

The image shows the front cover of a record book. The cover is light-colored with a fine, woven texture. A large, stylized letter 'R' is printed in the center, formed by a decorative border of small circles. The word 'RECORD' is printed in a bold, serif font across the middle of the 'R'. The cover has rounded corners and a dark, possibly black, spine on the left side. The overall design is simple and functional, typical of a record book from the early 20th century.

RECORD

Pages

Flight New Orleans to Merida..... I

Mexico..... 1-107

Yucatan..... 1-8

..... 110-121

Merida-Chichen Itza by car..... 110-120

Chichen Itza

Specimens collected #1894-1935..... 120-121

Alacran..... 8-100

Peres Jalat..... 8-27

Specimens collected #1862-1866..... 8-9

#1867-1874..... 16-17

#1875-1882..... 26-27

#1883-1893..... 68-69

..... 70, 108

#1913..... 82-83

Patrol records..... 31-37

Wind directions..... 38-67

Chico I..... 71-75

Specimens collected #1905-1912..... 82-83

Peres Jalat..... 76-87

Specimens collected #1894-1904..... 82-87

Trip to Desterrena Cay by boat..... 98-108

Specimens collected #1914-1921..... 102-103

#1922-1933..... 106-107

Maryland

Betta Woods..... 128-129

Virginia

Wildcat Mt. beyond Bethel..... 122-125

Specimens collected #1936..... 124-125

Official Forester.

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and of Agriculture

John

Field

for

signature

Collection and Field Note Book

No. 62

(June 29, 1961 - Sept. 23, 1961)

(41862 -- 42180)

	<u>Pages</u>
Flight New Orleans to Merida.....	1
<u>Mexico</u>	1-107
Yucatan.....	1-8
.....	110-121
Merida-Cichen Itza by car	110-120
Chichen Itza	
Specimens collected 41934-41935....	120-121
Alacran.....	8-108
Perez Islet.....	8-27
Specimens collected 41862-41866	8-9
41867-41874	16-17
41875-41882	26-27
41883-41893	68-69
.....	70, 108
41913	88-89
<u>Rainfall</u> records.....	31-37
<u>Wind directions</u>	38-67
Chica I.....	71-75
Specimens collected 41905-41912	88-89
Pajoros Islet.....	76-87
Specimens collected 41894-41904.....	86-87
Trip to <u>Desterrada Cay</u> by boat.....	98-108
Specimens collected 41914-41921....	102-103
41922-41933....	106-107
<u>Maryland</u>	
Belts Woods.....	198-199
<u>Virginia</u>	
Wildcat Mt. beyond Bethel.....	122-125
Specimen collected 41936.....	124-125

Virginia (continued)

Shenandoah National Park

Knob Mt.....	41937-41967.....126-137
.....	41968-41976
.....	136-137
Matthews Arm, Fire Trail Gate.41981....	138-139
Bear Wallow	41977-41980 136-137

California (Hayward)..... 42180.....196-197

Hawaiian Islands..... 140-194

Hawaii & Maui

Hilo & vicinity	41982-41992 140-143
Kulani Road ... (Maui) ..	41993-42000 144-145
Haleakala Rd, Hosmer Grv	42001-42002 147-149
Waikamoi Stream (Maui).....	148-149
West Maui (Maui).....	150
Auwahi (Maui).....	42017-42035 154-159
Waikamoi Stream.. (Maui)	42039-42041 158-159
Haleakala .(Maui).....	42041a-42044 ... 160-161
Malamaki Forest Reserve.....	162
Kilauea, Stainbach Hwy.42045-42051....	164-165
Kulani-Mauna Loa.....	42052-42063.... 166-168
Kulani Prison Camp, w.	42064..... 168-169
Haw. Vol. Nat. Pk, Hilina Pali..42065.....	168-169
Kilauea Iki.....	168-169
City of Refuge, S. Kona...42066.....	168-169
Hutchinson Mill, Naalehu.....	170
Keauhou Bay	42067..... 170-171
Manuka Park	42068-42078 172-173
1868 Lava Flow	42080-42083 174-175
Hutchinson Sugar Mill..	42084-42085 174-175
Kaupulchu Rd, N. Kona	42086-42099..... 174-177
Keauhou Rd to Hualalai..	42113-42122 180-181
Puu Kawaiwai, Kohala ..	42123-42142 184-187
Saddle Road	42143-42147 186-189
Puu Hulukulu	42148-42161 188-191
Pokakuloa	42162-42168 190-193
Kaupulehu Forest	42169-42174 192-193
Hilo.....	42175
.....	192-193
Akaka Falls.....	42176-42179 192-195

Oahu

Kaena Point.....	42009-42014 150-151
Honolulu.....	42015-42016 152-153

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Provided, that the provisions of Chapter 16, R. L. H. 1945, and any other laws applicable thereto, and all rules and regulations of the Board of Agriculture and Forestry pertaining to forestry shall be strictly observed.

8/14, 19*6* *Walter N. Hall*

Territorial Forester.

Locality usually
also follows date

Locality - Specific name
or distance or direction

Occurrence - Environment
or how plants grow.

Specific description
is remark

Jatropha urens L.

Chenop. ambrosioides L.

Port. grandiflora Hook.

Mentha spicata L.

Cyperus planifolius
L. C. Rich.

Cymodocea

manatorum Asch.

but see

Syringodium

bilobum Kütz.

Jour. Bot. Apr. 1939

Tell Walker of
Syringodium isoetifolium (Asch.) Dandy
Jour. Bot. 77: 116, 1939

F. R. Fosberg
Collection Book no. 42
begin with # 41862

42180



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1941

Louisiana

1

June 29 - New Orleans to
Merida - Jet.

Mississippi Delta
has a great proportion
of water, in pools, lakes,
channels and innume-
rable straight ditches.

Near New Orleans pools
and channels are
largely lined or covered
by a pale green floating
plant very probably
 Eichhornia crassipes.

Farther west and
south this disappears
and the dark water
does not seem to have
any vegetation in it.

The lakes here are larger.
The ditches have enlarged
ends. White sand(?) lines
many of them.

1961

Mexico - Yucatan

June 29 -

Alacran Reef, from air.
regular unbroken reef
front to n.e.

Two small sand bars,
one with a bit of vegetation
on west side. Lagoon
is mostly filled with
a maze of reefs. Four
cays on south side, east
third, all vegetated; but
only the larger one densely
so. No real open water
in lagoon, but more
open water in west south
part and in extreme
southeast part.

Islets are very small.

Yucatan

Barrier beaches with
white sand, scattered
clumps of vegetation
then thin dull green scrub
with some sand showing
in a sort of reticulum
thus gradually getting
greener and denser
with only cow paths
showing. Then large
cleared fields, in varying
degrees of revegetation.
Small clearings, then
obvious plantation patterns,

but this apparently
not cultivated, or only
partly so. Many
abandoned fields ^{toward} ~~at~~
Merida. ~~North~~ Merida
much apparent scrub
forest. Some sisal (?)
plantation, many
small bare fields,
gardens, large fallow
fields, some bare
reddish or white ground
showing in scrub
forest. This locally
closed, locally open.
Much cutting and burning.
Extensive areas of sisal.

June 30 - Alacran Reef
Perez I.

Lighthouse built 1900 Dec. 13th
acc a plague on the foundation.
Casuarina planted in
1917 or 1920.

Sr. Cabañas has been here
caring for the light for 29 years.

From the top of the light
house one sees that
Suriana has spread
over most of the island.
A strip along the west side
has clumps of *Tournefortia*,
probably has been added,
as have horns projecting
to leeward at both ends.
These disappear during
seasons when winds
are from west, reappearing
during trade wind seasons.

Casuarina, *Cordia*
sebastena (leafless but
flowering), *Coccoloba*
have been planted,
acc. Sr. Cabañas, also
a patch of *Opuntia* to
north of the light.

Sooty tern rookery
occupies interior north
of light.

Casuarina planted
around buildings
and a row to north
scattered ones to south.
Apparently do not
establish themselves
from seed, at least not
much.

Enormous numbers
of sooty terns on ground,
many noddies ~~sitting~~ in
Suriana bushes and
Casuarina. Appear to
be common noddy, but
rather light colored.

Nests of Suriana
twigs, bulky and poorly
formed. a few have
eggs and newly hatched
young, some fully
feathered out young.
Many young sooty
terns, almost full
grown and fully feathered
but scarcely able to fly.
Breasts dark, anal parts
pale gray, back black,
barred with buff to white
on feather tips.

Farther south hundreds
of frigate birds sitting
on Suriana.

Interior of south part of island entirely covered by an open scrub of *Suriana*, some of it more or less dead from effects of enormous numbers of bird - feathers all over bushes, globs of guano. Even the sooty terns roost in hundreds on the bushes, though in tens of thousands in spaces between. Guano pile made by frigate birds (photo.)

One noddy nest ornamented by 25-30 shell halves + some fragments.

No ground flora at all.

Inner beach has apparently been added to, as upper slope 4 m or so wide, has no *Suriana*, but has scattered plants ~~as~~ of *Euphorbia buxifolia*, mats of *Sesuvium*.

rounded clumps of *Atriplex*, dry skeletons of *Calile*, etc. becoming more luxuriant toward the south point, where

there is a small secondary lagoon surrounded by gravel bar with only a very sparse vegetation. The pond opens to the lagoon at its inner, seaward end, as a few shrubs of *Avicennia*, and luxuriant mats of *Sesuvium*.

On the gravel bar, made up of worn *Acropora* fragments, *Euphorbia buxifolia*, on wider parts a few tiny shrubs of *Suriana*, ~~several~~ ^{several} of *Tournefortia*, one of *Atriplex*,

some larger dead bushes of *Tournefortia*(?).

(4) Locally quite a few *Suriana* seedlings. Small flock of terns? and a smaller noddy with head only slightly paler but with sharp white lines over eyes.

Calile skeletons locally abundant on end of hook.

On tiny bar islet beyond this one *Sesuvium* plant.

Two sea grasses -
Thalassia (wide lvs.)
 and *Diplanthera*? (narrow)
 piled up in quantities
 in embayments in this
 secondary lagoon.

Thalassia testudinum
Diplanthera wrightii

June 30 - south end of
 Perez Islet, Alacran Atoll
 on upper part of
 lagoon beach.

41862 *Euphorbia buxifolia* Lam.
 common

5 63 *Cyperus planifolius*
 rare

5 64 *Caecilia obtusa* var. *abscissa*
 common

5 65 *Euphorbia buxifolia*
 common

5 66 *Avicennia germinans* (L.) Stearn
 very local, one small
 colony on shore of small
 pond in secondary lagoon.

No guano at all seen
 accumulated in sooty
 tern rookery, except where
 frigate birds roost.

Yucatan - Alacran 9

Diplanthera growing
 abundantly locally
 at low tide level on
 lagoon shore.

Small dark heron seen
 on one of lagoon bars.

branches ascending.

Tufts, culms spreading.

All seen were dead
 and in fruit - a truly
 annual species.

very ~~deeply~~ ~~root~~
 large root system,
 lactiferous dwarf shrub,
 thickly branched
 shrub 2.5 m. tall; leaves
 very glaucous beneath;
 flowers cream white
 with pale orange-yellow tube,
 inflorescence blackish.

Sooty terns not seen
 defecating in air over
 land, but noddies were
 some.

This has been a very severe dry season. Many of the plants show it. Hard to tell if effects seen, esp. the poor condition of much of the Suriana, is due to rain or birds.

Planted species are, acc. Sr. Cabanas, *Casuarina equisetifolia*, *Cordia sebastena*, *Coccoloba uvifera*, and *Opuntia dillenii*. Cereals also planted at various times but haven't grown. A row of small *Cremum* sp. planted near house.

July 1 - Perez!

Opposite lighthouse on lagoon shore is a lobe of sand flat with sparse vegetation of *Euphorbia*, *Tournefortia*, and saplings of *Suriana* up to 7m tall. one large mat of *Sesuvium* that is almost dead - a few stems only still green. ^{dead lobe} sand lobe surrounded by small beach ridge very low.

Yucatan - Alacran R. 11

Photos of noddies roosting on dead *Suriana* bush, lagoon shore. These bushes undercut by wave erosion on this stretch of beach s. of sand lobe. (photos)

The *Sesuvium* has rather light pink flowers, a little, but very little red pigment in stems, erect somewhat compressed, not glossy but not conspicuously dull leaves.

South end of islet - panoramic series of photos of seaward lobe taken from near head of secondary lagoon with *Avicennia*.

Series of small gravel beach ridges curving out to form a lobe.

The lobe, itself is bare and white. Back of it the parallel ridges are largely covered by an open stand of dwarf scrub of *Euphorbia*. A large bush of *Avicennia* in edge of open *Suriana* scrub back of the *Euphorbia*.

The lobe is built out around a couple of ponds, which are partly filled by gravel sheets. (photos). On the absolutely white accropora gravel a few spreading tufts of Cyperus. no other plants. On the core of the lobe, between the 2 ponds, (a) Euphorbia, (b) Tournefortia, Suriana scattered half way out.

One dead Cabile plant with the Cyperus.

Toward end of lobe are areas where numerous Cyperus seedlings and even some older clumps, and some Euphorbia and Tournefortia are dead or dying. Appears to be where there has been some recent wash over of salt water. Probably concentration of salt by evaporation has killed the plants.

In some fresh ~~sand~~ beach surfaces the top cm. or so is pale green, but surface is pinkish white.

In largest pond 1 m or less deep, a profusion of fine diffuse green algae, some *Diplanthera*.

Two turtle burrows on sand.

Toward base of lobe Euphorbia is much more green and luxuriant than seen anywhere else. Two plants of Cabile are green, several dead.

Along first part of seaward coast a ridge seems to have been added, sloping toward a 'trough' just outside the Suriana. Seaward part of it then cut away. ~~by~~ ^{by} few Euphorbia on landward slope, fair sized plants.

Back of this, which is perhaps 10 m. wide, is a terrace or berm 1.2-1.4 m. wide with ~~an~~ ^{irregular} open dwarf scrub of Tournefortia with ^{at} south end and ^{near light house} scattered bushes of Suriana 1-²/₃ m. tall. 1 sooty tern egg on sand.

This is about 1-1.5 m lower than the edge of the main Suriana covered flat of the island. (photos)

This edge is really a miniature dune ridge, sand caught by the *Suriana*. Inside the flat is much lower, with open *Suriana* scrub 1 m. tall, partly dead. (photos)

A few large seeds - several kinds, on seaward beach. *Cakile* and *Tournefortia* abundant near parent plants.

North of lighthouse - Open planting of *Casuarina* to 5-8 m. tall, in an open scrub of *Suriana* about 1.5-2 m. tall, except near beach partly or mostly dead. Enormous numbers of sooty terns in the bushes and on ground. Ground smooth and packed. No ground flora at all. (photos)

Several patches of *Opuntia dillenii* forming a dense scrub 0.7-1 m. high. (photos)

Noddy nest of twigs

piled almost 1 m. (photos)

Most of lagoon beach north of light has a broad low beach ridge completely occupied by *Suriana*. This is greener on beach ridge than in interior. Near north end, where it begins to curve seaward, there is some open sand on lagoonward slope of ridge on this are scattered *Euphorbia* tufts, ^{some of them} quite green, and dead *Cakile*. Locally some dead tufts or bases of *Cyperus*, upon berm.

Quantities of dry *Thalassia* blow inland, mixing with dead *Suriana* leaves to make up the litter. Some *Sargassum*, also.

At the north end are two sand lobes - one small one on the lagoon corner, a large one on the seaward

July 1 - Perez I., Alacran Reef (atoll)
on nearly bare sand terrace on seaward side, south end.

- 41867 *Portulaca oleracea* L.
occasional
- 5 68 *Calsila dentata* var. *alacranensis* (Nilspp.) Schulz
only two green plants seen, numerous dead ones.
- 1 69 *Tournefortia graphalodes* R. Br.
abundant on beach terrace.

July 2 Perez I. Alacran
on narrow sand terrace at top of beach along secondary lagoon a pond at south end.

- 5 { 70 *Atriplex pentandra* (Jacq.) Standl.
- 5 { 71 common

forming meadows on bottom of pond.

- 5 72 *Thalassia testudinum* Kien. + Sims
abundant,
- 5 73 *Diplanthera wrightii* (Arch.) A. Br.
abundant

edge of small pond just at high tide level

- 5 74 *Sesuvium portulacastrum* L.
locally abundant

To p. 26

stamens
17-22

flat mats, leaves rather thin; ^{less than 1 cm.} fls. yellow ^{across petals} fleshy, branched from near base.

dried fruits abundant on ground.

rounded clumps, much branched from base.

forming a dense sod with tangled rhizomes, forming a dense sod with tangled rhizomes.

fleshy, ^{green, only slightly reddish at nodes,} stems prostrate with ascending or erect branches, leaves somewhat compressed, not or scarcely glossy; flowers purplish pink.

corner, this is ending in a very narrow almost straight sand horn, this being eroded away by lagoon waves.

(Photos of the ^{open} Tournefortia scrub vegetation of the large lobe, bordered by ~~the~~ open dwarf scrub of Euphorbia, and of sand horn, and of wave erosion cliff about 3 dm. high along north shore.

Also of bare strip ^{each} seaward ~~to~~ shore, in front of Tournefortia belt.)

A few scattered Suriana bushes are in ~~the~~ the Tournefortia scrub on the lobe. The scrub generally is about 0.7-1 m high,

open, of round spreading patches separated by sand. A few Euphorbia clumps in the open.

Also much dead *Cakile* especially on bare flats near shore.

The Tournefortia does not come very close to shore in some places.

No vegetation on the sand horn except that the upper

few mm. of the sand are greenish with algae. This is where sand is wet by sea water.

Some open areas in the Tournefortia scrub are occupied by an open dwarf scrub, 3-4 dm tall of Euphorbia, much affected by drought, rather dry-looking, some bushes dead.

Much open sand here, all white, no algal crust at all, no any darkening by algae. The sand is fine but with some admixture of shells and coral gravel.

Some unhealthy spreading *Cyperus* tufts.

This whole lobe, about 100 m. long, from base of horn, to edge of tall Suriana scrub, gives impression of being much younger land, probably deposited after Millsbaugh's visit.

Along seaward side a broad beach ridge or low dune ridge, about 1 m high, 25 m. wide, covered by Suriana scrub 2-2.5 m tall mostly green.

Outside this is a very shallow depression and slope up to a low beach ridge, forming a flat about 50 m wide, from edge of ^{suriana} scrub to top of beach. This is occupied by widely scattered *Tournefortia* patches scattered *suriana* bushes, an abundance of dead *Cabi* (one green plant seen), a few large flat plants of *Portulaca*, a few poor ~~patches~~ tufts of *Cyperus*, or very few *Euphorbia* bushes. The woody vegetation much sparser toward beach. *Cabi* abundant there.

(Photos ending roll 3 of this flat.) (Thou before of birds in *suriana* scrub and on *Casuarina* trees.)

Near north end, about 30 m in from top of beach on the flat are 3 large thick slabs of a compact limestone rock 50 cm or more long, half as wide, lying together.

3 graves at north end, one from 1901.

Along middle of seaward coast the *Tournefortia* clumps 3-5 m across, seem to accumulate low mounds of sand.

The dune ridge here is about 2 m. high, broad and rounded.

At night the sooty terns seem still to be resting on the ground and on bushes, making less noise than during the day. A strong light scares them up but they fly with much less swiftness than in daylight.

Ghost crabs are numerous along and just above the beach, all sizes up to 15 cm. across between leg tips. If surprised near their own holes they dart down, but apparently don't care to go into any except their own, as

they will run long distances when pursued. Sometimes in loose sand they will quickly wriggle down into the sand. Others simply freeze with eyes sticking up and will not move until touched.

Only one small *Gecarcinus* was seen, with bright red claws. It was spawning cautiously with a much larger *Cyprida*.

July 2 - north of lighthouse buildings -

pit dug 68 paces from lagoon beach, 90 paces from seaward beach, on ground sloping gradually from dune ridge to lagoon beach.

1-2 cm. of loose dry sand and litter (from *Lunaria*) on top of a somewhat caked layer 14 cm. thick. First traces of moisture at 25 cm. from 25 to 40 cm. a layer of somewhat

mottled slightly darkened sand with numerous *Lunaria* roots. Below this a coarser shaggy white sand with scattered rather rotten pieces of white coral.

The upper 10 cm. or so is finely and irregularly bedded with dark and pale layers.

Sample 1 from upper 3 cm.

2 from mottled layer of about 25 cm.

3 from nest 30 cm.

4 nest 40 cm.

wet layer 5 there to H2O

to rocks & sand from wet layer

water at 5' 3"

Profile

3-10 cm. fine sand,
thinly and irregularly
bedded light and dark
gray brown.

10-35 cm. medium fine
sand, pale brown
and yellow brown
irregularly mottled
first traces of moisture
at about 25 cm.
Suriana roots in
this zone, up to 1 cm. thick.

35-65 cm. coarser pale
sand with fine roots
scattered through
it.

65-105 cm. coarse sharp
very pale sand

105-140 cm. coarse sharp
white wet sand
with scattered coral
fragments.

Water level, at 12:10 p.m.
133 cm. same at 3:30
water quite salty -
(2 samples.) at 6 p.m. 5'0

Trench in beach
at about mid tide
level - ~~of~~ seaward
beach opposite hole.
Mostly finger-like
fragments of a small
coral.

This extends back
under a layer of
dune sand or
storm beach.

Interstices filled
with fine sand
with a little silt.

Toward lagoon
from hole - about
half way, at lowest
level, the surface
is caked with quartz,
but the layer is no
more than ~~about~~ 1 cm.
thick. Under it is
15 inches of dark
gray brown ~~so~~ ~~too~~
loamy sand before
it becomes pale.

During rainy weather,
acc. local people, water
wets this place and
soaks into ground.

Nearer beach the soil
becomes progressively
paler and sandier,
coarser near beach.

July 2, Perez Islet

41875 *Suirana maritima* L.
5 The dominant shrub over almost the whole island.

planted around lighthouse building

6 76 *Casuarina equisetifolia* L.
common

6 77 *Cordia sebastena* L.
common

6 78 *Coccoloba uvifera* L.
local, a few ~~tree~~ shrubs

1 79 *Nopalea cochinillifera*
two plants

growing on coral heads on watch reef in lagoon opposite Perez I.

1 80 *Turbinaria*
occasional

July 3 Perez I.

planted in pots in an enclosure of bamboo.

1 81 ?
volunteer in pot of something else that did not grow

1 82 *Jatropha urens* L.

to p. 68

many stemmed much branched shrub 2 m. tall; trunks used as fuel by people.

small tree 6 m. tall. (all from one tree).

small tree, 3 m. tall, completely leafless (leafy branches from ~~very~~ young shrub 1.5 m. tall, not flowering), flowers brilliant orange-vermillion.

very diffuse, sprawling shrubs 2 m. tall. erect, 1 m. tall; fruit purplish red.

sterile, erect, unbranched seedling 5 dm. tall

shrub 1 m. tall leaves eaten, sap somewhat milky.

1941 Mexico - Yucatan

Patch reef in lagoon
opposite Perez.

Roughly circular area
100 m. or so across, from
1.5 to 3 m. deep, more or less
flat, covered by broken
pieces of *Acropora*
Cervicornis and fine
silt to sand white
sediment. Abundantly
scattered over this are
two ^{or three} types of brain corals
reaching enormous
size, 1-2 m. diam.
Attached to these are
sea fans and gorgonea
, also soft
corals and an erect
sparsely branched black
gorgonian, all in abund-
ance. Patches of
Acropora cervicornis
are common. *Diptyota*

Halimeda, *Turbinaria*,
and *Cladophora* are
common. *Penicillaria* flats.

Diadema are very
common in cavities,
and crevices and
interstices. Occasional
Panulirus.

at least two kinds
of tube worms in and
on the brain corals, one

Alacran

with a funnel
shaped whorl of
tentacles. the other
with two conical
spirals of very
showy tentacles.

People say that the
birds leave in Sept.
and return in Feb.

They have a piece of
pegmatite - quartz,
felspar, muscovite,
about 15 cm. in diam.
that they say they got
off the lagoon bottom.

Birds - several boobies
seen flying by. When we
approached the island 2
blue fac. boobies flew by
one Royal tern.

Don Perez

1 heron

Frigate birds in hundreds

Noddies in thousand

Sooty terns in scores or
hundreds of thousands.

July 3 - Perez I.

Observations on clouds coming from north east - several substantial clouds disappeared completely when over the atoll. (10 a.m. very slight wind.

Two slight showers came across the islet. The terns were much agitated, flying in the rain with much noise and apparently great eagerness.

Rainfall by day beginning Jan. 1, 1959 - from records of weather station on Alacran.

mm.	Jan. 1959	Feb.	Mar.	Apr.
20	0	5	0	
0	0	0	0	
0	0	0	0	
0	0	0	0	
21	0	0	0	
8	1	8	0	
0	0	0	0	
18	0	2	0	
0	0	0	0	
0	0	0	0	
0	1	0	0	
0	0	0	2	
0	0	0	1	
0	0	0	0	
0	0	0	0	
0	0	0	0	
0	0	0	4	
0	0	0	0	
0	0	5	0	
0	0	0	0	
0	20	0	0	
7	0	0	0	
0	0	0	0	
0	0	0	0	
1	0	0	0	
0	0	0	0	
0	0	0	0	
0	4	0	0	
5		0	0	
0		0	0	
0		0	0	

Mar. 1960	Apr.	May	June	July
0	0	6	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	3
0	0	0	0	0
0	0	0	0	0
0	0	0	0	40
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	4
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	2	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	40	1	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Aug. 1960	Sept.	Oct.	Nov.	Dec.
0	0	0	0	0
2	8	0	0	0
0	0	0	0	0
0	0	1	0	0
0	0	0	0	0
0	0	0	1	0
0	0	0	0	0
0	0	25	0	0
0	0	3	0	0
0	0	0	0	0
3	0	0	0	0
6	0	0	0	0
0	3	0	0	0
0	0	0	0	6
0	0	0	0	0
0	0	0	0	0
0	6	0	0	2
9	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	20	0
0	1	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	999
0	21	1	0	0
0	28	0	0	0
0	0	0	0	0
0	7	0	0	0
0	0	19	0	0

Wind directions, 3 times daily

Jan. 1959	Recalando NW	9	NNW	N	W
	—		NNW	NE	W
	N		NNW	NE	NW
					ENE
2	SSS Recalando puerto del SSW WSW	10	NE	ENE	ENE
			NE	SE	E
			NE	SE	ENE
3	Recalando W		NE	SE	NE
	SE	11	NE	SE	NE
	E		NE	E	NE
			ENE		
4	E		ENE	SE	NE
	E	12	ENE	SE	E
	NE		ENE	NE	ENE
5	N	13	ENE	N	E
	E		ENE	N	E
6	NE		E	NW	NE
7	NE		SE	N	E
	ENE	14	SE	ENE	E
	NE		SE	ENE	E
	NE		ESE plana	ENE	ENE
	E		E		
7	E		N	ENE	ENE
	SSS	15	NW	ENE	ENE
	E		NNW	NE	ENE
8	NE		NNW	NE	ENE
	W	16	N	NE	ENE
	NW		NE	NE	ENE

U.S.F.W. Buil 89
1944

Feb. 1959	NE	SE	N	SE
	E	SE	SW	S
	NE	E	WNW	NW
	ENE	SE	SE	SSS
	E	SE	SE	S
	NE	ENE	NW	NNE
	E	E	NE	S
	SE	E	SSE	SSW
	E	ENE	NNE	NW
	SSS	E	SE	NNE
	S	E	ESE	SW
	WNW	ENE	NNE	N <small>on rocks to 80 km. last 4 p.m.</small>
	Rec. d. W.			
	Rec. d. W.	ESE	E	
	Rec. d. W.	E	E	
	Rec. d. W.	E	ENE	
	NE	SE	ENE	
	NE	E	NE	
	NE	ENE		
	E	SE	ESE	
	E	SE	E	
	ENE	N	ENE	
	E	Rec. d. W. Puerto	SE	SE
	ESE		SE	E
	E	16	NW	ENE

Mar. 1959

1 NW	ENE	SW	ESE
WNW	NNE	ESE	E
NW	NE	ESE	ENE
2 NNW	E	ENE	SSW
NE	E	NE	S
E	E	NE	S
3 SE	ESE	N	SSW
E	SE	NW	SSW
NE	NE	N	S
4 E	WSW	ENE	SW
E	NNW	ENE	S
E	N	NE	SSW
5 SE	NNE	SE	SW
SE	E	S	SW
SE	E	W	S
6 N	SE	NNW	SE
N	ESE	NW	SE
N	E	NNW	NNE
7 N	SE	NW	SE
NE	SE	NW	SE
NNE	NE	NE	NE
8 NE	SE	ENE	
ENE	SE	E	
ENE	N	ENE	

Apr. 1959

1 SE	ESE	E	NE
SE	ENE	E	ENE
N	NE	ENE	NE
2 NW	E	SE	E
NW	E	SE	E
NW	NE	NE	ENE
3 NNW	E	SE	E
SE	SE	ESE	ESE
N	N	NE	ENE
4 ENE	SE	SE	SE
NE	SE	ESE	ESE
NE	NE ^{cm} _{rachas} de 60 km.	ENE	ENE
5 E	N	SE	SE
E	NNW	ESE	ESE
NE	N	NE	E
6 E	N	ESE	SE
E	NNE	NW	E
NE	NE	N	NE
7 E	NE	N	
ENE	ENE	N	
ENE	ENE	N	
8 E	E	NNE	
E	NE	NE	
ENE	NE	NNE	

May 1959

E	E	SSE	ESE
E	E	ESE	E
NE	ENE	ENE	NE
E	ESE	SE	NE
E	E	SE	E
NE	ENE	ENE	NE
E	ESE	SE	ENE
ENE	E	ESE	NE
NE	ENE	ENE	NE
E	ESE	ESE	N
E	ENE	SE	NW
ENE	ENE	ESE	NW
E	SE	ESE	W
E	flana	E	WSW
ENE	NNE	E	flana
E	N	E	ESE
ENE	NW	E	SE
NNE	NNE	NE	E
ENE	E	E	SE
NE	ENE	E	SE
NE	NNE	NE	E
NE	N	E	
NE	SE	NE	
NE	NNE	NE	

June 1959

SE	SE	SSW	E
ESE	ESE	WSW	E
NE	NE	WNW	E
			ESE
SE	SE	SSW	ESE
E	ESE	WNW	E
NNE	ENE	N	E
ESE	SE	SSE	ESE
ESE	E	WSW	E
NE	NE	NNE	E
ESE	SE	SE	E
E	E	calm	ENE
NE	NNE	NE	ENE
SE	S	SE	ESE
SE	S	SE	E
NE	NNE	ESE	NE
SE	SE	ESE	ESE
SE	SE	ESE	E
NE	E	E	NE
SE	E	ESE	
SE	E	E	
ENE	NE	E	
Rec. fuer del SE	SSE	E	
SE	SE	E	
NE	SE	E	

July 1959

E	SE	E	SE
Calm	SE	ESE	SE
NE	NE	NE	ENE
ESE	ENE	ESE	SE
Calm	Calm	E	E
NE	NNE	NE	ENE
Calm	SE	SE	ESE
NE	Calm	SE	E
ENE	NE	ENE	NNE
E	SE	ESE	Llana
E	Calm	E	Llana
NE	NNE	NE	NE
ESE	SE	SE	E
ESE	E	SE	E
NE	NE	ENE	E
SE	ESE	ESE	ENE
Calm	SE	SE	ENE
NE	NE	SE	NE
E	SE	ESE	E
E	SE	E	E
NNE	NE	ENE	E
SE	ESE	E	
SE	E	ESE	
NE	ENE	ENE	

Aug. 1959

Llang	SE	ESE	E
Llana	SE	E	E
NNE	NE	ENE	ENE
SSE	SE	E	SE
Llang	SE	E	E
Llana	NE	NE	E
SE	ESE	ENE	E
Llana	E	NNE	E
NNW	NE	NNE	NE
SE	SE	E	E
Llang	SE	E	E
N	NNE	ENE	NNE
SSE	SE	E	Llang
S	SE	ENE	NW
Llana	NE	NE	Llang
SSE	SE	ESE	NW
SE	ESE	E	NW
ENE	ENE	ENE	Llang
SE	E	ESE	Llana
Llang	ENE	E	SSE
NE	E	E	NE
SE	ESE	ESE	
ESE	E	E	
NE	ESE	ESE	

rachas de 80 km.

Sept. 1959

SE	SE	ENE	SE
SE	Plans	SE	SE
NE	NNE	NE	NE
			1
SE	Plans	ESE	SE
E	W	E	SE
ENE	N	NE	NE
ESE	SW	NE	SE
E	SW	ENE	SE
ENE	Plans	E	NE
ESE	S	E	SE
ENE	SW	ESE	ENE
ENE	WSW	NE	NE
Plans	S	E	E
E	SW	E	E
NE	NW	E	NE
E	NW	ENE	SE
SSE	SSE	NE	SE
N	Res. del W	NNE	NE
ESE	SSE	E	
ESE	SW	E	
NE	WNW	NNE	
SE	Plans	Plans	
ESE	N calma	SW	
NE	N	NE	

Oct. 1959

SE	SE	N	NW
SE	SE	NW	NNW
NW	ESE	NW	NNW
		ENE	
SE	ESE	NNW	E
ESE	E	NNW	SE
NE	SE	N	E
ESE	E	N	ESE
E	ENE	N	ESE
E	ENE	NE	ENE
ESE	E	N	SE
E	E	NNW	S
E	E	NNW	Calma
		(16 HS 7 submados condiente 75 Km.)	
ESE	ESE	NW	SE
E	E	NW	SE
ESE	E	NNW	ENE
SE	SE	Calma	ESE
SSE	SE	NE	E
SE	ENE	NE	ENE
SSE	SE	SE	ENE
SW	E	S	E
WSW	NE	Calma	NE
SSE	E	Calma	
W	ENE	W	
NNE	ENE	NW	

Nov. 1959

ENE	N	NE	NNW
NE	N	N	N
NNE	N	N	NE
NNE	N	rec. fuerte del N	SE
NNE	NNE	N	ESE
NE	NNE	N	E
SW	Calma	NNW	SE
NE	"	NNE	WSW
ENE	NNE	NNW	WNW
SE	N	Calma	rec. muy fuerte del N
ESE	S	SW	NNW
E	Calma	WSW	NNW
SE	Calma	W	NNW
ESE	"	WNW	N
NE	NNW	WNW	N
NNE	Calma	WSW	N
N	NNW	W	NNE
rec. fuerte del N	NW	Calma	NE
"	NW	ESE	
"	Calma	SE	
N	"	ENE	
N	Calma	S	
N	E	SW	
N	NNE	NW	

Dec. 1959

NE	E	SE	Calma
NE	E	SE	"
NNE	ENE	WNW	NE
N	E	WNW	E
NNW	NE	NW	ENE
NW	NE	NW	E
NW	ESE	NW	ESE
NW	SE	NW	ESE
NNW	E	NNW	E
WNW	SE	N	Calma
N	SSE	N	NW
NE	NNW	NNW	NNW
Calma	NNE	NW	NNW
SW	NE	NW	N
Calma	NE	NNW	NNE
W	E	NE	N
NW	E	NE	NNE
NW	ENE	ENE	NE
NW	ESE	ENE	E
NNW	ESE	Calma	E
N	E	"	E
NE	ESE	N	
E	ESE	Calma	
ENE	ENE	NW	

Jan. 1960

SE	ENE	SSE	SE
SE	NE	SE	SE
NE	NE	E	E
SE	ENE	SSE	E
SE	ENE	W <i>rec. muy fuerte del N</i>	E
E	NNE		ENE
SE	NE	N	E
SSE	ENE	NNW	E
NNW	NE	NW	NE
E	E	N	E
E	E	NNW	E
NE	<i>Rec. fuerte del NE</i>	NNW	ENE
E	E	N	Calma
E	E	N	SSW
E	ENE	N	<i>rec. fuerte del NW</i>
SE	ESE	N	WNW
SE	ESE	N	<i>rec. fuerte del W</i>
NNE	E	N	WNW
N	SE	N	WNW
<i>Rec. del N</i>	SSE	N	WNW
N	N	N	NW
N	E	ENE	
NNE	ESE	ENE	
NE	E	ENE	

Feb. 1960

NE	SE	ENE	WNW
ESE	SE	SE	NW
NE	E	N	N
E	SE	NW	N
SE	S	<i>rec. muy fuerte del NW</i>	N
NE	SW	NNW	NNE
SE	ENE	N	NE
SE	SE	NNE	NNE
E	NE	NNE	NE
SE	ESE	ENE	ESE
SSE	ESE	E	E
Calma	SW	ENE	NE
1			
NNW	<i>rec. muy fuerte del W</i>	ESE	E
NNW	WNW	E	E
NW	WNW	ENE	NE
NW	NNW	SW	
WNW	N	S	
NNW	NE	NE	
NW	E	NNE	
N	E	NNE	
N	NE	NNE	
N	ESE	ESE	
NNE	WNW	ESE	
NE	NNW	NE	

Mar. 1960

ESE	ESE	SSE <i>Rec. del S</i>	ESE
ESE	ESE		E
ESE	NE	NNW	ESE
ESE	SE	NNW	ESE
ESE	SE	NNW	ESE
NE	NE	NNW	ENE
N	ESE	<i>rec. del NNW</i>	SE
N	E	<i>rec. del N</i>	SE
N	NNE	N	ENE
NNE	NE	NNE	SE
NNE	NE	NNE	ENE
NNE	NE	NE	ENE
NE	ENE	NE	SE
NE	E	NE	SE
NE	NE	NNE	NW
NE	E	NNE	NE
ENE	E	N	SSE
NE	E	NNW	NNE
NE	SE	NE	
N	<i>rec. del S</i>	NE	
NE	NNE	NE	
NE	SE	E	
ENE	SE	E	
E	NNE	ENE	
		ESE	
		E	
		ENE	

Apr. 1960

SE	E	E	ESE
E	E	E	E
ENE	NNE	NE	NE
ESE	NE	ENE	E
ESE	NNE	NE	ENE
NW	NNE	NNE	NE
SSE	ENE	NE	E
<i>llano</i>	ENE	ENE	ENE
N	NE	NE	ENE
NW	E	E	NNE
NW	E	E	ENE
NW	ENE	NE	ENE
NW	E	ENE	E
NW	ENE	ENE	E
NW	ENE	NNE	ENE
NW	E	ENE	ESE
NE	ENE	E	E
NE	ENE	NNE	NE
E	ENE	E	
E	ENE	ENE	
ENE	NE	NNE	
ESE	E	E	
E	E	E	
ENE	NE	NNE	

May 1960

ESE	NE	ESE	E
ENE	NE	ENE	ENE
NE	NNE	ENE	NE
N	E	ESE	ENE
SE	ESE	E	NNE
SE	NNE	ENE	NNE
SE	NNE	E	NE
SE	NW	E	NE
NNE	NNW	ENE	ENE
SE	NW	E	ENE
E	NW	E	NE
ENE	NW	ENE	ENE
ESE	WNW	E	NNE
E	NNW	E	N
ENE	NNE	NE	N
SE	ESE	E	NE
E	E	E	NNE
ENE	NE	ENE	NE
SSE	ESE	E	
SW	E	E	
NW	NE	NE	
NW	E	ESE	
NNW	ENE	E	
N	ENE	ENE	

June 1960

NNE	NE	ESE	ESE
NNE	N	ESE	E
NE	NNE	NE	ENE
E	NE	ESE	E
NNW	NNE	ENE	E
NNE	NNE	ENE	NE
E	E	E	E
NNW	E	ENE	NE
N	ENE	ESE	NE
E	NE	E	ENE
NE	NE	E	NE
NNE	NE	ESE	E
E	ENE	ESE	ESE
NE	ENE	E	ENE
NNE	NE	E	NE
ENE	ENE	E	E
E	NNE	E	E
NNE	NE	E	ENE
E	ENE	ESE	
E	NE	ESE	
NNE	ENE	ENE	
E	SE	ESE	
NW	SE	E	
NNE	E	E	

July 1960

SE	SE	ESE	ESE
MNE	ENE	E	E
NE	ENE	ENE	NE
ENE	ENE	ESE	SE
ENE	N	E	SSW
ENE	NE	ENE	NW
SE	ESE	ESE	flana
ENE	ESE	E	SW
NE	N	ENE	WNW
SE	SE	ENE	S
ESE	S	NE	SSW
ENE	NNW	NE	W
ESE	SSE	ENE	S
E	SW	ENE	SW
NE	NW	NE	rec. del SW
E	SE	ENE	SSE
E	SSE	ENE	SE
NE	ENE	ENE	ENE
E	ENE	E	SE
NE	ENE	flana	SE
MNE	ESE	NE	ESE
E	E	E	
E	ENE	E	
ENE	ENE	ENE	

Aug. 1960

SE	SE	ENE	SSE
ESE	flana	S	ESE
ENE	NE	S	NE
ENE	E	S	SE
ENE	E	SW	ESE
ENE	ENE	N	NE
E	E	SE	ESE
ENE	SE	SE	ESE
NE	NNE	E	NE
ENE	E	ESE	E
ENE	ESE	E	E
NE	ENE	SE	ENE
ESE	ESE	ESE	E
ESE	E	ESE	ENE
NE	E	E	ENE
E	ENE	<u>ESE</u>	ENE
ENE	ENE	E	ENE
ESE	ENE	ENE	ENE
SE	ENE	ESE	ESE
SE	ENE	ESE	ESE
NE	NE	NE	NE
ESE	ENE	SE	
ENE	ENE	SE	
ENE	ENE	NE	

Sept. 1960

SE	SSE	NE	Calma
SE	SSE	NNE	WSW
ENE	NW	NNE	NW
ESE	Calma	NE	Calma
E	WNW	NE	SSW
ENE	WNW	NE	NW
ENE	SW	ESE	NW
NNE	NW	ESE	SW
NE	WNW	NNE	WNW
Calma	SSE	SE	NW
NNW	SSW	SSE	WSW
N	SW	NNE	WNW
S	SSE	ENE	rec. fuerte del SW
SW	rec. fuerte d. SE	N	W
NNW	SSE	NNE	NW
SE	rec. muy fuerte SSW	N	NNW
SE	SSW	NNW	NNE
ENE	SW	NNW	N
SE	rec. del W.	E	
SE	SW	NNE	
NE	rec. del SW	N	
SE	E	S	
S	E	SW	
NNE	NNE	WNW	

Oct. 1960

NW	SE	NE	ENE
E (weak)	ESE	NE	NE
ENE	ENE	NE	NE
ESE	rec. muy fuerte SE	E	NNE
E	ENE	ESE	NNE
NE	NNE	E	NNE
ENE	ENE	ESE	NE
ENE	ENE	E	NE
NE	NE	NE	NNE
ENE	ESE	E	NNE
NE	ESE	ENE	NNE
NE	NE	N	NE
E	ESE	ENE	E
NE	ESE	NNE	E
ENE	ENE	NNE	ENE
SSE	SE	NNE	ESE
SSW	ESE	NNE	SE
WSW	NE	NNE	NNW
NW	SE	ENE	NE
W	E	NE	N
N	NE	NE	NW
ENE	NE	NE	
SE	NNE	NE	
NNE	NNE	NE	

Nov. 1960

NW	ESE	NE	NE
NW	E	NE	NNE
WNW	ENE	NE	NNE

NW	NE	SE	NNE
NW	NNE	SSE	NNE
NNW	NNE	NW	NE

NNE	N	ENE	ENE
NNE	NNE	ENE	E
NNE	NE	NNE	ENE

ENE	NNE	ENE	E
ENE	NE	ENE	E
ENE	NE	NE	NE

NNE	E	ENE	E
ENE	ENE	E	N
NNE	ENE	NE	<i>rec. fuerte del IV</i>

N	ENE	ENE	<i>rec. muy fuerte del N</i>
NNW	ENE	ENE	N
NNW	ENE	ENE	NNW

N	NE	ENE
N	NE	NE
NE	NE	NNE

ENE	NE	NNE
ENE	NE	NE
ENE	NNE	NNE

Dec. 1960

N	E	NNW	NE
NW	E	NW	NE
N	ENE	NNW	NE

N	E	NE	NE
NNE	ESE	E	NE
NE	E	ENE	NE

NE	SSE	NE	NE
NE	SSW	ENE	NE
<i>rec. fuerte d. NE</i>	WNW	ENE	NE

ENE			
E	N	E	ENE
E	N	E	NE
<i>rec. muy fuerte de E</i>	N	ENE	NE

E	N	WNW	ENE
E	NE	<i>rec. del NW</i>	E
<i>rec. m. fuerte d. E</i>	NE	N	NE NE

E	E	N	E
E	E	NE	E
<i>rec. m. fuerte d. E</i>	E	NE	NE

E	S	NE	SE
E	NW	ENE	S
ENE	<i>rec. muy fuerte d. NW</i>	ENE	WNW

ESE	NW	NE
E	NW	NE
NE	N	NE

Jan. 1961

N	<i>rec. del NW</i>	N	ESE
N	NW	N	E
NNE	<i>rec. muy fuerte d. NE</i>	N	NE
NE	NNE	NNE	SE
N	NNE	NE	SE
NNE	NNE	ENE	<i>rec. de W</i>
NE	NE	ESE	N
NE	NNE	WSW	NNE
NE	N	WNW	NE
<i>rec. fuerte d. NE</i>	NW	N	ESE
NE	WNW	N	ESE
NE	WNW	N	Calm
ENE	WNW	NNW	N
ENE	<i>rec. fuerte d. W</i>	NNW	NNW
NE	<i>rec. fuerte d. W</i>	N	N
ENE	NW	NE	N
ENE	NW	NE	N
ENE	NW	NE	NNE
E	NW	E	NNE
E	NW	ENE	NE
ENE	NW	ENE	NE
SE	N	E	
SE	N	E	
<i>rec. muy fuerte d. N</i>	N	ENE	

Feb. 1961

ENE	NE	ESE	NNE
E	NE	ESE	NE
NE	NNE	E	NE
ESE	N	ESE	E
ESE	NNE	ESE	E
NE	NW	E	E
<i>rec. fuerte d. NW</i>	NE	E	E
NW	ENE	E	E
N	NE	E	ENE
NE	E	ESE	
NE	ENE	E	
NE	NE	ENE	
↓	SE	NE	ESE
ENE	SE	NE	SE
E	NNE	ENE	N
ENE			
<i>SW</i>	ENE	SE	
<i>rec. fuerte d. NW</i>	ENE	ESE	
<i>rec. fuerte d. NW</i>	ENE	NE	
NNW	ENE	ESE	
NNW	ENE	ESE	
N	ENE	ENE	
N	ESE	<i>rec. muy fuerte d. NW</i>	
NNE	ESE	N	
NNE	ENE	N	

Mar. 1961

SE	N	SE	E
ENE	N	ESE	E
NE	N	N	ENE
NE	N	SE	E
ENE	NE	ESE	E
NE	ENE	NE	ENE
E	E	ESE	SE
ESE	E	E	E
ENE	ENE	ENE	E
ESE	ESE	ESE	ESE
E	E	ESE	ESE
E	ENE	N	ENE
E	ESE	ESE	ESE
E	ESE	NNE	ESE
ENE	N	N	ENE
ESE	ESE	ENE	ESE
E	SE	E	ESE
ENE	N	NNE	ENE
ESE	ESE	E	SSE
E	ESE	ENE	SSW
ENE	ENE	N	NW
ESE	SE	E	
SE	SE	E	
NW	ENE	NE	

Apr. 1961

rec. many fronts

NW	d. SE	ENE	SE
NW	SSE	ENE	ESE
NNW	N	NE	NE
N	N	E	<u>ESE</u>
NNE	NE	ENE	E
NNE	NNE	ENE	NE
NNE	NNE	ENE	NE
Calm	SE	E	ESE
NE	ESE	E	E
N	ENE	ENE	NE
Calm	SSE	E	ESE
N	WNW	E	ESE
NNE	N	NE	NE
ESE	N	ESE	ESE
E	NNE	E	E
E	E	ENE	NE
SE	ESE	ESE	E
SSE	ESE	E	E
NW	ENE	ENE	NE
NNW	<i>rec. many fronts</i> d. SE	ESE	E
NNW	SE	E	ENE
N	N	ENE	ENE
NNE	N	ESE	
ESE	N	E	
ENE	N	NE	
	NNE		
	NE		
	NE		

May 1961

SE	SE	E	SE
ESE	SE NW	ENE	ENE
E	W	ENE	NE

E	NNW	E	SE
E	NNW	NE	SE (debris)
NE	NNW	NE	NW

E	WNW	ENE	NW
E	WNW	NE	NW
NE	WNW	NE	NW

E	E	E	Calm
E	E	ENE	NE
E	ENE	NE	NE

E	ESE	ESE	E
E	E	E	E
E (fines)	ENE	NE	NE

E	E	ESE	E
E	E	—	ENE
E	ENE	—	NE

E	ESE	ESE	E
E	E	E	ENE
ENE	NE	ENE	NE

ESE	E	E
E	ENE	E
E	NE	NE

June 1961

ENE	ESE	E	ESE
ENE	E	E	Calm
NE	NE	NE	NE

E	ESE	E	SE
ENE	E	E	ESE
NE	ENE	E	NE

E	ESE	ESE	ESE
E	E	ESE	E
NE	ENE	ESE	NE

E	E	SE	ESE
E	E	SE	E
E	E (ranchas trasto 100 km.)	SE	NE

E	E ^{cañon}	S	E
ENE	E ^{trasto}	Calm	ENE
NE	E ^{con ranchas puerto}	"	NNE

July 1961

E	ENE	SE	ENE
E	ENE	SE	ENE
E	ENE	N	E NE NE

E	E	SE	ESE
ENE	ENE	E	calma
NE	ENE	NE	NN

ESE	E	ESE	E
ESE	ENE	ESE	ENE
NE	ENE	NNE	NE

E	ENE
E	ENE
E	NE
ENE	

- from H. 24
- 41883 *Terminalia catappa* L.
- 84 *Mentha spicata* ^{h?}
- 85 *Portulaca grandiflora* Hook.
- 86 (Commel.) *Setcreasea purpurea* Boon
- 87 *Chenopodium ambrosioides* L.
- 88 *Capsicum annuum* ^{L.}
- 89 *Capsicum annuum* ^{L?} 2
- on narrow sand
flat behind seaward beach
- 5 90 *Tournefortia gnaphalodes* R. Br.
common
- near lighthouse building
- 1 91 *Cinnam* sp.
planted
- 2 92 *Opuntia dillenii* (Ker-gawler) Haworth
locally abundant,
forming dense patches
- on lagoon beach ridge just
inside edge of *Buriana*
scrub, near south end.
- 2 93 *Conocarpus erectus* L.
no plant, only,
To sp. 86

- shrub 1.4 m. tall, leaves
all small
"yerba buena"
ornamental, flowers magenta
diffuse, stems brittle,
leaves dark purple esp.
beneath, flowers magenta,
closed in afternoon.
used as worm medicine;
very rank odor.
sweet bell pepper.
a strong pepper with
small spherical fruit.

low rounded bushes,
1 dm tall, 1.5 m. wide.

sterile

plants 0.5 - 1 m. tall, much
branched, ~~areoles~~
tending to be on mamillae;
flowers pale yellow, fruit
dark red, juicy, pleasant
to taste.

old gnarled bush about
1 m. tall, spreading; single
trunks.

July 3 - Percy I.

Reef flat seaward of islet - about 1.5 m depth - bottom sandy with clumps of algae on dead coral blocks, with a number of kinds - *Dictyota*, a gigantina like red, *Halimeda*, and a large sea anemone with fish living among its tentacles.

Some areas have little or no algae.

Strombus gigas very common.

Some areas have dense meadows of *Thalassia*, with many small fish, crabs, sponges, sea anemones, etc. On the blades of the *Thalassia* a small coelenterate resembling tufts of thick filamentous algae of a pale brownish color, which stings rather painfully.

Areas between *Thalassia* beds seem scooped out by waves.

July 4 - Chica I.

A flat platform of sand covered on the west end by a sparse growth of *Euphorbia* right to the top of the beach -

cover on margins 75% more inland much sparser. Scattered *Calcite* both living and dead near margins. The *Euphorbia* mostly in rather dried up condition but occasional plants bright green.

Much of it actually dead. Dead plants side by side with living ones. A few patches of *Sporobolus virginicus* mostly dead, but a few tips living, no small area green.

A few large mats of *Portulaca oleracea*, up to 36 cm. across, fls. (closing at 8:30 a.m.) 1-1.5 cm. across petals emarginate to apiculate stamens 23-34. stigmas 5.

Vegetation inland much sparser, also mostly dead, locally, but scattered *Euphorbia* bright green.

Thalasseus on small sand horn (orange bills) perhaps 20-25.

~~20-30~~ black headed gulls.
6-8 blue faced boobies with young. These downy to partly feathered out and almost full grown. One parent stayed with each young. Two of these parents got in a mild fight, locking beaks and tugging. Not much alarmed until approached within 10'. One has eggs, ^{will} not leave.

One low Suriana bush 0.7 m. tall, 4 m. across at top of beach on side toward Papua near middle.

On n.w. side between 2 short horns, a low sand ridge perhaps 0.5 m. above general level. Outer slope steep. Covered to top on inner side with open dwarf scrub of Euphorbia. Most of it rather dried up, some dead.

2 boobies with newly hatched young, scarcely even downy yet.

Central part of island mostly covered by sparse Euphorbia dwarf scrub in parts almost dead. a few plants of Portulaca locally.

Handy patch of low dune at base of ~~east~~ north sand horn; a few wisps of Sporobolus. 5 ruddy turnstones.

Loose white sand. Euphorbia back of it green at margins of dune drier back flatter.

Several patches of green Sporobolus scattered across east 4th of islet but back 30 m. or so from end. Patches near and on low beach ridge on n.e. side more dry. some dead. Here ~~four~~ six small Suriana bushes 0.4 m. high up to 1.5 m. across, mostly smaller.

Euphorbia on loose broad sand ridge on east end open, rather green. Some wind erosion here. back part held by Sporobolus.

Just back of this a patch of Sesuvium

17x20 narrow.

A few small Suriana bushes scattered on this end.

Inland from this an almost bare area of red-brown loose coarse sandy soil, much burrowed by crabs.

Most of sparse stand of Euphorbia dead.

A few Portulaca - large ascending diffuse form.

Toward s.e. corner large patches of almost closed green Sporobolus.

A small nest with an egg - dull gray with blackish brown irregular spots, (about like Gygis)

Nest about 15-18 cm. across of Euphorbia twigs. Gulls flying around making much noise.

A smaller patch of Sesuvium on s.e. corner of islet surrounded by large patches of Sporobolus on landward side.

Several small Sesuvium mats on east beach.

Also Euphorbia, mostly

small plants, scarcely more than seedlings, but fruiting, some dead capsule.

One or two very small Suriana around this corner on beach. One tiny plant of Tournefortia. Small patch of low Suriana just outside second largest Sesuvium patch, near top of beach. Some small piles of grass in this and some fairly large dead stems.

all photos before
Avicennia are chips?

July 4 Pajaros Islet

On north end is a long narrow spit of fringe-like coral fragments, 400 paces long, bulbous at end, enclosing 2 small ponds. These lined with *Avicennia* mostly 1, up to 2 m. tall, dense, shattered with gnaws. The leaves also eaten by insects.

Scattered mats of *Sesuvium* mostly small, on ~~the~~ ^{gravel ridge} around the *Avicennia*.

The end of the spit is eroding away, leaving some of *Avicennia* with roots exposed.

Sesuvium is obviously first colonist on gravel. Vary in color from yellow to green. Many seedling mats.

Many seedling *Avicennia* in low spots.

Sesuvium mats are only vegetation on terminal 150m of gravel, except *Avicennia*. Then dead *Cahile*, on sandier facies, with fewer *Sesuvium* mats.

50 m. farther on a single bush of *Tournefortia* on sand, then small *Euphorbia* family common, less *Cahile*. and *Portulaca* locally on sand. Occ. *Tournefortia*.

Piles of Strombus shells. *Euphorbia* mostly rather dried, some dead.

60 m. on a large mat of *Sesuvium*. Much *Cahile* - gravel here again. Less *Euphorbia*. 20 m.

Then a sandy stretch with *Euphorbia* and *Cahile* 20 m. Then another large mat of *Sesuvium*. 24 m.

Then a small patch, 3 x 4 m. of *Sesuvium*, about 7-8 m. tall.

Then a 50 m. stretch of sand with patches of *Sporobolus*, one of *Sesuvium*, scattered *Portulaca*, fairly common *Cahile* and *Euphorbia*.

Portulaca with fl. 1 cm. 20-27 st. one *Cahile* green, in fruit, one flowering, rest dead.

Then main body of islet, continuous cover of *Sporobolus*, except in depression behind wet

beach ridge, which has several diagonal low ridges of finger coal gravel.

Here is sparse dead Cabile, mats of Sesuvium, Euphorbia, Portulaca, 1 live Cabile, Euphorbia green to dead. 1 gull 1 willet \varnothing along eastern beach.

Tribulus mats on sand. Some small Sesuvium mats in Sporobolus lawn.

Solid Sporobolus extend perhaps half way to end then a large patchwork of ~~lots~~ mats of Sesuvium, patches of Sporobolus and an open stand of Portulaca on mixed sand + gravel. Some Tribulus mats. (photos) Cabile toward west side mostly dead, 1 living.

Perhaps 100 or more blue faced boobies in this area. mostly with young in various stages from just hatched to almost grown.

Very low sand ridge on W. side with almost pure open stand of dead Cabile and abundant

seedlings of it on seaward slope of beach ridge above beach. A very little Portulaca and Euphorbia here.

Some Cabile in flower (white) especially northward on ~~the~~ back slope of ridge.

More Euphorbia where ridge tends to become double. A patch of Tournefortia about 4 m. across, low.

Also a low bush of Suriana. Then a patch of ~~the~~ Cenchurus about 10 m. long, completely dead. A small patch of Cyperus.

Thick Euphorbia. Inside this 5-10 m. strip is an almost continuous belt of Sporobolus extending around the north end of the islet, approaching beach part way around. Great pile of Strombus gigas shells, animal used for bait by commercial fishermen, line beach. (photos)

Some interruption of Sporobolus by large

sesuvium mats.
 Some Portulaca and Euphorbia at top of north beach.
 Inside the Sporobolus along the north side is a strip of open to sparse Euphorbia dwarf scrub. (photos) Euphorbia mostly green, except a few old dead plants! On very slightly higher ground this is mostly dead, mixed with Portulaca.

2 boobies seen with eggs, one with 1, one with 2.

A number of turtle holes in west sand ridge near n. end. n. of Tournefortia.

Guano piles esp. where there are bushes, cf. Tournefortia.

Under Sporobolus
 Lepisma + isopod (P.) + cricket
 Under Sesuvium
 pupillid + tarantellid
 On Avicennia
 flies, coccinellids

old
 w. p. 19X

Two mss. shown me by ~~F. Bonet~~ F. Bonet

Bonnet, F. + Rzedowski, J.
 Vegetacion de las Islas del Arrecife Alacranes, Yucatan (Mexico).
 with maps.

Huerta Musquiz, L.
 Flora marina de los alrededores de Isla Perez, Arrecife Alacranes, Sonda de Campeche, Mexico.

alg Description of algal communities but not a flora. Was in Alacran in July, 1960. + perhaps also in May, 1955.

Bonnet's paper based on 3 expeditions, 1955, 1959, 1960.

To be published by Escuela Nacional de Ciencias Biologicas, I.P.N.

Bonnet uses term "nestings" for sand hewn (+ spit?)

Dr. Bonnet found a small lizard, *Emia cyanura* vel aff. Hoshin says he has seen these for 3 years but has not managed to collect any. I collected one at n. end of Perez? Mabuya mabuya

det. D. Cochran
 W. H. P. 1960

	Perey			Dretna			Pajaro			Chico
	M	B	F	M	B	F	M	B	F	
7* <i>Cordia sebastena</i>			X							
<i>Avicennia fruticosa germinans</i>		X	X				X	X		
<i>Flaveria linearis</i>	X									
<i>Philoxerus vermicularis</i>	1			1						
<i>Boerhavia repens</i>	1									
<i>Scaevola lobelia plumieri</i> (<i>S. lobelia</i>)	1									
11* <i>Nopalea cochinellifera</i>		1	X							
* <i>Casuarina equisetifolia</i>		X	X							
* <i>Crinum</i> sp.			X							
30* <i>Terminalia catappa</i> (pot)			1							
91* <i>Capsicum annuum</i> 1 (pot)			1							
9* <i>Capsicum annuum</i> 2 (pot)			1							
9* <i>Jatropha</i> sp. (pot)			1							
3* <i>Mentha spicata</i> ? (pot)			1							
17* <i>Chenopodium ambrosioides</i> (pot)			X							
8* <i>Portulaca grandiflora</i> (pot)			1							
6* <i>Solanum lycopersicon</i> (pot)			X							
<i>Thalassia testudinum</i>		X	X							
<i>Cyrtandra maritima maritima</i>		X	X							
<i>Diplanthera wrightii</i>		X	X							
17 <i>Scaevola</i> sp.			X							

#	W	Cont.
	X	X
	X	X
	X	X

July 4 - Pajaros Islet,
Alacran Reef
on ~~coral~~ coral sand
and fine gravel

- 41894
5 *Cenchrus insularis* Pilow, HBK.
one patch a few m. across
- 2 95 *Cyperus planifolius* L. C. Rich
small colony
- 5 96 *Tribulus cistoides* L.
~~fairly~~ fairly common
- 5 97 *Tournefortia gnaphalodes*
large plant, several m. across
and several smaller ones
- 4 98 *Suriana maritima* L.
rare
- 5 99 *Euphorbia buxifolia* Lam.
very common
- 41900
5 *Cahilo edentula* v. *alacranensis* (Millsp.) Schubert
abundant
- 5 01 *Sporobolus virginicus* (L.) R. Br.
abundant, dominant
over large areas.
- 5 02 *Portulaca oleracea* L.
common
- 5 03 *Lesquerium portulacastrum* L.
very common, locally abundant
- 2 04 *Avicennia ~~nitida~~ ^{germinans} (L.) Stearn*
locally abundant, around
small ponds.

- large clumps, but
completely dead at
this season.
- spreading tufts.
- prostrate, forming
loose mats, petals yellow.
- erect branches
from subterranean
stems.
- low bush; flowers yellow.
- stems ascending
- spawling much branched
herb; flowers white.
forming a loose sod;
sterile.
- stems prostrate, radiating
from central root crown;
flowers about 1 cm. diam., yellow;
stamens 20-27; style branches 5.
- prostrate, forming
large mats; leaves
fleshy, compressed,
scarcely glossy; flowers
pink. Stems brownish-reddish green.
shrub 1 m. tall; corolla
white, tube yellow; infl. black.

1961 Mexico - Yucatan

July 4 - Chica Islet.

on coral sand soil

41905 *Sporobolus virginicus* (L.) R. Br.

2 locally dominant

2 06 *Suriana maritima* L.

occasional locally

1 07 *Tournefortia gnaphalodes* R. Br.

rare, one tiny plant seen

4 08 *Sesuvium maritimum* ^{*portulacastrum*} L.

locally common

5 09 *Portulaca oleracea* L.

very local in open area

2 10 *Cakile edentula* var. *alacranensis* ^(Millsp.) _{Schubert}

very common

5 11 *Euphorbia basifolia* Lam.

abundant, dominant

plant on most of islet

5 12 *Portulaca oleracea* L.

common

July 5 - Perez I.

in 1.5 m. water at north end

5 13 *Syringodium filiforme* Kütz.

common locally

forming loose sod; sterile.

small bush, 0.6 m. tall.

leaves somewhat fleshy.

forming large mats;
stems prostrate, slightly
reddish; leaves
fleshy, somewhat compressed,
not glossy.— stems many, bright
red, diffusely ascending.
— mostly dead, this plant
alive.stems ascending,
plant glaucous green.stems prostrate, red,
plant fleshy; flowers
yellow 1-1.5 m. across,
~~masses of~~ petals
emarginate to apiculate;
stamens 23-37, style beak 3.rhizome white; leaves
terete, sterile.

July 5 - Trip by boat to
Desertada Cay.

Sooty terns flying over
lagoon include immatures
that have varying amounts
of gray on under sides.

North of Peely I. are some
areas of shallow water with
Thalassia, a stretch of deep
water, then a vast area of
reef of 1-3 m (?) depth. This
is largely sandy, with
irregularly scattered
brain corals and patches
of brain corals, with sea
fans, Gorgonia, algae, etc.

Approaching Desertada
Cay the water gets deeper
still with dark patches,
apparently of brain corals
and associated forms.

Then a more uniform
deeper bottom, finally
too deep for observation.

The islet has a rather
high sand ridge on the
lagoon side, with a
steep beach. A large
patch of *Opuntia*, and
some areas of low shrubby
types, possibly low *Suriana*.
Much open sand and

grass. Large colony of
frigate birds, mostly
sitting on ground, some
on a series of pilings
just off shore. An
enormous number of
blue-faced boobies.

Six brown boobies flying
north of Desertada.

Great expanse of
rather deep water here.

Then an area of rather
deep, finely patchy
reef, too deep to tell
its character. Another
deep area. Then more
deep patchy reef.

To the left (west) a large
patch of submerged
sand - *Desparacida* I. -
and on its northern
part a line where
waves are breaking -
not clear if only lagoon
waves or if lagoon and
sea waves come together here -
probably latter. Sand
almost breaks surface
in a narrow strip.

Two porpoises ~~seen~~ north
of here.

Between Desertrna and Desterrada, except for patches just noted, the water is so deep that bottom cannot be seen, but a shallow area extends s. w. from Desterrada.

A number of royal terns seen, all flying toward east Desterrada.

Some vegetation on each of these, on higher sand.

Near Desterrada is a considerable area of shallow water.

Desterrada is an irregular surface of low dunes, covered principally by *Tournefortia*. Locally patches of *Euphorbia* near lagoon. Tufts of *Cenchrus* scattered on lagoon side. *Portulaca* occasional.

Mounds of guano frequent in *Tournefortia*. *Cahile* occasional mostly dead, some flowering.

Cenchrus pauciflorus and *Cahile* common on seaward face of dunes.

Cenchrus generally scattered everywhere in dune area.

A 15 m wide sand terrace back of top of seaward beach has only a few seedling *Tournefortia*. - a m. or so lower than general level of dunes.

Considerable area of dunes near ~~se~~ w end ~~to~~ on seaward side blown out, leaving a flat surface with debris of old *Tournefortia*, but almost no living plants. Level with terrace farther east.

Western 50 m. is a flat sand terrace with little or no vegetation, ending in a sand lobe pointing north. A few wisps of *Cenchrus*, *Tournefortia* and *Cahile* near base of lobe.

Terrace extends some distance down lagoon shore, narrowing.

Back of it locally Euphorbia is common, locally also Portulaca and a few plants of Cenchrus insularis, with more abundant C. pauciflorus. Tournefortia is general vegetation. Some seedlings. Along ^{inner} edge of terrace and outer dunes is abundant Cabile.

1. great ~~in~~ ^{one} mydas in shed on backs.

As islet narrows to east seaward dune ridge is higher, seaward terrace pinches off, lagoon terrace appears again with a few green Cabile only. Patch of ~~sub~~ ^{sub} in interior, some dead Cenchrus pauciflorus, otherwise Tournefortia.

Where the islet narrows to a spit the dune ridge fades out, and with it the Tournefortia. Cabile, dead, goes a little farther. Then no more vegetation. Some layers of Thalassia leaves in sand on north side. North side of spit slopes

gradually, but waves have cut a low cliff

a flock of terns - medium size dark gray on back white nape & bridled terns some with black head and under parts except light tail, light shoulder patches - congregated on spit. black terns

East Desterrada -

Large sand flat on s.w. end with no veg.

Then a few small scattered dunes with Tournefortia, some Cabile between.

Fairly large bird, dull gray on back mottled, light beneath straight bill, long legs, teetering habit, longitudinal white band on wings when flying

An area of dunes with Tournefortia, a little Euphorbia, much Cabile (dead) on terrace on seaward side.

Locally *Cenchrus pauciflorus*, 1 plant of *Portulaca*.

Much dead *Tournefortia* where inlet begins to narrow. a large blown out saline flat with a few small dunes on seaward side.

Very flat scarcely above sealevel. A thin grayish crust - algae & salt?

Back of this a few ^{dune} *Tournefortia*, *Euphorbia* & *portulaca*.

Farther near end of islet a deep (1m+) saline pond with gelatinous bluegreen algae remnant of those on Xmas I.

Nearer tip several more tiny such ponds, one with *Cladophora* (?) in it.

At end a perfectly enormous flock of Royal terns, at least several thousand. sitting on ground, protesting when scared up, mostly not wanting to leave. Many have black beaks - immature? several laughing gulls with them.

Many large gray duck-shaped eggs - large in slight depressions in sand, on berm at top of seaward beach.

Much ado for no few eggs.

A few small dunes with *por Tournefortia* near end and very sparsely scattered along seaward sand beach ridge.

Much *Cakile* between *Tournefortia* here. Piece of coal, somewhat rounded.

The two islets are connected by a great sand ~~bar~~ ^{apron} extending well into lagoon, about 1 m. of water.

Not a sign of beachrock on whole area, both islets, & sandbar.

These two islets are entirely of fine sand, except for a few corals scattered here and there, and vast quantities of shells. Much *Halimeda* on surface.

These are mostly truly pioneer situations as truly as that of *Sesuvium* on the other islets.

Desertora I. -

North end almost bare, many hundreds of blue faced boobies with young in all stages, some with eggs. (photos)

Vegetation of rookery area is almost entirely mats of Tribulus.

Around this flat tufts of Cenchrus, some Euphorbia, much Cabile. esp. along a very low north beach ridge.

South of open area fewer nests. Euphorbia is common and green, much Cenchrus inularis. scattered Portulaca.

Several laughing gulls flying. Many frigate birds.

Some rather sick, even dead mats of Sesuvium. Frigate birds nesting here on ground. Nests are very low mounds of twigs.

Toward seaward, south of open area, Cenchrus inularis is dominant.

The drying Sesuvium is on rather high sandy ground.

The Tribulus flats continue just back of very low beach ridge almost to seaward corner, where a mixture of Euphorbia and Cenchrus replaces it, with many frigate bird nests with fully feathered cut young (photos). Some drying Sesuvium mats here too. Some boobies nesting ^{here too.}

Tribulus sauciflorus here also.

Beyond this a lower terrace, ending in a lobe and extending perhaps halfway along seaward shore. Scattered seedlings of Cabile.

Some boobies on this.

South from point much Cabile (dead) on terrace.

A number of turtle holes. Inland from this a belt of Euphorbia with some Cenchrus.

Back of this a low bare moist spot with many crab holes.

Then a broad low ridge with open Euphorbia.

Then a low bare
dry spot of dark
soil, dead *Sesuvium*
on it. Broad area
of this in center of
islet with some
Atriplex and *Euphorbia*.

Many dead birds,
mostly young
frigate birds.

Several *Tournefortia*
along lagoon beach ridge.
Patch of *Opuntia* near
s.e. corner.

Piece of coal, somewhat
rounded, above beach

July 6 - Desertora Islet

Just north of inlet
50-60 or more brown
boobies in air. Not
clear where they live.
2 ruddy turnstones back

Tribulus area has
pairs of boobies spaced
about 2 m and *Tribulus*
mats with root crowns
about 2-3 m apart. mats 1-2 m
across.

Along lagoon coast
a very low sand
ridge, with *Cakile*
and a few *Cerebrus*
pauciflorus and *Euphorbia*
back of this, only slightly
lower, a gently undulating
sand flat. with,
near coast, *Cakile*,
Cerebrus pauciflorus,
Euphorbia, a few *Portulaca*
plants. One *Tournefortia* bush.

Inland are patches
of *Sesuvium*, dead
or partly so.
much dead *Euphorbia*,
some live.
Farther in large
dead *Sesuvium* areas
and extensive *Atriplex*
flats, these two occupy-
ing the central area.
A few live green *Sesuvium*
mats.

Near s.e. corner
a zone of *Sporobolus*
just back of lagoon beach
ridge.

Green *Sesuvium* over
an extensive area back
of that, around the
patch of cactus.

One brown booby on ground

1961 Mexico - Yucatan
July 5 - Desterrado Islet
on low dunes of fine
coral sand.

41914 *Cenchrus insularis* Gilson 1958
rare, ~~near~~ ^{toward} inner beach

2 15 *Euphorbia buxifolia* Lam.
common locally

2 16 *Tribulus cistoides* L.
one plant seen, near center

2 17 *Portulaca oleracea* L.
occasional on lagoon half
of islet

3 18 *Tournefortia gnaphalodes* ~~L.~~ R. Br.
the dominant plant on the islet

5 19 *Cenchrus parviflorus* Kunth
common

2 20 *Casipourea edentula* var. *alacranensis* (Millsp.) Schubert
common, fruiting plants
all dead.

July 5 Perez J.

1 21 *Solanum lycopersicon* L.
planted in a pot in an enclosure

Alacran

dead clump.

glaucous green.

prostrate, loose mat,
half dead; one yellow flower.
prostrate, fleshy, stems
hairy; one flower seen,
yellow, petals emarginate,
stamens 22.

low spreading bush,
stems erect from
prostrate ones.

prostrate spreading
clumps.

(Millsp.) Schubert
flowers white

flowers yellow; fruiting.

Desertora I. (ctd)

Colony of about 75 frigate
bird nests in cactus patch
everything from eggs to
fully grown young.

Males with distended
pouches entirely black.

Considerable damage
to cactus patch.

Sporobolus does
not extend around
south side. On
corner one small *Luriana*
bush, one *Tournefortia*.

Large lobe on corner
with open stand of
Euphorbia, *Cabile*, &
Conchus pauciflorus.

Sesuvium flats,
quite green along
south end, right to
top of beach.

Broad strip of open
to sparse *Euphorbia* dwarf
scrub in from beach
along s.w. side. Patches of
Cabile and of *Conchus rosularis* ^{on a just}
_{back of}

Lycaenid butterflies
abundant around *Atriplex*
in interior
northward just behind
beach ridge ^{on} _{w. side}

extensive dead
patches of *Sesuvium* -
almost completely
dead, rather few
frigate nests.

A number of
laughing gulls flying.

Reddish-yellowish
brown soil (sample)
from upper layers in
depression with
dead *Sesuvium*, many
crab holes. Coral fragments
rotten & brown.

In general *Cabile* is
in an outer zone,
mostly on beach
ridges and upper
slopes of beaches.
Tribulus in areas
of greatest concentration
of forby nests. *Portulaca*
rare but general in
sparse areas of other
vegetation. *Tournefortia*
and *Luriana* only just
back of beaches.

Atriplex only in central
part.

Sesuvium general, but
healthy only in extreme south end.
Sporobolus only back of s. lagoon beach.

W. of P. ...
July 6 - Desertera (Allison) Islet
Alacran Reef
on sand flat, 4

- 41922 *Portulaca oleracea* L.
occasional generally
- 23 *Tribulus cistoides* L.
abundant in open areas
- 24 *Atriplex pentandra* (Gray) Standl.
abundant near center of islet
- 25 *Sesuvium portulacastrum* L.
abundant on ~~east~~ south end of islet
- 26 *Sporobolus virginicus* L.
one large patch on s.e. corner
- 27 *Tournefortia gnaphalodes* L.
two plants only seen, just
back of lagoon beach
- 28 *Suriana maritima* L.
one plant seen, on ~~beach~~
lagoon beach ridge, south end.
- 29 *Cenchrus pauciflorus* ^{gracillimus} _{W. B. R.}
fairly common along
lagoon beach ridge
and somewhat inland.
- 30 *Cenchrus insularis* ^{insularis} _{W. B. R.}
generally common, locally dominant.
- 31 *Euphorbia buxifolia* Lam.
generally common, locally dominant
- 32 *Calicle edentula* var. *alacranensis*
abundant on beach ridges and upper beaches.

July 6 - Perez I.

- 1 33 (blue green alga)
forming crust in area of sand horn wet by salt water

1 m.

W. B. R.

- prostrate; flowers yellow.
- prostrate, forming mat
2 m across; flowers yellow
(type locality of *T. alacranensis* Mill.)
much branched rounded
low bushy gray plants.
- forming extensive mats;
leaves fleshy, compressed, dull,
forming a low closed
sward, sterile.
- low spreading rounded
shrub, branches erect.
- shrub 0.7 m. tall.
- spreading dense
prostrate clumps.
- spreading dense
prostrate clumps.
- dwarf shrub; leaves
glaucous; much branched at base.
- leaves fleshy. Plants mostly
dead skeletons.

Perey I. - drilling,
up to July 6, afternoon
27', through sand with
some layers of corals
in sand.

July 7 - left at 9:15 a.m.
slightly fresh breeze
from east, about half
cloudy sky - cumulus.

2 porpoises a few miles out.

July 7 - Merida - Chichén Itzá
by car. ~~After~~ Odometer
near center of town 246 mi.
Windmills a characteristic
feature in Merida.

Trees - Cedrela, Cocos,
Camea, Roupeltia, Samanea,
Enterolobium, Melia,
Eriobotrya, Terminalia,
Cassipouira, Delonix.

Edge of town (approx.)

Patch of henequen just
outside city, were large
fields of it.

Tricholaena along road.

Large patches of low
secondary scrub, mostly
leguminous.

Henequen yields about
14 years before replanting.
Rows perhaps 3 m. apart,
plants 1 m. in rows, blue-gray
in color. Low green herbaceous
ground cover bet. rows.

257.5 Hba. Teva. Henequen now
continuous beyond here.

260 Some fields very weedy,
with shrubs. Then an
irregular tangled scrub
forest about 5-6 m. high,
alternating in large
areas with Henequen.
The scrub forest varies

290
(odometer
readings
in km.)

in density, and some
of it is certainly regrowth
in abandoned henequen
fields. It is green at
this season, but must
be deciduous in dry
periods. Varies to a
scrub status.

In newly planted
henequen fields are
piles of slabs of
limestone, marking
20 m. intervals in
square arrangement.

In older fields the
trunks may reach 1.5 m.
~~but~~ or even 2 m. but
then some of them flower.

Scrub forest does not
appear especially spiny
but when opened up
by grazing there may
be Opuntia. Also Ipomoea
fistulosa.

Old henequen fields
are after flowering
grown up to brush and
are then burned.

274 To here the greater part of
the land is in henequen.
From here about 2.5 miles
of scrub forest, then
more henequen.

The most developed of the scrub forest has a continuous rather dense canopy, undergrowth somewhat open.

279#66. Holcatur - center of large hereguen area.

Stone walls common around and between fields. Some strips of scrub forest along road, hiding fields.

282 Country a little rougher, low karst with rock exposed. Croton sp. common in undergrowth and on roadsides. Some patches of forest, mostly hereguen.

286. Tahmek. Black vultures common.

Hereguen fields on rolling ground with much scab-rock showing.

Relief 5 m or mostly less.

After burning over a field of hereguen after it has flowered, a crop of maize is planted. After harvesting this, the stalks are burned. Then hereguen is replanted.

291.5

Hostin.

After this ~~is~~ little more hereguen.

scrub forest along wall. A few fields of hereguen.

295

~~Robledo~~ ~~hereguen~~. A slender tall fan palm with long finely branched panicles common here.

Beyond here much dense tangled scrub 2-4 m. tall, locally 5-6 m. Mixture of microphyllous legumes and larger leaved shrubs & trees, not very spiny. Occasional small rocky clearings, scarcely any soil.

The scrub is very dense here, green at this season.

Dry season from December to May. Scrub is deciduous, leafless during that period.

Some vines generally, many locally. Some Jatropha (Cnidocarpus).

Kantunil.

310

Scrub and scrub forest with clearings on low karst, only pockets of soil, but this a dark chertnut brown. Some grazing.

315

A small hereguen field.

Horses and cows wandering along roads.

Generally along this highway there is a strip on each side about 20 m. w. that is kept clear, with sprouts and stubs not more than 1 m. high. But this and field or ~~scrub~~ scrub may be a barbed wire fence, a stone wall, or nothing.

319-19 Considerable clearing.
 320 Some maize fields. scrub forest.
 322 ~~Halt~~ Holcha. Some bananas around town. A small apiary.

Then more less continuous scrub and scrub forest.

A very few clearings.

The trunks in the scrub forest vary from 1 to 5 rarely 10 cm. thick. The spacing of smaller ones 2-4 dm. larger ones (5 cm+) 1-1.5 m.

331 Still the same low rounded karst but here perhaps the relief is up to 10 m. locally, with sink holes deeper than that.

A fan palm (Sabal?) very rarely seen in scrub forest.

Some charcoal burning in scrub forest.

334.6 Libre Union
 337 Some palm thatched huts. Relief becomes a bit more pronounced.

A fan palm and several arecoid palms in a sink hole. An occasional Cecropia. Dense low forest, but locally much opened up by charcoal burning scattered houses - palm thatched cattle along road.

338-9 (km 99) Scattered taller trees ~~as~~ as emergents in forest. Some tall fan palms.

342 Yobdyonot
 Forest seems more luxuriant here, locally very scrubby, many clearings with maize. Various stages of regrowth ~~but~~ still microphyllous but perhaps more larger leaved trees.

Tendency for forest to be lower and more scrubby on tops of knolls, taller in depressions, making a canopy that is much smoother than the actual terrain.

351 a few scattered ranchos.
Forest becomes somewhat
less microphyllous, at
least locally.

356.5 Piste

Forest somewhat lower,
but quite dense.

359 Chichén Itzá.

Sun quite hot, slight breeze.

In all directions, from
the tall pyramid, one
sees the same irregular
scrub forest, in
places with emergents,
in place these close
enough to make a
good open to closed
taller forest. Mostly
microphyllous scrub
forest. Some scattered *Cecropia*.

Leucaena leucocephala
reaching 10 m. and a
number of other legume
trees are principal
components of both
scrub forests: 2 m. and forest 8-15 m.

Lianas very common.

A few bromeliads in trees
but only in a very few trees.

A few spiny plants -
Randia.

The flora appears quite
diverse and rich.

The great pyramid
is restored on two sides,
crumbling on other two.

The Cenote is a great
round hole in the
bedded limestone, with
vertical walls, sharply
undercut at water level.
Many plants on walls.
(Photos)

Scrub between
Cenote and pyramid,
along the raised road,
about 4-5 m. high,
dense, tangled with
lianas, canopy
almost complete but
thin. Vines are Bignoniaceae,
Menispermaceae, *Cardiospermum*,
legume, *Dioscorea*.

A very few small cecus.

Very little ground cover
except a sub-shrubby
Croton and a *Scleria*, a
few vines, a small grass.

The most abundant
shrub is a mimosaean
one with panicle of short
pedunculate spikes of
whitish flowers with
very short stamens. Pod
very broad and thin, finely veined.

On way back -
stop near highest
point in road -
about 6 km from C.I.

where road is cut
through a knoll on
the karst. - the limestone
varies from hard to
chalky, bedded, dipping
slightly.

Covered with scrub
forest 5 m. tall ± mainly
legumes, *Alcornoque*,
Croton, etc. many
lianas. So dense
that walking
is slightly impeded
especially by vines.

No ground cover.

In lower spots adjacent
the forest reaches 8 m.

Roadside cleared to about
km 101.

About km 99 - photos
of scrub forest, charcoal
bins being loaded.

Dense scrub forest
about 6-10 m. largest
trees are *Bursera* about
20 cm dbh. spaced about
5 m. some 4-5 cm. trees.
But mostly slender

wand like trees
of a number of sorts
from 0.5 to 1 m. apart
some shrubs, - 2 m.
Almost no ground
cover. Layer of
litter. Black & dark
brown highly humic soil
mixed with pebbles &
cobbles, 15-20 cm. deep,
in some spots almost
none, on rough rock layers.

limestone here bedded
(photo) beds 20-30 cm. thick
alternately hard and
soft and earthy. The
soft ones mottled with
iron oxide.

Photo of charcoal burning
near Libre Union.

Sky mostly overcast by
heavy cumulus and
thunder showers on all sides.
said to rain most afternoons.

at about km. 75 are a
number of small Maya
mounds, completely covered
by scrub forest, right in road.
Tohmeté -
About 40 km out of
Merida - photos of hereguen.

Here they do not distinguish between sisal and henequen so far as the plants are concerned. Sisal is the fiber, henequen the plant. It is a very glaucous, narrow leaved agave, not exactly the greenish plant widespread in the Pacific. Narrower leaves, smaller panicle. Requires practically no soil, gets along with no water but condensation in dry season.

Merida -

Merida - C.I. about a 2 hour trip, driving moderately trees - Plumeria rubra, Citrus spp. Samanea, Persa, Balaguirum, Mammea, Phoenix sp.,

July 8 - Chichén Itzá, in rock crevices in the Great Pyramid

41934

Spermacoce
common

35

Spermacoce

plant ~~green~~ somewhat purplish; flowers white. flowers white; plant erect.

July 22 - Wildcat Mt.
 beyond Bethel from Naventia
 ± 1133 acres, wooded except
 for a few very small
 clearings. A strip of
 forest between property
 and farms at foot of
 hills. Property mostly
 on west slope. The
 strip belongs to Amundel.
 The farms west are
 mostly cattle meadows
 in active use.

Forest on air photo
 shows a mosaic of
 textures.

Below house - oak thicket
 second gr. scattered
Pinus virginiana
 but this only near top
 Trees up to 20 cm,
 a few wolf trees -
Linodendron - to 60 cm
Quercus rubra

Rich herb layer
Galium
Adiantum
 c. *Arisaema* ~~trorubens~~
 a *Impatiens*
 a *Pantheocissus*
Circaea
 - *Camp. anem.*

Cornus florida
Viburnum sp.
~~*Cercis*~~
Lindera (wet spots)

Ulmus
Fraxinus americana
Rhus typhina
Castanea (dead)
Quercus prinus
Carya
Quercus rubra

Chimaphila mac.
Vaccinium var.
Lolidago caesia
Galium triflorum
Cimicifuga
Monarda
Impatiens (in wet places)

Lower parts sparsely
 much Robinia
 Lonicera japonica,
 Passiflora, ^{even}
 Broussonetia & Ailanthus
 around old house site

Towards fistulosa
 in opening and along
 old roads.

Small pond 10 years
 old.

Spring and stream
 (permanent), below
 old stone house.

On lower slopes
 toward north &
 patch of green
 scrubby Vinus
 virginiana

This below bird
 feeding area. planted
 plants. This is
 shaly soil.

July 22 - Wildcat Mt.

n.w. of Warrenton, Fauquier Co.

Galium latifolium Michx.
 common on rocky slopes
 in woods.

Collected
 by
 41936

North of the cattle
 farm - gentle east
 slopes - second growth
 red oak, black or scarlet,
~~lett~~ tulip, Carya.

Large area of rather
 gentle rolling ground
 with second growth,
 rather open, umbrella
 crowned trees.

On large Fagus.

Carya, Quercus rubra,
 cocinea, alba, prinus
 Liquidambar.

Nyssa, Ostrya, etc.

several stems from
 base; roots yellow.

July 29 - Knob Mt.

Medium forest of
Quercus prinus,
Q. velutina, *Q. coccinea*,
Carya sp. on slopes *Acer rubrum*
 Low forest on summit
 mostly *Q. prinus*. rather open.

Shrub layer

Corylus
Menziesia
Acer pennsylvanicum
Hammamelis virginiana
Viburnum acerifolium
Rubus
Amelanchier arborea?
Prunus serotina
~~*Prunus virginiana*~~

Herbs

- a *Aster macrophyllus*
 a *Solidago squarrosa*
 o *Anemone virginica*
 c *Geranium maculatum*
 c *Festuca obtusa*
 o *Gibbernia trifoliata*
~~*Hammamelis virginiana*~~
 c *Dryopteris marginalis*
 la *Circaea quadriculcata*
 o *Asplenium platyneuron*
 o *Utricularia perfoliata*
 c *Galium latifolium*
 o *Aquimonia gryposepala*
 o-o *Aster divaricatus*
 c *Helianthus divaricatus*
 lc *Eupatorium rugosum*

Dwarf shrubs
Spiraea betulaeifolia
Ceanothus americanus
Rhus toxicodendron
Chimaphila maculata
Vaccinium vacillans
Vaccinium stamineum
Rhus canadensis ~~aromatica~~
Rubus ~~setae~~ occidentalis
Rubus argutus
 Lianas + creepers
Dioscorea quaternata
Parthenocissus quinquefolia (Chittenden)
~~*Rhus toxicodendron*~~ (set)
Vitis (glaucom beneath)

- c *Pyrenanthemum rucanum*
 c *Hedyotis purpurea* s. *tennifolia*
 c *Allium cernuum*
 o-r *Lactuca floridana* var. *villosa*
 c *Carex* ~~s~~
 e *Paronychia canadensis*
~~*Vitis*~~
~~*Rubus*~~
 c *Lanieria marilandica*
 la *Antennaria plantaginifolia*
 la *Galium boreale*
 lc *Polygonum cristatum*
 o *Viola*

- c *Potentilla* ^{simplex} ~~canadensis~~
 c *Poa compressa*
 ~ *Asclepias quadrifolia*
 ec *Euphorbia corollata*
 c *Lilium stellatum*
 ~ *Parthenium integrifolium*
 o *Lactuca floridana*
 l *Sedum ternatum*
 l *Poa*
 l *Viola*
 a *Vicia caroliniana*
 c *Thlaspi* ^{barbinode} ~~triflorum~~
 o *Smilacina racemosa*
 c *Achillea millefolium*
 ~ *Heuchera* sp.
 l *Convolvulus spithameus*
 o *Geranium flavum*
 ~ *Thalictrum caesia*

Flora with forest 10-15 m.
 tall, canopy almost
 closed, sparse shrubs
 1.5 - 4 m. tall (*Amelanchier*,
Cornus florida, etc.)
 Dense dwarf shrub layer
 of *Vaccinium vacillans* l.
 with some *Gaylussacia*
baccata, *Menyanthes*, etc.

Shrubs

- ~ *Diospyros virginiana*
 o *Pinus rigida* P. *strobus*
 c *Cornus florida*
 ~ *Kalmia latifolia*
 o *Castanea dentata*
 ~ *Ostrya virginiana*
 ~ *Penstemon canescens*
 o *Aureolaria laevigata*
 o *Aster* (*sericeocarpus*) ad.
 ec *Aster limifolius*
 o *Aureolaria flava*
 l *Monotropa hypopitys*
 ol *Dianthus*
 o *Hieracium venosum*
 c *Cimicifuga racemosa*
 o *Zizia*
 ~ *Zygadenus*
 ~ *Melanthium hybridum*

Summit forest low, 5-8 m. tall,
 mostly *Quercus prinus*,
 rather open, esp. locally,
Vaccinium abundant. Many

Summit
July 29

July 29 - Knob Mt.
in mixed oak forest on slopes

- 41937 *Vicia caroliniana* Walt.
very common generally
- 38 *Lonicera maunlandica* L.
common
- 39 *Hedyotis purpurea* var. *tenuifolia*
common
- 40 *Aster infirmus* Michx.
occasional
- 3 ~~41 *Aster schreberi* ?~~
~~abundant~~
- 2 41 *Aster schreberi* Nees ?
abundant
in low oak forest on summit
- 2 42 *Polygonum ~~distichum~~ ^{crispatum} Engelm. & Gray*
occasional
- 1 { 43 *Galium latifolium* Michx.
1 { 44 *Galium latifolium* Michx.
common generally
- 3 45 *Bromus purgans* L.
common
- 2 46 *Helianthus divaricatus* L.
common
- 1 47 *Polygonatum*
rare
- 1 48 *Viola triloba* var. *dilatata* (Ell.) Brainerd.
rare
- 2 49 *Carex laxiflora* Lam.
common
- 1 50 *Taenidia integerrima*
occasional

- weaks, prostrate to ascending.
- flowers pale ~~lavender~~ lavender,
(note difference in corolla size on two plants)
several stems from base; rays white, broad, disk greenish yellow, leaves prominently ~~reticulate~~ areolate beneath.
- ligules pale lavender, disk yellow turning reddish; involucre cylindrical.
- twining on herbs; flowers white; fruit lustrous, ~~common generally~~; tufted, flowers reddish.
- scattered erect culms, panicle drooping or arcuate, erect, rays bright yellow, disk dull yellow.
- lvs. glabrous but fls. solitary.
- leaves erect
- leaves green, not glaucous.
- leaves glaucous beneath.

- 4195 1 *Vitis aestivalis* var. *argentifolia* (Munss.) Fern.
4 local, on ground
- 2 52 *Viola bicarpa* var. *leucocarpa*
occasional
- 1 53 *Carex stipitata*
common
- 1 54 *Carex*
common
- 2 55 *Poa*
rare
- 3 56 *Galium boreale* L.
very common
- 1 57 *Zygadenus*
rare
- 2 58 *Aureolaria flava*
occasional in woods on slope
- 1 59 *Melanthium hybridum*
rare
- 1 60 *Galium boreale*
common
- 2 61 *Geum*
rare
- 1 62 *Rubus*
occasional
- 1 63 *Lactuca floridana* v. *hirsuta*
rare
- 2 64 *Vaccinium vacillans*
abundant
- 1 65 *Rubus*
occasional
- 1 66 *Heuchera*
rare
- 1 67 *Rubus*
common

- vine; leaves glaucous
beneath, rusty pubescent;
fruit immature.
plant erect, fruit erect.
- tufts very loose, culms
spreading.
- tufts very loose, culms
spreading.
- culms erect, solitary.
shoots erect.
- erect; ~~petals~~ ^{tepals} white
with green heart-shaped glands.
corollas caducous,
yellow, villous in lines within.
erect; flowers greenish.
- erect
- petals minute, yellowish.
- stems ascending;
fruit not quite ripe.
erect, buds purplish.
- bushes 2-4 dm. tall; fruit
pleasantly acid, fragrant.
vines procumbent;
fruit black.
- primocanes somewhat
ascending; flowers arching
and then prostrate.

Road clearing, partly shaded but brush cleared out.

Pedicularis canadensis

Prunella vulgaris

Pr. compressa

Geranium maculatum

Viola sp.

Ceanothus americanus

Chenopodium vulgare

Solidago

Dioscorea quaternata

Galium circaezans

Antennaria plantaginifolia

Achillea millefolium

Veronica officinalis

Hedyotis purpurea v. *tennifolia*

Vicia caroliniana

Rubus hispidus?

Circaea quadrisulcata

Galium triflorum

Carex

Sanicula marilandica

Carex laxiflora

Festuca obtusa

Chrysanthemum leucanthemum

Utricularia perfoliata

Oxalis

Thaspium

Erigeron strigosus

Trifolium agrarium

Dianthus armeria

Lactuca

41968 (cp.)

- 1 rare
- 1 69 *Amelanchier*
occasional
- 3 70 *Lactuca floridana*
locally common
- 3 71 (grass)
very local
- 3 72 *Monotropa hypopitys* s. *americana*
very local
- 1 73 *Panicum*
local
- 1 74 *Danthonia spicata*
locally common
- 1 75 *Zizya*
occasional
- 2 76 *Lactuca*
rare in old fire road clearing

July 30 - Bear Wallow
in second growth woods
on rocky ground.

- 1 77 *Zygadenis glauca*
rare
- 1 78 *Lilium philadelphicum*
rare
- 1 79 *Bidens bipinnata*
rare, on bare rock along
wood road.
- 3 80 *Scutellaria ovata* var. *ovata* (Hill)
rare, on bare rock along
wood road.

tufted

shrub 1.5 m. tall;
fruit red.
erect; buds purple.

spreading by rhizomes,
forming loose patch, the
few flowering culms erect.
erect; plants straw colored.

stems erect; fruit green,
strongly aromatic-
erect (branches from a
cut off base); flowers yellow.

erect. pet tepals
white with heart-shaped
green gland.
flower erect, orange-red,
dark spots near base of blade
of tepals.

flowers purple and
white.

138

1961 Virginia

Labels
✓

July 30 - Matthews arm
Fire Trail gate, foot of
Matthews Arm ridge.

41981

Vaccinium corymbosum?
rare in dry second growth
forest

Shenandoah Nat. Park 139

sterile shrub 1 m. tall.
leaves glaucous beneath.

Aug. 10 - Hilo

Open areas, cleared of buildings by 1960 tsunami; luxuriant weed growth.

41982

Trema

2

rare

3

83

Desmodium

common

3

84

Euphorbia

abundant

2

85

Euphorbia

occasional

2

86

Spernococe suffruticosa

occasional

2

87

Ageratum

common

Aug. 10 - 7 mi. above Hilo on Saddle Road

along road in low open ~~to~~*Metrosideros* scrub

3

88

Melastoma malabathrica

common

Aug. 10 - Saddle Road 13.5 mi. above Hilo

2

89

Carex alligata Booth

local in wet depression in rough lava in lehua forest

2

90

Nephrrolepis cordifolia

common in lehua forest on rough lava

2

91

Rhynchospora

common in open scrub on lava

5 mi.

most of weeds seen about twice normal size.

shrub 1.5 m. tall.

branching herb ~~1.5~~ 1 m. tall, (others seen twice that) no anthocyanin

moderate anthocyanin

branched at base

flowers blue-lavender plant to 1 m. tall, aromatic.

500 m.

shrub 1.5 m. tall; petals bright rose.

1065 m.

branching from base, culms ascending.

fronds erect.

41992

Cyperus cyperoides
occasional in open power
line right of way on lava.

Large area where cars
can park on rt. side of
road about ~~4~~ 4-5 above
m.p. 13. (.3 mi above place
picked for stop on trip).

Plants in disturbed area
and along trail on lava.

- c Paspalum dilatatum
- o Nephrolepis exaltata
- o Rubus rosaeifolius
- lc Rhynchospora lararium:
- o Sporobolus apicatus
- ~ Stachytarpheta dichotoma
- o Epilobium oligodontum
- o Spatoglottis plicata
- c Anthoxanthum adnatum
- c Sarciolepis contracta
- ~ Conyza canadensis
- o Conyza bonariensis
- o Geranium carolinianum var. australe
- l. Oxalis corniculata
- l.a. Axonopus compressus
- c Sphenomeris chinensis
- lc Buddleia asiatica
- c Pluchea odorata
- c Andropogon virginicus
- c Hypochaeris radicata
- a Hypericum japonicum
- o Setaria geniculata
- ~ Eupatorium riparium

l.a. Cyperus carthaginensis
l.b. Cyperus polyanthus

Just
below
4000'

heads globose.

Open lehua with herb layer

- a Machaerina angustifolia
- a Lycopodium cominum
- a Metrosideros collina
- c Vaccinium reticulatum
- a Gleichenia linearis v. tomentosa
- ~ Dubautia scabra
- c Sadleria cyathoides
- c Hedyotis centranthoides
- c Polypodium pellucidum
- lc Coprosma ernodeoides

Area of denser forest around
lava ravine with wet bottom

- a Metrosideros collina
- c Cheucodendron trigynum
- o Broussaisia arguta
- Thelypteris cyathoides
- Mysis cf. lessertiana
- Mysis cf. sandwicensis
- Vaccinium calycinum
- Nephrolepis cordifolia
- Peperomia sp.
- Nertera granadensis var. insularum
- Gouldia terminalis
- Cyperus carthaginensis
- Coprosma rhynchosarpa?
- Pilotum sp.

Aug 10 - Kulanii Road,

350 m.

3 mi. below Prism Camp, in dense wet Metrosideros forest on old lava.

- Trichomanes bauerianum
- Aplousiogramma pendulum
- Polygodium saffordii
- Polygodium temausianum

in tall dense mossy Metrosideros forest.

41993 *Hymenophyllum* det. S. H. Hillebrand 1950

on fallen tree trunk

1 94 *Hymenophyllum* det. S. H. Hillebrand 1950

on fallen tree trunk

1 95 *Polygodium saffordii* det. S. H. Hillebrand 1950

on fallen tree trunk and erect sapling.

Aug 10 ^{outer} Edge of Kilauea Caldera in low open Metrosideros forest

1200 m.

1 96 *Deschampsia nubigena* common

erect

1 97 *Rhynchospora* common

tufts

1 98 *Luzula hawaiiensis* occasional

2 99 *Gleichenia linearis* var. *omentosa* forming a low tangle locally

42000 *Sacciolepis contracta* common locally

39.5 first belt of forest
40.2 enter forest
41.3 first stop.

Road to Dam -
young kōa showing
both kinds of leaves on it
at stream.

Anthoceros on cuts.
Thelypteris cyatheoides
Subantia cf. plantaginea
Thelypteris sp.
Athypium ponnetianum
Cephaelis sp.
Elaphoglossum conanum
E. hirtum v. micans
Polypodium ruffoides
Asplenium sp.
Peperomia sp.
Hymenophyllum recurvum
Eurya sandwicensis
Amilax sandwicensis
Clematis
very abundant
Myrsine cf. lessertiana
Pelea cf. clusiaefolia
Myrsine sp. (small lf.)
Urnia notinata

Haleakala Road

49.7
Jct. 56.9
view 59.6
Lepechinia 65.5 small side rd. to it.
bridge 66.1

Hosmer Grove

native veg. - a tall scrub
of Lophora, Styphelia,
Vaccinium reticulatum, Coprosma
montana, Vaccinium barbeidifolium,
Rubus moerseana?, Fragaria
chiloensis, Santalum
haleakalae; Geranium cuneatum v. tridens

, galls caused by gall fly not wasp.

Pamakani now flowering
at high elevations, not
lower down. (lower edge of scrub belt)

Pinus strobus

Cupressus arizonica

Hosmer Grove - Chamaecyparis lawsoniana

Libocedrus decurrens

Eucalyptus globulus

Eucalyptus pulchella

Cedrus deodora

Pinus coulteri Pinus ponderosa

Picea cf. rubens Picea glauca

Pinus contorta Juniperus virginiana

Cryptomeria japonica

Pseudotsuga menziesii

Pinus tabulaeformis

P. sylvestris

Aug. 11 - Hosmer Grove, near
Puu Niianian, n.w. slope
Haleakala
in ^{native} dense scrub among
planted trees

2070 m.

6800'

~~42001~~
42001

Vaccinium reticulatum
very common

02 *Vaccinium berberidifolium?*
common

erect shrub 1 m. tall,
leaves strongly glaucous;
corollas not strongly
tapering apically;
firm, dull red, paler
at base, lobes green.

~~shrub 0.4 dm. tall~~
shrub 0.4 (or 0.5) dm. tall,
not glaucous, not
flowering at this season,
fruit red.

Aug. 11 - Waikamoi Stream
near dam, north
slope of Haleakala Dome.
in thick mossy ~~forest~~
forest

1250 m.

03 *Uncinia uncinata*
rare, on mossy bank

tuft

04 *Juncus bufonius* L. ?
~~occasional~~ on wet roadside

05 *Juncus bufonius* L.
abundant in road

06 *Polypodium bellucidum?*
epiphytic on tree trunks

blade flat.

07 *Trichomanes*
epiphytic on tree trunks

08 *Coprosma*
rare

small tree 3 m. tall;
fruit green.

Aug. 11 - West Maui, n. coast,
from air.

Cliffs of whitish material
around n.e. side.

Lower ridges, above the
cliffs and on westward
very seriously eroded.

A dirt road ~~crosses~~
~~the~~ follows the coast at
a fairly low elevation.
Some pineapple fields
on lower slopes toward
n.w. corner.

N.w. side has no
cliffs, low cultivated
foot slopes, almost a
coastal plain. Red soil.

Aug. 20 - Kaena Point, Oahu
on dunes of ~~lime~~ sand,
exposed to wind and spray

42009

Scaevola sericea Vahl

abundant, binding sand

10

Heliotropium anomalum H. & A.
common

11

Vitex orata

locally common

12

Lesbania tomentosa

very locally common

+

13

Boerhavia repens L.

rare

14

Capparis sandwischiana DC.

very rare, where sand is thin or rocky

West Molokai from air.

s.w. coast - gray
bushes (*Protopis*?) forming
small patches, probably
grass beneath them,
red soil between them.
No appearance of green
at all.

5-10 m.

depressed shrub,
fruit white, fleshy.

- depressed dwarf shrub,
silvery; flowers white.

- prostrate shrub
with ascending

twigs, flowers purple.

- prostrate shrub,
flowers bright

→ salmon - vermillion,
prostrate forming mats,

- leaves white beneath.

- depressed shrub; flower
wilted; fruit green but seeds apparently ripe.

Sept. 2 - Honolulu, just above
of ^{Mehoa} School St. and Peabody Ave. 45 m.

in thicket in vacant lot
412015 *Prosopis pallida* var. *inermis*
common with spiny form. (HBK) Pers.

6 16 *Basella?*
abundant

small spreading
flat-topped trees.
clambering, tangled
twines, enveloping
bushes. Staminate
only seen.

Sept. 3 Auwahi

weeds seen in addition to list

- Festuca myuros*
- Clenopodium ambrosioides*

Composition of forest changes downward - *Santalum haleakalae* drops out, *Sophora* drops out - *Diospyros* comes in, becomes common.

Dracaena becomes very common. *Osmantthus* and *Dracaena* become commonest trees. *Lantana* becomes more and more abundant.

~~42017~~ Sept. 3 Auwahi, south slope of Haleakala

in dry open forest on

42017 *Alectryon macrocarus*
4 one tree seen

3 18 *Pouteria auahiensis* (Rohlf) Fock
occasional

4 19 *Myrsine*
occasional

1 20 *Osterneles anthyllidifolia*
occasional (very common higher up.)

~~21 *Santalum ellipticum*~~

3 21 *Pouteria auahiensis* (Rohlf) Fock
occasional

as trees become sparser, *Lantana* is dominant, practically a pure scrub. Definite altitudinal gap bet. the dry sclerophyll forest and the deciduous forest of *Erythrina*, *Reynoldsia*, etc. This includes considerable *Diospyros* and some *Aleurites*.

Toward lower part of sclerophyll, *Metrosideros* fairly common. A different *Myrsine* than above.

At water tanks and below *Santalum ellipticum* in *Lantana* scrub.

1600-1200 m.

"aa" (rough) lava.

Radlk. small tree

tree with round crown
6-8 m. tall.

small tree, ripe fruit
black, depressed globose.

(Sm.) Lindl. shrub 2 m. tall,
ripe fruit white, fleshy.

small tree 6-8 m. tall,
fruit yellow, turning orange.

- 42022 *Coccoloba*
occasional, twining over low bushes and on rocks
- 1 23 *Pelea*
~~occasional~~ rare
- 2 24 *Wikstroemia*
rare var. *Ovalifolia* (det. B.C. Stone, 1967)
- 2 25 *Pelea grandiflora* (Hillebr.) St. John var. (Hillebr.) St. John
rare
- 4 26 *Myrsine*
occasional
- 3 27 *Carex*
very local, small patch
- 3 28 *Pelea multiflora* J.F. Rock
occasional
- 2 29 *Passiflora*
common generally
- 3 30 *Alysicarpus olivaceiformis* Daud.
~~very~~ rare, under trees
- 2 31 *Champeritium obovatum* Daud.
occasional *carinatum*
- 3 32 *Chenopodium* ~~botry~~
occasional
- 3 33 *Pisonia forsteriana*!
rare
- 1 34 *Polypodium thunbergianum* (Haufl.) C. Chr.
occasional on bare lava rock.

same - in *Santana* scrub
rock.

- twines, leaves somewhat glaucous, flowers greenish white.
- small tree.
- tree-like shrub, 2.5 m. tall; fruit green.
- spreading shrub, leaves tending to be revolute.
- small tree 6 m. tall, fruit green.
- culms or small tufts well separated, spreading by rhizomes.
- small tree, flowers greenish.
- vine, climbing over bushes; flowers white, sepals green without, fruit green, soft.
- shrub 0.3 m. tall; flowers orange without.
- small tree.
- small tree; flowers pale bronze green. (same tree as #41512a)
- dries and curled in dry season.

900m.
Chr.

same - on open rough
lava in ~~open~~ deciduous
woodland

42035 *Capparis sandwicensis* DC.
1 one large plant seen
hanging over low cliff

Sept. 3 - Ulupalakua
in sparse pasture
on lava flow.

1 36 *Polycarpha*
common

1 37 *Rhipidium*
common

2 38 *Baccharis putrescens* L.
— very local

from p. 156, bottom

0.5 34a *Santalum ellipticum* David
occasional in Santana scrub

Sept. 4 - Waikamoi Stream,
Pipeline Trail.

1 39 *Plantago*
in wet trail in montane rain

1 40 *Astelia forbesii* Kottsb.
occasional, on fallen
logs.

1 41 *Stenogyne* cf. *scrophularioides*
on ground in dense wet
forest

450 m.
~~800 m.~~

spreading shrub
flowers faded, buds
white, fruit immature

600 m.

shrub 2 m. tall,
inflorescence pendent.

900 m.

small tree 4 m. tall;
flowers pale green,
fragrant.

1250 m.
4000'

Forest.

flowers greenish white.

creepers, sterile.

~~Sept~~
 Aug. 4 - Haleakala, near summit
 bare slopes of broken
 lava and cinders.

- 42041a *Erodium cicutarium*
 rare
 42 grass
 rare
 43 *Dubautia menziesii* Gray
 very common.
 44 *Dubautia menziesii* Gray
 common

~~Sept~~
 Aug. 3 - Lower ^{south} slopes of
 Haleakala, several miles
 beyond Ulapalahu on
 main road.

Erythrina and *Reynoldsia*
 both leafless or nearly so.
Erythrina flowering.
Reynoldsia in bud. Budding
 inflorescences while still
 small embedded in
 a hard transparent gum.
 This forming a thin coating
 when infls. expand.

Neosparganium common
 here, also, but general
 aspect is of a deciduous
 forest. Only scattered
 trees and clumps of trees
 left now, on rough
 places, ravines, etc.

7950 m.

spikelets dark purple

Hemeraania locally
 abundant, at least
 along road, for some
 distance. *Bocconia* much
 more local, occasional
 just south of Ulapalahu.

~~Sept~~
 Aug. 3 - east of Makawao,
 toward Kula.

Tibouchina semidecandra
 growing in yard of house.

None of the melastomes
 seems to be well-established
 on Maui, at least yet.

Sept. 5 - Malamalesi Forest Reserve, n. of Mackenzie Park, just back of sea cliffs

Collapsed lava tube - two holes -

Brassia actinophylla

Pipturus albidus

Nephrolepis hirsutula

Polypodium scolopendria

Adiantum capillus-veneris

Cordyline terminalis

Sadleria cyathoides

Sept. 5 - inland from Kalapana on upper road is an excellent piece of decent mature undisturbed forest. Tall lehua with much *Freyinetia*. Should be examined carefully at earliest opportunity.

Generally throughout Puna *Andropogon virginicus* is just about flowering. This is taller than the ordinary e. u. s. form.

Arundinaria is most conspicuous and abundant, flowering everywhere.

Sept. 6 - Kilauea Homesteads,
Wright Rd., Kilauea

42045
3 *Asplenium lobulatum* (Sw.) Presl
occasional, on ~~logs~~
fallen fern trunks
in Cibotium forest

Sept. 6 - Stainback Highway
to Kulani, at Old Flume Rd.

1 46 *Psidium cattleianum* f. *lucidum*
occasional in metrosideros forest

1 47 *Labordia*
rare in wet Metrosideros forest

Sept. 6 - Lower part of
Stainback Highway to Kulani,
just above Hils.

2 48 *Melochia*
abundant along road
in mixed secondary thickets

Sept. 6 - Stainback Highway
to Kulani, 1 1/2 mi. above Old
Flume Rd.

1 49 *Psilotum complanatum* Sw. Det. D. Palmer 8/96
occasional on tree fern trunks

1 50 *Cyanea*
rare

3 51 *Cyrtandra*
common in undergrowth

600 m.

small tree; fruit ~~is~~ globose,
pale yellow when ripe.
shrub about 1 m. tall,
leaves very pale beneath.

60 m.

tree 4 m. tall (others to 10 m.),
dried fruit only.

670 m.

unbranched; leaves pale
beneath, flowers purplish
without, greenish white
within.

dark green, shrubby at
base; leaves pale beneath;
flowers white.

Sept. 6 - Road from Kulani
to Mauna Loa, at edge of
1942 lava flow
in open Metrosideros forest
on old aa lava.

- 42052 *Oreobolus* ?
common in crevices and
depressions on ~~at~~ rock
- 53 *Koehleria cylindrica*
parasitic on *Metrosideros*
- 4 54 *Vaccinium*
rare
- 1 55 *Vaccinium ~~pelcarum~~ ^{pahalae} Skottsb.*
common
- 1 56 *Vaccinium reticulatum* Sm.
common
- 1 57 *Vaccinium pelcarum* x *reticulatum* ?
common
- 1 58 *Senecio sylvaticus* ?
rare
- 1 59 *Centaurium umbellatum*
occasional
- 1 60 *Rhynchospora lararium* ?
common
- 1 61 *Urcinia uncinata*
common, terrestrial
- 2 62 *Elaphoglossum wawrae* (Luer) C. Chr.
local, abundant on ~~at~~ peaty
hummocks Det. D. Palmer 8/94
- 1 63 *Dubautia scabra* (DC.) Keck
common on bare 1942 lava at edge of road

5860'
1480 m.

dense cushions

joints terete

shrub; leaves subcoriaceous,
subglossy beneath;
calyx flaring, corolla
green, cylindrical.

shrub 0.3 m. tall,
leaves concave beneath
fruit immature

shrub 0.3 m. tall,
leaves flat; fruit orange red.
leaves almost flat;
fruit dark red.
erect. flowers yellow.

flowers pink.

tufts

loose, small, very
spreading tufts

densely branched dwarf shrub;
flowers white.

Sept. 6 - about 1 mi. w. of
Kulanui Prison Camp on road
to Mauna Loa.

42064

Rumex giganteus

2

in cleared pasture in
~~low~~ *Metrosideros* forest
(rainfall approx. 100 inches)

Sept. 7 - Hilina Pali, Kaa
Hawaii Volcanoes National Park

3

65

Andropogon glomeratus
abundant generally on
ash-covered lava flow.

Sept. 7.

6

Kilanea) li - coll. G. Ruhle

Anemone japonica

local on ledges along trail

2

Dodonaea viscosa

Sept. 8

Puu Waawaa - E. C. Evans III

(comp.)

abundant on flats

M. Buehringer

Polygonum

Sept. 8 - City of Refuge, Honaunau
South Kona

2

66 *Cyperus compressus* L.

in crevices in lava rock.

1500 m.

tangled, vine-like,
flowers brick red.

680 m.

erect, culms in small
groups.

1180 m.

flowers said to be white.

erect, flowers yellow

1 m.

Sept. 8 - just n. of
Hutchinson Mill, Naalehu

Aa flow, very rough
with very sparse
vegetation of
Canthium, Thyoporum,
Tephrosia, Plumbago,
Doryopteris, Waltheria,
Schinus, Erythrina,
Nephrolepis cf. hirsutula,
Metrosideros, Pluchea
odorata, Santana.

Great transverse fissures
in lava flow. Also
great smooth boulders
up to 1-2 m. diam. embedded
in the fantastically rough
aa. The lava forming
crags and pinnacles
to 1-2 m. tall, fissures
to 3-4 m. deep.

Sept. 8 - Keauhou Bay,
South Kona

42067

3

Capparis sandwichiana
common locally on aa lava

Sept. 9 - Keauhou Road n.
Kualalau

25 m

spreading shrub 1 m.
tall, flowers faded.

Sept. 7. Manuka Park, Kau
in dense *Metrosideros*
forest on aa lava

500 m.

- 42068 *Antidesma pulvinata*
uncommon
- 69 *Antidesma platyphylla*
uncommon
- 70 *Antidesma kapuae*
uncommon
- 71 *Lycopodium phyllanthum*
locally common, terrestrial,
- 72 *Nikastroemia*
occasional
- ~~73 *Annua*~~
- 73 ?
- 3 74 *Lipochaeta*
rare
- ~~75~~
- 75 *Pelea oblongifolia* A. Gray
rare
- 76 *Gouldia terminalis* var.
occasional
- 77 *Gouldia terminalis* var.
occasional
- 78 *Psychotria hawaiiensis*
common

same loc. - on deep weathered
soil between flows of aa, in
guava forest

500 m.

- 3 79 *Annua*
rare

- sterile sapling
- sterile small tree
- sterile slender small tree
- erect, arching at summit.
- shrub 3 m. tall, slender,
sparsely branched.
- very slender elongate
sprawling shrub, 1.5 m.
tall; rays yellow.
- sprawling slender
shrub; flower pale green.
- shrub; ripe fruit blue.
- slender shrub 2.5 m. tall,
fruit immature.
- shrub 2 m. tall;
flowers white.

- ~~3~~ sterile shrub
2 m. tall; leaves rather
glaucous beneath.

Sept. 8 - on 1868 Lava flow where highway crosses it, Kaa on almost bare pahoehoe lava

500 m.

42080

Graphalium sandwicense var. *bilauceanum*

Deq. & Sheriff

rare

1 81

Peperomia leptostachya?

~~Peperomia~~ rare

1 82

Picris hieracioides??

rare

1 83

Lycopodium phyllanthum

rare

erect, flowers yellow
erect, arched at tips.

Sept. 9 - just north of Hutchinson Sugar Mill, ^{Honua'apai} north of Naalehu, on ~~rough~~ sparsely vegetated very rough aa lava

50 m.

Kaa

2 84

Tephrosia purpurea

very local

1 85

Myoporum sandwicense
occasional

erect, flowers whitish.
shrub 1.5 m. tall;
leaves fleshy; fruit pinkish,
fleshy.

Sept. 9 - Kaaupulehu Road up Hualalai, North Kona

1500 m.

5000'

3 86

Graphalium sandwicense Gray
on loose lapilli along road

4 87

Hypericum perforatum
colony in grazed flat

large plant, much branched near base
erect, fls. yellow.

same - in sparse small *Metrosideros* forest on somewhat rough lava flow.

1 88

Geranium carolinianum var. *australe*
common along road

prostrate, flowers pink.

- 42089 *Vaccinium reticulatum* Sm.?
- 90 *Vaccinium*
- 91 *Vaccinium reticulatum* Sm.
- 92 *Vaccinium pahalae* Skottsb.

- 4 93 *Vaccinium berberidifolium*
very local
- 1 94 *Styphelia tameiameia*
common
- 1 95 *Styphelia tameiameia*
common
- 2 96 *Vaccinium reticulatum* Sm.
common

- 2 97 *Vaccinium pahalae*?
local
- 1 98 *Fragaria chiloensis*
occasional
- 1 99 *Veronica serpyllifolia*
occasional on loose
lapilli on roadside
- 42100 *Funaria bofonius* L.
rare on loose lapilli on roadside

} with
Tomlinson -

- low bush, fruit dark red.
- fruit light red
- fruit scarlet
- fruit scarlet. corolla broadly unciniate, not much contracted at top, green with reddish patches.
- low bush, somewhat tangled; corolla red, subglobose.
- shrub, 1 m. tall; fruit dark maroon, ^{depressed globose}
- shrub 1 m. tall; fruit crimson, slightly depressed globose.
- shrub 3-4 dm. tall; leaves slightly glaucous; corollas unciniate, tapering somewhat apically, red with green lobes; fruit dark red.
- low tangled bush; fruit bright red.
- leaves ascending.

- prostrate, fls. pale blue.

Sept. 9 - just below summit of Hualalai on Kaupulehu (west) side. on ash accumulated on and around pahoehoe lava.

- 42101 1 *Graphalium japonicum* common
- 3 02 *Carex macloviana* common
- 4 03 *Tetramolopium humile* common
- 1 04 (grass) rare
- 3 05 (grass) occasional
- 1 06 *Trisetum glomeratum* occasional
- 2 07 (grass) occasional
- 1 08 *Achillea millefolium* rare
- 1 09 *Graphalium purpureum* occasional
- 1 10 (grass) occasional
- 1 11 *Sisyrinchium aca* common

Sept. 9 - ~~west~~ east of summit of Hualalai

- 1 12 *Geranium curvatum* occasional in scrub

2375 m.

low spreading clumps, dead in center.

rays white

flowers yellow

2160 m.

shrub 0.8 m. tall, leaves green, flowers white.

Sept. 9 - Keaunohou Road to
Hualalai

- 42113 *Ostermeles anthyllidifolia*
occasional in scrub
4 14 *Dubautia ciliolata* (DC.) Keck
common in scrub
1 15 *Polycarpon tetraphyllum*
rare on open ground

Sept. 9 Keaunohou 2, Road
up Hualalai
in low rather open *Metrosideros*
forest, ground mossy

- 3 16 *Stenogyne*
locally common
2 17 *Rubus macraei*
occasional
1 18 *Dubautia scabra*
occasional
1 19 *Liparis hawaiiensis*
very local
2 20 *Vaccinium calycinum*
common

same - openings

- 6 21 *Hedyotis centranthoides*
common

same - at gate at lower
edge of forest

- 1 22 *Mucuna*
climbing in thicket

1200 m

shrub

shrub, heads yellow.

1050 m.

corollas bright deep purple;
fruit greenish black, fleshy.
sterile, unbranched.

subshrub mostly
rather attenuate; heads white.
in fruit only.

slender weak shrub
to 4 m. tall.

1000 m.

sparsely branched
shrubs 1-2 m. tall; flowers
purple without, green within.

400 m.

wine, flowers chartreuse

Sept. ~~10~~¹⁰ - road to Waimea,
 13 mi. from Kailua - area of
 dry forest recently burned
 over - trees appear dead.
 14 mi. - Erythrina grove.

Sept. ~~10~~¹⁰ - Puu Kawaiwai

Enclosure of a few acres
 with remains of a
 dry woodland - a few
 still living trees
 of Acacia koaio.

claytonia
salweenii
 Myoporum, Nototrichum
 sandwicense, Osmorhiza
 Myrsine sp., Xylocarpus
 hillbrandii, Osteomeles
 Japhora, Grewia
 Cyrtandra, Brownia
 ?

Sept. 10 - ^{above} Puu Kawaiwai, Kohala

on dry weedy slope with scattered small trees.

- 42 123 *Acacia koaia*
occasional
- 2 24 *Korthalsella complanata*
parasitic on *Acacia koaia* (#42123)
- 3 25 *Apium petroselinum* L.
abundantly naturalized
- 3 26 *Xylosoma hillbrandii* Wawra
2 trees, ~~seen~~ only, seen, in ravine
- 3 27 *Acacia koaia* Hbd.
occasional
- † 28 *Osmanthus sandwichensis* (A. Gray) Knott.
two trees, seen in ravine
- 2 29 *Chenopodium oahuense* Meyers
rare
- 2 30 *Myrsine*
occasional
- 1 31 *Acacia koaia* Hbd.
occasional
- 3 32 *Lepidium*
locally common

Sept. 10 - Head of Alahahi Gorge, Waipio Valley, Kohala mts. above Waiomea in wet scrub vegetation on plateau

- 1 33 *Asplenium*

950 m.

small spreading tree, apparently unhealthy. dull dark olive green.

erect, flowers greenish, plant aromatic when broken.

small tree 5 m. tall, young growth and petioles red; flowers staminate.

small spreading tree; flowers light yellow, somewhat fragrant.

small spreading tree, fruit blue-black when ripe.

shrub 1 m. tall.

tree 5 m. tall, leaves coriaceous.

from very young tree

1180 m.

- 42134 Polygonum
4 abundant in wet road
- 1 35 Peperomia
epiphytic on mossy shrub
- 4 36 Hydrocotyle sibthorpioides var. oedipa Dc. - Greenw.
local on open Sphagnum
cushions.
- 2 37 Hexanoma
common
- 1 38 Axonopus compressus?
small patch in Sphagnum bog.
- 3 39 Clermontia
occasional
- 3 40 Myrsotis
local along old road
- 4 41 Cyperus
abundant along old road

~~42~~

same - low forest on
gentle slope

with
P. D. Mansueti
4

- 42 Cyrtandra
occasional

Sept. 11 - Saddle Road 13.4 mi
above Hilo

In wet Metrosideros forest
Adiantum digitifolium (Kaula)
Adiantum sp. Hook + Green

- 1 43 *Polygodium*
epiphytic on mossy tree trunks
- 5 44 *Vaccinium calycinum* (dentatum?)
common in edges of
- 3 45 *Pipturus albidus* (H. & A.) Gray
occasional
- 2 46 *Uncinia uncinata* (L. f.) Kuhn.
rare, on mossy logs.

stems ascending,
flowers white.
leaves white beneath

stems deeply buried
in Sphagnum.
shrub 2 m tall,
flowers white.

shrub; calyx green,
lobes unequal,
corolla purple.

shrub; flowers white;
fruit white.

1060 m.

fronds pendent.

erect shrub 1-2 m tall,
fruits glossy, bright red,
acid and somewhat astringent.
shrub; fruit white, fleshy.
tufted,

Sept. 11 -
 Goat Hill, on Kailua -
 Waimoa Rd. - 20000 acres
 burned last year.
 Native dry forest trees
 all dead as seen from rd.

(ctd. from 186)

42147 *Psilotum* ~~complanatum~~
 on mossy tree trunk

Sept. 11 - Puu Huluhulu,
 Hummala saddle

- 2 48 *Carex*
occasional in *Coprosma*
thicket on ~~open~~ boulder slope
- 2 49 *Geranium carolinianum* v. *australe*
common on bare ground
- 1 50 *Oxalis corniculata* L.
occasional, in rock crevices
- 5 51 *Sicyos macrophyllus* Gray
rare, in thicket
- 3 52 *Coprosma montana* Hbd.
locally abundant
- 1 53 *Lesymbium officinale* L.
open ground.
- 1 54 *Coprosma montana* Hbd.
edge of thicket
- 1 55 *Malva parviflora* L.
open ground
- 1 56 *Trifolium arvense* L.?
common on bare ground
- 1 57 *Geranium carolinianum* v. *australe*
common on bare ground

tips of fronds pendent.

2100 m.

caespitose

prostrate, flowers
 rose pink.
 sub-prostrate

liana, 4 cm. thick at
 base, climbing in trees,
 shrub 3 m. tall (others taller);
 fruits fleshy, orange.

shrub 4 m. tall, erect;
 fruit fleshy, orange.
 flowers pinkish, especially
 veins of corolla; glabrous
 within.

prostrate

- 42158 *Veronica arvensis*
1 in moist spot between
base of cinder cone and lava flow.
- 1 59 *Carex wahuensis* C.A. Mey.
rare
- 1 60 *Wahlenbergia*
roadside
- 3 61 *Modiola caroliniana* (L.) G. Don
common on open ground

Sept. 11 - Pohakuloa
in open woodland of
Sophora, ~~Myoporum~~
and *Chenopodium*

- 3 62 *Rhamnus californicus*
planted around nene pens
- 3 63 *Sicyos baillebrandii* St. J.
rare
- 2 64 *Bromus*
abundant
- 5 65 *Helianthus*
occasional

Sept. 11 - main highway
near Puu Waa Waa Ranch entrance

- 3 66 *Reynoldsia sandwicensis* Gray
locally common

Sept. 11 - main highway
opposite Puu Waa Waa

- 4 67 *Nothoecetrum breviflorum* Gray
rare in open dry woodland on
aa lava.

flower deep purple within,
pale without.
- very prostrate stems
radiating from root
crown; flowers orange
red.

1980 m

shrub 1.5 m. tall;
ripe fruit, fleshy, black.
win; flowers white.

dense tufts.

erect clumps 1 m. tall;
disk brown, rays bright yellow.

625 m

tree 8 m. tall; in bud only.

610 m.

small spreading tree;
flowers green, deliciously fragrant.

42168 *Argemone glauca* var. *inermis*
rare

Sept. 11 - Kaupulehu Forest
10 miles ^{north} of Kailua
in open sclerophyll forest
on aa lava slope

42169 *Pouteria auahiensis* (Roh) Forb.
occasional

70 *Argemone glauca* var. *inermis*
rare in openings.

71 *Koehleria cylindrica*
abundant on certain
Diospyros ferrea trees (#42172)

72 *Diospyros ferrea* var. *pubescens*
abundant

73 *Colubrina oppositifolia* Brongn.
occasional

74 *Coccoloba ferrandianus* Gaud.
common, tangled in shrubs

Sept. 12 - Hilo

75 *Cestrum nocturnum* L.
cultivated

Sept. 12 - Akaka Falls,
above Honokaa
in *Metrosideros* forest
much modified

76 *Pteris vittata* L. det. D. Polak 4/96
on stone wall along trail

77 *Psilotum complanatum* Sw.
very common on mossy tree trunks
det. D. Polak 7/96

flowers white.

640m.

tree 8-10 m. tall; fruit
yellow, not quite ripe
erect, 2 m. tall.

branches cylindrical.

small tree.

tree 6 m. tall, fruit
immature. (note domestic).

twines, flowers whitish;
petals emarginate at tips.
(broad leaf form commoner
than narrow).

10 m.

shrub 3 m. tall; flowers
pale yellow, very fragrant
at night; fruit white
when ripe.

320 m

rhizome erect, fronds
strongly ascending.

- 42178 *Lycopodium phyllanthum*
occasional on mossy
tree trunks.
- 79 *Cryptotaenia canadensis*
locally common along
trail

all
done
5-2

H. & A.

Label typed
~~42780~~

Sept. 16 - Hayward,
Alameda Co.

42780 *Setaria sphacelata*
4 large persistent clump
in garden

perennial; brought
accidentally with
garden plants, some
years ago, perhaps 1959,
from Turlock.

Sept. 23 - Belts Woods
 Old growth deciduous
 forest -

Tree layer 30 m. ±

- a Liriodendron
- c Quercus coccinea
- c Q. velutina
- c Q. alba
- c Carya sp.

Second layer 5-10 m. ±

- a Cornus florida
- r Nyssa sylvatica

Shrub layer 0.5-5 m.

- c Cornus florida
- o Acer rubrum
- o Morus rubra
- o Lindera benzoin

Ground layer

- a Cornus florida (2)
- c-a Liriodendron (2)
- c-a Parthenocissus quinquefolia (leaves)
- c Vitis sp. (green beneath)
- r Smilax glauca
- lc Botrychium virginianum
- c Quercus sp. (2)
- o Desmodium nudicaulis
- r Dioscorea quaternata
 (not glaucous, condensed at
 base but not a whorl)
- o Dioscorea quaternata var. glauca
- r Acer rubra (2)

- o Carya sp. (2)
- o Morus rubra (2)
- o-c Cimicifuga racemosa
- r Arisaema atropurpureum
- lc Sanicula sp.
- r Collinsonia canadensis
- o Sassafras albidum (2)
- r Chimaphila maculata
- lc Languinaria canadensis
- lc Uvularia sessilifolia
- o Uvularia perfoliata
- r Castanea dentata (sprout)
- lc Apios triberosa
- r Monotropa uniflora
- lc Thelypteris hexagonoptera

198 200

103

50

66

42

24

53

to

K.M.S. AZIZ

HOMEO HEALING HOME,
ELEPHANT ROAD, DHANMANDI,
DACCA-2,

EAST PAKISTAN.

Dr. F. Bonet

Apartado Postal 18196
E.N.C.B

México, D.F.

put on cards

Cholla				4197
Quilfordia				
Quilfordia				
Quilfordia				

Plants of Alvarado
 B. L. Welch in July, 1941
 711161

Perez I

- ~~Lycium~~ Atriplex pentandra
- ~~Forsia~~ Suriana maritima
- Opuntia dillenii
- Portulaca oleracea (2)

- Sesuvium portulacastrum
- Cyperus planifolius
- Tamifolia gnaphalodes
- ? Aicemia alba
- Euphorbia luxifolia

~~tools for I Jones~~

~~cards~~

~~White steamer~~

collections of
Sam Rainey

1957 Nevada

July - Charleston Mt

1. *Jamesia americana* T. & G.
2. *Chamaebatia millefolium*
aria (Torr.) Maxon.
3. *Philadelphus microphyllus*
Gray
4. *Acer glabrum* Torr.
5. *Calochortus*
6. *Arceuthobium*
7. *Heuchera versicolor* Greene?
8. ?

July Desert near Mercury

- 3 9 (Crucifer)
- 4 10 *Eriogonum*

1957

Nevada

- 11 Eriogonum
- 12 Eriogonum
- 13 Gilia (Langloisia)
- 14 Euphorbia
- 15 (comp.)
- 16 (comp.)
- 17 Eriogonum
- 18 Mentzelia
- 19 Baileya multiradiata
- 20 Arctostaphylos
- 21 Eriogonum
- 22 (comp.)

1958

Marshall Is.

June ~~15~~ - Glenn I. Eniwetok atoll

23 Canavalia microcarpa

5 24 Suriana maritima
Caroline Is.

June - Kusaie

2 25 Hedychium coronarium

26 Canna

27 Wedelia biflora

28 Phyllanthus

29 Asplenium nidus

3 30 Paspalum distichum Berg

3 31 Vigna marina Burm.

32 Cyperus

4 33 Sida acuta

2 34 Vernonia cinerea

July 1 ~~Frank~~ Moey, Truk

2 35 Cassia occidentalis

36 Macaranga

1958 Caroline Is.

- 37 *Crotalaria incana*
- 38 *Stachytarpheta verticillifolia* Sims.
- 39 *Torenia*?
- 40 *Passiflora foetida* var. *hirsuta* Killip
- 41 *Ixora casei* Harms

1958 Virginia Fairfax Co.
Sept. 22 Scott Run

- 42 *Eupatorium*
- 43 *Eupatorium*

1959 Virginia Fairfax Co.
Apr. 24 ~~Potomac~~ Scott Run, Potomack R.

- 44 *Ranunculus*

1959 Bermuda

May 20 St. George's I.

- 45 *Chiococca alba*
- 46 ?
- 47 *Buddleia*
- 48 *Oenothera*
- 49 *Asparagus*
- 50 *Centaurium*
- 51 *Sisyrinchium*
- 52 *Euphorbia heterophylla*?
- 2 53 *Juniperus bermudiana*
bermudensis



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North Pacific Science Co



Inocencio A. Ronquillo

CHIEF, SECTION OF HYDROLOGY & FISHERIES BIOLOGY

DIVISION OF RESEARCH
BUREAU OF FISHERIES

MANILA, PHILIPPINES

163
50
66
42
24
53

18 u of fresh 8/9 m
Hlo, H...

H0

K.M.S. AZIZ
HOMED HEALING HOME,
ELEPHANT ROAD, DHANMANDI,
DACCA-2,
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