

The image shows the front cover of a book. The cover is primarily a light, textured material, possibly cloth or paper, with a dark, repeating geometric pattern. This pattern consists of a large outer square frame with a scalloped inner edge, and a smaller inner square frame with a straight edge. The space between these frames is filled with a repeating pattern of small circles or dots. The corners of the book are reinforced with a bright red material, likely leather or a different type of cloth. The spine of the book is visible on the left side, showing several raised bands. The word "RECORD" is printed in a bold, serif font in the center of the cover.

RECORD



Collection and Field Note Book

No. 62

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

(11862 -- 12180)

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by  
 signed  
 for  
 J. David  
 45, and any other  
 and of Agriculture  
 Official Forester.



Collection and Field Note Book

No. 62

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

(41862 -- 42180)

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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

, 196

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* Katz.

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 innumera-  
ble straight ditches.

Near New Orleans pools  
and channels are  
largely lined or covered  
by a pale green floating  
plant very probably  
*Lichornia 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  
then 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 <sup>toward</sup> ~~at~~  
Merida. ~~Merida~~ Merida  
much apparent scrub  
forest. Some sisal (?)  
plantations, 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. 15<sup>th</sup>  
acc a plague on the foundation.

Casuarina planted in  
1917 or 1920.

Dr. 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. Dr. 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 of *Euphorbia buxifolia*, mats of *Sesuvium*.

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

there is a small secondary lagoon surrounded by gravel bars with only a very sparse vegetation. The pond opens to the lagoon. At its inner, seaward end, are 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~~ <sup>several</sup> of *Tournefortia*, one of *Atriplex*,

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

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

*Calidris* 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 *Calathea edentata* var. *alacranensis*  
 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.

*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*. Crows 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 .7 m. tall. one large mat of *Sesuvium* that is almost dead - a few stems only still green. <sup>dead lobe.</sup> hard 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 bank 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. (photo). On the absolutely white accretion 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 ~~pink~~ sand beach surface 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~~ <sup>by</sup> 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~~ <sup>irregular</sup> open dwarf scrub of Tournefortia with <sup>at</sup> south end and <sup>near</sup> ~~scattered~~ <sup>scattered</sup> bushes of Suriana 1-<sup>2</sup>/<sub>3</sub> 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. (photo)



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 twig

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, <sup>some of them</sup> quite green, and dead *Cakile*. Locally some dead tufts or bases of *Cyperus*, upon them

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*<sup>v.</sup>  
occasional
- 5 68 *Calsile edentula* var. *alacranensis* (Nielsen) 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* Koen. + Sims  
abundant,
  - 5 73 *Diplanthera wrightii* (Arch.) A. Sch.  
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; <sup>less than 1 cm.</sup> fls. yellow <sup>across petals</sup>  
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, <sup>green, only slightly reddish at nodes,</sup> stems prostrate with ascending or erect branches, leaves somewhat compressed, not or scarcely glossy; flowers purplish pink.



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

(Photos of the <sup>open</sup> 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 <sup>each</sup> seaward ~~to~~ shore, in front of Tournefortia belt.)

<sup>Some</sup> 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 Millsparagh'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 <sup>suriana</sup> scrub to top of beach. This is occupied by widely scattered *Tournefortia* patches scattered *suriana* bushes, an abundance of dead *Cakile* (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. *Cakile* abundant there.

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

Near north end, about 20 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 *Cyprina*.

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 *Suaeda*) 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 *Suaeda* 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 next 30 cm.  
4 next 40 cm.

wet layer 5 there to H2O

6 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 the~~  
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 cochinchinensis*  
two plantsgrowing on coral heads on  
patch 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. tallshrub 1 m. tall leaves  
eaten, sap somewhat milky.



1961 Mexico - Yucatan

Patch reef in lagoon  
opposite Perez D.

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 <sup>or three</sup> 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  
*Panuliris*.

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.

On Perez

1 heron

Frigate birds in hundreds

Noddies in thousands

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















Wind directions, 3 times daily

Jan. 1959	Recalando NW	9	nnw	n	w
	—		nw	ne	w
	n		nw	ne	nw
					<del>ne</del>
2	sss Recalando puerto del ssw wsW	10	ne	se	ne
			ne	se	e
			ne	se	nne
3	Recalando w		ne	se	ne
	se	11	ne	se	ne
	e		ne	e	ne
			<del>ne</del>		
4	e		ne	se	ne
	e	12	ne	se	e
	ne		ne	ne	ne
5	n	13	ne	n	e
	e		ne	n	e
6	ne		e	nw	ne
7	ne		se	n	e
	ne	14	se	nne	e
	ne		se	ne	ene
			ESE plano		
			E		
7	e		n	nne	
	sss	16	nw	nne	
	e		nw	ne	
8	ne		nw	ne	
	w	17	n	ne	
	nw		ne	ne	

U.S.F.W. Buil 89  
1944

Feb. 1959	ne		se	n	se
	e	9	ese	sw	s
	ne		e	wnw	nw
	ne		se	se	26 sse
2	e	10	ese	se	s
	ne		ene	nw	nne
	e		e	ne	s
3	se	11	e	sse	27 ssw
	e		ene	nne	nw
	sse		e	se	nne
4	s	12	e	ese	28 sw
	wnw		ne	nne	n
					con raches de 80 kms las 4 p.m.
	Rec.d.W.		ese	e	
5	Rec.d.W.		e	e	
	Rec.d.W.		e	ene	
	ne		ese	ene	
6	nne	14	e	ne	
	nne		ne		
	e		se	ese	
7	e	15	se	23 e	
	ene		n	ene	
	e		Rec.d.W. Frente	se	se
8	ese	16	se	24 e	
	e		nw	ene	



Mar. 1959

1. NW	ENE	17 SW	25 ESE
WNW	NNE	ESE	E
NW	ENE	ESE	ENE
2. NNW	10 E	18 ENE	26 SSW
NE	E	NE	S
E	E	NE	S
3 SE	11 ESE	19 N	27 SSW
E	SE	NW	SSW
NE	NE	N	S
4 E	12 WSW	21 ENE	28 SW
E	NNW	ENE	S
E	N	NE	SSW
5 SE	13 NNE	22 SE	29 SW
SE	E	S	SW
SE	E	W	S
6 N	14 SE	22 NNW	30 SE
N	ESE	NW	SE
N	E	NNW	NNE
7 N	15 SE	23 NW	31 SE
NE	SE	NW	SE
NNE	NE	NE	NE
8 NE	16 SE	24 ENE	
ENE	SE	E	
ENE	N	ENE	

Apr. 1959

SE	9 ESE	E	25 NE
SE	ENE	E	ENE
N	NE	ENE	NE
2 NW	E	SE	E
NW	E	SE	26 E
NW	NE	NE	ENE
3 NNW	E	SE	E
SE	SE	19 ESE	ESE
N	N	NE	ENE
4 ENE	SE	SE	SE
NE	SE	ESE	ESE
NE	NE <sup>cm</sup> <sub>rascher</sub>	ENE	ENE
5 E	N	SE	SE
E	NNW	ESE	29 ESE
NE	N	NE	E
6 E	N	ESE	30 SE
E	NNE	NW	E
NE	NE	N	NE
7 E	NE	N	
ENE	ENE	23 N	
ENE	ENE	N	
8 E	E	NNE	
E	NE	24 NE	
ENE	NE	NNE	



May 1959

	E	E	SSE	ESE
1	E	E	ESE	E
	NE	ENE	ENE	NE
	E	ESE	SE	NE
2	E	E	SE	E
	NE	ENE	ENE	NE
	E	ESE	SE	ENE
3	ENE	E	ESE	NE
	NE	ENE	ENE	NE
	E	ESE	ESE	N
4	E	ENE	SE	NW
	ENE	ENE	ESE	NW
	E	SE	ESE	W
5	E	flana	E	WSW
	ENE	NNE	E	flana
	E	N	E	ESE
6	ENE	NW	E	SE
	NNE	NNE	NE	E
	ENE	E	E	SE
7	NE	ENE	E	SE
	NE	NNE	NE	E
	NE	N	E	
8	NE	SE	NE	
	NE	NNE	NE	

June 1959

	SE	SE	SSW	E
	ESE	ESE	WSW	E
	NE	NE	WNW	E
	SE	SE	SSW	<del>ESE</del>
2	E	ESE	WNW	ESE
	NNE	ENE	N	E
	ESE	SE	SSE	ESE
3	ESE	E	WSW	E
	NE	NE	NNE	E
	ESE	SE	SE	E
4	E	E	calm	ENE
	NE	<del>NNE</del>	NE	ENE
	SE	S	SE	ESE
5	SE	S	SE	E
	NE	NNE	ESE	NE
	SE	SE	ESE	ESE
6	SE	SE	ESE	E
	NE	E	E	NE
	SE	E	ESE	
7	SE	E	E	
	ENE	NE	E	
	Rec. fuerte del SE	SSE	E	
8	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
<del>ESE</del>	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

llana	SE	ESE	E
llana	SE	E	E
NNE	NE	ENE	ENE
SSE	SE	E	SE
llana	SE	E	E
llana	NE	NE	E
SE	ESE	ENE	E
llana	E	NNE	E
NNW	NE	NNE	NE
SE	SE	E	E
llana	SE	E	E
N	NNE	ENE	NNE
SSE	SE	E	llana
S	SE	ENE	NW
llana	NE	NE	llana
SSE	SE	ESE	NW
SE	ESE	E	NW
ENE	ENE	ENE	llana
SE	E	ESE	llana
llana	ENE	E	SSE
NE	E	E	NE
SE	ESE	ESE	
ESE	E	E	
NE	ESE	ESE	

rachas de 80 km.



Sept. 1959

SE	SE	<del>ENE</del>	SE
SE	Plana	SE	SE
NE	NNE	NE	<del>NE</del>

SE	Plana	ESE	SE
E	W	E	SE
ENE	N	NE	NE

ESE	SW	NE	SE
E	SW	ENE	SE
ENE	Plana	E	NE

ESE	S	E	SE
ENE	SW	ESE	ENE
ENE	WSW	NE	NE

Plana	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	Plana	Plana
ESE	N calma	SW
NE	N	NE

Oct. 1959

SE	SE	N	NW
SE	SE	NW	NNW
NW	ESE	NW	NNW

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 submadas 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	26 ESE
NE	NNE	N	E
SW	Calma	NNW	SE
NE	"	NNE	WSW
ENE	NNE	19 NNW	WNW
SE	N	Calma	rec. muy fuerte del N
ESE	S	SW	28 NNW
E	Calma	WSW	NNW
SE	Calma	W	NNW
ESE	"	WNW	N
NE	NNW	WNW	N
NNE	Calma	WSW	30 N
N	NNW	W	NNE
rec. fuerte del N	NNW	Calma	NE
"	NW	ESE	
"	Calma	SE	
N	"	ENE	
N	Calma	S	
N	E	SW	
N	NNE	24 NW	

Dec. 1959

1. NE	9 E	17 SE	25 Calma
NE	E	SE	"
NNE	ENE	WNW	NE
N	E	WNW	E
NNW	10 NE	NW	26 ENE
NW	NE	NW	E
NW	ESE	NW	ESE
3. NW	SE	NW	ESE
NNW	E	19 NNW	E
WNW	SE	N	Calma
N	2 SSE	N	28 NW
NE	NNW	NNW	NNW
Calma	NNE	NW	NNW
5. SW	NE	NW	N
Calma	NE	21 NNW	NNE
W	E	NE	N
NW	E	NE	30 NNE
NW	ENE	ENE	NE
NW	ESE	ENE	E
NNW	ESE	23 Calma	E
N	E	"	31 E
NE	ESE	N	
8. E	ESE	Calma	
ENE	ENE	24 NW	



Jan. 1960

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

ENE	ESE	SSE	ESE
ENE	ESE	Rec. del S	E
ENE	NE	NNW	ENE
ESE	SE	NNW	ESE
ESE	SE	NNW	ESE
NE	NE	NNW	ENE
N	ESE	rec. del NNW	SE
N	E	rec. del N	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	rec. del S	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	MNE	NNE	NE
SSE	ENE	NE	E
llano	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
SE	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
NNE	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
NNE	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> E	ENE
ENE	ENE	ENE	ENE
ESE	ENE	ENE	NNE
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. fuente del IV</i>
N	ENE	ENE	<i>muy rec. fuente 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. fuente d. NE</i>	WNW	ENE	NE
E	N	E	<del>ENE</del> 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	<del>NE</del> 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	rec. del NW	N	ESE
N	NW	N	E
NNE	rec. muy fuerte d. NE	N	NE
NE	NNE	NNE	SE
N	NNE	NE	SE
NNE	NNE	ENE	rec. de W
NE	NE	ESE	N
NE	NNE	WSW	NNE
NE	N	WNW	NE
rec. fuerte d. NE	NW	N	ESE
NE	WNW	N	ESE
NE	WNW	N	Calm
ENE	WNW	NNW	N
ENE	rec. fuerte d. W	NNW	NNW
NE	rec. fuerte d. W	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	
rec. muy fuerte d. N	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
rec. fuerte d. NW	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			
SW	ENE	SE	
rec. fuerte d. NW	ENE	ESE	
rec. fuerte d. NW	ENE	NE	
NNW	ENE	ESE	
NNW	ENE	ESE	
N	ENE	ENE	
N	ESE	rec. muy fuerte d. NW	
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

NW	<sup>rec. many fronts</sup> d. SE	ENE	SE
NW	SSE	ENE	ESE
NNW	N	<del>NE</del>	NE
N	N	E	<u>ESE</u>
NNE	NE	ENE	E
NNE	NNE	ENE	<del>NE</del>
		ENE	
		ENE	
		NE	
Calm	SE	E	<del>ESE</del>
NE	ESE	E	E
N	ENE	ENE	NE
Calm	SSE	E	<del>ESE</del>
N	WNW	E	<del>ESE</del>
NNE	N	NE	<del>NE</del>
ESE	N	ESE	<del>ESE</del>
E	NNE	E	<del>E</del>
E	E	ENE	<del>NE</del>
SE	ESE	ESE	<del>E</del>
SSE	ESE	E	<del>E</del>
NW	ENE	ENE	<del>NE</del>
NNW	<sup>rec. many fronts</sup> 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	<del>SE</del> NW	ENE	ENE
E	W	ENE	NE
E	NNW	E	SE
E	NNW	NE	SE (debit)
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 (parca)	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	<del>E</del>	E	E
E	ENE	E	ENE
E	NE	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 (racha hasta 100 km.)	SE	NE
E	E <sup>avanzando</sup> <sub>trunks</sub>	S	E
ENE	E	Calm	ENE
NE	E <sup>con rachas fuertes</sup>	"	NNE
E	ENE	SE	ENE
E	ENE	SE	ENE
E	ENE	N	E
E	E	SE	NE
ENE	ENE	E	ESE
NE	ENE	NE	calma
ESE	E	ESE	NNE
ESE	ENE	ESE	E
NE	ENE	NNE	ENE

July 1961

ENE
ENE
—
E
NE
NE
ESE
calma
NNE
E
ENE
NE
ENE
E
ENE
E
ENE
ENE



from 11.24

41883 *Terminalia catappa* L.1 84 *Mentha spicata* <sup>h?</sup>1 85 *Portulaca grandiflora* Hook.1 86 (Commel.) *Setcreasea purpurea* Boon1 87 *Chenopodium ambrosioides* L.1 88 *Capsicum annuum* <sup>L.</sup> 11 89 *Capsicum annuum* <sup>L.</sup> ? 2on narrow sand  
flat behind seaward beach5 90 *Tournefortia gnaphalodes*  
common

R. 31.

low rounded bushes,  
1 dm tall, 1.5 m. wide.1 91 *Cinnam* sp  
near lighthouse building  
planted2 92 *Opuntia dillenii* (Ker-gawler) Haworth  
locally abundant,  
forming dense patches

sterile

plants 0.5 - 1 m. tall, much  
branched, ~~areoles~~  
tending to be on manillae;  
flowers pale yellow, fruit  
dark red, juicy, pleasant  
to taste.2 93 *Conocarpus erectus* L.  
on lagoon beach ridge just  
inside edge of burian  
scrub, near south end.old gnarled bush about  
1 m. tall, spreading; single  
trunks.

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.



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 75-90% more inland much sparser. Scattered *Calcile* 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 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, <sup>will</sup> not leave.

One low Suriana bush 0.7 m. tall, 4 m. across at top of beach on side toward Papuans 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 on 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 sparser.

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. Low 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.

2 smaller patches 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 Cabite.

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 9.

July 4 Pajaros Islet

On south 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 gnarls. 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. Varies 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 1-2 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 fls. 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  $\frac{1}{2}$  along eastern beach.

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

Solid Sporobolus extends 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~~ Cenchrus about 10 m. long, completely dead. A small patch of Cyperus.

Much 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 + tanaidellid

On Avicennia

flies, coccinellids

stack with p. 19X

Two mes. 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 hove (+ spit?)

Dr. Bonet found a small lizard, Eumia 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. B. Whittaker







	Perey			Dretnoa			Pajaros			Chueq
	M	B	F	M	B	F	M	B	F	
12* <i>Cordia sebastena</i>			X							
21 <i>Avicennia <sup>germinans</sup> <del>fruticosa</del></i>		X	X				X	X		
22 <i>Flaveria linearis</i>	X									
11 <i>Philoxerus vermicularis</i>	X			X						
9 <i>Boerhavia repens</i>	X									
20 <i>Scaevola <sup>plumieri</sup> <del>lobelia</del></i> ( <i>S. lobelia</i> )	1									
31* <i>Nopalea cochinellifera</i>		1	X							
15* <i>Casuarina equisetifolia</i>		X	X							
24* <i>Crinum sp.</i>			X							
30* <i>Terminalia catappa</i> (pot)			1							
14* <i>Capsicum annuum</i> 1 (pot)			1							
15* <i>Capsicum annuum</i> 2 (pot)			1							
19* <i>Patroptha <sup>urens</sup> sp.</i> (pot)			1							
33* <i>Mentha spicata</i> ? (pot)			1							
27* <i>Chenopodium ambrosioides</i> (pot)			X							
18* <i>Portulaca grandiflora</i> (pot)			1							
36* <i>Solanum lycopersicon</i> (pot)			X							
7 <i>Thalassia testudinum</i>		X	X							X
1 <i><del>Cyrtandra</del> <sup>Chenopodium filiforme</sup> <del>maritima</del></i>		X	X							X
2 <i>Diplanthera wrightii</i>		X	X							X
37 <i>Scaevola <sup>indiana</sup></i>			X							



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

41894 *Cenchrus ~~islandicus~~ pilosus HBK.*  
5 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 *Cahilo edentula* v. *alacranensis* (Millsp.) Schubert  
5 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-red, 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 graphalodes R. Br.  
rare, one tiny plant seen

2 08 Sesuvium maritimum <sup>Portulacastrum</sup> L.  
locally common

5 09 Portulaca oleracea L.  
very local in open area

2 10 Calce edentula var. alacranensis <sup>(Millsp.) S. Wats.</sup>  
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 Syngonium filiforme Kütz.  
common locally

to 2.102

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 heads 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 Pery 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 Deserona 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*. *Cakile* occasional mostly dead, some flowering.

*Cenchrus pauciflorus* and *Cakile* 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 ~~B~~ 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 *Cakile* 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 <sup>inner</sup> edge of terrace and outer dunes is abundant Cabile.

1 great Chelone mydas in shed on beach.

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 herbs 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 - Perge 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, tectering 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 sea level. A thin grayish crust - algae & salt?

Back of this a few dunes *Tournefortia* ~~cup~~ *Portulaca*.

Farther near end of islet a deep (1m+) saline pond with gelatinous blue green algae reminiscent 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.

Much also for few eggs.

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

A few small dunes with few *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~~ <sup>apron</sup> extending well into lagoon, about 1 m. of water.

Not a sign of beach <sup>rocks</sup> or, 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 dying 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 out young (photos). Some

dying Sesuvium mats here too. Some boobies nesting here too.

Tribulus pauciflorus 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 - Desertera Islet

Just north of inlet  
50-60 or more brown  
boobies in air. Not  
clear where they live.  
& ruddy turnstone birds

*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* <sup>Willd. HBK.</sup>  
rare, ~~near~~ <sup>toward</sup> inner beach
- 2 15 *Euphorbia boxifolia* Lam.  
common locally
- 2 16 *Tribulus cistroides* L.  
one plant seen, near center
- 2 17 *Portulaca oleracea* L.  
occasional on lagoon half  
of islet
- 3 18 *Tournefortia gnaphalodes* ~~Willd.~~ R. Br.  
the dominant plant on the islet
- 5 19 *Cenchrus pauciflorus* <sup>Benth.</sup>  
common
- 2 20 *Casipoua edentula* var. *alacranensis* <sup>(Millsp.) Schubert</sup>  
common, fruiting plants  
all dead.

July 5 Perez I.

- 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  
bony; one flower seen,  
yellow, petals emarginate,  
stamens 22.
- low spreading bush,  
stems erect from  
prostrate ones.
- prostrate spreading  
clumps.
- flowers white
- flowers yellow; fruiting.



Desertona 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*<sup>and</sup>  
bush, one *Tournefortia*.

Sand lobe on corner  
with open stand of  
*Euphorbia*, *Cakile*, &  
*Conchus pauciflorus*.

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

Board strip of open  
to sparse *Euphorbia* dwarf  
scrub in from beach  
along s.w. side. Patches of  
*Cakile* and of *Conchus insularis* <sup>on a just</sup> <sup>back of</sup> <sup>sand ridge.</sup>

*Lycaenid* butterflies  
abundant around *Atriplex*  
in interior,

northward just behind  
beach ridge <sup>or</sup> <sup>w. side</sup>

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 *Cakile* 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 lagoon beach.



North of edge of <sup>black</sup> ~~beach~~  
beached ~~beach~~ of ~~island~~  
July 6 - Desertera (Allison) Islet  
Alacran Reef  
on sand flat, ~~s~~

- 41922 <sup>2</sup> *Portulaca oleracea* L.  
occasional generally
- 3 23 *Tribulus cistoides* L.  
abundant in open areas
- 3 24 *Atriplex pentandra* (Jacq.) Standl.  
abundant near center of islet
- 2 25 *Sesuvium portulacastrum* L.  
abundant on ~~east~~ south end of islet.
- 2 26 *Sporobolus virginicus* L.  
one large patch on s.e. corner
- 2 27 *Tournefortia graphalodes*  
two plants only seen, just  
back of lagoon beach
- 2 28 *Buriana maritima* L.  
one plant seen, on ~~beach~~  
lagoon beach ridge, south end.
- 2 29 *Cenchrus ~~pauciflorus~~ <sup>gracillimus</sup> ~~pauciflorus~~* <sup>near</sup>  
fairly common along  
lagoon beach ridge  
and somewhat inland.
- 5 30 *Cenchrus ~~insularis~~ <sup>villosus</sup> ~~insularis~~* <sup>HBR</sup>  
generally common, locally dominant.
- 3 31 *Euphorbia buxifolia* Lam.  
generally common, locally dominant
- 2 32 *Calicle edentula* var. *alacranensis*  
abundant on beach ridges and upper <sup>beaches.</sup>

July 6 - Perez I.

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

1 m.

R.Br.

- 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.



Percey 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, Roystonea, Samanea,  
Enterolobium, Melia,  
Eriobotrya, Terminalia,  
Cassipouira, Delonix.

247  
(odometer  
reading  
in km.)

Edge of town (r.s.)

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

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 *Sperdea  
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. Holcatus - 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 Hoctin.

After this little more hereguen.

295

scrub forest along road. A few fields of hereguen.

~~Robledo~~ ~~brassia~~. 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 (Cnidocobus).

310

Kantunil. 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 may be a barbed wire fence, or 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 (Labal?) very rarely seen in scrub forest.

Some charcoal burning in scrub forest.

- 334.6 Libre Union some palm thatched huts.
- 337 Relief becomes a bit more pronounced. a fan palm and several arecife 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.



357 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 places 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: 8 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 rested 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 ceas.

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  $\pm$  mainly  
legumes, alophylloids,  
Crotalaria, 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 *Bourneria* about  
20 cm dbh. spaced about  
5 m. some 4-5 cm. trees.  
But mostly stender

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 on road.  
Tahmek -  
About 40 km out of  
Merida - photos of henequen.



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 Warenton  
 ± 1173 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 highway  
 second gr. scattered  
*Pinus virginiana*  
 but this only near top.  
 Trees up to 20 cm,  
 a few wolf trees -  
*Liriodendron* - to 60 cm  
*Quercus rubra*,

Rich herb layer  
*Galium*  
*Adiantum*  
 c. *Arisaema* ~~trorubon~~  
 a *Impatiens*  
 a *Parthenocissus*  
*Circaea*  
 - *Camp. am.*

*Cornus florida*  
*Viburnum aa.*  
*Cereis*  
*Lindera* (wet spots)

*Ulmus*  
*Fraxinus americana*  
*Diospyros*  
*Castanea* (dead)  
*Quercus prinus*  
*Carya*  
*Quercus rubra*

*Chimaphila mac.*  
*Vaccinium vac.*  
*Lolidago caesia*  
*Galium triflorum*  
*Cimicifuga*  
*Monarda*  
*Impatiens* (in wet place)



Lower parts sparsely  
 much Robinia  
 Lonicera japonica,  
 Passiflora, <sup>even</sup>  
 Broussonetia, & Ailanthus  
 around old house site,

Monarda 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 Pinus  
 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.

Sealed  
 typed

41936

North of the cattle  
 farm - gentle east  
 slopes - second growth  
 red oak, black or scarlet,  
~~Low~~ 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, pinus  
 bicolor.

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~~*

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 *Agrimonia 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 ~~occidentalis~~**Rubus argutus*

Lianas + creepers

*Dioscorea quaternata**Parthenocissus quinquefolia* (Schott)~~*Rhus toxicodendron*~~ (stat)*Vitis* (glauca beneath)c *Pycnanthemum nemorosum*c *Hedyotis purpurea* s. *terrestris*c *Allium cernuum*o *Lactuca floridana* var. *villosa*c *Carex* ~~sp.~~c *Paronychia canadensis*~~*Vitis*~~~~*Rubus*~~c *Lanieria marilandica*la *Antennaria plantaginifolia*la *Galium boreale*lc *Polygonum cristatum*o *Viola*



- c *Potentilla* <sup>simplex</sup> ~~canadensis~~  
 c *Poa compressa*  
 ~ *Asclepias quadrifolia*  
 ec *Euphorbia corollata*  
 c *Helianthus stellata*  
 ~ *Parthenium integrifolium*  
 o *Lactuca floridana*  
 l *Sedum ternatum*  
 l *Poa*  
 l *Viola*  
 a *Vicia caroliniana*  
 c *Thaspium* <sup>barbinode</sup> ~~canadense~~  
 o *Smilacina racemosa*  
 c *Achillea millefolium*  
 ~ *Heuchera* sp.  
 l *Convolvulus spithameus*  
 o *Geranium flavum*  
 ~ *Thalictrum caesia*

floor 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* i.  
 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*) var.  
 ec *Aster linifolius*  
 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  
by road

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

41937 *Vicia caroliniana* Walt.  
very common generally

3 38 *Lonicera maundlandica* L.  
common

1 39 *Hedyotis purpurea* var. *tennifolia*  
common

3 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~~ cristatum* 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

weals, prostrate to  
ascending.

flowers pale ~~to~~ 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.



Labeled types

- 41951 *Vitis aestivalis* var. *argentifolia* (Munz) Fern.  
4 local, on ground
- 2 52 *Viola tricarpa* var. *tricarpa*  
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 slopes
- 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; <sup>tepals</sup> petals 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*

*Poa compressa*

*Geranium maculatum*

*Viola sp.*

*Ceanothus americanus*

*Chenopodium vulgare*

*Solidago*

*Diroscorea quaternata*

*Galium circaeifolium*

*Antennaria plantaginifolia*

*Achillea millefolium*

*Veronica officinalis*

*Hedyotis purpurea* v. *tennifolia*

*Vicia caroliniana*

*Rubus hispidus?*

*Circaea quadrivalvata*

*Galium triflorum*

*Carex*

*Sanicula marilandica*

*Carex laxiflora*

*Festuca obtusa*

*Chrysanthemum leucanthemum*

*Utricularia perfoliata*

*Oxalis*

*Thaspium*

*Erigeron strigosus*

*Trifolium agrarium*

*Dianthus armeria*

*Lactuca*



Labels typed

41968 (cop.)

- 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 *Zizia*  
occasional
- 2 76 *Lactuca*  
rare in old fire road clearing

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

- 1 77 *Zygadenis glaucus*  
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

Label  
typed

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

Rhyrachospora

common in open scrub on lava

5 mi.

most of weeds seen about twice normal size.

shrub 1.5 m. tall.

branching herb ~~to~~ 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 4-5 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 *Nephrrolepis exaltata*
- o *Rubus rosaeifolius*
- lc *Rhynchospora lamarum*:
- o *Sporobolus apicatus*
- ~ *Stachytarpheta dichotoma*
- o *Epilobium oligodontum*
- o *Spathoglottis plicata*
- c *Anthoxanthum odoratum*
- c *Sarciolepis contracta*
- ~ *Conyza canadensis*
- o *Conyza bonariensis*
- o *Geranium carolinianum* var. *australe*
- l. *Oxalis corniculata*
- la. *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*

la *Cyperus carthaginensis*  
lc *Cyperus polyanthus*

heads globose.

Just below 4000'

- Open lehua with herb layer
- a *Machaerina angustifolia*
- a *Lycoodium complanatum*
- a *Metrosideros collina*
- c *Vaccinium reticulatum*
- a *Gleichenia linearis* v. *tomentosa*
- ~ *Dubautia scabra*
- c *Sadleria cyathoides*
- c *Hedyotis corymbosa*
- c *Polypodium pellucidum*
- lc *Coprosma ernodeoides*

Area of denser forest around lava ravine with wet bottom

- a *Metrosideros collina*
- c *Chenodendron trigynum*
- o *Broussaisia arguta*
- Thelypteris cyathoides*
- Myrsine cf. lessertiana*
- Myrsine cf. sandwicensis*
- Vaccinium calycinum*
- Nephrrolepis cordifolia*
- Peperomia* sp.
- Nertera granadensis* var. *insularum*
- Gouldia terminalis*
- Cyperus carthaginensis*
- Coprosma rhynchosarpa* ?
- Psilotum* sp.



Aug 10 - Kulanii Road,  
3 mi. below Prism Camp, in dense

- Trichomanes bauerianum*
- Ophioglossum pendulum*
- Polypodium saffordii*
- Polypodium tanausium*

in tall dense mossy  
Metrosideros forest.

- 41993 *Hymenophyllum* <sup>*Melocentrum*</sup> *recubum* (Gaudich.) Copel. det. D. Palmer 8/90  
on fallen tree trunk
- 1 94 *Hymenophyllum* <sup>*Sphaerobolium lanceolatum* (Hook. & Arn.) Copel.</sup> det. D. Palmer 8/90  
on fallen tree trunk
- 1 95 *Polypodium saffordii* <sup>*Oligophanes (= Adenophorus) pinophilus* Gaudich.</sup> det. D. Palmer 8/90  
on fallen tree trunk and  
erect sapling.

Aug 10 <sup>outer</sup> Edge of Kilauea Caldera  
in low open Metrosideros forest

- 1 96 *Deschampsia nubigena*  
common
- 1 97 *Rhynchospora*  
common
- 1 98 *Luzula hawaiiensis*  
occasional
- 2 99 *Gleichenia linearis* <sup>*Dicranopteris linearis* (Gardn. f.) Underw. 8/90</sup> var. *mentosus*  
forming a low tangle locally
- 42000 *Sacciolepis contracta*  
common locally

350 m.

wet Metrosideros forest on old lava.

1200 m.

erect

tufes



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

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

Anthoceros on cuts.

*Thelypteris cyathoides*

*Subantia cf. plantaginea*

*Thelypteris* sp.

*Athyrium punctatum*

*Coprosma* sp.

*Elaphoglossum conanum*

*E. hirtum* v. *micans*

*Polypodium ruffatum*

*Asplenium* sp.

*Peperomia* sp.

*Hymenophyllum recurvum*

*Eurya sandwicensis*

*Amilax sandwicensis*

*Clermontia*

very abundant

*Myrsine* cf. *lessertiana*

*Pelea* cf. *clusiaeifolia*

*Myrsine* sp. (small lf.)

*Urosia uncinata*

## Haleakala Road

Jct. 56.9

view 59.6

Lepechinia 65.5 small side rd. to it.

bridge 66.1

49.7

## Hosmer Grove

native veg. - a tall scrub  
of *Sophora*, *Styphelia*,  
*Vaccinium reticulatum*, *Coprosma*  
*montana*, *Vaccinium barbidifolium*,  
*Rubus moeroseana*? *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 Nihoa, n.w. slope  
Haleakala  
in <sup>native</sup> dense scrub among  
planted trees

42001

*Vaccinium reticulatum*  
very common

1

02 *Vaccinium berberidifolium?*  
common

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

1

03 *Uncinia uncinata*  
rare, on mossy bank

1

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

1

05 *Juncus bufonius* L.  
abundant in road

1

06 *Polypodium bellucidum?*  
epiphytic on tree trunk

1

07 *Trichomanes*  
epiphytic on tree trunk

1

08 *Coprosma*  
rare

2070 m.

6800'

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 (0.5) dm. tall,  
not glaucous, not  
flowering at this season,  
fruit red.

1250 m.

tuft

blade flat.

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 ~~coral~~ 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 sandwichiana* DC.  
very rare, where sand is thin on rocks

West Molokai from air.  
s.w. coast - gray  
bushes (*Prosopis*?) 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  
 & corner <sup>ob</sup> <sup>Mehoa</sup> School St. and Peabody Ave.  
 in thicket in vacant lot

417015 *Prosopis pallida* var. *inermis*  
 4 common with spiny form. (HBK) Torr.

6 16 *Basella*?  
 abundant

45 m.

small spreading  
 flat-topped tree.  
 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. *Osmanthus*

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* (Roth) Fock

occasional

4 19 *Myrsine*

occasional

1 20 *Osterneles anthyllidifolia*

occasional (very common

higher up.)

~~21 *Santalum ellipticum*~~

3 21 *Pouteria auahiensis* (Roth) 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.

1000-1200 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 *Alyxia olivaeformis* Gaud.  
~~rare~~ rare, under trees
- 2 31 *Chaptalia obovata* Gaud.  
occasional *caimatum*
- 3 32 *Chenopodium* ~~bracteatum~~  
occasional
- 3 33 *Pisonia forsteriana*!  
rare

same - in Santana scrub

- 1 34 *Polypodium Thunbergianum*  
occasional on bare lava 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 a small tuft, 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)

9:00 am.

(Haufl.) C. Ch. dries and curled in dry season.



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

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

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

1 36 *Polycarpaea*  
common

1 37 *Rapidium*  
common

2 38 *Breccaria putrescens* L.  
— very local  
from p. 156, bottom

0.5 34a *Santalum ellipticum* <sup>David</sup>  
occasional in Santana scrub

Sept. 4 - Waikamoi Stream,  
Pipe Line Trail.

1 39 *Plantago*  
in wet trail in montane rain

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

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

~~800 m.~~  
450 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.

creeper, sterile.



~~Aug.~~ <sup>Sept.</sup> 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

~~Aug.~~ <sup>Sept.</sup> 3 - Lower <sup>south</sup> slopes of  
Haleakala, several miles  
beyond Ulapalaku 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.

*Niosphyros* 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

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

~~Aug.~~ <sup>Sept.</sup> 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 - Malamahi 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*

*Codylina terminalis*

*Sadleria cyathoides*

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

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

*Arundina* is most conspicuous and abundant, flowering everywhere.



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

- 42045  
3 *Asplenium lobulatum* Mett. Det. D. Palmer 8/96  
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 415.

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

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

- in dense wet Metrosideros forest
- 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 ~~of~~ 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* ?  
5' common in crevices and  
depressions on ~~the~~ rock
- 1 53 *Koehleria cylindrica*  
parasitic on *Metrosideros*
- 4 54 *Vaccinium*  
rare
- 1 55 *Vaccinium <sup>pahalae</sup> ~~pelleanum~~ <sup>Shottsb.</sup>*  
common
- 1 56 *Vaccinium reticulatum* Sm.  
common
- 1 57 *Vaccinium pelleanum* × *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* (Kunze) C. Chr.  
local, abundant on ~~the~~ peaty  
hummocks Det. D. Lohman 8/9/61
- 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, Kauai  
Hawaii Volcanoes National Park

3 65 *Andropogon glomeratus*  
abundant generally on  
ash-covered lava flow.

Sept. 7 -

6 ↓ *Kilanea* (hi) - coll G. Ruhle  
*Anemone japonica*  
local on ledges along trail  
2 *Dodonaea viscosa*

Sept. 8

1 ↓ *Puu Waawaa* - E. C. Evans III  
(comp.)  
abundant on flats

M. Buchinger

3 *Polygonum*

Sept. 8 - City of Refuge, Honouliuli  
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. 3 - 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. 3 - 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. 9. Manuka Park, Kau  
in dense *Metrosideros*  
forest on aa lava

- 42068 *Antidesma pulvinata*  
uncommon  
69 *Antidesma platyphylla*  
uncommon  
70 *Antidesma kapuae*  
uncommon  
71 *Lycopodium phyllanthum*  
locally common, terrestrial,  
72 *Nikotiana*  
occasional  
~~73 *Antidesma*~~  
73 ?  
74 *Lipochaeta*  
rare  
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  
quava forest

- 79 *Annua*  
rare

500 m.

- 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; flowers pale green.  
shrub; ripe fruit blue.  
slender shrub 2.5 m. tall,  
fruit immature.  
shrub 2 m. tall;  
flowers white.

500 m.

- 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

42080 *Graphalium sandwicense* var. *bilauceanum*  
rare

1 81 *Peperomia leptostachya*?  
~~very rare~~ rare

1 82 *Picris hieracioides*?  
rare

1 83 *Lycopodium phyllanthum*  
rare

Sept. 9 - just north of Hutchinson Sugar Mill, <sup>Honuaʻe</sup> north of Naalehu, on ~~rough~~ sparsely vegetated very rough aa lava

2 84 *Tephrosia purpurea*  
very local

1 85 *Myoporum sandwicense*  
occasional

Sept. 9 - Kaupulehu Road up Hualalai, North Kona

3 86 *Graphalium sandwicense* Gray on loose lapilli along road

4 87 *Hypericum perforatum* colony in grazed flat

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

1 88 *Geranium carolinianum* var. *australe* common along road

500 m.

DeG. & Sherff

erect, flowers yellow

erect, arched at tips.

50 m.

Kaa

erect, flowers whitish.

shrub 1.5 m. tall; leaves fleshy; fruit pinkish, fleshy.

1500 m.

5000'

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

prostrate, flowers pink.



- 42089 *Vaccinium reticulatum* Sm.?  
 1 90 *Vaccinium*  
 1 91 *Vaccinium reticulatum* Sm.  
 1 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 *Juncus bufonius* L.  
 rare on loose lapilli on roadside

- with Tomlinson — low bush, fruit dark red.  
 fruit light red  
 fruit scarlet  
 fruit scarlet. corolla  
 broadly urceolate,  
 not much constructed  
 at top, green with  
 reddish patches.
- low bush, somewhat  
 tangled; corolla red,  
 subglobose.
- shrub, 1 m. tall;  
 fruit dark maroon, <sup>depressed globose</sup>
- shrub, 1 m. tall;  
 fruit crimson, slightly  
 depressed globose.
- shrub 3-4 dm. tall;  
 leaves slightly glaucous;  
 corollas urceolate, 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 acic*  
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 - Keaunohu Road to  
Hualalai

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

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

- 3 16 *Stenogyne*  
locally common  
2 17 *Rubus macraci*  
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 alternate; 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~~<sup>10</sup> - road to Waimea,  
 13 mi. from Kailua - area of  
 dry forest recently burned  
 over - trees appear dead.  
 14 mi. - Erythrina grove.

Sept. ~~10~~<sup>10</sup> - Puu Kawaiaui

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

*claytonia*  
*salweenii* Myoporum, Nototrichum  
 sandwicense, Ozmanthus  
 Myrsine sp., Xylocarpus  
 hillbrandii, Osteomeles  
 fopphora, Linnæa  
 cynosu, Bromus cathart-  
 ica?



Sept. 10 - <sup>above</sup> 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 *Xylosma 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 Alakahi Gorge,  
Waipio Valley, Kohala mts.  
above Waimea  
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.

(A. Gray) Knott. 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

same - low forest on gentle slope

with P. O. ...  
4

- 42 Cyrtandra  
occasional

Sept. 11 - Saddle Road 13.4 mi above Hilo

In wet Metrosideros forest

- 1 43 Polypodium <sup>Adenophorum hymenophyloides (Kaulf.) Det. D. Palmer 9/16 Hook + Green.</sup>  
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 -  
 Waima Rd. - 20000 acres  
 burned last year.  
 Native dry forest trees  
 all dead as seen from rd.

(ctd. from 186)

42147 *Psilotum complanatum* Sw.  
 on mossy tree trunks  
 Det. D. Palmer 8/96

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 *Lycias macrophyllus* Gray  
 rare, in thicket
- 3 52 *Coprosma montana* Hbd.  
 locally abundant
- 1 53 *Lesyumbium 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



- 42153 *Veronica arvensis*  
1 in moist spot between  
base of cinder cone and lava
- 1 59 *Carex wahuensis* C.A. Mey.  
rare
- 1 60 *Wahlenbergia*  
roadside
- 3 61 *Modiola caroliniana* (L.) G.  
common on open ground

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

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

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

- 3 66 *Reynoldsia sandwicensis* Gray  
locally common

Sept. 11 - main highway  
opposite Pau Waa Waa

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

flow.

flower deep purple within,  
paler without.

Don

very prostrate stems  
radiating from root  
crown; flowers orange  
red.

1980 m

shrub 1.5 m. tall;  
ripe fruit, fleshy, black.  
vine; 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 <sup>nnw</sup> north of Kailua  
in open sclerophyll forest  
on aa lava slope

42169 *Pouteria auahiensis* (Rock) Fock.  
occasional

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

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

72 *Diospyros ferrea* var. *pubescens*  
abundant

73 *Colubrina oppositifolia* Brough.  
occasional

74 *Cocculus ferrandianus* Gand.  
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. Palmer 8/96  
on stone wall along trail

77 *Psilotum complanatum* Sw.  
very common on mossy tree trunks  
Det. D. Palmer 8/96

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 dormatia).  
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.



194

1961 Hawaiian Is.

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

all  
done  
once

Hawaii

195

H → A.



196

1961

California

Label  
typed  
~~42180~~

Sept. 16 - Hayward,  
Alameda Co.

42180 *Setaria sphacelata*  
4 large persistent clump  
in garden

197

perennial, brought  
accidentally with  
garden plants, some  
years ago, perhaps 1955,  
from Turlock.



Sept. 23 - Belts Woods  
Old growth deciduous  
forest -

Tree layer 30 m.  $\pm$

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

Second layer 5-10 m.  $\pm$

- 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 Sanguinaria canadensis
- lc Uvularia sessilifolia
- o Uvularia perfoliata
- r Castanea dentata (sprout)
- lc Apios triberosa
- r Monotropa uniflora
- lc Thelypteris hexagonoptera



198 200



163

50

66

42

24

53

Min. of Fish & Game  
Hls, Dacca

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

<i>Cadellia</i>				4147
<i>Quilfolia</i>				
<del><i>Quilfolia</i></del>				
<i>Rizostachya</i>				

Plants of Alcazar  
 B. L. Welch in July 1901  
 711161

Perez I

~~*Limonium*~~

~~*Forsia*~~

*Atriplex pentandra*

*Suaeda maritima*

*Opuntia dillenii*

*Portulaca oleracea* (2)

*Sesuvium portulacastrum*

*Cyperus planifolius*

*Tournefortia gnaphalodes*

*Aicenia alba*

*Euphorbia luxifolia*

~~tools for *Tournefortia*~~

~~card~~

~~White steamer~~



5791  
Collections of  
Sam Rainey

1957 Nevada

July - Charleston Mt

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

July Desert near Mercury

3. 9. *(Crucifer)* *occidentalis*
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 Arctomecon
- 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. 8291

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

1958 Virginia Fairfax Co.  
Sept. 22 Scott Run

42 *Eupatorium*

43 *Eupatorium*

1959 Virginia Fairfax Co.

Apr. 24 ~~Scott~~ Scott Run Potomack R.

44 *Ranunculus*

1959 Bermuda

May 20 St. George's I.

45 *Chioscoca alba*

46 ?

47 *Buddleia*

48 *Oenothera*

49 *Asparagus*

50 *Centaurium*

51 *Sisyrinchium*

52 *Euphorbia heterophylla?*

2 53 *Juniperus bermudiana*  
*bermudensis*



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*[Faint, illegible handwritten text, likely bleed-through from the reverse side of the page.]*



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 Bangkok, Thailand  
 P. 2. 250*



Inocencio A. Ronquillo

CHIEF, SECTION OF HYDROLOGY & FISHERIES BIOLOGY

DIVISION OF RESEARCH  
BUREAU OF FISHERIES

MANILA, PHILIPPINES



163  
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Unit 1030  
Div. of Fish & Game  
Hilo, Hawaii

H0

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