RECORD

Forsberg Field Book
No 51

Collection and Field Note Book

No. 51

(March 22, 1958 - April 14, 1958)

(39317 ----- 39419)

Page

COLOMBIA

Forberg Field Book
No. 51
beginning
with #39317
and with # 39419

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B & W Photos for this book
58-1 to 58-6

Dont [illegible]
bracketed [illegible]

post Tampa on ( )
e.g. (7:15)

March 22 - Flight from Miami to Managua
Left Miami 7:25
Everglades are gray-brown plains with low vegetation (sawgrass?) and vivid green patches of woods (hammocks). Much of the area seen is wet & even submerged.
Near Miami the plain is cut by roads and several large industrial plants (marl pits? cement plants?) mar its surface. The roads and near around the plants are white. This area also has drainage ditches.
After this peripheral area roads and canals are scarce. The hammocks are mostly small and in places extremely numerous, in other places scarce.
7:35 Some patches of sparse pine forest under plane and close to course. Several miles out, beyond a curved road, is a curious parallel arrangement of elongate patches of vegetation in the direction of the course, looks

like drainage
7:52 This changes into spotty vegetation and a great series of lagoons and some flooded swamp-land, some of it mangrove, some a brownish-green lower vegetation. The lagoons are muddy to varying degrees.
7:56 Crossed coastline, a scalloped & cuspate peninsula with a very narrow sand beach just to right of course. The Keys visible in distance to right, course following rather parallel to their direction but gradually coming closer. The water is greenish-muddy color north of keys.
8:03 Some isolated small wooded keys north of main chain and highway have curious spits like tadpoles tails.
8:05 Large wooded keys with real estate projects. almost under plane.
8:06 Keys on both sides of course, mostly wooded, but many areas grassy &

sandy. Amount of street development seemingly out of proportion to number of houses.
8:09 Islands exceedingly irregular in outline, separated by shallow water, many small lagoons.
8:13 Key West

8:35 ~~Varadero~~ Havana
Land around city almost entirely under cultivation, soil a bright hematite red.
8:40 West along coast a rather wide coastal strip of savanna, some patches of woods ~~to~~ toward inland edge of it. Inland, in cultivated area some wooded patches, also.
8:43 Offshore several miles a curved strip of island or bar cut by transverse channels - perhaps a barrier reef exposed by fall of sea level.
Inside this some islands with dark purplish red soil, partly wooded, very flat.
The "barrier reef" may be the landward edge of a large atoll-like structure with most islet development

Cuba - Isle of Pines

on southeast side

8:48 West end of Cuba to south in distance

8:58 Isle of Pines - southeast side very irregular, broad mangrove belt with some higher ~~[illegible]~~ areas, apparently of raised reef limestone, judging by pits.
Inland is dry savanna-like area, very flat.
Westward entire south part of island is apparently a coral plain (possibly sandy but pits suggest rock) covered by dense low scrub or scrub-forest, very even drab green.
Along coast some small irregular lagoons. To westward a coastal area of sand that is either rather young or is unfavorable to scrub vegetation, as it is very thinly vegetated, appears sandy.
In the south part of the island are no roads, not even trails, apparently.

10:08 Swan Island - visibility poor - building on west or northwest end, east apparently wooded (or in coconut plantation). Has station for some sort of air navigation system.

continuous clouds

10:37 Breaks in clouds show continuous luxuriant forest on somewhat rough terrain
Dull green canopy with lighter green emergents, a very few bright yellow emergents in flower - looks like typical primary rain forest.

10:40 continuous clouds

10:46 small breaks in clouds, dense forest.

10:48 small breaks - dense forest
-:51 as described above. A small river crosses course, dark water, not muddy.
Light green emergent trees conspicuous, numerous.

10:52 clouds.

10:54 Breaks in clouds - dense forest
-:55 stream at acute angle to course, not muddy

:56 clouds

:57 breaks - dense forest

:58 clouds.

11:00 Breaks in clouds - densely forested
-11:06 low mountains. Dull green mottled with light green, occasional reddish flowering trees.
11:06 First clearing seen in forest. In this area pinkish flowering trees are common.
11:07 Large area visible - mostly in shifting agriculture and secondary forest, hilly, some hills covered with dense forest, mostly deciduous at this season. Large winding river crosses course - wide sandy bed dark water, low at this season. Some slopes burned off.
11:10 Cloudy with some breaks - country similar to last.
11:12 Proportion of clearing becomes
-:14 greater, much pasture with scrub, small patches of forest, mostly secondary. Many roads.
Some patches of sugar cane.
11:15 Country, still hilly, suddenly takes on a much drier aspect. Some sparse pine forest on higher hills, hills mostly in brown a drab savanna, patches of gray-brown scrub or scrub forest.
11:17 Scrub becomes quite extensive,

relief becomes less
Lago de Managua visible ahead. Land about 1/3 is 1/2 in scrub or scrub forest, the rest in cleared patches, dry grain fields and pastures, pen. gallery woodland very narrow along streams and ravines.
11:20 Cross railroad, pass small town Trinidad? Very few clouds.
11:22 Approaching Lake Managua the ground is almost completely covered by gray-brown scrub or scrub forest with conspicuous green gallery forest, scattered yellow clearings, cattle trails, abundant, relief lower. North of Tipitapa is a mosaic of scrub, wet and savanna, very dry looking.
Along lake some large cultivated fields, brown, some very dark burnt umber brown. Narrow strip of herbaceous vegetation along shore of lake. Volcano on peninsula in lake has two crater lakes, slopes are covered by deciduous forest with scattered green trees. Crater lakes blue, Lake Managua muddy khaki colr. Plain between volcano and Matagalpa mostly

cultivated, also strip bet. crater lake and lake in peninsula.

11:30 Small volcano south of Managua erupting lots of steam and some ash. Plain around Managua mostly cultivated, many fields plowed, some freshly burned. some in dry grass. Large cotton gin near airport. Trees partly deciduous at this season.

11:35 Landed at Managua airport. Plants observed at terminal:

Lawsonia inermis
Acalypha amentacea v. wilkesiana
Pseuderanthemum carruthersii
+ var atropurpureum
Citrus sp.
Araucaria excelsa
Melia azedarach
Nerium oleander
omit Cyrtodon dactylon
Ficus retusa
Bougainvillea nivea
Terminalia catappa
Hibiscus schizopetalus
Caesalpinia pulcherrima
Codiaeum variegatum
Jatropha tenuifolia
Bougainvillea spectabilis
Polyscias fruticosa
Mangifera indica
Cocos nucifera

This is obviously dry season on this slope. Some completely bare trees of Ceiba type, very large, thick conical trunks, other smaller bare species.

12:09 Took off for San Jose, C. Rica.

On low hills about 95% of trees are bare, 5% bright fresh green. Soil is a light sandy ~~tx~~ color.

12:14 One conspicuous area of contour farming. The country here looks generally rather depleted — erosion not of gully type, however.

Two crater lakes, caldera type (time) with scarcely elevated above surrounding hilly plain.

12:16 Several sink-holes & blow-out holes at base of volcano south of Granada. Slopes of this volcano wooded with mixed evergreen-deciduous forest, which becomes more deciduous as it runs out onto flatter low ground.

12:2 Isla Zapatera covered by deciduous, locally partly evergreen forest. Some evidence of recent fire.

Isthmus bet. Lake Nicaragua and Pacific a mosaic of savanna and forest

of deciduous woods. Lagoon along lake have areas of bright green mass always along shores.
Around Belen, etc. mostly cultivated some sugarcane, some may be pineapples - well its very pop. fields separated by hedges (?)
12:30 Ometepe Island - flat part near Moyogalpa mostly cultivated
Slopes of Ters volcanos wooded, Ometepe Volcano erupting some steam and ash. Forest here mostly evergreen.
South of this in the south west ~~the~~ side of lake the hills are wooded with mostly evergreen forest but large areas of savanna probably secondary, as soon burning actually going on now.
12:36 Mostly cloudy, some breaks show mosaic of savanna and semi-deciduous forest.
12:40 Break in clouds - solid evergreen forest.
Cloudiness complete.
12:38 Tempisque Valley in distance clear, mosaic of cultivation and wood. Mountain mass covered by clouds.

12:42 Clear. Hills partly grass and partly wooded, evergreen forest. Little cultivation mostly pasture. Southward mostly dry pasture, much burning, some patches of wood left.
12:44 Mountains again covered by clouds, valley in distance clear, rather dry aspect, especially around head of Gulf of Nicoya.
12:47 Mts. east of Gulf clear mostly cleared and in dry pasture but perhaps 10% in ravines and on steepest slope in secondary forest. South toward Gulf thinning out to low savanna-covered hills with gallery forest.
12:50 Considerable area probably sugar cane (?) near Gulf. Shore has a broad belt of mangrove.
12:52 Punta Arenas Punta Morales
Hills s.e. of here covered by savanna and open deciduous woodland.
12:54 Inland hills with palm savanna. Some thin wooded. Ravines wooded, semi-deciduous. Much burning going on. Pasture generally dry.
Mts. s. w. of San Jose brown with green wooded ravines almost to tops, ~~[illegible]~~

on upper slopes are semi-deciduous trees.

Plateau around San José greener, but still dry looking. Considerable bright green bananas, sugar, etc. Maize fields brown. Deciduous trees here partly leafed out. Cranthaceae conspicuous. From ground to sky looks rather, uncared, but only because of fence rows, treeground dwelling, shade trees, etc. Some coffee with shade trees.

1:40 Pt. off from San José for Panama.

Bananas planted under and between Inga in coffee plantations.

Stream ravines very steep and straight walled here in volcanic matrix. Just from San José the country appears dry except for trees, but south in wet a distance is considered wet, cane. Hills to east are dry with green ravines. Hills to south slopes of Volcan Turrialba are green, but largely cleared. Hills are heavily grazed.

grazing pattern visible even from air.

1:50 Turned back since to gain altitude, as clouds are thick around mountains.

1:55 Country very rough, almost completely cleared except for cane.

1:57 Country becomes somewhat greener, generally more woods left, sugar cane in flat valleys.

2:00 Large city surrounded by coffee plantations and woods. Probably Cartago (Turrialba?) Then clouds over everything.

2:23 Clouds thinned and we seemed to be over the ocean. Then closed in again. Distinct layers of cloud. Then a long period of dense cloud and rough weather.

3:07 Large opening in cloud, dense forest with some clearings. Visibility poor. Rare.

Clouds thin out. Continuous for with evidence of shifting cultivation.

3:10 Large & low cloud.

3:11 No clouds. But a thin haze appears to be over ocean.

3:12 Approx. a small steep dry island.

3:14 a rolling version, wooded
a little same no. perhaps in
wet no cities. N area,
grassy, zones are on
guano-stained & flyff-
overseo.

3:16 Two larger islands
steep, rocky, partly
wooded; partly grass.
a landing and roads on
larger one, sol light rang. w

3:18 Then still another a little
larger and thickly wooded.
These must be Taboga Isl.

3:20 approaching Panama coast
at an angle. Sea like
very dull. Passing activity
for landing at Torrumos.
Bay with muddy sea, very
shallow here. Band of bleaches
well developed strip of mangrove
along shore then a few cocoanut
sand ridges with bananas, next
largely occupied by a
scrubby bright green forest
with patches of a low
even & very scrub. Then
cultivation and pasture,
much burned grass.

3:25 Landed. Grass hay.

Relief map of Darien & Choco in
airport shows inundated
land along lower Rio Sinu, entire
lower strata, and narrow strip on

Rio Sanjuan to opposite Pacific
Lower Rio Baudo and coastal
strip from Cabo Corrientes south.

Cult. at airport.
Ruellia longifolia!
Lonchocarpus
Codiaeum variegatum
Calliandra roseus
Alpinia purpurata
Hibiscus hybrid

4:15 Took off from Torrumos for
Penonquilla.
Low hills covered with
savanna at end of airport
and for some distance,
ravines with scattered
trees. and
Then flat grassland
cut with wooded ravines
and then the coastal wooded
belt with meandering
tidal channels, then
a large area of marsh
before coming to a large
drowned river, probably
Rio Mamoni.
Following up this, there
is wooded land with some
clearings & patches of grass.

4:30 Visibility gradually obscured
by haze. When there are lots
much clearing is seen near river.

1:24 Solid forest through plains in clouds.

4:27 Reached pass of Farallon - shows wooded - marvelous visibility pan.

5:30 Hole in clouds - rather dry country mostly geometric by cut up.

March 28 - Air trip, Barranquilla to Medellin via Cartagena

Town Barranquilla

2:pm 1:50 is a sparse deciduous Urban woodland most of which in the vicinity of the city has been cleared at one time or another, ~~and~~ the fields being separated by thin hedge-rows. Mostly in pasture rather than cultivation. The general pattern west toward Cartagena is a patchwork of fields in various stages of succession mostly rather bare, but some presenting a savanna appearance, others a scrub woodland. Along ravines it tends to be green. Many fields has been burned very very recently. Most fields are brown but

occasional ones are green.

7:05 Some patches of well-developed thorn woodland, also a lacerated pond the central part very gray. Then some rough hilly land, cut by ravines, ~~then~~ half surrounding a small lake with no outlet. Then an area of green cultivated fields. This is only a mile or two back from the coast. Then more pastures, not quite so dry looking and with tiny ponds or water-holes, very frequent constructed by damming small dry watercourses. Then an area of very low hills, ~~a~~ heavily grazed, with gallery forests that are green along ravines and dry watercourses, many of these dammed to form small reservoirs. Some cultivation, mostly pasture. Then some savanna-like pasture with large flat-topped trees. Then much sparse deciduous woodland, especially close to coastal lagoons. Just east of Cartagena around lagoons

is some slight development of mangrove. Some small mangrove patches in harbor and around airfield.

7:15 Landed at Cartagena

8:53 Took off for Medellin. Small hills near airport covered by dry scrub. Considerable mangrove swamps around lagoon west of Cartagena. Urban fringe with patches of taller deciduous forest back of mangrove. South along coast a mosaic of patches of cleared bush, recent and burnbush in various stages of ~~sq~~ development. Some patches of taller deciduous forest. A large canal forwarz course crossing it to eastward.

8:03 ~~at~~ intersected by smaller curving channels, these possibly natural. Large ponds of black water with light green floating vegetation, perhaps Nymphaeaceae along margins. Some taller forest.

8:05 Landscape obscured by haze.

8:17 Large savannas, obviously cleared because of some angular patches of vegetation. Visibility very poor. Country looks wooded.

8:19 Crossed a ~~to~~ conspicuous road. (San Marcos ?) (a pipe in it?) Somewhat denser vegetation south of it. No visibility.

8:41 Green forest but with many dry looking clearings, locally over 50% of area, but seems to be a typical shifting cultivation pattern, with various stages of secondary forest. Much recent burning.

8:45 Crossed a large very muddy river, probably the Cauca. Savanna. Forest here probably 75% cleared, much recent burning.

8:57 Course paralleled meandering river.

8:58 Forest at now forest. Clearing green except where recently burned. Forest green but with many bare emergents.

8:50 Preponderantly forest, but some clearing, especially along meandering ~~ra~~ stream channels. Country flat.

8:51 Country begins to be dissected and is now entirely forested, no clearings at all.

8:7 A few tiny clearings, one small stream, otherwise forest — no obvious trans. roads to this forest here has rather rough canopy, few big trees, few obvious emergent above general canopy though with such irregular canopy this is hard to ~~[illegible]~~

8:54 Small fairly wide stream with local rather large clearings near a main intersection of streams. In distance to west the escarpment down to the Cauca is visible. This forest is montane and the land has reached a rather considerable altitude

8:58 Relief very strong, with large ridges and deep canyons, all entirely forested. The forest on the ridges — esp. of a much finer texture than on slopes.

9:00 Much cleared land in middle distance, on steep slopes, mostly pasture, perhaps 40-50% of area. Some roads there. Very little clearing along course. Landslide frequent.

9:02 Suddenly almost all is cleared perhaps 80%. Roads and

dwellings rather common in this large river valley leading west down to the Cauca

9:04 Much relief, perhaps half cleared. Much recent burning. Trail along ridge tops. Large ridges

9:06 leading up, parallel to course now mostly cleared and in pasture.

9:07 Almost entirely cleared, in pasture, many bright orange-pink erosion scars. Grass very thin, soil showing through.

9:09 Villages in road, now perhaps 25% forest but rather poor, mostly

9:09 pasture looks somewhat better, but erosion scars conspicuous. Soil dark, pinkish orange.

9:10 Small city on small river. Perhaps Jamundí river

9:11 About 70% cleared — patches of forest on some hill-tops and on some ravine heads.

Grass in better condition.

9:12 Large valley of Río Jorge

9:17 Mts. perhaps 85% cleared, ravines generally wooded here slopes ~~[illegible]~~ and ridges with exposed rocks. Some cultivated land

9:15 Very little forest left, some logged wood with scattered trees. Gentler slopes a patchwork of cultivated patches especially bananas and pasture.

9:20 Steep slope, mostly in pasture much of it very thin, some wood in ravines, much rock.

9:27 Mostly pasture with abundant scattered bushy in valley, some patches of thin bushy woods. Pass town, pob. Medellin.

9:29 Much conspicuous erosion, high range red soil approaching Medellin.
Hills around city almost all cleared and recently burned. Some poor scrub.

Mar 22 - Medellin - Guibdo

10:17 Left Medellin in fog.
Grazing pattern very noticeable on some of foothills west of Medellin. Some hills rather bushy. Ravines generally with trees, these mostly shade for coffee. Perhaps 10-15% of land in coffee, rest in pasture, some bananas. Many

houses. Some small citrus groves, generally mango. Many roads and houses on tops of ridges.
Percentage of pasture less as we descend hill to west. Some woods mostly tangled secondary. More coffee. Hard to tell shaded coffee from secondary forest. Gullying noticeable on some slopes and ridge.

10:25 General landscape grassy with wooded patches covering perhaps 20% or 25%.

10:28 More and more c[illegible] woods

10:32 higher up.

10:29 Perhaps 50% wooded locally more less, especially low in larger valleys which are mostly deforested. Higher peaks are forest or scrub.

10:30 Lower valley almost completely cleared broad ~~muddy~~ gravelly river entering Rio Cauca which

10:37 here is very muddy.
Cauca Valley 90-95% cleared and in thin grass, some added, a [illegible]
Some small [illegible] still wooded, only steepest ones.

10:35 Proportion of wooded patches increases on higher steep

upper. Relief here is very great. Good roads. Trails on top of most ridges. Much coffee here.

10:37 Patches of woods with cornfields white crops. Perhaps 75% of estate, of wooded part left, no to coffee. Good forest remains. Some good pastures forest. Some ~~[illegible]~~ plants without shade. Pastures

1:20 here greener - rain ~~[illegible]~~ in [illegible] a year.

1:42 More patches of good forest, much less coffee at higher altitudes. Greater part still cleared.

10:43 Some large peaks entirely wooded except lower slopes. Clearing now mainly in valleys. Perhaps only about 70% cleared, becoming rapidly less westward. Mountains very rugged, much good montane forest. Valleys cleared, bright green, especially along road.

10:46 Very little clearing - elev much lower now. Forest mostly undisturbed canopy rather uneven. Rather little clearing here even along road.

10:50 Many clouds, visibility better,

- on good. Relief lower. Rivers here with low water, right now low.

10:52 Some scattered clearing, in various stages of regrowth.

10:53 Village in large clearing, river running westward, some clearing around village. Road goes through village and - west.

10:55 Another village on road at smaller less clear stream.

10:56 Vis visibility.

10:58 Rio Atrato - enormous meandering muddy river. Gualdo. Dense forest on flood plain, some clearing, along road running north from city, now along river and bayou. Many palms in this forest. Forest very mixed in composition with a low canopy, a few bare trees, but very few.

11:20 Landed at Quibdo in city - a - at dirt strip.

Cultivated plants seen at Quibdo:
Alocasia macrorrhiza "ñacharu"
Dieffenbachia maculata
Carludovica palmata
Colocasia esculenta "Tachin" "Tarro"
Axonopus compressus
Begonia [illegible]
Artocarpus altilis

1917 Colombia

Stapelia sp.
Malvaceae
Clerodendrum thomsonae
Coleus scutellarioides
Borojoa patinoi
Passiflora quadrangularis
with narrow fruit, light
yellowish green skin white
within
Persea americana
Mangifera indica
Ananas comosus
Euphorbia cotinifolia
Cassia alata
Saccharum officinarum
Guilielma
Hibiscus (hybrid)
Allamanda cathartica
v. hendersonii
Musa paradisiaca
Canna sp.
Lagerstroemia indica
Eugenia jambos
Amaranthus roseus
Antigonon leptopus
Caladium bicolor
Euphorbia antiquorum
Rosa sp.
Asparagus plumosus
Polyscias fruticosus
Hippeastrum longiflorum
Tabernaemontana coronaria
Inga sp.

1958 Colombia

Mar. 23 Río ~~[illegible]~~ strato above Quibdo.

Much erosion along banks. River evidently falling large sand bars exposed, slumping in steep banks, present level 2-3 m. below level of flood plain.

On flood plain along river are many dwellings and clearings. Artocarpus altilis very common. Gustavia Castilla, Guilielma, Musa, and other ~~[illegible]~~ planted ~~[illegible]~~ pengra. Soil is sandy and ~~[illegible]~~ brownish gray. Along the banks Gynerium is common. On older sand bars a large cow grass forms tangled masses. Musa planted back of this. Scattered large trees left from forest on flood plain. Flood plain on east bank extends several miles, then narrows out and the bank is cut into a higher terrace about 10-15 m. On west side is a broad flood plain. The higher terrace is

of red soil. Bluffs covered by a luxuriant macrophyllous forest of several species of Cecropia, Ochroma, several palms, Heliconia, Carludovica and a number of small leafed trees. Bare slump faces with talus at base covered by grasses. Often river swings west and again there is a large flood plain with small farms. ~~[illegible]~~ Musa seems by far the most important food plant. Musa sapientum, M. paradisiaca and M. nana all present.

The river is more closer to the east side of the flood plain than the west, and much of the east bank is of cliffs. Lower part of cliffs is ~~[illegible]~~ gray gravel, upper part a deep red or flesh colored clay. The surface of this upper terrace is locally much dissected.

A bare Ficus and Ceiba very common on flood plain.

1950 Colombia (Choco)

Mar. 29, Boca Tanando, Rio Atrato, above Quibdo
Top of bank in flood plain near dwelling.

39377 (grass)
" first pioneer on beaches and sand bars.
" 19 Solanum
edges of thicket.

From here, (Notes Tanando expedition) there is flood plain on both sides, no bluffs.
Guadua is very scarce here. A large Heliconia is common along the shores at top of beaches and low edges of flood plain.
Gravel bars are much more common than sand bars.

At a fork in the river is village ~~Las Mirinas~~ in the middle of the fork on a remnant of high ground.

Above here the flood plain is composed of a layer of gray-brown sand about 2 m. thick, underlain by gray gravel.
In places the sand layer is much thinner.

forming tangles

shrub 2.5 m. tall, fruits white, immature "cauco mango".

Guilielma very common on flood plain. Some Mauritia and a slender caespitose arecoid palm.

Above the flood plain becomes somewhat higher, 3 m. or more, the gravel beds much thicker, the color of the sand red-brown. This is said to be typical of the areas where gold and platinum are mined and some small holes were seen where gravel had been dug for washing.

(35 km. above Quibdo but 20 km in straight line)

~~Below~~ ~~At~~ Taputo Yuto (A) on the east bank is higher ground, but perhaps 5 m. of gravel and yellowish sand or clay. Gradually becomes higher and redder. Above town are bluffs 10 m. high. At town an exposure just above

water level of a yellowish gray fine bedded sandstone.

Above here for the first two the bluffs appear on the west bank, broad flood plain on east. Then the river swings across, and they are on the east. Between here and Tocollero - there is high ground at frequent intervals on either side. ~~These~~ The cliffs are covered by a machophyllous vegetation of aroids, jungleboard, and a large gleichenia.
The bedded sandstone or shale shows up frequently at bases of the cliffs. In the irregularities of its surface lies a gravel.

(Basis of agriculture is plantain, maize and rice.)
Above Tocollero the bluffs become higher, the vegetation more luxuriant.

Below Sloró on west side of Rio Atrato, above Quibdo
West cliffs, immediately in high water (sedge)
59319 (scrub)
1 20

40 m.
↓

These bluffs and ravines cut in them are covered by luxuriant tall forest, with abundant lianas and large-leaved aroids. Palms scarce or almost lacking.

Boranda - a high bluff on the east bank, largely cleared, with several species of palms left. These may be generally present but concealed by trees.

Quadua is more common in the flood plains above Yuto than below, but only very locally.

Just below Sloró is a large farm. Some sugarcane. Here the flood plain is about 2½ m above the level of the river. about 1-1.5 m of brown sand lying directly on the black bedded shale or sandstone, locally on gravel.

flowers pale lavender.

Mar. 23 Lloro, east bank of Rio Atrato, above Quibdo
on flood plain 55 m.

3 301 Gustavia superba
1 common understory tree
in abandoned clearings and
around dwellings. planted.

1 21a Theobroma cacao
planted. small tree, cauliflorous.

same - on dissected terrace of gravelly clay 65 m.

3 22 Zamia
rare in secondary forest

3 23 (sub)
rare in secondary forest

3 24 Trichomanes?
occasional locally in deep
shade at base of tree in secondary forest

4 25 Cephaelis tomentosa
common in undergrowth,
in secondary forest

3 26 (sub)
occasional in undergrowth
in secondary forest

1 27 Schefflera
in undergrowth in secondary forest

3 28 Trichomanes
occasional, terrestrial in
secondary forest

tree 6 m. tall, flowers
in axillary corymbs,
petals rose-purple dotted
with white, staminal
mass yellow individual
filaments yellow at base,
purplish maroon distally
anthers yellow. side of (photos)

leaves 4, erect, reclining
in age, from a rhizome
2 cm. thick 30 cm. long,
curved upward, sterile.

slender understory tree
4 m. tall; fruit immature
dark green, fertile
fronds erect, sterile
fronds rooting at tips.

shrub 1-2 m. tall; bracts
scarlet, corollas pale yellow,
fruit bright blue, fleshy.

weak shrub stems green,
leaves with silky sheen,
juvenile leaves with purple
under surface, upper
surface dark green with light
pink raised veins. fruit
immature

weak shrub 1 m. tall.

rhizome erect; fronds
somewhat iridescent,
ascending.

Mar 23 'Hacienda Las'
Small very new experiment station occupying the site of an old farm, in the floodplain. The soil is brownish gray silt. The plain about 2.5 m. wide. Of the [illegible] all close to the river is a big [illegible] bank, forming a natural levee. Back of this is marsh to the foot of the slope up to the [illegible] terrace. All of this is [illegible] as is the slope, but mostly recently cleared. Some trunks are still lying on the ground, covered by creepers and weeds.
On the dissected surface of the terrace is thick secondary forest with scattered old trees, many young ones, perhaps 2-3 m. apart, with thick undergrowth of shrubs ~~and~~ small palms and vines.

The soil is a ~~red~~ yellow to reddish gravelly clay with up to several inches of decomposing ~~[illegible]~~ organic matter filled with live roots.

The vegetation is covered by epiphytes - ferns, cyclanthus, araceae, bromeliads, etc. One species of Iriartea has conspicuous arched prop roots. A fair sized palm has stilt roots.
Several specie of Tachigali, Aspleniums, Costus, Iyclanthus, Cephaelis, Apocynaceae, Lecythidaceae.

Guibodo - called the tree of Brosimum utile with immature fruit.
Pseudocarp or pseudomorph fruit subtended by a thin disk like involucre, this by a pair of stipular bracts.
The endocarp is completely fleshy.
Stipules ovate - lanceolate, caducous.

Birds were scarcely seen along the river. One white heron, one that may have been an anhinga, one large sandpiper and three unidentified medium small birds were seen in a whole day on the river.

Mar. 28 - rulsh - 2 j. Quibdo 40 m.
cut-over land, undoubtedly burned over, also, has scattered large trees probably persisting from original cover. Many small trees and shrubs distributed with spacing of 1-5 m. in a tangled mass of Gleichenia sp. Scleria sp. etc.

Among the trees & shrubs are Casearia sp.
Cecropia sp. Cespedesia sp.
Vismia sp.
Lipanna sp.
Vernonia sp.
Banisteria sp. (vine)
~~Paliccia~~ ~~Psychotria~~ sp.? (vine)
Psychotria sp.
many Melastomaceae
Isertia
Annona ?
Borreria sp. (shrub)
small palm

3 39329 [illegible]
abundant between scattered trees
2 30 (Gleicheniaceae)
common
3 31 Borreria
common in open areas
1 32 Cespedesia
common

The thickets vary in height up to 4-5 m. The Gleichenia from 1-3 m. Small open spaces have a small species of Dichromena, ferns of several sorts, etc.

forming dense tangles; pinnules glaucous beneath.

weakly ascending

stump sprouts only, stems

1958 Colombia

Mar. 28 - Quebrada Platina
3 km. s. of Quibdo
in second growth scrubby
forest along small stream

50 m.

3+333 Cephaelis
3 very common — shrub 2 m. tall (others can up to 8 m.) flowers white, fruit immature, green with white longitudinal lines. Bracts white caducous.

5 34 Sabicea
very common — twiner, flowers white, fruit purplish red, fleshy.

3 35 Faramea
rare — slender understory tree 5 m. tall, buds with lime greenish tube blue, open corollas sky-blue, fruit immature.

3 36 Tetragastris [illegible]
occasional in undergrowth in dense shade — erect, unbranched, ~~base~~ dark green, bracts dark green, leaves little, fleshy, fruit white, crisply fleshy.

Cut-over land, with many scattered tall trees remaining from original forest, the quebradas filled with thickets, the ridges and elevated lands more frequently with Gleichenia tangles with scattered bushes and small trees, especially Cespedesia.

Mar. 29 - Flight from Quibdo to Condoto, to the S.E. of Bagui, north to Andita, east to Rio Iro, south to Quibdo.

Rio Iro

Rather complete deforestation immediately along rivers, scattered clearings for 1-2 km. from rivers.

The primary forest is dull green mottled with light green and reddish brownish green.

Occasional small streams with clear water, sedged, grave, occasional small primitive mine workings.

Palms common in forest, left when clearings are made, at least some. Also with planted, including five to clearer near - the appearance of palm savannas.

Well south of Yuto ~~the~~ near Istegui there is considerable insection with entrenched meandering of small clear stream.

South of Istegui are occasional clearings in the forest; some new, some with secondary scrub.

North of Isthmian west of

Rio Iro Juan. The country is almost entirely in secondary forest and shifting agriculture. The range of mountains called Cerro la Mojarra is very steep and of gray bedded sedimentary formation.

At Condoto is a large area of dredge tailings not or partially vegetated (Photos).

There is no. no. of Isthmian is almost entirely in shifting cultivation and small mines.

Northwest of this a small very much meandering river with vast white sand bars. Scattered shifting cultivation in large areas of good forest.

Another meandering river with some ox-bows, much secondary forest in vicinity. and some up to west.

Country becomes more dissected and heavily forested, except for clearings along small streams.

Some palms here but less than near Rio Atrato.

Becomes quite rough to the west. Still varying amount of shifting agriculture and secondary forest. Palms locally abundant in north-south valleys. No clearing after first sharp ridge ~~for a mile~~ until after third. Then numerous but clearing then high ridges bordering de Bando - with tall forest.
Rio Bando very strong meandering, red at, yellow with mud. Flood plain definitely not swampy but perhaps flooded at high water. Some cultivation but not much. More rather high mountains west of river. Cultivation only along rivers.
Here most emergent trees are bare. Some bright yellow
These mountains are much higher than the map suggests.
Densely forested, palms common, no cultivation.
Approaching coast north of Nuqui. Much cultivation.

then mangrove swamp around a large branching estuary.
Small wooded island in bay. Is beach only to every peculiar forest appearing from air like the Sahonia forests of Marshall.
North of this the coast is very abrupt and mountainous with gray crescent-shaped beaches. Mountains wooded down to high tide mark. Deep water up to rocky shores. Deep gorges, a few small ones.
Puerto Utria - deep inlet, rocky islets, very steep shores on ~~north~~ west side. 1 miles narrow coastal shelf on south side.
Then the coast continues steep and very crooked, densely wooded.
Ridges roughly paralleling coast. Then long straight dark gray beach with little land beat area behind it then steep slopes.
Back of coast in valleys parallel to it is much cultivation.
Then El Valle with a

El Valle

conspicuous strung on cultivated valleys as running north, they are inland.
North of this a very rocky shore wooded from top of beach up the steep slope.
Landslides show bright red soil.
Counting back of coast on peninsula west of Mutis very mountainous and densely wooded with somewhat open canopy.
Flat valley cultivated
Beaches of red-brown sand at base of bluffs.
Wet cleared land with 9 ans east of Mutis in valley.
Back of this untouched forest. Valleys running down to coast cleared.
Most of coast to north steep and wooded. A few gently sloping areas are cultivated.
Where there are are long beaches along shore or gulf of Cupica. The beaches alternate with steep bluffs.

Inland from north part of gulf is dense forest with no cleared land.
Mountains to north of gulf mostly obscured by clouds.
Island from Naborgá is a rather dissected upland with rivers meandering but deeply entrenched. Densely forested.
Below Tagachi and Naborgá are several large lakes, surrounded by swamp forest.
Flood-plain of Atrato largely forested with palms - Euterpe, Manicaria, Manicillo, Moriche, etc in swamp forest.
In places almost pure stands of Manicillo.
In places much open water, numerous lagoons.
Atrato is very muddy, the lagoons without openings have inky black water.
Some are somewhat muddy.
Manicillo has leaves white beneath some show conspicuously.
Some clearing on natural levees. Back of this - swamp.

1915 Colombia

Cute pe very abundant in swamps up river, reaching almost to Quibdo. More clearing & natural levees in Quibdo is approached.

The swamp forests have an understory principally of Virgiola cuatrecasana with very large leaves scarcely divided, ~~that~~ acuminated.

Ac. cuatrecasas ~~Jamaica~~ Jamaica chiqua grows on slightly wet situations. Lands about 100.

Cuatrecasas says the Mauritia's have pneumatophores.

Mar. 30 – Quibdo
cultivated
39337 Borojoa patinoi

30 m.

small tree; fruit immature, eaten mixed with milk and sugar when ripe. odor unpleasant.

with Fernando Mar. 30 Turbaneado, on road above Quibdo toward Medellin
cut-over land
39338 (Howel)
terrestrial in river ravine
39 (Gentry)
shade scale needs.

~~Mar. El Pino de Atrato~~

Mar. 30 Bolivar, Antioquia
The mountains here are completely denuded except in ravines where trees remain to shade the coffee. Bananas are planted on steep slopes, but most slopes are covered by a thin growth of Melinis, with abundant erosion scars. The soil is a pale to orange latosol.
In the valley above this several miles are plantations of Tonchera on steep slopes.

In the valley below Bolivar a few miles above its junction with the Cauca is a rather dry forest along the river with Bursera, etc. The slopes above are

extremely eroded. The same is true of the gorge of the Cauca but with less forest. The rivers are very muddy.

(rust scales covers parts, leaflets in bud.)

Between Bolombolo and Medellin are coffee plantations alternating with bare slopes. The plantations are shaded by Inga trees from 2-5 or more m. apart, varying in height from 3 to 12 m., flat topped giving a medium shade. The coffee is in flower at present and is all trimmed down to bushes 1-2 m. high, mostly about 1 m., spaced variously from 1 m to 2 m. or more.

2700' (photo)
(photos shaded and wooded hills)
4100'

Large areas are completely cleared, one side with perhaps a few patches of tangled secondary vegetation on the steepest slopes and in headed ravines. Very little second growth, each, mostly pasture, this of Melinis varying, badly eroded varying at this time from plantations of figure figure and bananas that look rather poor.

1957 Colombia

Mar. 31 "Carmen de Atrato

Mar. 31 – Santa Helena, near summit of highway bet. Medellin and Rio Negro
Brushy over-grazed slopes and low thickets

3, 9340 Epidendrum terrestrial

2 41 Nertera granadensis on moist banks at foot of cliffs, shaded

2 42 on moist banks in sun

2 43 Borreria common ~~so~~ in low brush

2 44 Coccocypselum occasional in low cliff

3 45 Vaccinium occasional

1 46 (melastom) occasional

1 47 Viola occasional

1 48 Epidendrum occasional

1 49 Viola rare

(Bot.)

2650m. (8600') in a small ravine in exposure of what appears to be a lateritic crust. The g. and soil appear to be a lithosol or alluvial soil, much eroded. Dr. Wagenknecht found a paucity of insects and n

– leaves fleshy distichous, flowers flesh-pink.
prostrate, leaves somewhat crispate, flowers yellow-green,
– fruit vermillion, fleshy.
witches broom on Nertera granadensis (3934)
– flowers white

prostrate, fruit bright blue, fleshy
– ~~slender~~ sparsely branched erect shrub 3.5m tall bracts pinkish red corollas pale shell pink,
– fruits reddish immature)
shrub, petals rose purple.

flowers ~~rose~~ pale lavender with dark purple lines on lower petals
– flower pinks to purplish.

flowers pale lavender with dark lines on lower petals.

1958 Colombia

3,9850 Borreria
occasional

2 51 Bejaria
occasional

2 52 Galium hypocarpium
occasional

3 53 Vaccinium
occasional

1 54 Epidendrum
occasional terrestrial

March 30 – El Piñon de Citrato, upper Rio Citrato Choco.
on steep brushy cut banks above road

55 Lil)
occasional

2 56 Rondeletia
abundant

March 31 – El Poblado, suburb of Medellin

1 57 Jatropha
cultivated as ornamental

flowers white leaves
– plicate.
Shrub 2 m. tall, leaves
~~flo~~ glaucous beneath,
– flowers rose pink.
climbing in bushes,
– fruit orange, fleshy.
diffuse shrub 2 m. tall,
bracts rose red, corollas
red with white tips.
– flowers orange.

800 m.

stem unbranched, 1.3 m.
– long. flower white.
shrub 1–2 m. tall.
flowers white.

(5000') 1540 m.

rounded shrub 1.5 m.
tall, flowers crimson,
lobes somewhat wavy.

April 1 - flight from Medellin to Bogota -
Tops of hills around Medellin still have occasional patches of forest, but very little. That some are undisturbed is suggested by presence of white Cecropia. Mostly the summits and higher slopes have a thin brush, or locally thickets. The slopes are in general least the uppermost ones and where there are coffee plantations. East of the city are extensive brushy slopes, the ridges badly eroded. Some ravines wooded. In lower valleys patches of sugar cane.
Mountains east of Medellin first very then mostly wooded.

April 3 - Bogotá - Zipaquira by road.
The sabana is mostly in grass, small plots, with cows. The hills around it are largely covered by a scrub vegetation, with occasional slopes cleared and grassy. The hills are

all of mostly of a light yellowish bedded sandstone. At Zipaquira is a large salt dome, with pure salt in great masses and layers in a black shaly material.

1958 Colombia (Cundinamarca)

(88)
2700 m.

Apil 4. Hills s.e. of Tenjo
Scrub about 2-4 m. tall, dense, tangled except where penetrated by cattle.
The ground very mossy, the moss forming loose cushions and hummocky around bases of shrubs.
Low Pteridium, a great mixture of shrubs and small trees, trunks seldom more than 3-4 cm. thick, usually less, rather ridged branches or many.
Cucaceae, Melastomaceae (Miconia), Myrsine, Xylosma, Valea, Piper, Cordia

3	9358	Piper occasional in secondary scrub
3	59	Smilax occasional in secondary scrub
1	60	Bidens common in secondary scrub
3	61	Miconia very common in secondary scrub
4	62	Myrsine ferruginea ♀ very common in secondary scrub
4	63	Myrsine ferruginea ♂ same
5	64	Palicourea common in secondary scrub
5	65	Cavendishia occasional in secondary scrub

On the middle slope Chusquea is very abundant.
The soil is a fine black layer up to 1 m. thick, but mostly eroded much thinner, lying on a pale sandstone.
At the top, on the main ridge leading down to the pass, the vegetation is a sparse scrub, the bushes mostly 1 m. or less tall. Low Ericetia cymbosa, Hud. Hedyotis nitida and Hypericum funifolium. Badly overgrazed by donkeys, eroded clay. (photos of valleys and of muddy slope)

tree-like shrub 3 m. tall, aromatic.
— extensive twiner

climbing in shrubs and small trees, ray bright yellow, disk yellow.
— shrub 2 m. tall, fruit immature
— small tree, 3 m. tall.

semi scandent
shrub 3 m. tall, flowers bright purple.
— shrub 2 m. tall, bracts & flowers reddish greenish

3	346	(echio)	sepals dull greenish, slightly gibbous, petals bronze yellow with maroon lines, column dark maroon
3		road cut at edge of scrub	leaves sub-fleshy, held up on stilt roots above ground
3	67	Rubus	arching shrub, extensive, flowers white flushed with pinkish
		roadside in secondary scrub, very abundant	
4	68	Cordia lanata H.B.K	bushy shrub 2.5 m. tall flowers white.
		occasional in secondary scrub along road	
4	69	Lepechinia salviifolia (HB.K.) Epling	aromatic shrub 3 m. tall rather weak, calyx dark blue corolla light blue
		common in roadside scrub	
4	70	Cestrum	shrub 1-1.5 m tall, flowers pale green with black tips.
		common in roadside scrub	
4	71	Muhlenbeckia	climbing, flowers white, fruit turning reddish, immature.
		roadside	
		April 4 - top of pass between Tenjo and Chia	soil black, badly eroded
		in thin overgrazed subparamo scrub on steep rocky slopes	
4	72	Palicourea	compact shrub 1 m. tall, tops green, flowers white, ripe fruit range.
		very common	
4	73	Miconia	shrub 1 m. tall, flowers white.
		occasional	
3	74	umbel)	woody at base
		common	
2	75	Mutisia coccinea L.f. det Wiedeck, 1970	flowers indigo
		rare	

3137 Hedyotis nitida
very common
1 77 Hedyotis nitida
very common

April 4 – mts. above Zipaquira toward Pacho Paiso
Partly cleared partly brushy, some area planted to eucalyptus. Chusquea abundant locally, one colony at 10000' flowering.
Summit of pass at 10750' has an area of degraded montane rain forest on the steep, northwest slope, with much scrub and grass, with some Espeletia on flattish summit.
The forest is a mixture, with Diangi most abundant, at many other small trees, maximum height about 9 m. diam 2.5 m. trunks lichen-covered, much moss on ground. Some epiphytic orchids, many ferns.
This forest, though isolated by paths and badly invaded by Chusquea, fairly well represents fairly well the

erect shrub, flowers white
depressed shrub, flowers violet
uppermost forested zone in this region. The trees are crooked, close together, have rounded crowns

Apr. 4 – northern extension of Sabana de Bogota –
Land very flat, mostly in pasture, some cultivation, small parcels. Salix very common along streams, and ditches and fence-rows. Eucalyptus also very common around dwellings and in fence-rows. Ficus candida (?) 'bonacheso' is common. One of the most abundant grasses seems to be Pennisetum clandestinum. Marshy areas and hummocky areas that must be marshy in wetter seasons are fairly frequent.
Just now there is an unusually long and severe dry season. There has been little rain in 6 months

Apr. 5 – Bright bom Bogota, warm. Savana [illegible] of Tesia has dark brown soil, some of it plowed other parts green, some marshy spots some rows of Eucalyptus. South of here the savana is covered by clouds. The mountains south and somewhat west are largely cleared but with rocky and steep slopes wooded the woods with some white Cecropia. Lower slopes green and with scattered trees, some rather poorly wooded. Toward Fusagasugá the dissected land about ½ to ⅔ cleared and green.

Below Fusagasugá broad alluvial fan, truncated below, grassy but scarcely green, partly dissected, lower part badly eroded, flat areas covered by savana. Steeper slope here cleared and bright green some brushy some patches of wood. Area east of course largely cleared but in distance higher mountain slopes largely wooded.

Area around first village mostly denuded, around second less.

good forest on slopes of sharp ridge paralleling course. Lower slope perhaps ½ cleared, lower parts mostly cleared except ravines. Southward mostly pasture and varied secondary brush and woods, cypress shifting agriculture pattern. Some slopes bright yellow green, others dull some reddish from soil showing through. Streams muddy and patches of erosion very evident, especially on ridges. Steeper slopes and higher ridges in distance to east wooded. Some higher peaks below course of tilted bedded pinkish rock bare on north slope, presenting an steep largely bare scarp along strike parallel with course, to the southward splitting into a number of scarps, very rough country but mostly clear. Valleys east of it largely cleared.

Now over a very muddy river which cuts through the bedded ridges running southwestward. River margins and ravines wooded. Otherwise country is mostly

cleared and with a rather
dry aspect, fairly grassy.
Very little woods left
even on ridges to east.
Some patches in various
stages of regrowth along
coast. Land along coast
mostly very dissected.
Then higher mountains,
cleared grassy, eroded,
woods in some ravines but
becoming scarce southward.
Dissection more extreme
southward. Slopes mostly
yellow-green, bottoms of
canyons mostly wooded.
Country extremely rough.
Ridges tending to be eroded on tops.
Southward brushy regrowth
on ridges more abundant,
also erosion much more
apparent. Aspect then becomes
somewhat ~~[illegible]~~ drier, less
and less green. Stream beds
here very rocky, water not
muddy. Little water.
Quite dry aspect except
for green patches of shrub
wood which more and more
cover slopes and valley and
ravine bottoms.
Then complicated dissection
in low relief very dry area
with wood in ravines. Higher

Rio Cabrera

mountains to east largely
bare and rather dry. Crossed
a westward flowing river
coming out of mts in broad
valley into ~~[illegible]~~ the flat
but terrifically eroded
Magdalena plain -
intricately gullied and
with almost no vegetation
except scattered gray
bushes and patches of
thin semi-deciduous wood
in low spots. Painted desert
landscape. Then ~~[illegible]~~
~~[illegible]~~ savanna with green
trees and very little grass
between them, density quite
variable. Then some
rough land with bare
ridges, patches of good
wood. Cacao and banana
plantations along a rather
large river flowing s. w.
Then more badlands, gray
and grotesquely dissected
relief not high.
Then Rio Magdalena with
flat bottom lands culti-
vated, some terraces
cultivated also. Some
thorn forest, especially
in ravines, some bamboo.
Deciduous savanna
on low relief dissected land.

1 flat terraces partly pastures, partly cultivated partly or scrub, scrubby savanna.
Fallow fields grown up, some in rotten land, some not.

April 5 - by car Neiva - Palermo & return.
Valley floor - deep gray-brown alluvial soil pasture and cultivation
Magdalena - muddy, lined with trees - leguminous mostly.
Terraces - savanna with dry grass, mostly leguminous trees & shrubs, some Cerus.
Grass grazed off to root except a dry dark red kind.
Low gray brush common.
Green scrubby wood in ravines and dry watercourses.
Randia. Jusgnus Acacia.

On remnants of a somewhat higher terrace more and large trees and taller grass.
Grass varies locally.

Closer to mts. trees are more abundant, locally a woodland, trees to 4-5 m.
On dissected land trees have

scrub between them.
Hills to west covered by a scrub-forest or woodland with eroded areas with scattered small bushes, red soil
Grasslands and forest in valley bottoms, also some bananas very locally.
Steeper E. slopes grassy and with sparse scrub.
Gentler slopes with scrub woodland. a few balsa trees. Wood thick in ravines. Wood becomes thicker and greener higher up to top of first dissected scarp.
Back of this, dissected country with bushy woodland and patches of savanna. Trees taller and closer together in valley bottoms and ravines up to 15 m.
Valley of Palermo flat and cultivated and in pasture.
Scarps surrounding it very rocky. Woodland on N. facing slopes, savanna on others. Scattered trees on valley floor.
Small plantation of teak saplings below town.

photos of Palermo Valley
col. + b + w. ; b + w. of woodland.
Ridge bet Palermo + Neiva
2 hrd. punched b + w. roll 2
5 on roll 3.
On Magdalena side of
ridge 2 hrd. + 4 b + w.
dissected terrace at foot of
scarp 4 hrd. 5 b + w. of sub
and disturbed woodland on
eroded alluvium.
Flat savanna on middle
terrace - 5 b + w. 5 hrd.
more open than savanna on
middle terrace 5 hrd. 8 b + w.
Magdalena R. from Neiva
bridge 3-4 hrd + b + w.

On the west side of the Magdalena the alluvial plain slopes gently up in a series of well defined terraces, at least 3 in number, in appearance especially dissected into rounded hills and low mesas. The scarps generally dissected into rounded hills. The river plain itself is very flat, mostly cultivated or in grass. Along the river on each side is a fringe of trees. The river has ample water at this time and is rather muddy, but the

tributaries entering it in this area are in low water and very clear. The lower terraces are sparsely vegetated except in the shallow ravines and watercourses, where there is a "gallery scrub". The general vegetation is a sparse to dense thorn savanna, with Randia aculeata vel aff., Prosopis or Acacia, Cereus peruvianus vel aff. and a few broad-leaved trees, these all small not over 4-5 m at most, crooked. Irregular patches of brush are interspersed with the badly over-grazed dry grassland. Only a species of Andropogon (?) occurring in patches and drying dark bull red has not been especially grazed. As ~~the~~ higher ground is reached the grass seems to have suffered much less grazing and the trees are much closer together, generally flat-topped with a higher proportion of larger-leafed trees, but leaves rather coriaceous.

Here the vegetation is not so spiny and cacti are rare or absent.
This gives way on the face of the hill, in upward to a woodland of broader leafed trees, mostly of small stature but larger and denser in ravines and flat bottoms of small valleys, in places a well developed forest.
This becomes, generally, a scrub-forest varying to woodland, locally scrub or grass, on the rocky range of hills east of Palermo. This range is of ~~tilting~~ tilted beds of sandstone. The Palermo valley has sandstone(?) cobbles on the west side and steep or medium dip slopes on the east side.
The bluffs are very bad and have grassy or savanna slopes up to their bases on the flat valley floor. The dip slopes are bordered with scrub forest or woodland.
Ifr. 5 - flat alluvial terrace 5 km. w. of Neiva 500 m

29378 Portulaca
on bare ground in overgrazed savanna prostrate, leaves fleshy, purplish-brown.

On the edges of the terrace, especially there has been very serious erosion and the scarcely altered alluvium is generally exposed. The soils of the terraces vary from yellowish gray to pink and red. The alluvium is in general a gravel, a gravelly clay with pebbles and locally boulders

Apr. 5 - by car Neiva to Mello -
eastern slope of Cordillera Central appears rather bare from road east of Rio Magdalena.
Gliricidia and Erythrina common in bottom-lands.
Lowest terrace cultivated or higher parts of it dry & rocky with some brush.
Escarpment of next terrace abrupt, of bedded sandstone grass with scattered trees.
Large trees abundant along streams. Broad leafed
8 km. n. Neiva finishes d.o.w. roll & and took several bod. of dissected terrace with erosion remnants. low thorn bush, nearly leafless at this time. some cacti, grass eaten to roots. Beds of sandstone gently dipping eastward. a layer of ~~gra~~ gravelly alluvium on top.
Cut by shallow clear streams. Thorn scrub and thorn savanna in valleys except gallery forest along streams.

Columnar cacti ~~common~~ common.
Large river with woodland in its flat valley bottom.
First north & bod. 4-5 h. & w. of erosion remnants etc.
North of here begins "Painted Desert" terrain.
Some small streams with green vegetation, low trees. Otherwise very overgrazed deciduous thorn scrub savanna.
Many cereus. Very rocky.
Along streams locally are banana patches.
Low rounded hills and small mesas. Tangled woodland in deeper valleys between hills.
Grass eaten to roots on hills. Trees on hills partly deciduous. Guayacan, legumes, etc. common in ravines.
Then out on a flat treeless grassy plain, cut by some brushy dry ravines.
Alluvium here filled with boulders. Grass a bunch grass. Probably

andropogon of apparently not eaten by stock. The grass between bunches of this eaten to ground.
Thorn forest in ~~broad~~ broadest ravines.
Approaching Tello the terrace is much more dissected a thorn scrub is general vegetation mostly green at this time, locally nearly bare.

Tello to Baraya.
Large trees and various patches in valley bottom.
Hard gravel.
Broad grassy terrace north of river valley. Mostly andropogon. Some cult. patches.
Few trees except in small gorges.
Low hills to east covered by scrub forest or woodland.
Deep ravines mostly wooded, dry, some slopes bare, rocky, grassy or ungrazed. Broad these ravines cut in deep ~~sand~~ gravel.
Some fields of ~~Panicum~~

Panicum maximum.
Eroded hills with savanna. Broad flat valley largely cult.
Gallery forest along small stream with bedded boulders. Thorn forest in side ravines, semi-deciduous.
Mts. to east mostly bare. Steep scarps of bedded rock. Wooded or grassy slopes at base.
Some small ridges of gray mudstone. Bedded pale sandstone shale.
These ~~hot~~ hills, mainly scrub-covered, some grass.
A flat green valley, ~~cot~~ cult. and with large trees. Bananas.
Rich pastures in bottom.
Guadua Caiba Epiphytes.
Baraya.
Largest trees seem to be Anacardium.

Bet. Baraya and Tello, n. of grassy plains, a hot fumaroles rol K.3 of grazed slope, a wooded ravine, about 8 km of this area, scrub forest, grazed slopes, etc.
This is area of deeply dissected

red a yellowish alluvium.
Just south in grassy plain first several frames on Kod roll 4 about 1 b + w.

Cocoa near Tello, with bananas, shaded by Erythrina. On s. of alluvium along stream.
Cebas with bottle-shaped trunks.
Much Ranchia in town south of Tello. Land uneven, 1-2.5 m. tall fairly dense. Soils orange red, gravelly.
South of here very rocky.
Grassy plain s. of Tello much less rocky than that north. Fine gray silty soil with some cobbles and pebbles. Ravine with an abundance of large boulders, washed out of lower layers.
A number of bodachrome and b + w. of cacti, etc. at s. edge of grassy plain also of eroded land south.
B + w. from moving car at Cucuta - erosion remnants.

The valley of the Magdalena northeast of Neiva is more complex than to the west. The flat along the river is made up of slightly different [illegible]. This is mostly [illegible]ated with pastures. There is some tham[illegible] and rocky [illegible]. Next level is a sloping rocky [illegible] apparently out [illegible] main terrace [illegible]eams, a number which flow westward [illegible] the Magdalena. Main terrace about 1200' and [illegible]med by a white [illegible] sedimentary [illegible]ation that dip[illegible]gently eastward [illegible] cap is rather [illegible]t. The different [illegible] resist erosion [illegible]ently and a [illegible] number of gateway [illegible]ion remnants occur along with rounded hills formed by a thick deposit of gravelly

Defensa de los suelos

Los colombianos, como lo ha anotado el eminente botánico F. R. Fosberg, quien se propone estudiar la degradación de la flora espontánea en nuestro territorio, hemos dilapidado todas las posibilidades de desarrollo de los recursos naturales. No hemos tenido, hasta el momento, sentido alguno de su conservación y de su incremento, como si en nada nos preocuparan las necesidades futuras del crecimiento nacional. Y como si no nos interesaran, además, los perjuicios de todo orden derivados de la pérdida, cada vez más creciente, de los recursos actuales.

El índice más grave de esa dilapidación es el abandono poco menos que absoluto en que se halla el suelo colombiano. La despoblación forestal practicada sin tasa ni medida, y desde luego sin sujeción a ninguna norma técnica, no sólo ha hecho imposible la rehabilitación indispensable de las reservas y de los recursos forestales, sino que ha dejado a los suelos expuestos a todos los factores determinantes de la erosión. Las tierras aptas para la agricultura, en estas condiciones, se han debilitado y empobrecido sistemáticamente.

Se trata, en verdad, de una bárbara empresa contra la agricultura, en particular, y contra la economía del país, en general, tanto más abrumadora si se considera que se la ha practicado tradicionalmente, sin que los planes científicos para defensa de los suelos ni los programas de instrucción a los amigos de las quemas y talas hayan surtido efecto positivo alguno. En los términos científicos citados por el doctor Fosberg, ese inclemente fenómeno es lo que ha ocasionado una degradación progresiva de la llamada flora espontánea, con la consiguiente destrucción de suelos aptos y su inhabilitación permanente para fines agrícolas.

red a yellowish alluvium.
Just south a grassy plain
first several frames on
Kod roll 4 ... w.

Cacao ...
bananas.
Lythrum
alluvium
Ceibas ...
tumbs.
Much R...
sand s. of
uneven ...
to dense. ...
gravelly
South of
grassy ...
much less
math. ...
soil with
pebbles. Ra...
abundanc...
boulders,
lower large
a number
and b+w. of
s. edge of ...
also of eroded land ... south.
b+w. from rising on at
Cucora - erosion remnants.

uzada
lima

Planadas", pide Soluzar Santos.— es de la región.

ber impresionado lo suficiente a los gobernantes nacionales, quizás por la subestimación de los factores sociológicos que han influído en él.

"En forma descarnada, sin ropaje literario de ninguna especie, el problema del Tolima es inacción del Estado, manifestada a través de las necesidades que el pueblo alimenta".

Añade el doctor Parra que para volver a poner al hombre en contacto con la tierra, para que el Tolima produzca de nuevo todo cuanto es capaz de producir, se requiere que el Estado intervenga y ayude decididamente. "Y esto no sería un gasto público, ni una limosna misericordiosa, sería la mejor de las inversiones públicas, porque todos, hombres y tierras le devolverían a Colombia con dividendos altos el dinero que a ellos se destine".

CRUZADA PERMANENTE

La campaña de los tolimenses para que se atienda de inmediato a su problema continuará cada vez con mayor decisión. El pueblo la ha recibido con muestras de sincero entusiasmo y está brindando por medio de cartas y de telegramas un creciente respaldo a sus mantenedores. La campaña fue abierta por el periódico "Tribuna" después de una serie de llamamientos al gobierno y a los hombres representativos del Tolima para que se actúe

The valley of the
Magdalena northeast
of Neiva is more complex
than to the west. The
flat along the river is
wide and made up of
two + slightly different
levels. This is mostly
cultivated + in pastures
but there is some tram
brush and rocky
savanna.
The next level is a
broad sloping rocky
plain apparently but
on the main terrace
is a stream, a number
of solid, low westward
spurs to Magdalena.
The main terrace
is 1 about 100' and
is formed of a white
bedded sedimentary
formation that slopes
very gently eastward
The scarp is rather
abrupt. The upper
beds resist erosion
differently and a
large number of potholes
erosion remnants
occur along with
rounded hills formed by
a thick deposit of gravelly

red & yellowish alluvium.
Just south on grassy plain
first several frames on
Kod roll 4 about 15 b + w.

Cocoa near Tello, with
bananas, shaded by
erythrina. On l at
alluvium along stream.
Ceibas with bottle-shaped
trunks.
Much Rancha in thorn
scrub s. of Tello. Land
uneven, 1-2.5 m. tall. Too
to dense. Soils orange red,
gravelly.
South of here very rocky.
Grassy plain s. of Tello
much less rocky than that
north. Fine gray silty soil
with some cobbles and
pebbles. Ravine with an
abundance of large
boulders, washed out of
lower layers.
A number of erodachoms
and b + w. of cacta, etc. at
s. edge of grassy plain
also of eroded bluff - north.
B + w. from moving car at
Cocoa - erosion remnants.

The valley of the
Magdalena northeast
of Neiva is more complex
than to the west. The
flat along the river is
wide and made up of
two & slightly different
levels. This is mostly
cultivated & in pastures
but there is some thorny
brush and rocky
savanna.
The next level is a
broad sloping rocky
plain apparently cut
in the main terrace
by streams, a number
of which flow westward
to enter the Magdalena.
The main terrace
is at about 200' and
is formed on a white
bedded sedimentary
formation that dips
very gently eastward.
The scarp is rather
abrupt. The different
beds resist erosion
differently and a
large number of picturesque
erosion remnants
occur along with
rounded hills formed by
a thick deposit of gravelly

alluvium on top of the bedded material. This terrace, where intact is covered by grassland with local some small trees, the grass being an endo-pogon with a smaller grass. The latter is grazed the former not. Locally there is a low pine scrub, dry at this time of the year. In rocky places there are tall cereus of several kinds. Wherever there is any dissection a thorn scrub or thorn woodland appears. In the deeper ~~or~~ and wider valleys or ravines a more luxuriant green gallery forest is found or if cultivation, such as bananas.

West of Tello the alluvium becomes very thick the sandstone having tipped so that it no longer is exposed. Here, also, where the surface is preserved there is a similar grassland that lower down. The surface is

~~so~~ very rocky. Where there is woody vegetation it is denser forming a woodland or scrub forest becoming less thorny, in general as higher levels are reached. Areas of grass and ~~scrub~~ savanna are common. Everything is very much overgrazed.

The large east west valleys are densely wooded with large trees, mostly cleared or planted to cacao under large Erythrina trees. Bananas and deep grass such as guinea grass common. Northeastward toward Paraya these valleys are deeper as the layer of alluvium is much thicker near the ~~or~~ base of the Cordillera. The foothills are mostly covered by a rather dense scrub forest, probably evergreen, at least very green at this time. Some areas here are grassy or with scattered brush and trees.

1958 Colombia (Heil)

April 6 - outskirts of Neiva
in dry weedy alluvial flat

3 39379 Commelina
wet spot near irrigation ditch

4 80 Guazuma ulmifolia
common

- 81 unk.
common in fence rows

4 82 unk
common in fence rows

2 83 Tournefortia
common along road.

4 84 Cordia globosa (Jacq) H.B.K.
common along road

4 85 Momordica charantia
common along road in fence rows

2 86 (Asclep.)
occasional in fence row

4 87 (Cong.)
common in fence rows

4 88 Casearia
common in fence rows

2 89 (Menisp.)
common in fence rows

3 90 Passiflora foetida
roadside weed

Apr. 6 Puerto Legizamo, on Rio Putumayo
3 91 (grass)
common around air field

472 (Heil)

prostrate; 2 large petals blue, one small one white.
small scraggly tree
4 m. tall, fls. dull yellowish.
semi-scandent scrambling shrub 2.5 m. tall, spinescent branchlets; corollas white.
scandent shrub, corollas white.
flowers greenish.
semi-scandent shrub.
subfrutescent herb 0.7 m. tall, flowers greenish white.
vine, climbing on bushes.
flowers yellow, fruit orange.
lactiferous vine, flowers white.
scandent shrub; ~~[illegible]~~
flowers yellow.
small tree 5 m. tall,
fruit red-brown.
vine climbing in trees.
flowers greenish.
vine flowers white
corona purple within, fruit green.

Rio Putumayo
culms ascending

April 6 – Flight from Neiva to Florencia

Some fair sized patches of forest left on high slopes of Cordillera Central visible from Neiva.

Some irrigated land near Neiva, but very little.

Banana patches look dry.

Low eroded terrace west of river has very sparse bushy vegetation except in shallow ravines, where there is continuous sand.

Some areas completely grassy and with no bushes.

(Photo

Dissected higher land south of Palermo very bare and dry except lower slopes which have low woodland or scrub and canyon bottoms which have woods.

East of Magdalena R. east of Petino is a large area of parallel low strike ridges, badly eroded, with woody vegetation between them. This crosses river to west near Hobo and continues south westward. West of this a large area of grass hills south of Iquira are grassy with wooded ravine

heads.

Somewhat wooded near big meanders of Rio Magdalena. Valleys entering from east are wooded in their bottoms, as are their tributaries and ravines running up from these. Lots otherwise grassy.

Entire upper valley seems to be grassy except for ravines and strips along streams.

North of Gigante large grassy plains. Eroded Gigante some fair patches of forest on flat land, esp. to north.

Very little wood north on Cord. Central perhaps 10% or less.

In Cord. Central under cover some good patches on upper slopes. To east much forest.

Some dense woods along Magdalena river bottom below Garzon and on affluent below Paita.

East of Garzon many small patches of wood esp. palm in lower hills. Thick montane rain forest with scattered white

Cecropia on almost
all of higher mountain
east of Figuante.
Landslide scars occasional
~~slopes sb~~ a few clearings
on e. slope along course
just after crossing, but
very few.
Entire area visible
s. and w. of course densely
and evenly wooded. To
east wooded also but
some clearings.
Many palms in this
forest. a few small
clearings along stream
perhaps ~~n.e.~~ 1 here.
Approaching Florencia
lower slopes have many
clearings, possibly ½ of
area in valleys. Some
grassy, some in various
stages of regrowth.
photo. Lower down perhaps ½
cleared. Flat land at
foot of mts. for several
miles around Florencia
mostly cleared.
Cdeguaja Rio ~~Caguaja~~ Caqueta extremely
meandering below Florencia.
Mauritia grows and
Guadua conspicuous.
Grass around Florencia
very poor - around airport

mostly Paspalum sp.
sp. dilatata and Panicum
maximum. Soil rather
red. Some palms left
in clearings.
Begin see b+w. + bow with
Guadua patch at distance)
10.27 Left Florencia
Clearings extend down
Rio Orteguaza and for
1-2 km. on either side, in
grass but some weedy +
scrubby regrowth.
River muddy. Some ox-bows.
10.35 Much clearing to about
Potosi (?), scattered
clearings from there on
and a narrow strip along
river, much active
clearing and burning
going on.
10.40 Area inundated area
west of river extends
down somewhat.
Forest with fairly dense
canopy, many palms to
canopy, many emergents
& some bare, many in
young foliage.
11.15 (photos)
Considerable cumulus cloud.
Rio Caqueta visible in
distance to west.
A few clearings on -we

approach Tres Esquinas
much swamp with bad
water east of Rio Integuay
just above Tres Esquinas.
Many palms.
11:13 Tres Esquinas. Village
on slightly big(?) piece.
12. Left Tres Esquinas
fine clearing on slightly
elevated ground around
Tres Esquinas (2 photos)
Many palms in forest
fine inundated land
very near Rio Caqueta on east
side, but not much.
Scattered clearings, long
short lines down river.
12:14 Rio Caqueta bend east to cross
again. Crossed it. Very muddy.
The forest here is low, in
places inundated, crossed
by channels or streams that
meander through it.
12:2 Crossed river again. A few
scattered small clearings
along it
12:13 Swampy area west of river. (Lake
on map.)
12:16 Crossed river inundated area
east of it. Clearing is on bank
which is higher.
12:17 (Photo of forest)
Forest away from river rather
uniform but apparently the compo-

sition varies. Occasional
pink flowered emergent tree.
a few blue ones.
12:19 An elongate area of taller
low vegetation that looks
like a wind-thrown strip.
Partly regrown. Palms
still common but less
so than before.
12:21 Pink emergents more common
12:22 Rio Caqueta far in distance
to east.
Bare emergents more common.
Some with white flowers,
narrow crowns.
12:23. Three and light pinks are
now very common, probably
same thing. (3 photos)
12:25 ~~Leaves~~ a lavender-flowered
emergent occasional
Some ~~to~~ pure stands of
a palm. Clearings.
12:32 Appr. Puerto Leguizamo.
Matting strip, not long, slobby.
Large cleared area around
town and air strip. Small village,
mostly military post (3 photos town,
2 bad. ~~etc~~ from air strip.)
Rained most of time we were
on ground.
Tall forest in sight from
airstrip in all directions.
Sky mostly cloudy. Temperature
high, humidity high, little breeze.

April 6 Left Puerto Leguizamo.
to Florencia to Bogota.
1:12 Left Pto. Leguizamo
Groves of Mauritia along
air strip at south end.
Soil on higher ground red.
A road leads northeastward
some clearings along it.
Apparently goes to Rio Caqueta.
which can be seen in distance
to east.
1:16 Pink emergent trees common
1:17 forest.
R. Putumayo visible in distance
to west, Caqueta to east.
1:20 Passed over what appears
to be some old clearings.
Otherwise uniform lowland
forest. Abundant big cumulus
clouds.
1:27 Rio Caqueta bends closer
on east side.
A few yellow flowering
emergent trees, many light
green newly leafed out ones.
1:28 Course enters bend in river
enclosing lagoon or swamp (at 1:16)
small
1:35 Pass ~~Caqueta~~ Esquinas
Much swamp on all sides.
1:39 Swamp with palms.
1:42 Clearing on higher ground, some
swamp close to river. Left river to
left side.

1:45 River east to left, land
slight relief here, maze
of ravine cut in terrace,
densely wooded. a light
green flat topped emergent
common occasional.
1:53 Pass area
1:55 arrive Florencia

Between Puerto Leguizamo
and beginning of cleared
area below Florencia took
remainder of b&w roll 5 and
a number of kodachrome.
Right for some rate — poss.

2:24 Left Florencia
Many palms in forest on
foothills above Florencia.
2:27 Scattered clearings well
up into hills, some planted
to bananas. Then none for fes.
Water in streams in canyons
here clear and dark, not a
trace of mud.
2:30 Some clearings in deeper
valleys, but few.
2:32 Palms less abundant but still
common.
2:37 Traces of old clearings some
new ones, perhaps 25% cleared
in broad valley.
2:38 Patches of very light green trees
on tops of certain peaks and ridges.

2:35 Still considerable c[illegible] in wise way.

2:35½ Still same.
Many pale yellow-green trees in forest, some white Cecropia.

2:37 Climbing strong very a mile - bad up into mountains.

2:38 No more clearing. White cecropia common in ravine. Vegetation on crests much lower and finer texture than on slopes.

2:39 Many clearing.. white Cecropia very abundant.

2:41 Crossed a valley that is perhaps 1/3 - 3/4 cleared, this on west slope. Lower west slope 75% cleared. Some steeper slopes and ravines left. Higher slopes and ridges mostly intact.

2:44 Road running up a ridge to a farm we'd up.
Most of farms connected only by mule trails.

2:44 Passed to east of pueblo. Here clearing is perhaps 80% on outer ridges of cordillera. Inner ones still forested.
Trails mostly on ridges. Slopes show signs of over-grazing.

2:4[illegible] Mts. here almost entirely cleared

grass rather fine and tending to be dry. Considerable erosion.

2:47 Dry low hills, grassy but very overgrazed, woods in ravine.

2:53 Broad valley of river from Algecirias, ~~[illegible]~~ much irrigated rice, much pasture above and below Caïpoalegre. Terraces dry, gullied.

2:57 Mts. cleared 2/3 the way to top in distance.

2:61 Extensive terraces with some cultivation, some savanna, ravines wooded, some open grass fields.

2:62 Narrow gallery forest along Rio Magdalena.

2:64 Terraces to east mostly Elisa savanna. Some rice along river.

2:75 Neiva.
Many trees in city.

Dry area in Magdalena Valley extends at least to above Garzon.

3:21 Left Neiva.
Some rice along river.
Dry savanna and eroded hills come practically to river on east side above Neiva. Tierra[illegible].

Where old surface of terrace
is preserved there are no
trees, only grass. Ravines
have trees. Slopes either
savanna or woodland.
3:20 Opposite Baraya —
some areas covered by tropic
forest, some eroded bare.
Eroded areas extend north almost
to Cabrera then bare dry
eroded hills from there north.
woody vegetation only
in ravine bottoms.
N to west of Abrera Valle
are almost completely
denuded except for woody
vegetation in canyon and
ravine bottoms. Ridges
bad eroded.
3:39 Hills become slightly green.
Still badly eroded, woody
vegetation only in ravine bottoms.
3:42 Low flat country mostly
thin grass, tree along streams that
come out of hills. Some of it very
badly eroded esp. just south
3:43 of Prado.
River N. of Prado meandering
dark chocolate color.
Valley rather green, very little
woody vegetation.
3:44 Upper part of valley quite green, grassy.
Hills here thinly grassy.
3:45 Visibility low.

3:48 Country hilly, much
greener, some woods,
mostly in valleys and
ravines.
3:50 Strike ridges parallel to
course about 130 & 310 thinly
wooded.
Northward now
3:52 Funiay - Flat grassy valley
with scattered trees
sharp bare grassy ridge
parallel with course,
~~flat grassy~~ gently
sloping grassy country
with scattered trees on
both sides of it, patches
of woods.
3:55 Head of valley above Funiay
and of other valleys
nearby considerably wooded
but with many farms
probably much coffee.
Lower slopes largely grassy.
3:56 Sharp ridge curves westward
and crosses course.
Iconozo. Iconozo
3:57 Landi. Landi
Grassy slopes, much scrub
or first forest
3:58 San Bernardo in distance
Much forest around it.
Nearer slopes largely cleared
or with thin second growth.

Hills in distance with in
broken wood. Coffee
plantations mud, pastures.
Below Turagauga a long
sloping grassy terrace.
Many patches of wood
in the Turagauga. Low
grassy slopes
4:03 Coffee and pasture near.
4:03 Grassy slopes with many
scattered trees left from
original forest.
Grassy slopes in part
still densely wooded, most
cleared.
Many farms throughout
this area.
4:04 A large patch of excellent
forest on west sloped
rim of savanna.
4:05 Large large re-wooded at
lower end of Labana
Factories above it.
Green fields, now - we are in
4:07 town.
Hills badly burned over
little vegetation except trees
saved.
Plowed fields, white, wood
4:08 Tecks. Rows of Eucalyptus.
Fields w. of Tecks very green.
Many Eucalyptus now.

Box ... Box ...

Jan 9 Plowed fields & well kept
bottoms so much black
clay in the south & part
fields of milk and 2 weeks
wine have about 1/3 of wood
left in places less.
Hilly rocky hills, on
the divide running down
to the Magdalena the hills
are cleared but have small
patches of wood left in the
ravines. The edges tend
to be eroded. Infrequent
very fine roads which
show little erosion. Many
farms. The beauty of
trees here is very pretty
few of them are connected
by roads mostly by trails.
The general effect is green
with dark relief where
[illegible]
Toward the setting
more like the same.
Few farms because fewer
[illegible] roads
[illegible] clear.
Valley of [illegible] very
open and more wooded northward
some ridges seem to have
remnants of original forest
ravines have wooded. Most
slopes grassy or recently burned.

[illegible] very much recognized
[illegible] according to the Pacific
[illegible] in Tel Canada, wooded
[illegible] to first on the left, [illegible]
[illegible] from the river,
[illegible] atoms. The continuous
[illegible] view from.

[illegible] a lot of the
[illegible] is [illegible] is [illegible]
[illegible] more wooded, few clearings
[illegible] and some valley. Large
[illegible] no, especially west of town,
[illegible] Rio Lazaro, too [illegible] very
muddy. [illegible] mouth
[illegible] from Sumitara. Much
clearing. Relatively [illegible]
clearing along banks,
[illegible] not many [illegible]
from River.

[illegible] River Rio Open [illegible]
slightly elevated land [illegible]
cleared. Low swampy [illegible]
along river open also.

[illegible] falls around lake
and between Open and Big. Bonito
cleared in [illegible] cleared. Already
eroding in spots.

Mostly a heavy [illegible]
between [illegible] lake and
Open Bonito. Whenever [illegible] hills
are badly eroded. Even so
immediately south of [illegible]
Ridge top are sides of [illegible]
erosion. Much secondary

vegetation here, especially
in ravines.

Lower low dissected
terrace of very recent origin,
pebbles abundant. The
tops of the remnants of
the terrace are mostly
cleared and passes in the
immediate vicinity of
Punamo Barrio, some
pasture. The
ravines generally have
guava scrub. Low areas
are swampy, some with
mixed wood, some
pure Iriarte. Other
open and grassy.

1:00 Over Ron Blas Is. – compound
barrier reef with small
apparently quite dry islets,
white sand showing in
woody vegetation in
interior of islands. Mostly
seem to be planted to coconuts
which do not look too flourishing.
The coast of the Isthmus
here is a typical drowned
coast. The peninsula that
shoots south toward the
islands has a fringing
reef on its outer side, a
barrier reef around its point
but reef at all on the bayside.

April 9 - flight from Bucaramanga
to small plane
part of terrace is shelter[illegible]
into narrow ridges.
Many oil wells on this
terrace - e of B.B.
a large part of the terrace
in the general vicinity is s.
cleared but less and
less as we leave B.B.
Part of cleared area is
growing back to Cecropia
and other trees - much as
~~[illegible]~~
being cleared or has recently
been
Other [illegible] the clearing
has largely been left behind.
lying about 700 the forest
appears very mixed many
light green, a few completely
bare at this time.
sending his bogamos.
Some clearing scattered
in various stage of growth.
Hilly land. Clearings when
on slopes show succession
the bogamos is wide and
braids
into completely cleared
country rather roughly.
at confluence with Tuna.
Rivers have extensive
gravel bars & terraces.

with scattered trees. Fields
on slopes, mostly grass,
slopes and ridges hilly
considerable rock showing.
Ridges, especially ended
slopes have very steep
[illegible] and down [illegible]
[illegible] of sheet stone
have abundant boulders
showing, even scattered
in grass. There are still
some patches of forest, but
clearing is going on. Perhaps
70% is cleared.

A large area of moderate
relief, with patches of
woody vegetation in depressed
places and among the
soil completely removed
from ridges and higher slopes,
leaving pinkish to reddish
scars. [illegible]
~~[illegible]~~ A sheet
green was much of it is
covered, comparatively
of woods, little more [illegible]
show much but cleared
slopes have abundant
boulders showing [illegible]
and woods land [illegible]
tops of ridges. [illegible] green
[illegible] [illegible]
general reddish but lighter

where badly eroded.
More and more woods
as we go back toward the
Rio Valera toward ~~and~~ the
town of same population
seems to initiate and proceed
very rapidly here after
clearing.
Mostly forest, few clearings
road lines on both sides
by clearings then the
railroad & the Wilder.
Very much forest
and little clearing for
a while then - Orchid
cleared strips
some about northern end.
Ch clearing
Some slightly hilly section
badly eroded.
Upper line of new railroad.
Much forest left here
but clearing is started
on fairly large scale
Forest here with many
emergent trees tall, canopy
appears rather open
Approaching Lake s.e. of Tenerife
Rio Magdalena - dense tall
forest - many of emergents
are bare. Much inundated
land on east side of river.
Water in numerous lakes
flash. Green islands of probably

floating vegetation. Extensive
and channels. Inundated
land separates from river
proper by several lines of
wooded slightly higher
ground. Much of the
cleared said of Rocaudel
Rosario. Now this especially
is river is broad and
much braided, with
extensive sand bars and
sandy channels.
Small Lake some miles west of
River. Some forest and
some low wet grassland,
muddy channels and
ponds. Some appearance
sandy ground, clear or
almost clear of forest
What may be some natural
grass and - outlines of
patches very irregular.
South of Lake
and here has a rather
Pampas-like aspect. Small
hills just south of lake
some grassy, some wooded
with many bare places
many bright yellow
tabebuias. Patches of what
appears to be deciduous
forest and bare places
on these hills. Considerable
savanna land around

fruit apparently subject to serious burning and grazing. Hills to west largely denuded and very overgrazed and eroded in bleached parts. Cattle trails form a fine network on cleared parts.

Westward largely forested but some hilltops bare. Lon mostly forest with occasional clearing as mountain ar ascended to west then turned and went back to east because of weather. Then northward west of Lago de Limiti

This area seems, judging from proportion of deciduous trees, to be rather marginal climatically and the savanna patches tend to bear this out. Large area in hilly part are savanna and locally very badly eroded. The forest in hills north of Lago de Limiti seems at least half bare of leaves. Many very large bright light green trees.

North of this much

and that area is seasonally inundated, with areas of higher ground cleared or almost so much of it apparently savanna some recently burned. Some of this rather abruptly higher than surrounding [illegible] seasonally [illegible] large proportion of high ground which is definitely seasonally deciduous forest. Much of this apparently subjected to burning

[illegible] Lago Payao [illegible] forests.

Thence much more inundated land around Ciénaga de Morales, much somewhat high ground also around Morales and to west ~~on~~ is hilly and wooded

Ciénaga de Morales is at this season a great series of channels with strips of dry ground and large ponds muddy.

Toward Río Magdalena is much less high ground and most of it must be

seasonally inundated.
Innumerable ponds
some patches of forest
apparently a natural
levee ~~on~~ west of Rio
Magdalena, or perhaps
terrace slightly above
high water, as that on
which Gamarra is
situated across the river
Pen river more, but
the same sort of country
~~and~~ mostly subject to
flooding much open
somewhat grassy or
just muddy land,
patches of wood,
patches of savanna.
Many lakes and
ponds. Much more water
than appears on map.
(Large lake n.e. of Tamalameque
not located).
First on islands w of
Rio Magdalena appears
greener than around Simiti
and Tamalameque.
Approaching La Plata
most of land is grassy
and very green, scalloped
bits of wood, no high
ground here on islands.
Large areas of grassland
east of river, as far as

we could see, mostly
rather poor
pasture for cattle &
horses.
Lands grassy from
River, wooded westward,
but with much clearing.
More wooded westward.
Lake north of La Plata
is really a great series
of small lakes and ponds
at this season.
Large sand bars in river
Island more wooded
northward but still
mostly cleared
with lots of lake, marsh,
grassland, extending
to and beyond Tamalameque.
Hundreds of ponds in
island west of river
much grass, some woods
Many of trees bare
Much evidence of burning
everywhere.
Patches of forest and
savanna east side north
of Tamalameque, much
savanna, some clearing
and burning going on.
Northward, near
Tienaga de Papatoro
hundreds of ponds
east as well as west of

river, land mostly
grassy, some patches
of woods, trees along
thickness between patches
some scattered in grassland.
Trees scant w. of Cienega
w. mostly grassy and
certainly seasonally
flooded. Gallery forest
along channels, probably
on natural levees. Many
cattle on grassland.
Great difference in appear-
ance of grassland with very
slight difference in
elevation. Some patches
of thick woods on islands,
but more grassy than
wooded. Considerable
woods on west side of
Cienega. Northwest of
Cienega, the islands have
some elevation, largely
denuded, but some still
wooded. Woods here semi-
deciduous. Many palms.
This whole area is
extensively burned every
year.
Around Chimichagua
mostly cleared.
East of Chimichagua the
lake bed is an intricate
labyrinth of channels, pond

and natural levees, the higher
of these wooded - northeastward
over high ground, but
hundreds of pond, ~~to~~ land
varying from pasture & savanna
to woodland to scrub forest
to patches of taller semi-
deciduous forest, but these
mostly being cut. The
woody vegetation is
mostly scrub or scrub
forest, some rather dense
to tall forest rather open.
To the east was much less
water, more grass, more
open & even further. Much
of this probably flooded
seasonally, some areas
probably not.
Toward Chinguana
savanna more land
more of dry, less flooded
land. North and east
of it are vast areas
of savanna, gradually
replaced toward foot of
mountains by forest.
Angular outlines of
of these patches of woods
suggests that the
savanna is of rather
recent man origin.
3:45 Landed at small dirt strip
at Chinguana.

Tiger Chaguaramo
well, plants seen
Gliricidia sepium
Tabebuia pentaphylla
Trees return
Euphorbia insulicola
Acacia pentadenia

Savanna east of town
thin grass with
scattered small bushy
trees 5-20 m apart,
very thin grass,
patches of small bushes
up to 4-5 m. tall mostly
Byrsonima crassifolia (common)
and Curatella americana (common)
badly overgrazed. Many termite nests
Bordeaux
mapira - strip of
gallery forest
along the banks
with large Ceiba
tall palms, Tecoma
Coast Lagerstroemia
Wax myrtle, Myrciaria
Tree Inga spuria etc.
forming open to closed
forest on the thick
sandy soil of
Carthy River, a common
subsidiary shrub Acanthus
Randia, Mimosa and
other vines and
many pinkish-green
epiphytes common
especially around
edges.
Ground very dry
mostly not any
standing water. Much
water borne debris shows
that in the rainy season there is
standing water.

April 9 – Baragona, about 15 km. e. of Chinquona

Small patch of thick low wet woods

3	9392		flowers white
3	93	Lapium	Euphorbiaceae,
3	94	Psidium guineense	shrub. flowers white.
"	95	Jaramea; very common in undergrowth	shrub 3 m. tall, fruits dry, black
"	96	(Ulmaceae) rare	shrub 1 m. tall, flowers scarlet.
3	97	Jaramea common in undergrowth	shrub 3 m. tall, fruit black
"	98	(Annonac.) rare in undergrowth	slender small tree, bud green
"	99	Randia occasional in margins of thicket	shrub 1 m. tall, ~~flowers~~ fruit immature
3	9400	Randia occasional in margin of thicket	flowers white shrub 2 m. tall
4	01	Vitex cymosa Bert. det. Moldenke occasional	tree 10 m. tall, ripe fruit black, fleshy, eaten but of very flat taste "acartuna"
"	02	Ilex occasional	tree 3 m. tall, flowers white.
"	03	~~Acacia~~ (pod.)	
3	04	(Bragg.)	flowers white

1957 Colombia (Magdalena)

April 9 - 8 km s of Chiriguana
in open dry savanna

39405 Mimosa?
5 occasional

" 01 Byrsonima crassifolia
commonest shrub

" 07 P. nubra
occasional

" 08 (nb.)
very common

5 09 Coutarella americana
very common

3 10 (Bign.) Cydista aequinoctialis (L.) Miers det. A. Gentry 1974
occasional

1 11 Lonjania
occasional

1 12 (nb.)
common

shrub 1.5 m. tall,
buds white.
shrub 3 m. tall
petals ~~[illegible]~~ bright yellow.
wood used for firewood.
"peralejo hembra"
shrub 3 m. tall, buds
greenish, fruits fleshy,
black when ripe.
shrub 2 m. tall,
fruit green.
small tree
"~~peralejo~~" peralejo
macho" wood said
to be useless for firewood
as it breaks pots.
scandent shrub
climbing in bushes,
flowers pale pink.

shrub 2 m. tall,
fruit black, fleshy.

April 10 - 1 mi. N. Chenigua
Savanna with gallery
forest along shallow
watercourses
c. 1 without - but 2 km. to
seasonally flooded land
1 km open - not yet well
palms, many Tabebuia with
yellow flowers - now
edges of innundable land.
The palms are fairly
dry now except for a few
small ponds and a small
lake. Much of it has been
burned; is a mosaic of
patches of deciduous or
semi-deciduous forest,
tall grass, meandering
wooded channels, mostly dry,
ponds, patches of savanna.
Ponds have in places green
floating vegetation. Through
this meanders the Río Casa, very
muddy, little or no current,
surface somewhat below banks.
West of this is a mosaic
of deciduous forest and
savanna, now more forest
than savanna but clearing
and burning going on. Noticeably Palms abundant
in this forest. The larger trees
are mostly bare, some
newly leafed out, lower

along green, much more
continuous than upper,
but locally quite open,
locally dense. Back toward
Cerrinchagua this is
more and more cleared,
in places as much as 75%
open. Burning has
killed the palms in places.
Every stage in development of savanna represented
here. Farther back good
forest is almost absent,
but gallery forest along
watercourses and degraded
patches are common, as
well as patches of sand,
but mostly grassland
and savanna. Palms are
frequently left in clearing.
Around Lake Zapatosa is
a woodland-thicket
complex, with bare shores
or with very thin grass. Even
the islands in the lake
have been mostly burned
where there is land high
enough to have anything
to burn. In lake are winding
channels bordered by ~~natural~~
natural levees, forming, at
this season, long winding
islands consisting of two
parallel strips of low land.

A few of larger islands in lake are well wooded but badly burned. Islands often sandy, from air. Close tread southeast side of lake wooded a long, but woods are very scrubby and badly burned, in places changed to savanna.

Tapatico

From Puerto Tapatico, east Hotelito - forest-land, very badly eroded in immediate vicinity of town. Beyond, in direction of Ocaña, a mosaic of grassland and forest, the forest being cut and burned very rapidly. The grassland locally eroded. Locally being converted to savanna. Gallery forest and dense patches apparently marking low wet spots. Crossed one of new roads under construction.

Similar mosaic continues with slight elevation and dissection resulting in local savanna, west mostly forest.

Arriba, on broad ridge of foothills of Andes is much more forest, but partly very badly cleared. Crossed new, parallel road railroad now. A mosaic of clearings, forest and second growth.

[illegible] passes through some broad stretches of forest and many [illegible] grassland. Low [illegible] rolling and grassland [illegible] Much of second and most of the forest is being cleared. Dry season. Fires sweeping across the country also the grasslands. Mosaic of grass, second forest and [illegible] clearing. More sharply marked southwest approaching the mountain. The dissection is much greater, in a somewhat radiating arrangement of ridges and valleys. This crestal zone is not wooded, but largely bared or in secondary scrub. Toward Ocaña country is rougher and more wooded. Forests are patchy mostly cleared and poor but with secondary vegetation. The mountain ridge and northwest of Ocaña very largely denuded, but with considerable woods locally in steep ravines. The usual trail

[illegible] appearing impossible spots [illegible] the steep [illegible] rocky [illegible] and [illegible] and [illegible] complicated [illegible] a slightly eroded. [illegible] much [illegible] [illegible] mountains. [illegible] [illegible] much dissected, has some trees and thicket in [illegible] bottoms. [illegible] cultivation in flat places, [illegible] in most places a [illegible] mixture of exposed bedrock - red shale to white, and ~~[illegible]~~ ~~[illegible]~~ [illegible] sandy then grass. Gullying is intricate and deep. The surrounding hills seem to be covered by ~~[illegible]~~ a very dark dull green, [illegible] grass.

The streams are in very low water, but the water is very clear.

Some sugar cane and plantain in cultivated spots. Perhaps 1-2% of land cultivated.

[illegible] is tan and pale [illegible] yellow [illegible] Wallows are deep and [illegible] [illegible] downward from red to white. [illegible]

reddish part is a finely mottled clay with some coarse sand and fine gravel, occasional pebbles.

Grass is a sandy dull gray green pubescent type stands at this season. Grass does compare to that of surrounding hills except for eroded spots essentially no forest - only thickets in narrow bottoms.

The soil has in general lost its A horizon and probably most of its B. In a few protected spots there is a ~~[illegible]~~ brownish gray layer up to 30 cm thick, which indicates that there was once a fairly good soil here. Williams [illegible]

On many of the hills no evidence grazing pattern is evident. There are many goats and donkeys and immediately around the town the slopes are a mass of gullies.

Left Pcaña analog at 1054 on [illegible] to NW.

On high ridges west of Ocaña are some scraps of montane forest left, more or less degraded, but with a few

white Cecropias left. Some patches also in steepest marine beds but mostly 1-2 m. high, we have by this time.

Climbed slope of west side of mountain. Saw forest in ravines and a mosaic of brush, scrub and clearing between the ravines.

~~[illegible] the region is [illegible] [illegible] shown on the map.~~

Inhabits from because of [illegible] hay.

Strips of forest extending on the front of the mts toward the Rio Magdalena in the region of Ayacucho - the glens apparently represent stream bottom lands. Northward in the region of Costilla these seem to be badly degraded and largely changed to scrub and savanna except for the immediate banks of the streams themselves, which may retain a narrow strip of trees.

North of this the gentle slopes near the mts. have mostly thin grass. Areas from mts.

The terrace is badly eroded.

Note roads less than appear on map.

Some of foothills: Tamalameque are grasslands, patches of scrub and some palm savannas.

Landed at Ocaña at 11:20 - [illegible] east of Tamalameque.

Scattered tall trees here remaining from forest. Some of the fields that appeared to be green scrub from the air are fields of manihot that are overgrown with a growth of weedy shrubs, vines and herbs 1-2 m. tall - several legumes (Bauhinia, Jatropha, Tri[illegible]etta, etc.), Cardiospermum, peppers.

When allowed to remain for a time this develops into a dense tangle of shrubs and vines about 3 m. tall, prickly, wiry, and impossible to penetrate on foot without constant and disagreeable labor with machetes. In places this is broken down and criss-crossed by trails made by cattle.

This area is of low rounded hills. Other than flat is it appears from the air. However,

from bus westward it is essentially flat. The hills are gradually ~~low~~ higher eastward, mostly denuded but with scattered trees left standing.

left Cl Buenaventura 11 10.
Wooded strips mostly are ravines or broken ground. Many of taller trees have probably been cut.
Northward are broad areas of forest, quite thick, probably semi deciduous but only tallest trees have now partially cleared. Some areas of grass with spots of forest. Lots of s. and Lagos Japatosa.
Then a mosaic of patches of woods, grass, clearings, low eroded hills. Burning going on actively. Some patches of typical savanna and all stages between forest and savanna. Passland is intermediate stage in this anthropogenous succession. Prime line. Much passland and gallery forest. Hills not called [illegible] prime wooded except [illegible] which are in part bare and eroded.
Then relatively flat

area almost completely shifting agriculture. Some tall wooded left but active clearing of them by process much second growth.
Then stretch that is still more than half still wooded, then more and more clearing. Above Buenaventura savanna and passland extend almost to foot of hills except for narrow gallery forest along shallow ravines.
Then some large patches of forest alternating with savanna - gallery forest pattern. Flowers many palms.
Some areas very eroded. Some of these eroded to rather green grass. Most of savanna is reddish, with just a light crust of green. Some spots eroded to a bright orange-pink. Some areas in savanna, some in shifting agriculture, some still in forest.
Aspect becomes drier, more savanna, forest patches thinner, more obviously deciduous.
Very peculiar irregular purple-brown areas in savanna perforated by pendent sand. Then large areas of deciduous

forest, some very good
some very degraded, some
grass and cleaning, some
very generally well-watered
rolling, all very fine
[illegible] de Lange Pass.
123 Deciduous forest becomes very
general on foothills & scattered clearings,
flat and new.
Can see foothills ahead on
both sides. Much burning in progress.
Forest here has a continuous
green lower layer and a deciduous
emergent layer. Some large
clearings - said to be for cotton.
Foothills on left are just
isolated small ranges away
from main Andean range. Near
Codazzi here and there very
flat cleared land, burning
on every side going on. Ranges of
hills almost completely bare
and dry, even the grass largely
burned off. Beyond the first
large hills large areas of
palm savanna, some often large
trees left, some areas of forest,
less cultivated fields. The
small ranges of hills are rough,
of bedded rocks dipping east
or southeasterly. Sierra Nevada
Mts visible to left.
Much savanna and pasteland,
some forest left.

Now following Rio Cesar,
wide windings - the
center of a large flat
plain. Deciduous forest
and savanna in a mosaic
of irregular patches. The
hills to the right are largely
brush covered, few not
marked.
124 Hills to left largely brushy -
some savanna patches. Hills
above Chiriaimo completely denuded.
Much of flat land is
savanna with very large
scattered trees. Some
deciduous savanna, some
have deciduous semi-forest
above Pelaya on alluvial
slopes with green semi-
semi-forest.
125 Valle de Upar. Much
forest and park-land in
valley. Slopes of Sierra
Nevada and alluvial slopes
at base largely wooded
except some higher slopes
which are denuded. The
west side of valley much
greener than east side.
Foothill ranges [illegible]
semi-forest, upper slopes
mostly denuded except well
up toward top where some
forest remains. In Valley

with grass and trees and scrub found on alluvial slopes.
Low range of hills from Novita thickly wooded. Scrub forest in valley extensive and becoming very sparse. Mostly tropical dry woodland. Land here less extensive and very dry
Magnita
Villa nueva.
Much open dry pasture and park-land. Low hills between here and Badilla covered forest varying to woodland, park-land and savanna. Mostly rather open. Many large spreading trees. On both sides lower slopes mostly covered by scrub forest

Now here on the valley floor is almost entirely scrub woodland, probably thorn bush, a few clearings near bases of hills on both sides. Non forest is other green but perhaps 1/3 of trees bare.
Upper-slopes of hills on east about ½ cleared, on west perhaps more, 1/3 cleared.

Found Pozaro more clearing, in centre of valley fields of very dry savanna.
Pozaro. Now fairly less. Many green fields, green patches, more of clearings, park-land and deciduous woodland. Alluvial slopes and foothills on both sides covered by deciduous woodland. Higher slopes partly wooded. Some greener woods along Rio Cesar
Fonseca. Above this along Rio Cesar a belt of park-land, otherwise thorn woodland.
Land here become more wooded. Middle slopes of range on west side very bare. Aspect of low range on right of course very dry, almost all trees bare.
General vegetation a very dry thorn bush with few green trees except along stream valleys, esp. Cesar, where trees very large but well separated.
Now few clearings
Woodland variable patches and greener, parks

very thin and dry.
Stream courses sharply
outlined in green trees.
Vast areas of almost
completely bare woodland.
2:00 Watch level northwestward
a broad band of thick green
woods in affame of gray
thornbush. Locally are
scattered light green
trees in thornbush.
Fewer green river courses
except near base of ridge
to east. This ridge rather
well wooded, perhaps
semi-deciduous woods.
2:05 Cuesticita - some cleared land,
pasture. Highway to Uribia
looks passable for jeeps, perhaps.
Occasional large dry pasture.
Otherwise thornbush with
some green watercourses.
Clearings become more
frequent, much savanna.
2:18 Maicao
Entering ship, oiled.
Inn built in 1 inn out
here to thorn savanna.
Shallow abrupt dry ravines
meandering northward.
Large tree leaves. Flat-topped
Acacia(?) or Prosopis, green.
Much dry herbaceous growth
on ground between trees.

height of trees of more
than 3 m except cacti
which may reach 4-5 m.
Cacti not occasional.
2:30 Left Maicao
There is some extension of
thorn savanna to east, especially
on south side, but almost
2:40 immediately and abruptly
changes to desert
or thin desert grassland
with occasional patches
of bushes or sandy patches.
Northward is generally a
sparse scrub on what seems
to be mostly drifted sand.
Perhaps the sand is caught
by the vegetation or possibly
the vegetation grows there
because of sand. ~~To one~~ This
seems to be characteristic of
flat area west of corner of
Lake Maracaibo, but extends
inland the same sort of
thorn savanna as around
Maicao but perhaps denser
almost continuous
with some more open patches,
probably drifted sand.
The general color is tawny
with gray vegetation.
Cerro Teta is a roughly
cone-shaped plug with a
2:54 thorn scrubby vegetation except

on rocky knob at top.
The rock is pale yellowish.
Ahead is a watercourse running to ~~Golfo~~ Maracaibo
Except for this, which has a strip of thorn-forest, the savanna is now very sparse, but quite uneven, density westward.
Would now certainly be classified as desert, from here into Tela westward.
Cordillera de ~~Capes~~ Capera
very dry, lower parts bare, with scattered uneven bush. Higher parts, partly well vegetated with what appears to be a thorn scrub or bush which seems to be general on hilly area by early, except in gloyas and braided dry watercourses, which are nearly bare
Serrania de ~~Jarara~~ Cocinas well wooded with thorn bush — a woodland — nearly leafless, many arboreous trees enough in parts to be the dominant feature of the vegetation. A small reservoir ~~[illegible]~~ between ranges of this.
Two other ranges of this running east and west. Crossed dissected country with east

of this with thorn savanna of this very uneven, with some complete bare areas. There, in one case, seem to be ~~[illegible]~~ dessicated pond. Some tiny Indian village with canals.
Serrania de Jarara — a high rugged range with a curious contrast in hue parts between a red rock and gray talus or scree slopes. In higher parts the vegetation is a scrub with scattered pine trees, in lower parts thornbush. Some green in bottoms of ravines.
This range is fairly extensive. A flatter valley and many ~~[illegible]~~ canyons, completely bare of vegetation except an occasional greatree.
~~Hatter~~ Plain north of this somewhat irregular, partly wooded with thorn savanna, partly ~~[illegible]~~ absolutely bare and eroded.
Left comes two days ride, more vegetation along them than the surrounding country.
Generally a fine mosaic of completely bare eroded areas and patches of dry grass (pay)

and scattered shrubs or
small trees, all bare
1:22 Presently north of Sierra de
Chimare, but turned back
directly west, over almost
wooded desert type of erosion,
but colors only gray, ~~and~~
brown, and tawny.
Low hills ~~[illegible]~~ to
north at an angle to coast
with coast appears, from
distance, to be rather extreme
desert. Some very large
apparently very shallow lagoons.
Apparently lined with
mangrove swamps, at least
east of Pabis tonto. These very
irregular in width
Large area southeast of Pabis
tonto is absolute desert, very
smooth and flat. Probably
salt flats. Some eroded slightly
higher ground immediately
around bay is eroded and has
scattered brush.
Large bay called El Dorado on
map has mangrove swamps
on east side but these appear
to be somewhat deciduous.
Salt flats ? on south side
higher ground with thorn
savanna in southwest,
narrow mangrove fringe
~~around~~ west extension. Large flats

if ~~other~~ [illegible] no dense
weed of El Dorado, and
general landscape
west of it is sand
thorn savanna. Again
south of Cabode la Vela
the bay is lined with
dunes and east of these are
bare salt (?) flats, very
smooth, without vegetation.
Coast southwest from here
has a broad belt of such
flats, back of a narrow
belt of dunes immediately
back of which dunes have
some vegetation.
Back of the salt flats
seems to be ~~so~~ thorn bush.
1:44 Carrizal - tiny village in
dunes along coast.
1:47 "Uruma" - another tiny
village, beyond which
the salt flats are flooded,
forming a lagoon. ~~[illegible]~~
to. The salt flats extend
a short distance beyond
the lagoon, then the thorn
bush reaches the beach.
Considerable interval, more
than is noted on map, before
the first of the lagoons.
1:52 Tanaure is reached.
Here is a large salt pan
and extensive lagoons and

salt flats extend along the coast from here on.
C beach ridge, ~~sep~~ with vegetation separate the salt flats and lagoons from the sea. S.E. end of large lagoon is a series of vegetated concentric beach ridges curving in toward lagoon, then a small outlet then extensive desiccating lagoons and salt flats.
Flat place with scarcely any beach ridge. The flats here are white rather than tawny, apparently a crust of pure salt, some sandy ridges in it with vegetation. After this broad bare flats, dull tawny in color, extend along the coast behind a well developed coastal dune ridge, this with hummocky vegetation. Evidently the tawny flats are sand but slightly higher spots vegetated. All along back of the flats is relatively level country with gray thorn bush.
~~beach flats extend~~ The sand flats extend to just before the big lagoon just east of Riohacha. There are also rather bare flats back of

this lake and to thorn forest extends out into the narrow peninsula east of it and reaching into the bay that separates it from the sea. This bar has apparently herbaceous vegetation.
Slight mangrove swamp at west end of this lagoon.
The sand flats extend to Riohacha. From there on is thorn forest, to the top of the beach for a good distance.
A few miles southwest of Riohacha is another lagoon, rather sandy, and a stream mouth with sand flats on both sides. Then the first of two large lagoons, with extensive sand flats east of it. The second lagoon seems to be almost dry, except in center, where there is a little water. The dried bed is very rather, w of this another small flat and some grassy dunes. Otherwise thorn forest or semi deciduous forest near the coast.
Possibly some swamp, but clouds cut off visibility. At least some water in a greener area than the surrounding

forest.
5:- Enea
5:13 Dibulla
considerable cleared land around Dibulla.
Some is west possibly low and marshy.
5:20 The coastal area here is mostly open and quite green, possibly marshy, considerable forest but clearing and burning going on. Some rather dry pasture. Flat area. Some low hilly land with forest. Then alternating low wooded hilly flat forested land, swamp, low hills with semi deciduous forest, then considerable reasonably level gently sloping forested land. This forest mostly evergreen except tallest trees. Some cleared land near coast growing back to brush
5:30 a large river with cleared flat land along it.
Then the coast becomes rather abrupt, densely wooded mountain slopes, with an abundance of large Tabebuia in flower, rose and greenish white (Cuipa?) These slopes seem undisturbed right down to sea

5:34 Then a flat area, newly cleared, hastily planted with bananas (?), then a narrow coastal reasonably flat strip, partly cleared, both of which are steep forested slopes.
5:39 Now extensive clearing near mouth of large river, issuing from a canyon. Then more flat cleared land, rather narrow coastal terrace, certainly not generally more than ½ km wide.
5:40 Another river valley and extensive clearing, broader terrace west of this, partly cleared
5:32 another stream, then the
coast becomes abrupt again and wooded to the shore. Some clearings in flatter places, and narrow stream valleys. Thus to Cabo San Juan de Guia. The mountains along this coast are extremely rugged and densely forested to crests of coastal ridges. Forest on crest is elevated, typical montane forest.

west of the cape the aspect becomes gradually drier. Some clearing at head of bay. Forest on coastal hills is and headlands rapidly changes to a dry ~~semi~~ deciduous and a thorn bush which surrounds the several beautiful bays. Higher mountain slopes still have wetter forest but only above 100 m. is somewhat moist.

April 11

The coast is very steep and has low wave cut bluffs. Aspect drier as Santa Marta is approached. Wave cut cliffs are almost white. Soil above is red. Back of Santa Marta the flat land is largely cleared save thorn bush. Hills scrub covered.

Valley south of Santa Marta green, mostly in bananas. Spiny trees. Hills scrub forest or scrub, some slopes bare.

Alluvial slopes above airstrip have thorn forest, small part cleared.

Flat, south of where coast turns west in bananas. Some lower spurs of mts.-

south of airport bare and eroded.

The thorn forests on the lower slopes are about 5-7 m. tall, leafless at this season. Cereus (columnar) of a fastigiate habit are abundant, Bursera, Pereskiopsis also, and several legumes. Undergrowth of leafless shrubs and an abundant large Bromelia. In the flat valley south, where there ~~is~~ no cultivation there as a thick scrub about 1.5 m. tall of a green Prosopis or Acacia, flat topped, forming a continuous canopy. The thorn forest comes down to the ~~coastline~~ flat ground in places, practically to the beach.

Around Ciénega are bananas plantations, some coconuts near the sea. Mangrove swamps abundant but not continuous around the eastern edges of the Ciénega. Much open water in them. Banana area south of Ciénega along the foot of the mountains is perhaps ½ - ¾ planted to bananas. Grassy fields sometime with scattered bushes or small trees make up the rest. This pattern extends south to Guacamayal,

where the plantations become almost continuous. A broad belt of plantation, with occasional grassy fields, extends to Aracataca.
Fields are crossed at intervals by irrigation canals and ditches.
Some sugar cane near foot of mts., not much.
West of the plantations and south of the Cienaga the land is mostly cleared and in pasture, locally with many palms left standing. From the appearance of the remnants the original forest must have been a ~~deciduous~~ ~~or~~ semi-deciduous forest with an abundance of palms.
It may be partly flooded at high water.
Around the shores of the cienaga on all sides is a broad belt of mangrove, and many islands and strips in the lake itself forming a labyrinth of channels.
West to the Magdalena is a complicated area of ponds with floating vegetation, bare saline soil, meadows, slightly higher areas of

scattered palms, dense grass that may be Paniscum, patches of mangrove.
A canal connects the river with the cienaga. Near this the land is mostly inundated, even now. Some higher sandy areas cultivated ~~Much~~ esp. across from Barranquilla. Much burning even in the marshes.
In the middle of the cienaga ~~are~~ are two towns on pilings, one of them, Nuevo Venezia, quite large, with churches, etc as well as large numbers of houses.
Below Barranquilla, east of the river the land is mostly inundated or marshy. Mangroves line the east bank. A tremendous breakwater or jetty ~~[illegible]~~ makes up ~~[illegible]~~ the west bank and projects far out to sea & conducts the silt out of the port. West of this are lagoons with considerable mangrove.
The mud from this river mouth a "boca de ceniza" colors the Caribbean as far as one can see

The land to the east of the extreme end of the entrance seems completely bare landward becoming gradually ~~so~~ grassy then great brakes of reeds with some brush. It appears that waves sweep completely over this projecting part during storms.

Leeward of Barranquilla itself is flat land with deciduous scrub forest and woodland, mostly bare now.

Between Barranquilla and Soledad airport is a similar vegetation but much sparser more scrubby and disturbed, with a network of cow paths, some of it savanna, some just dry grass. South of Soledad much of this has been cleared for cultivation and is in various stages of regrowth.

11:45 Left Barranquilla for Cartagena.

Same pattern of various stages of regeneration of scrub/and condition of overgrazing west of Barranquilla as south of Soledad. A little farther west there seems to be less overgrazing, but somewhat more land cleared for agriculture.

Following the coast southwestward, less clearing, some rather low relief, showing spots of serious erosion, tawny against the gray-brown of the scrub forest.

11:50 Manzanarosa - Rough areas here partly wooded with fairly good deciduous forest.

Then some flat areas that are cleared, with a pale buff soil, and areas of some relief with deciduous forest and scrub forest.

More flat cleared land, narrow green gallery forest or scrub along dry watercourses.

Inland a mosaic of deciduous scrub forest and cleared land.

12:34 Some relief with deciduous forest, with intervening cleared flat land.

Much clearing and burning going on in the patches of forest that are left, obviously the ~~so~~ rate of clearing to be seen far exceeds that of regrowth.

12:01 Serious overgrazing

12:09 Punta ~~de~~ la Galera - salt pans on east side of point.

Back of point some fair deciduous forest.

Ciénaga del Totumo - a shallow very complicated lagoon with some slight mangrove development, opening to sea.

~~Boats~~ West of Punta de la Galera a very striking parallel series of bars curving south and inward.

Around ciénaga the flat land is cleared and overgrazed the rough land with deciduous woods being cleared and burned.

12:08 A small crater-like pond surrounded by green forest, back of an extensive salt flat extending back from the point.

Turned inland. All of this area has much the same pattern of cleared flat pasture and wooded hills being cleared and burned. Inland there are more and more green trees and bushes, a few bananas planted here and there in ravines. Many palms scattered locally in the pasture. Circled over the area northeast of Cartagena. Several small reservoirs. Country generally very overgrazed.

12:16 Santa Catalina

10 fires visible at one time from plane at 1750' alt., many more

burned areas.

Some poor looking barrens patches east of Cartagena.

Mangroves around bay north of Cartagena, forming a very complicated pattern. Cartagena. All between the two bays covered by deciduous scrub forest, but even on this a burned area.

Much less mangrove around bay south of city. Some on north end of Isla Tierra Bomba, a little bit around other parts. The island generally covered by deciduous scrub. North end of Isla de el Rosario with considerable mangrove development. The island itself a mosaic of scrub woodland in various stages of regeneration.

Head of Bahia de Barbacoas lined with a very considerable mangrove development, also its east and southeast shores outside the Canal del Dique, a little inland of canal, also many sandy areas and desiccated ponds in these mangrove swamps, some patches of higher ground with deciduous trees. Very complex mosaic.

The interior of the large swamp area of Punta de Malagueña is probably fresh water swamp. South of this is an area of ~~[illegible]~~ brown overgrazed savanna, and patches of woodland and scrub. The coast is lined by a narrowing belt of mangrove swamp. Some low wooded hills just back of coast, increasing inland. Here also much burning and clearing.

Southward these hills get lower and lower, more and more burned and denuded. On flat ground is extensive palm savanna.

Mangrove belt has practically vanished.

Palm savanna very extensive. The palms seem to resist, somewhat, the burning. Some scrub forest with many palms. Scattered large Ceiba (?) along the ravines.

Much burning in low hilly

12-49 area back of Punta San Bernardo. Some spots deciduous and palm forest left inland from point. Extensive grassland and open savanna farther inland. Mangrove belt along Golfo de Morrosquillo much narrower than shown on map.

Inland from Tolu extensive palm savanna "Los Sabanas de Bolivar". Some semi-deciduous forest along coast. Some marsh and swamp back of this, but not extensive.

12-56 Tolu - back of it extensive savannas. South of it a tiny landing strip. South of this a very narrow belt of swamp, back of this considerable green woodland. Around Tolu some coconuts. Woodland in various stages of regrowth. Patches of woodland some palm forest.

1-00 Landed at Tolu.

Mangrove swamps here very dense, trees up to 10 m. Mostly Rhizophora, with aerial roots originating as high as 6-7 m. and hanging vertically. Some Avicennia, Hibiscus tiliaceus, Thespesia populnea planted along beach in front of town.

2-44 Left Tolu, on Cartagena going considerably ~~inland~~ southward. Savanna, inland from Tolu have green trees and bushes, mostly palms. Very few patches of woods left, these green

a partly green palms
and less common. Going
inland the woods become less
green but there are narrow
gallery forests along streams
and ravines. Smoke from
burning is so thick that visibility
is poor. Any patches of
palm savanna, & other fly
grassland without trees
are to a rather high range of
hills, wooded somewhat along
the top of main ridges and —
places on the slopes with tall
forest, semi-deciduous to deciduous
many palms in lower parts
cleared slopes mostly scrub covered,
scrub deciduous, some brown
and planted to something or in
pasture.
Followed this upland eastward
~~southward~~
It get lower and more denuded,
very rocky.
Country to east is hilly and
very much denuded. Ravines
tend to be wooded and green
what wood there is on slopes
is deciduous. ~~Same~~
Sinceleja. Turned north and
northwest. Vast savannas
and grasslands, some patches
of scrubby second growth,
especially on hilly areas.
Smoke so thick that there is no

visibility in mts. to west.
They seem more less bare
below, with woods on higher
ridges.
Hill, along course more or
less scrub covered, with
green to bare woods in
ravines.
Northwestward, hilly to
mountainous country
, ostly bare but with
many irregular
patches of green second growth.
Then hills that have
some deciduous woods then more
bare one. Most of open area
recently burned over. Considerable
flatland burned over land
Then the strip of flatter and
marsh and swamp complex
along the Canal del Dique,
east of Corfem. The woods
here are green and contrast
sharply with the brown savanna
on both sides.
Northwestward a mosaic of
cleared land and woods,
south and east of Arjona.
West and north of it almost
all is cleared and much of
it covered by low scrub, some
grassy with scattered trees
some scrubby woods in hilly
places, but far more low scrub.

around Turbaco almost all is cleared, mostly overgrazed and covered by a thin low brush. Some second growth wood on escarpment between the terrace around Turbaco and the Cartagena plain. Cartagena plain cleared and overgrazed, some areas of green deciduous woodland. Mostly grass, ~~too~~ scrub and savanna.

Trip by car to Turbaco - Soils of hills near Cartagena are gray or gray brown, darker near surface. Those of the low flats are black to a considerable depth, appear very fertile. On rolling ground toward foot of the escarpment ~~subsoil~~ soil is gray brown to dark brown, the ~~surface~~ ~~is~~ subsoil gray-brown, lying on a dense semi-consolidated clay. Here the plants look much greener.

The escarpment is of ~~coral~~ limestone. The soil on top is a dark chestnut brown or chocolate brown when moist.

Cartagena - most of the coconut trees here are diseased, characterized by extreme shortening of leaves, then death

[illegible] Lake Sanaga
[illegible] several hectares of very low cones 1-3 m. high, with considerable area, with craters in their tops from which slowly bubbles and oozes a gray fine mud and a certain amount of an odorless gas. The mud cracks into polygons with desiccation. The area is irregular, mostly bare of vegetation (elev. about ~~[illegible]~~ 10-120). Fine example of a sedge. Very forest around it with Bromelia on ground.

B. Bubbling produces sound like plumbing ~~pebbles~~ in a half barrel ~~of~~ half full of water, or like certain frogs

No obvious relation between activity of neighboring craters.

Craters vary in size from several cm. to about 1 m., mostly less than 30 cm.

Some of them seem to issue from a very narrow throat others very broad, probed with a pole to 2.5 m. before encountering

resistance.
The mud is gray, tastes very slightly alkaline, is coarse enough so that the particles are felt between the teeth. After exposure to air the surface turns rusty brown, but not rapidly.
On the surface of one of the pools was a circular patch of a brownish oil-like material. One of the local people said that at times the production of mud was much greater, especially during the night, and that the amount of oil on the surface was at times much greater, also. He said, also, that there were other areas of these volcanoes also.
The mud is firm enough to walk on soon after emission.
The temperature is very slightly below body temperature as judged by feeling several of the more active pools.
Some of the craters have a distinct rim, others are merely rounded on tops.
The cones 3 m. high are compound ones and do not stand that high

separately. The character of the slopes varies from straight and very low to definitely tending to be hyperbolic.

Apr. 12. Cartagena to Barranquilla via Turbaco.
Photographed mud volcanoes from air. Unable to locate any more, except possibly one small patch situated in a depression on top of a low hill some distance north east of main area.
The main area is definitely on a somewhat dissected terrace.
East of Turbaco the country is hilly, largely burned over, covered by secondary deciduous scrub or scrub forest in various stages of regeneration.
Approaching Repelón there is some level cultivated land, very dry now, overgrazed pastures, and some swamps with green trees.
East of this is a vast complex of lakes and ponds and seasonally flooded land.
Some green floating vegetation forming large rafts or pastures

and patches in Ciénaga de la Grupara. East of this savanna, burned over and overgrazed hills and flats, patches of palm savanna, watercourses with green trees, these large and spreading. Locally north of Sabanalarga some serious erosion on hilly places.

Grazing even more intense east of Baranoa and northward to Coledad.

April 13 - drive out of Barranquilla

Cordia sebastena cultivated much used as street tree in Barranquilla also Delonix. Zero casei and D. coccinea common. A red flowered and an orange flowered form of Cordia sebastena. Cassia common, also Pitcheardia pacifica.

Calotropis is common as a weed around outskirts of city.

Here there has not been very recent clearing and no grazing (on road to Puerto Colombia). The vegetation is a scrub forest of bare trees up to 6 m. tall.

of several species not identified except that one is a crescentia. Undergrowth too dense to walk through, mostly bare but some species green, up to 3 or 4 m. high. The whole is tangled with woody vines, also mostly bare. Most of these plants are not spiny, except a small palm with excessively spiny stems and a Theophrasta with leaf tips spinescent. Also what appears to be Pisonia aculeata, completely bare of leaves but with flower buds. Cordia rather common with green leaves, white fls.

Across street, where the land is fenced, the undergrowth is broken down by cattle.

Soil here is a gray sandy loam but is rather thin on a white chalky soft rock, occasional small areas of compact brown sand.

Fence posts all living trees of Gliricidia sepium a "matarátu", which seems to be universally used for this purpose here.

In ravines the trees reach at least 16 m. in height. A species of Sterculia is evergreen and conspicuous but not abundant. Pereskiopsis with long

needle-like spines and a spiny Pithecellobium ~~sta~~ vel aff. he found but rare. Large Cereus is rare.

Road to Boca de Cenizas - much industry, especially on river side of road. Vegetation low and weedy or brushy. Beyond industry a patch of bare sand dune, crescent shaped, moving away from river. Then a low leguminous scrub, mostly green, some Cereus. Scrub generally 1.5-2 m. high, maximum 3 m.

Farther out the scrub is lower, more wind swept. Cactus become common. Then mangrove swamps alternating with consolidated dunes. On the dunes is a rather thorny scrub of Acacia? Randia, Cereus, Theophrasta, ~~[illegible]~~; Opuntia etc. 4 m. tall.

Cn. On flat low ground between patches of mangrove are ~~[illegible]~~ Distichlis and Batis maritima.

The mangrove here is Avicennia sp. and is mostly quite low, 1-3 m. but occasional trees that have escaped

cutting for a time are up to 7 m. tall. Prop roots are present but not well developed. Above a certain tide level the Avicennia survives cutting and sends up sprouts. However, out in the flats that are submerged large areas have been cut and have not recovered. It is possible that the stumps represent some other species, of course.

On the low bluffs landward is a spiny scrub of Acacia sp. and a number of other bushes including ~~a~~ very spiny and painfully stinging Cnidoscolus with a sulcate stem. Though grazed this scrub is still very hard to walk through. It is about 3/4 deciduous.

Acrostichum aureum common locally in the mangrove.

On way back, green leguminous scrub is on ~~of the~~ low ground, giving way to deciduous as soon as slightly higher ground is reached.

1958 Colombia

April 12 - Burisaco Mud Volcanoes about 6-8 km. e. of Turbaco, s.e. of Cartagena

39413 Fimbristylis — densely caespitose, forming patches.
3 the only plant on the mud volcanoes

April 12 - e. of Turbaco, s. e. of Cartagena
in second growth thickets

with E. Paragallelus

1 14 Cassia — fruit immature, shrub 2 m. tall, flowers white, contorted, fragrant.
1 15 (spec)
occasional

April 12 - north of Barranquilla on road to Boca de Ceniza, Atlantico
on consolidated sand dune just above mangrove swamp

2 16 Randia — stiff shrub 2 m. tall, fruit black.
common in deciduous scrub

*1 17 Conocarpus erectus L. — small tree 4 m. tall.
occasional just above mangroves

April 12 - west of Barranquilla on road to Puerto Colombia
in dry deciduous forest

2 18 Crotalaria — low suffrutescent herb standard lavender, lined with purple, keel deep purple.
common in clearings.

4.1 19 Cordia — shrub or small tree 2-4 m. tall, flowers white, fruit immature; buds curiously appendaged.
common

April 14 - between Barranquilla and airport Soledad
The deciduous woodland has between the trees a rather thick herbaceous ground cover, now completely dry. The trees are mostly spiny acacias about 2-3 m tall. Farther away are some larger bare trees, perhaps 3 m., widely spreading. Cacti are common - Opuntia and a low cereus.
Gliricidia sepium is present as living fence posts, fully leafed out and green.

April 14 - flight Barranquilla - Tocumen, Panama (1 hour 35 m)
Calotropis ~~very~~ abundant around airport, locally.
11:50 Took off.
Open grassland between airport and Rio Magdalena, also on island in river.
Barranquilla is a great sprawling city with many trees in residencial areas; rather concentrated business area.
Deciduous woodland with scattered green trees northwest

of city. Watercourses lined with green trees. Some open hay grassy fields.
A few small ponds made by damming ravines - water very green.
Many small burned areas.
12:00 Puerto Colombia - port with no harbor - pier projecting beyond bar which encloses lagoon.
" From here went out 9 nm. Rather muddy apparently shallow water for a considerable distance, bounded very sharply
12:05 by blue water - perhaps this is not shallow but is merely the mud from the Magdalena.
1:00 Over Isla de Tierra Bomba (Fort Blasco) - type of island. Looks like a man-apparently a coral fringing reef with small apparently protected inlets with white sand showing through sparsely vegetated interior of islets - apparently a very thin coconut plantation. The coast of the bay over which we have a typical forested appearance. Fort Blasco [illegible] the [illegible] of a [illegible] reef around the top and a reef inside around the gulf of Barbas. Is the gulf [illegible] this

[illegible] mainland coast are

Several tiny islets ~~in the bay~~ are completely covered by thatched houses, crowded so closely that no ground shows. The coast of this bay shows much shifting cultivation, inward for perhaps several km. After that is solid unbroken rain forest until first small river is crossed, along which are scattered clearings, and others from here on.

1:08 Approaching a largely cleared valley
Ridge-tops in forest with dwarfed vegetation, some bare and brown, obviously burned.

1:10 over airport. Country ~~[illegible]~~ ~~east of~~ around it bare, burned over, showing patchy red and pale buff soil
23 fires visible at once toward canal zone.

1:14 Approached Tocumen –
Fires in all directions
Some ~~veg~~ forest along streams

has escaped burning
Grass is mostly brown and dry.

[illegible] Took off from Tocumen.
[illegible] generally [illegible]. Along the Pacific coast there is a well developed but narrow belt of mangrove as far as Panama City. The coast is remarkably straight. Incidentally we [illegible] the [illegible] Panama City.

[illegible] Land cleared [illegible] along a few [illegible] completely drained [illegible] a lake, the country around is [illegible] largely in shifting cultivation but [illegible] forested, hilly. Soil bright red. Apparently this is the southeast extension of Gatun Lake.
Between here and the coast west of [illegible] is forested country but showing many clearings in various stages of regrowth, some fresh ones.
Small streams entering all along the coast have very black water at least [illegible] from high altitude.

[illegible] Left coast.

3:1 Passed [illegible] [illegible] ~~[illegible]~~ [illegible]
in distance to left. [illegible]
[illegible]. [illegible]
[illegible] [illegible] point
northwest of the [illegible]
banana plantation.
3:31 [illegible] [illegible]
is about half cleared and
planted to something — in
primitive arrangement —
possibly [illegible]. [illegible] wooded
[illegible] northwest of the
[illegible] straight
[illegible] [illegible] dark gray
[illegible] narrow beach.
Between [illegible] [illegible] of
very muddy water [illegible]
origin is not evident. Back
of the beach ridge is
a vast area of swamp
with black water and
[illegible] running through it
[illegible]
3:34 Crossed a very muddy river
which probably is [illegible]
of the [illegible] and is evidently
[illegible] southeastward by a
big [illegible] current a [illegible]
[illegible] mouth of the river.
Probably the river running
down from [illegible].
North west of here solid
dense forest.
[illegible] [illegible] patches of grass, [illegible]

[illegible]
[illegible] [illegible] but
not [illegible] [illegible]
[illegible].
3:46 [illegible] grassy [illegible]
small meandering stream.
3:47 [illegible] [illegible]
ponds. [illegible]
[illegible] swamp.
3:48 From a long [illegible] of
grass with abundant
patches of trees. [illegible]
[illegible] [illegible]
[illegible] well be [illegible]
[illegible] [illegible] of [illegible]
[illegible] [illegible] very muddy [illegible]
[illegible] [illegible]
[illegible] [illegible]
west of it [illegible] area of
[illegible] grass and [illegible]
[illegible] [illegible]
[illegible] [illegible] evident
by [illegible]
inside
Many patches of [illegible]
vegetation on the forest [illegible]
[illegible] probably swamp.
[illegible] [illegible] [illegible] forest
[illegible] [illegible]
[illegible]. [illegible]
[illegible] [illegible]
3:56 Abundant [illegible]
[illegible] ~~[illegible]~~ [illegible] appear to
be dense [illegible] forest. [illegible]
become [illegible]

abundant. Mombacho being
cloudy [illegible]

4 [illegible] general aspect of the forest [illegible]
type. Changing [illegible]
different dry [illegible],
[illegible] [illegible]. [illegible]
[illegible] [illegible]

[illegible] [illegible] [illegible] of [illegible]
5.12 [illegible]
[illegible] [illegible] [illegible]
[illegible] on a [illegible] [illegible]
[illegible]

5 [illegible] [illegible] [illegible] [illegible]
5 head of lake [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible]
[illegible] ~~[illegible]~~ of [illegible] [illegible]
[illegible] [illegible] and [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible]
Isletas [illegible] lake [illegible]
Isla San Bernardo [illegible]
[illegible]

5 Passed a set of symmetrical
volcanic cones [illegible] [illegible]
There was puff of smoke
as we passed [illegible] [illegible]
[illegible] it is not possible
[illegible] of it [illegible] [illegible]
of these [illegible].
We saw about a different
[illegible] [illegible] that
[illegible] [illegible] [illegible].

5 passed head of lake - [illegible]

every day.

5.9 [illegible] Nicaragua
[illegible] [illegible]

5 [illegible] island in lake Nicaragua
[illegible] [illegible] [illegible] grassy
[illegible] slope

5 Looking ~~[illegible]~~ [illegible] of Momotombo
[illegible] [illegible] [illegible]
slopes [illegible] [illegible]
[illegible] [illegible] [illegible]
Forest slopes [illegible],
Cordillera de Los Marabios
[illegible] [illegible]
except upper slopes [illegible]
crater.

Middle part of [illegible]
grass [illegible] [illegible]
sharp [illegible] the west slope
part below the top.
[illegible] at base [illegible]
[illegible] [illegible] but
[illegible] [illegible] [illegible]
fields

ascend? Steep slight smoke from
[illegible] the [illegible] crater
several wooded [illegible]
[illegible] west slope [illegible]
Much [illegible] at base
[illegible] [illegible] of [illegible]
[illegible] [illegible] of [illegible].
Possibly the smoke from
[illegible] [illegible] [illegible]
for the haziness and poor
visibility [illegible] many [illegible]

1954 Nicaragua – El Salvador

Intensively cultivated country, sometimes multiple terraces of grass, low shrubs, partially cleared, numerous stages of growth. Flow continued with the power while spells of gulley forces. Grand Bay Lake belong. The south side of gully, deforested from at Dyo vegetation. Steep ridges. Flats bare of trees or vegetation at all.

Huge earth or mountain or peninsula, sometimes coming from a gently layer of slopes of mountain. Gulf and from side. The underlayer to be of some volcanic lava, covered by a mixture of rounded green trees.

Have cut cliffs along coast. Influence of tides Lagoon.

5 Tuna Campana – Marigot swamps around bay back of land of point.

West of this a long very straight pale grey beach. Back plus a long gully parallel to coast, lined with mangroves.

Back of this dry mountain slopes, mostly cleared but some forest left on higher slopes.

Cultivated, fully cultivated, fully partially cleared.

6 Lake Managua – Lake approximately circular, with a crater in upper not nearly.

6 Lake Managua – Lake water very extensively cultivated.

6 Another cone, lower but closely resembling some, deeply eroded, steep steep.

Distributed mangrove forests of Amatique.

Mountain slopes most of the way steep, eroded, steep slopes and lowland cleared, dry.

6 Coastal Rio Lempa – Wide valley, partially cleared, dry, most level part, most of lower part, separated by ridges.

6 Approaching Lake Izabal – Indian mounds on top from a lower or slope, wooded, slopes and ridges, lower and dry. Streams and little water, clear.

Large mound on top of hill east of Lagoon Lake Izabal – Large mound, dry, inlets in lake.

Stalactite on pinnacle, a large cavern.

Coast running west of lake

[illegible] pattern
of [illegible] and
[illegible]
Slopes on steep [illegible] impossible
and [illegible] to [illegible]
[illegible]
[illegible] by Salvador
[illegible] on slopes
above [illegible]
Lands planted on flats
or slopes. Sugar cane and
[illegible] on level ground.

508 Land left from [illegible] Salvador
[illegible] for pasturage
[illegible] Sparsely
[illegible] cleared,
grazed or cultivated.

Two deep graded gulches
separated by [illegible]
[illegible] with seed.
[illegible] above
the leading [illegible] of a [illegible]
[illegible], [illegible]
[illegible] by deep wooded
gulches. Cleared [illegible]
[illegible]
[illegible] very [illegible]
[illegible]
Many of gulches [illegible]
[illegible] cane, [illegible] generally
[illegible], cultivated [illegible]
[illegible] between fields.

[illegible] conditions
[illegible] for [illegible]
[illegible]
[illegible] long [illegible]
[illegible]
[illegible] and Guatemala [illegible]
and [illegible]
Deep gorges cut in [illegible]
of [illegible] and [illegible]
[illegible] not to [illegible]
[illegible]

[illegible]
Rivers [illegible]
[illegible]