Collection and Field Note Book

No. 50

( Nov. 30, 1957 - Jan. 26, 1958)

(38917 -- 39316)

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Virginia

Prince William County................. 172-173
Specimens collected 172-173 + 39/13-39/16
(Manassas)
Nov. 20 - Road eastward along head of Gulf of Siam. Saline flats between the road and the sea are covered locally by a purple tufted (S. fruticosus) and generally by mangrove, mostly Avicennia. The Avicennia is mostly only 1 m. tall and seem to be harvested regularly for wood - bundles of wood ranging from finger size to very large and filled along the road and different patches are of different average heights. Occasionally, especially farther east, are taller patches of Rhizophora, the still roots very low, appearing to be about 1 m. tall. In some areas the mangrove has been cleared and casuarina planted as windbreak.

The road forms the boundary between saline and non saline conditions. On the seaward side there is little cultivation, on the landward side all is cultivated or in canals which are intensively used for fishing for small fish.
1937 Thailand

Dec. 1. Lifatpis - headlands covered by secondary scrub vegetation showing striking examples of wind growing especially radiating up from small coves and running up over the lower ridges.

Lakes of broad streams coming down to sea have south exposures covered by a low scrub, north exposures by scrubby tangled forests.

Dec. 1. Ko Kram (Island)

Flat coastal plain 1.5 m. above high tide. Covered by few cultivated patches and much thicket and grass. The grass is in part a pure stand of Heteropogon contortus, the fruits twisted together in bunches (photos). Some of the openings are a mixture of Imperata Cephaloides, Eupatorium heterophyllum, etc. The thicket is a tangle of small trees and shrubs, many of them semi-climbers, many very springy.
1957 Thailand

Dec. 1 - Ko Kram (Island)

3. in spring secondary thicket, on rather low flat ground.

3.917 jasminum common

1. 18. ajuga occasional

2. 19. amorphophallus, very local in shade

3. 20. phyllanthus, rare in shade

4. 21. occasional

5. 22. occasional

6. occasional

same in open grassy places

7. 23. heteropom cantius, dominant locally

Dec. 3 m.r. Wang Noi
1957 Thailand

Dec. 2 - Bus trip Bangkok to

Central plain - rice land
submerged except top of

leaves.

Aquatic plants less common
spicuous after leaving
vicinity of Bangkok.

a fewwith patches of
Melismium (flowering).

aquatic seen in flower:
Nymphaeidae sp.,
Ficus sp.,
S. malaccensis
Sympus

Gypsophus trees on road
9 km from town said to be from

coconuts thrown tree can.
Pithcocaltianis also?

Tropical mountains beyond Bangkok
behind this the water is not

so thick, and a dark blue like
soil is exposed

Dec. 3 - Isan Botanical garden

Lowland along river,
a dark soil (quimoo? ).
Gentle slopes are very

stony (without).
Low hill

a knoll covered by bushy
secondary thicket, choked
around the edges with
Eupatorium, Psorosperma,
Xanthocypus, Phragmites,
Cassalia, etc.

(flu of Tenouch, Spondium hypophyllum)
Dec. 7 - area around Loei:
an old lake bed of black

soil underlain by mud.
Mostly in rice, quite

wet at this season.

Widely scattered trees,

spreading crows and low
branching. Brachys common.
Gypsophus. Pithcocaltianis

Rubus. Margiferia

all over pasture and reddish

weedy fields, probably

fallow near city. Termite

mounds.
Limestone hills covered by

sparsely dense scrub

mainly bamboo, scattered

broad trees.
Dec. 3 - Pulicaria, northeast of Haraburi
edges of thicket on low hill of disintegrating rock

38924 Stylomma
2 in low ground around

25 Sida
occasional around

26 Phrynipides banks
common in

27 Solanum aff. rupestre silvianum
occasional in

28 Boerhavia diffusa
common around
(apparently same population as no. 38931, 38976)

29 Ipomoea
rare in

30 Quisquilis
occasional in

31 Boerhavia diffusa
saw - in open cleared field on low hill of disintegrating rock

32 Abutilon asiaticum
occasional

33 Andropogon
common

prostrate, calyx white
prostrate, forming a broad mat, leaves pale green beneath; flowers pink
prostrate, forming a broad mat, leaves pale green beneath; flowers pink; stamens mostly 2; twining in tall 'weedy' growth; calyx tube conical, white; limb purple; stamens straight, stigma capitate, sprawling, elongate to 2-3 m.

prostrate to somewhat ascending; flowers pink; stamens 2; leaves very pale beneath.
cespitose; culms almost erect.
10 1957 Thailand

38 34 B. simplicifolium
1
3 35 Emilia sonchifolia
occasional locally
36 Boecharia diffusa
common (apparently
same population as nos. 38928, 38931)

Dec. 3 - So Phuri
waste place along street
37 Putulaca quadrifida
common locally

Dec. 3 - 10 km. east of Chainat
38 Oryzopsis vir. shoot and
very common on edges of
wet rice fields

Dec. 3 - Chainat Dam, Chao Phaya
39 (wet)
stone embankment of inside
reservoir, flooded at high tide

Dec. 3 - northeast of Wang Noi,
Central Plain
muddy edges of ditch along rice field
40 (wet)

41 Monochoria
commun

flowers purple, not much
exceeding involucres
ascending, leaves whitish,
below, flowers pink,
stamens mostly 2.)

prostrate, purple, fleshy;
flower leaves opposite;
flowers yellow, petals 4, stamens
about 8.
culms ascending

prostrate, extensive, flower
white; fruit immobile

prostrate; flowers white
erect, flowers bright
purplish blue.
Dec. 3 - Journey from Lopburi to Chainat

The land very gradually rises after leaving the very flat lake-bed area of Saraburi (about 200') to a maximum on the road of about 500', before the descent to the Central Plain at Chainat starts.

As the land rises, cultivation becomes less, the scattered trees more abundant until thickets and patches of open forest form a mosaic with patches of savannah and cultivation. Many kinds of trees are involved, including Dilophocarpus alatus and Carypha umbraculifera. The latter is locally common on the highest part of the road and most of the larger acacias are in flower, a magnificent sight. A few were already past flowering and dying.

As the descent starts, cultivation increases. This area is a cooperative homesteading project and is being cleared. The grant for loans money to start, and assigns a family 5 hectares of land, which becomes family property after 10 years of cultivation.

The hills from Lopburi almost to the edge of the Plain are of limestone, fantastically eroded into vertical fluted capes. The slopes of these are covered by wood in various stages of degradation. Some are covered by little but spiny bushes, others with loose scrub, some with denser scrub. One was noticed with some grass and but with scattered flowering tree. The few hills with even scrub forest are being actively exploited for charcoal.

The nearest hill to the Central Plain seems to be of sandstone, judging by the amount of sand at the base, as well as by the non abrupt appearance.

Bamboo is prominent in all landscapes. In place it forms veritable barbed wire entanglements.
Dec. 4: Chainat Daen
Floating islands of Homes, aquatic cult. on flood (photo).

Dec. 4: Nakhon Sawan
Teak logs being assembled in rafts (photo).

In market - Durian, Tangerine, Achees, etc., bitter orange.
Breadfruit, oranges, melons, mangoes.

Dec. 4: Ban Daen, Nakhonsawan

Abrupt jagged hills of massive limestone.
Steep slopes, sparsely vegetated, lower slopes wooded.
Many characteristic shrubs - a eucalyptus, Dracaena, Hesperandra, Pinnas, Bridelia, etc. (photo).

Dec. 4: Taloo Banthi
Remnants of old forest.

Dec. 4: Kamphaengphet
Dec. 4: Chainat to Nakhon Sawan - Granite hills with thin latosolic soil near road - soil on flat ground rather prone to wind erosion, some in cultivation, some in thicket.

After leaving hills most of land is in rice, with scattered tree and termite mound.

Nakhon Sawan &
Tak - rather sterile soil for some distance, with thicket, some cultivation. Then an isolated range of limestone hills.

Much of the country degraded to thicket of shiny bamboo.

Beyond Bangkok rice
mainly flat country for formerly evidently in mixed deciduous forest, cleared to varying extent.

Degradation here takes unusual form - the shrubs and small trees are taken out for charcoal, leaving none unless the large trees. These locally are dipterocarps (Dipterocarpus sp., Chaea sp.), locally Lagerstroemia, and many others. The areas where the trees are very sparse are

(5/6/20)
1957 Thailand
Dec. 4 - Nakorn Sawan
roadside
389 4  Alternanthera sessilis
4 43 Tribulus cistoides

44 Apheloderma
Dec. 4 Ban Daen, northwest of Nakorn Sawan
on steep, jagged hills of folded limestone
3 44 Apheloderma
occasional
1 45 Hedyotis
common in crevices
2 46 Premna
common
4 47 Premna
common
2 48 Bridelia
common
2 49 Trichozanthus
common
2 50 Achryapanthes
on ledge,

prostrate, forming a mat.
prostrate; flowers:
petals yellow, less than 1 cm. long.

Chao Phrayas River
30 m.

shrub 2 m. tall,
hawks and calyx pale green,
all plants seen completely
dried.
shrub 1 m. tall,
fruit green.
shrub 1.5 m. tall,
flowers pale green,
scarcely any odor.
shrub, elongate lanceolate,
leaves glabrous beneath,
fruit immature.
wine, climbing in bushes
and mounds; flowers white,
fruit red, soft when ripe,
ripening from abaxial end.

50-100 m.
Dec. 4. Talok Batin, 6 km. near Khana, 60 km. south east of Kam Phaeng Phat, cleaned flat land along road.

38951. Phaseolus

2.52. Pontacme siamensis (Kaj) Kuy

2.52. Hedystis common under trees

1.54. Dipterocarpus obtusifolius tree remaining from former forest

Dec. 4. - Kam Phaeng Phat.

4.55. Fraxinus

Parasitic on mango tree

- twine, flower with maroon calyx and stamens, yellow wings, pale green leaf.
- tree 25 m. tall, dark longitudinally fissured into ridges, leaves stipules and callos from ground beneath tree.

- woody plant about 1 m. long, branched, callos laterally compressed, tubed calal red, lobes yellow with green top near base.
1957 Thailand

(Old farm 4-15) mostly planted to rice. Where somewhat dense, there is a grass ground cover, rather tall (1 m. 5) with occasional clumps of Chamaedorea gigantea, up to 2 m. high. Much of this is rather slashed by brush, saplings, bambos, etc. In other areas more open, there is conspicuous regeneration of Dracaena antarctica, Ficus, etc, with little or no undergrowth. In places, especially just south of bridge over Ping river, one area of open a thin forest that has been little changed, with many very large buttressed trees. This forest is irregular, with considerable undergrowth, in one place rather open, nowhere with canopy complete. This forest is all gradually burned over quite often but shows few clear signs of it.

Dec. 5 - Ban Talha
Village with large tea
old cult. ground, but
lered (photo).

Dec. 5 - m. of Rahaang
very sh. forest, (photo)
deroded.

Dec. 5 - Ban Masa Lisa 2.5 m. of Talha
Old weathered low granite knobs protruding from
plain - very degraded
dry deciduous forest
(photo), very eroded.

Bow H


Dec. 5 – from Tah to Thon
The route lies mostly
over low rolling hills
covered by open forest
with some cultivation
along streams, but
soil elsewhere very
thin, or else of a very
sand or fine gravel
derived from granite.
Low hills covered by
quartzite pebbles and
cobbles embedded in
clay soil, this almost
all eroded away
leaving a sort of
pavement.
The forest varies some
in height and density
but is sparely at
best and seldom has
the trees touching
sometimes very open.
Pass a herbs and
dwarf shrubs between
some large shrubs
Cyan sibiricus common.
The forest is a very
degraded "deciduous
dwarf cast" type,
several different
common but also
various other trees.
The whole area
seems to be burned
frequently in the dry
season, land is also
heavily grazed.
North of MacPhail, this
is a burned area of
completely unplanted,
cleared land, some in
rice, some is
thickest of various
stages of development.
This then gives way
to scrub forest again,
partly能看出 by
Scotch balsam.
A range of rounded
hills, to the east
from north of MacPhail
at least to Thon which
does not show on map.
Dec. 5 - Ban Talay (Rabaeng), north of Talay Ping (River). Around thickets and garden patches in village 38956 (Feb.)

25

24 1957 Thailand

1 60. m.

2 57 Plumbago zeylanica L.
2 58 Urena lobata L.
2 59 Urena common

Dec. 5 - 2 km. n. of Ban Talay (Rabaeng), north of Talay Ping (River) in dry sparse scrubby woodland on thin stony soil.

1 60 (grass)

1 62 Evolvulus occasional
1 63 Euphorbia rare
1 64 Campanula rare

5 65 Cycas siamensis common locally

2 66 Cycas siamensis common locally

Corolla pink end of lip maroon; plant with little or no odor. Elongate herb; corolla white. Herb 1-2 m. tall; flowers rose pink. Herb 1-2 m. tall; flowers bright rose pink.

Small dense tuft.

Flowers pinkish; flowers blue; gland appendage white.

Stem fleshy, large color: influenence already dry. Stem about 5 dm. tall, 12 cm. thick; old leaf bases charred; cone immature. Stem about 3 dm. tall, 1 cm. thick; old leaf bases charred.
38947  Cycas siamensis

1  63 (leg.)

2  69 Dencerei?  

common

4  70 Heliocere?

very common

1  71 Ethmacium odnatum  
abundant generally
in open, full sun.

1  73 (anom.)

1  74 (sp.) Persia  
vine

4  75 Grewia

common

1  76 Curcumia

occasional, mostly sterile

2  77 (recent)  
occasional

4  78 Tetrastemaria?

Dec. 5 - Bar Matsoi, 50 km.
n. of Zali, near Wang River
in very open woodland
and around weathered
granite boulders, coarse soil
Hedypete

1  79 Cassia chamaccosta?

2  80 Lindernia

very young plant, with
"phycomeris"  
subterranean stem
bulbous roots, flatly
small tree or large
shrub.

succulent herb, stem
ascending to spreading;
flowers purple.

heil 1-1.5 m tall
flowers lavender, faint.

fruit red.

traits fuzzy

low shrub up to 0.6 m tall.

flowers violet

flowers white.

flower, yellow, calyx maroon.
flowers purple and white.
1957 Thailand

28

2. occasional, climbing in bushes.
1. 83 Terminalia alata
    common
1. 89 Lespedeza
    common

Dec. 5 - Thoen, Mae Wang (River)

89

1. 85 Sterculia pexa
    in village, probably montane.

Dec. 5 - mountains between Thoen and Pho

4. 86 Desmodium
    occasional on farm road cuts

Dec. 5 - Pho

2. 87 Salix
    common along stream

Dec. 5 - about 70 km. south
    of Ban Hong, about 70 km. south
    of Chiang Mai.

Open Dal, dipterocarp forest

3. 88 Elephantopus
    common on open soil
1. 89 (leg.)
    occasional in openings
1. 90 Verbena
    rare in opening
Dec. 5 - went from Then the low ground is cultivated, slightly lower ground is in thicket and very degraded forest, then rather open. Ascending into the mountains the forest rapidly becomes more dense and much more luxuriant in aspect, a tall monsoon type forest with straight clean trunks, but without a complete canopy, no very definite layering but with rather dense undergrowth.

Locally on steep slope a tall aralioid bamboo forming thickets. This forest is at this season very green but is said to be deciduous a little later, from diptercarp, much Lagerstroemia (photo). Trees to 30+ m tall. Coming down somewhat into a broad flat valley, cultivation becomes locally dominant; the forest is often and of small stature, drier than in mountains, has suffered much from fire. From 800 m north, there is much cultivation.
Dec. 6 - ridge leading up to Boakhua, east slope of Doi Pha Tan, west of Chiang Mai

- high forest broadleaf evergreen forest, mainly Fagaceae
- 3895 Ardisia rare
- 3905 Lithocarpus common
- on grassy ridge with abundant scattered trees and shrubs

1. 97 Lygodium flexuosum
2. 98 Phyllaphyllum rare
3. 99 Polygonum chinense occasional in margin of forest

2902 m (gymn.) (Ailanthus?) rare in open
1. 01 Tonnerrellia rare
3. 02 Aeginetia common
1. 03 Melaena rare on bare soil at edge of trail
1. 04 Justicia occasional
2. 05 Justicia occasional
3. 06 Hedysere occasional

1200 m unbranched, erect, 1 m tall, fruit scarlet
the 1200 m tall, fruiting twigs lying on ground.

1200-1400 m showing evidence of fire
climbing or shrub, culms descending to erect
decumbent to ascending, flower white, petiole calyx enlarged, jelly-like rosettes flat on ground

calyx maroon, fruit yellow

calyx red

erect, flower deep purple

flowers pink

flowers blue

corolla pink, upper lip edged with maroon

erect, leaves stiff, dark green above, white beneath, flowers white.
1957 Thailand

789 Osbeckia
common

7907 common

2

3 02 (lab.)
common

2 07 Anaphalis occasional

2 10 Thelypteris?
common

2 11 (huff)

2 12 Hydrocotyle
occasional in edges of woods

13 Atriplex occasional

17 Codonopsis
common climbing moss
and shrubs

shrub 1 - 2 m tall, petals rose pink, fruiting calyx reddish, erect 0.3 m tall, flowers white, involucres white, dull, corollas yellow.

flowers yellow, anthers dark brown.

fruit fleshy, globose, bright blue.

fleshy, leaves flushed red and green beneath, erect

shrub, corymb tubular, very slightly dilated upward, congested below lobes, not fleshy, coral scarlet, lobes green, lactiferous, wings, stems maroon, leaves hairs; calyx maroon, fruit black.
Cares barbatus

1 39018

19 Helicia

comm

21 Dianella

occasional

21 Papenonia reflexa

epiphytic, rare

22 Bletum

common

23 Greviichia linearis var. fungosa

common

24 Indigofera

occasional

25 Guaranthus

rare, parasitic

26 Polypodium

common, epiphytic on tree trunks

1 27 (Actinita)

common, epiphytic on tree trunks

28 Columnnea (Actinoma)

occasional, epiphytic

29 Vittaria

occasional, epiphytic

30 Trichomanes

very local, epiphytic on tree trunks

31 Mucrona (Actinobium)

common

erect, penigyni deep range, red, fleshy

small tree, fruit immature
erect, leaves with

sections margins

fruit globular, dark purplish blue, fleshy

fleshy

erect herb 1-1.5 m. tall,
dick yellow

low, not forming

notable tangles, pinnate

flavescence beneath

shrub 1.5 m. tall, leaves

distichous, infloration

arising from plane

of leafless branch,

fruit glutinous within,

skin slipping off

the fronds mostly dry at this season.

leaves fleshy, pressed to stems.

flowers brilliant scarlet.

fruit ellipsoid, linear.

pendent, leaves

from dryness.

leaves curled from dryness.

min, climbing over shrubs, inflor蠭escence pendent, often
curved with ants, boots, names.

calyptr purple, callo blackish purple.
1957 Thailand

3903

2. Andropogon dominant grass
   (gras)
2. 33 common
3. 34 Lithocarpus common
2. 35 Lithocarpus common
2. 36 Lithocarpus common
2. 37 Pieris common
4. 38 Pieris common

Dec. 4 - lower slopes of Doi Luang, west of Chiang Mai, Melastomataceae very common in dry deciduous forest

Dec. 6 - Doi Luang
The lower slopes, below about 3500', are covered by a rather strange scrubby deciduous forest with

- **small tree**
- **small tree; flowers**
- **small tree; fruits from ground**
- **small tree; fruit immature**
- **small tree**

600 m.

- **small tree; flowers white; fruiting calyx scarlet, becoming so very young**
- **small tree; flowers white; fruiting calyx scarlet, becoming so very young**
- **tall, evergreen, and spreading crown. Some ravines here are rather moist and there are flowing streams. Above 3500', the forest changes to an evergreen type, dominated by many kinds of oaks, but with various other tree genera. In ravines, and on some slopes, this is dense, with canopy and**
1957 Thailand

Undergrowth: Generally the undergrowth is lacking, and the canopy irregular. On ridges the trees are sparse, in places so scattered that the aspect is of woodland or even savanna-woodland with tall grass, especially grasses of the and some shrubs, ferns, etc. Many interesting herbs. Above 5000' this forest becomes much more scrubby. Epiphytes become more common and include Hymenophyllum, Vittaria, and other ferns, as well as much moss and many orchids. Gleichenia linearis is common in open places. There are open, gravelly areas with rather few trees. The general height of trees here is perhaps 8 to 15 m. The color is dull dark green.

The moisture seems to be more abundant with altitude. Fire is said to sweep this forest annually, and dead logs, stumps, etc., seem to clear this out, as well as

the lack of undergrowth and general physiognomy of the forest. A few pines in the extreme summit.

A small canopy with only one or two leaves seen, not commonly at about 3000'.
Dec. 7 - Chiang Mei to ChangDe
Road skirts edges of main area of rice cultivation. Low rolling ground has scrubby growth and thickets, some bamboo, obviously judging by regenerating, and scattered persisting trees, formerly deciduous forest. Patches of this remain in a degraded condition. Oak is common, both in patches of forest and around village.

Finally, leaving the plain and entering hilly country the forest changes to "moist forest mixed deciduous forest." This is also much degraded, drafed with vines, with abundant bamboo in understory. At 1,250', is a small tea plantation on slopes, shaded by Alpinia zerumbet. On the flat bottom land oranges are planted.

The common understory bamboo is Oxytenanthera. It is encouraged by burning. Indicates good soil for tea. Also such areas are planted for dry land rice cultivation. Cut close to ground and allowed to dry and burn.

Tea plantation here dates from just after the war. Canopy trees are wooded with a conspicuous grass understory. Oxytenanthera also common in orchard places. At about 1,700', Dendrocalamus is very abundant in places forming a thick forest.

Dec. 8 - Huey Tard
Photos of forest with conspicuous Dendrocalamus costatus with tall white trunks and spreading crowns. Steep slopes here mostly covered by forest, partly in Tea plantations, the plantations mostly on rounded spurs, naming wooded and containing small streams. The forest is tall, uneven, with generally a full canopy and many lianas. Trees perhaps 30 meters higher on ridges. This forest is replaced by an evergreen moist oak forest. This is apparently burned frequently as undergrowth is sparse and absent.
Dec. 7 - Canyon leading up to Khafl Station Chambers in ravine with moist deciduous forest. Very common in weedy spring

2 41 (7/6)

2 42 Helaginella on dry rock cut above trail, wet in rainy season

3 43 Helaginella on dry rock cut above trail, wet in rainy season

5 44 Helaginella abundant on cut bank of trail

2 45 Angiospermae none near bottom of ravine

3 46 Helaginella vogelii? Spring common along trail

4 47 Helaginella common on wet banks

3 48 Macca gregarious on steep walls

1 49 Formilla?

3 50 Eulalia? Dominant in ground layer in open forest

2 57 Argyrocha sine along trail

Turner, climbing on bush, flowers scattered. Small tree, leaves glaucous beneath. Plant closely adherent to substratum. Vegetative plant prostrate, splitting branches erect.

Small slender tree. Flowers white. Branches ascending, 3 m. long, petals and calyx with longitudinal white marks, glandular.

39.05° N

Dec. 7 - Ban Pak Nam at Ma Chang Mai

Dec. 8 - Huey Tha, in mountain clay paths near small villages

Dec. 9 - Sembouer

3 57 - Sambucus

4 58 - Diocaea alata, L.

3 59 - Elaeagnus

3 60 - Ischnocarpus

3 61 - Solanum

4 62 - occasional

350 m.

800 m.

dense clump, leaves plumose, flowers white.

small tree, flowers white, fruit immatures.

53 - Drymaena

57 - Zizyphus along road

57 - Borreria caerulea (Lam.) Gmel.

57 - Borreria

3 58 - Diocaea alata L.

3 59 - Elaeagnus

3 60 - Ischnocarpus

3 61 - Solanum

4 62 - occasional

occasional

exert 3 m. tall, flowers white, some modified to yellow glands, "sphinct" (flanks) to right.

"man" (Nathan Thai)

ascendant shrub, flowers cream color, "malat," Nathan Thai, elongated to 3-4 m., forming tangles.

shrub 3 m. tall, flowers white, fruit immature, "fa palyi" (Nathan Thai)

slender shrub, branches elongate, flowers yellow.
Shrubs 1 m tall, flowers purplish; fruit red. Herbs, spreading, flowers pale yellow, leaf very bad; used in cooking.

Trachys distichously arranged, aromatic herb, flower yellow and maroon.

"horn peny" (Matthew Thai) plant, spineless, less prostrate, glabrous, hairy, bearing spines erect, fruiting peduncles, viscous, reddish.

Woody vine, climbing in trees; fruit immature. Tree 2 m tall; figs green, globose

Scented herb 1 m tall; flower violet; flowering elongate, shrub wine figs reddish.

Grew from prostrate stem, fruit bluish. Tangled shrub, fruiting receptacle, fleshy, white.
1957 Thailand

Dec. 3 - slope above
Huea Yai, mountains southwest
sloped ridge

2nd - 77.  Dacavia
common on mossy banks
and rocks.
1 - 78.  Hectolepis
often bare soil in ridges
1 - 79.  ketoginella
common on bare soil
2 - 80.  Pinndernis
common on bare soil
2 - 81.  (grass)
common on rocky place
2 - 82.  Fruition
parasite on Lamania
1 - 83.  Welwendingia paniculata
occasional
2 - 84.  Argyrea
occasional
1 - 85.  Evina
occasional
1 - 86.  Coleonemia
occasional
2 - 87.  (S.)
occasional, climbing
in trees.
4 - 88.  Peristrophe
occasional
2 - 89.  Cartanopsis
common.

fleshy fruit, tan.

fruits all dry, very
loosely articulated by
stigmas.

corolla white, limb
purple above.

understory trep
twining, flowers rose pink.
small understory trep.
flowers white.
vine, flowers white,
fruit black.
vine, tracts pale green.

rooted herb, flowers
purple.

tree 2 m. tall, fruits
from ground.
1937 Thailand

3.090 (gray)
1 91 ferns
in wet in thin shade
2 92 Panicum
occasional along trail
3 93 Trimenia
occasional
2 94 Pastinaca
rare along trail
3 95 Viburnum
occasional in understory
1 96 (clab.)

2 97 Micromelum
rare in undergrowth
2 98 Thelypteris
occasional
3 99 Dalbergia
common
3.9100 (cm.)
2 01 Impatiens
common
2 02 Thelypteris
very common
2 03 Geranium
common
0 04 Astelia
common
2 05 Asparagus
occasional in open woods
4 06 Photinia buxifolia
common in understory

flowers pink.
flowers white, frilly
within.
shrub 3 m. tall, bud only.
flowers lavender.
shrub 1 m. tall
bud only.
shrub 2.5 m. tall.
twined, fruits fleshy,
reddish, immature.
flowers pink.

exist.
exist.

plant arching; fruit orange.
small tree.
29/04 (gray)
2 occasional
107 Habenaria

108 Crotalaria

3 occasional
10 Humata
occasional, epiphytic

11 Adiantum

12 Clerodendrum

13 Asystasia
occasional

14 (rub)
locally common

15 Leeg
occasional

16 Pitheces
occasional

17 Costus praecox

108 Thunbergia coccinea

119 Livistonia
occasional

97 (rub)

88 trumpetty
imbedges of forest
87 (rub)

321 trumpetty
imbedges of forest

22 Costus praecox
39123 Tea
3 planted

24 Ligusticum orientalis
weed in

25 Freesia
weed in

76 Vitis versicolor
in thicket

27 Fagopyrum palustrum
common

28 (Acanth?)
common weed

29 Eclipta prostrata
common in open
between

in other words

29 Eclipta prostrata
common

30 Dispernum
rare

31 Rauwolfia
rare

32 Centaurea
rare

1300-1400 m.

Dec 8 - ridge of a camp

Huey Tard stands south west of Chiang
often evergreen oak
woods, bushed frequently

32 Centaurea
rare

4 Dendrobium
epiphytic

small tree 4 m tall
(mostly trimmed down
& shrub size), petal white
stem hair 1 m tall
flower yellow,

herb white.

herbaceous vine

leaves pale with white,
climbing or shrub.

flower blue,

 erect herb, 1-2 m tall,
flower pinkish
fruit black, pendent
leaves glaucous
fruit scarlet.

 erect to 1 m tall, flowers purple.
flower pale yellow.
1957 Thailand

39 137 Eurya
2 occasional

2 33 Calliandra
rare

36 Osbeckia
commm

2 37 gran
occasional

2 38 Cunbergia alata
Sims occasional

2 39 Cossusophilum
commm

3 40 Adenostemma
rare

2 41 Vitis
rare

3 42 Lithocarpus
commm

2 43 Anisophyllum?
epiphytic

1 44 Vittaria
epiphytic

2 45 Plectranthus fruticoso
occasional

1 46 (elca)
nare, epiphytic

1 47 Hedylia
rare

1 48 Entalzia
rare

2 49 Desmodium
rare

2 50 Desmodium
occasional

small understory tree
fruit purple.

erect 1–2 m., petals rosepink.

twining; flower white.

heads nodding, reddish to yellow.

flowers white.

vines, & inflorescence
purpleish red, fruit reddish.

large tree

stems dried and curled.

stems dried and curled, pendul.

atromatic herb; flowers white.

erect.

flowers yellow.

erect.

erect, 1 m. tall; flowers purpleish blue.
60

39 51 Euphorbia
occasional
1  52 Annona
occasional
s  53 Guava
rare
2  54 Clerodendrum
rare

Dec. 8 - Villagers went
north

2  55 Eupatorium
occasional

Dec. 8 - near village
near Huey Tard.
1  56 Cactus
1  57 Commelina
3  58 Tagetes
around abandoned cultivated
field

Dec. 9 - Huey Tard

60 Clerodendrum fragrans

2  61 Licorice
tree kept in plantation

small underground;
fruit scarlet;
fruiting spike red;
shrub (rare),
fruit green;
 erect shrub 1.8 m. tall;
trunks purple.

Flowers white.

950 m.

trunks red.
petals blue.
Malodorous herb.
Flowers orange.

Flowers purple.

950 m.

herbage petiolate when broken,
calyptra maroon, capsule white.
Dec. 9 - Chiang Dao Cave - place where a stream issues from base of limestone massif - Doi Chiang Dao (photo)

The mountain has not been well botanized, especially the top 100'. Very difficult to ascend. Some common grassy areas high in the sides of the mountain - must be result of lightning fires. Otherwise wooded except on cliffs and ridges.

Valley below is variously cultivated. Bamboos thick, and trees common. Landscape appearing wooded, but really largely cultivated.

Dec. 9 - Mae Chaem 23 km. N. of Chiang Mai

Patch of mixed deciduous forest on slightly sloping ground. Trees spaced 5-10 m. about 2.5-3 m tall; canopy perhaps 3/4 complete. Trunks up to 5-6 dm. thick, covered with lenticels, over 50% Tectona, some Dipterocarpus tuberculatus, several other tree species. Undergrowth mostly herbaceous, some seeding Tectona. Lack leaves, falling form herbaceous vines. Small ferns, dark green.

Dec. 9 - Kang Dan Tao, canyon above Mae Ramylon

in moist deciduous forest on canyon sides

39164 Helagrinilla

2 on ... soil of cut tanks above trail.

369 Menisera

occasional on steep slope

64 Dipteroncymus obtusifolia

common

vegetative branches, prostrate, adherent to soil, fruiting branchless erect. Culms 2 m. tall, often sparsely panicle.

Tall tree, 25 m. tall, trunk clear, 6 dm. thick, material on ground beneath tree, flowering died shrub.
Dec. 9. Me Ramying, south of Chiang Dao along stream in cultivated land
39165  
halis tetrasperma Roxb.
4  single tree, persisting
7cyanotic  
in thick, weedy growth.

Dec. 9 - Chiang Dao Cave, base of Doi Chiang Dao
4 67 halis tetrasperma Roxb.
scattered tree along river
3 68 halis tetrasperma Roxb.
scattered trees along river
2 69 Polygonum  
edges of river
1 70 (pectis) shrublets  
river bank

Dec. 9 - Chiang Dao Cave, base of Doi Chiang Dao
2 71 Ceanothus  
parasitic on citrus in village
1 72 Aleurites moluccans Wild.
planted in temple ground
2 73 Epipactis polyphylla (L.) Schiede  
floating in pond

375 m.

385 m.

460 m.

4700!

(1) tree 12 m. tall, diffusely branched.
elongate juicy vine.  
few flowering branches erect, flowers purple, petals equal.
small shrubby tree
small shrubby tree
prostrate, few flowering branches erect.
trunks elongate, whip-like, rooting near tips.  
producing small plant.
flowers orange yellow with green stripes on tube.
small tree.
Dec. 9 - Mae Chan, 27 km. n. of Chiang Mai in mixed deciduous forest.

72174 Linneaus

75 Dipterocarpus obtusifolia occasional.

76 Antiderma in undergrowth.

Dec. 10 - Chiang Mai airport

1 Fagham weedy places near muddy pond.

Dec. 10 - Air trip Chiang Mai to Bangkok (left side of plane. Rice fields below Chiang Mai are all dry, brown, and harvested. Leaves green. Ditch banks mostly lined with trees and bushes. River lined with strips of village, green with bamboo and trees - mangos, palms (coconuts), and bananas. Village form patches and irregular strips of green. Soil appears almost white where dry and bare. Foothills to east are thinly wooded - crows mostly not as scarcely tending, bare ground showing on south slopes. Forest gets thicker as mountains are higher.

330 m.

4000'.

shrubs from cut stumps, showing white, striped, waxy fruit, deep red, acid.

exet, wing of bees at node, go particular to stem.

Many tree yellow, many Melanorrhoeas tree flowering, showing white or pink, in first main range. River plain narrow, nice. Second range similar to first but somewhat high. Much Melanorrhoeas, and a considerable mixture of tree species evident here and in third range. The forest is dense, brown mostly, tending, south slopes especially steepens, sparsely wooded with gray ground showing. Canopy generally very irregular, not complete. Much bamboo, locally, foothills on other side sparsely wooded.
On east side of mountains an extensive mostly rolling plain, the flattest area in rice, most of it in sparse woodland or young regrowth after cutting, Most of the forest rather a drab green. Along river a strip of cultivated rice land. Many hamlets, then a beautiful dark green. East of river a broad strip of rice culture. Then a broad area of scrubby thicket and trees. More rice around Lampang. Then town with many trees. -Bamboo, Caman.

Rice fields with village around rice strip. Village looks like patches of bamboo and trees. Rice all harvested, soil gray silt.

Southeast of Lampang, desiccated paddy fields with termite mounds with trees. Then alternately with rolling areas of scrub this sparser and with scattered trees.

Then a small range of hills with sparse forest with much bamboo, this bamboo mostly dry.

The whole aspect here much drier than around Chiang Mei. After hill or rolling plain, mostly forested, some scrub, some rice cultivation. The trees in the wooded areas mostly leafless or becoming so. Some sharply outlined patches of dry bamboo on small hills. Lower woods in ravines etc.

Green term hills still green. Coastward the relief is greater and the forest though sparse is definitely green.

Then a high double range of hills, well wooded and green, but with considerable bamboo. The forest on the higher part of this, has a complete closed canopy, but this, of somewhat irregular height. Steep north slopes have some rocks, with ground showing.

Then another flat & rolling valley bottom with a little rice, mostly forest. This very green, but appearing rather degraded.
with evidence of shifting agriculture. Fair sized rivers meandering through this valley. Rough land to east very well wooded and mostly green, some trees losing leaves, south slope tending to be brownish. Some clearings mostly overgrown. A few nice fields in flat place. Southward much more clearing, few in more ragged condition. Then high hills thickly wooded but mostly with much bamboo. Some valley with excellent forests. 

Along course considerable shifting cultivation, but much less of it eastward. Cross valleys almost entirely in treeless condition much overgrown with weeds. Incidence of rice cultivation in these valleys. The forest on the higher hills is thick, but tendency to brownness suggests that it is deciduous. Southward the hills begin to flatten out and the forest becomes much more sparse. As land becomes flatter, the proportion of cleared land increases. A road cuts across here, following near the south bank of the range of hills. Much rolling irregularly wooded land with some cultivation, fading into cultivated land and what appears to be several desiccating lake beds eastward. Southward fine areas of some sort of dry land cultivation also area of pasture. The land along the course seems unsuitable for rice cultivation too irregular to irrigate. Cultivation becomes more prevalent, forested land scarce and forests sparse. A fair sized river to left, meandering. Some fields below lake, some still with water. Much cultivated land considerable super crop. Then more and more rice. Down the valley trees become scarce, some rolling patches of grass cultivation. Rice fields are getting slightly greener. Many scattered trees. Along river patches of village, a large boy with
Thailand

A lake in center, Phayao lake (2)
around it, a sizable
bazaar town.

The rice is rather low
with shifting banan
cultivated during low
water season, as at Chupa,
deep jungle, (rub, tobacco).
This at Chumpoo, from
lotus pond tree. Many
coconut tree, patches of
banana tree, even.
Arbitrary along
air strip, time important.
Below town ground is flat,
much cultivated but
looks dry. Small ponds,
or bows, and parallel
sloughs, mostly weedy
with floating vegetation.
Irregularly scattered trees
in cultivated and fallow
land.

Some patches here are
marshy, others seem a
bit too high for cultivating.
At least of rice. Some small
shallow lakes with patches
of floating vegetation. Long
banana patches. Considerable
sugar cane near river.

The rice is apparently
short or dark green, in the
light olive green plain.
Or bows and old meanders
as well as marshy or
inundated areas more
prominent. Down rice,
Village cultivation
around these marshes
and some villages in the male
Villages scattered, connected
in places by roads. Along
thee and along meandering
channels villages tend
to be continuous.

Down rice, trees tend
to be absent from large areas
of rice. Village become
scattered. Even some
channels have no trees.

Then very large areas
of rice, with only small
and widely scattered
villages, trees very widely
spaced, and numerous
small circular, or elongate
ponds of all sizes, no other,
as often surrounded by a
narrow belt of grass. To
eastward they become
more and more abundant.
Large tributaries of rice,
meander, almost like tidal
channels. Very few roads
in this area. Villages here
almost treed. General
color brownish, dark to green.

Again large marsh
areas (east of rice) and a
small isolated "island" hill of rock. A muddy lake near it with marsh and irregular patches of reeds (?) around it. Several other hills in distance. Inundated land along tributary of river. Some apparently flat land with some scrub and patches of dry bamboo. Then a mosaic of cultivated weedy ground, patches of woodland, bamboo, scattered trees in open land. A belt of woodland east of this, then a cluster of hilly hills. Under course on the hill, mostly with bamboo, some woods, a large area of woods east of this, rather sparsely but not much disturbed, including a few small hills. Down south slope, much cultivated land in small clearing southward along course. In distance a belt of clearing along a road. Clusters of isolated small hills protruding up through alluvial plain become more numerous southward.

Eastward is large wooded area, west of it much cleared pasture, immediately along course considerably richer, alternating with brushy patches, dry land cultivation, etc. The fairly extensive patch of abrupt hills mentioned above is surrounded by cleared land mostly brushy in pasture, some cultivation. They hill are probably sandstone (granite?), rather reddish. Skirting south of them is a large canal. West and south of the canal is very land with numerous trees (or termite mounds), those becoming sparser rapidly westward, many small ponds. This is just below Chainat. The rice fields here become definitely open instead of diked. Some inundated land is a small lake with small elliptical floating gardens of Yanka echinata (2) arranged in front of a small village. A considerable belt of groves and bamboo. West of it is strip of village with
some slightly higher ground with patches of sugar cane. The village itself is less hidden by trees, arranged roughly in a checkerboard pattern. The village strips mostly follow small canals in meandering channels. Cross river again and follow it on left side. Rice land here without trees. Many old ox bows. East of rice a large inundated area. Land use east on both sides of river marked by meandering channels lined by village strips hidden by trees. Many irregular lakes or inundated areas surrounded by marsh and rice cultivation. Farther in distance. (Photo) More and more inundated land east of river. Rice here is partly green partly harvested and brown. Brasses locally abundant around villages crossed river to east. Several areas of marshy land with boundary floods and channels on both sides of river. Village strips are apparently on natural levees here, from a complex pattern just above Ayutthay. Below it is mostly continuous bright green rice with small scattered villages completely flooded. Water showing almost everywhere except in natural levees of rice. Villages seem small here and widely scattered in proportion to area in rice. To east a vast gridiron of tree-lined canals and intervening rice fields. This partly yellow mostly green. Rice along come bright green. Many brasses from village rice, small village truck gardens. Out some in boundary lines between rice field.

Near and near truck gardens as Bangkok is approached. Villages become more numerous near Bangkok.
Dec. 11 - Bangkok

(Handwritten, not legible)

Dec. 12 - a trip to Bangkok to learn more about the rice fields. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals. The ground is mostly covered by water, divided into a vast grid of canals.

Eastward a higher proportion of the rice fields are brown and harvested. Less regular pattern of villages along natural channels. More than canals. There is a meandering river trending about 60° back southwest from course. East of this the land is much drier and with scattered trees along course. You can track farms for a short distance east of river, recognized by close rows of earth banks up in patches. Then and to north rice with few trees except along slight tributaries. More irregular patches of slightly higher thinly wooded land. Rice land between these with scattered trees and termite patches. More and more wooded land, now densely wooded, some rather bushy. Rice cultivation
irregular strips of
sustaining between
stream courses
less hilly country the
shape of rocky
and with only brush
Hills become more numerous
green with bamboo
patches between them on
relatively flat ground
then a striking sheaf
curved range of limestone
hills with some white
cliffs and peaks (Picture)
East of this roughly
parallel low ridges
between N.W. and S.E.
continuous dense past
Then level ground forest!
but with a dendritic
drainage pattern of
stripes of light colored brush
savanna trending east
probably grassy plain
below course, in distance
5 to 10 miles a large area
of grass the forest
then tends to change to
a mosaic of forest, scrub,
woodland and savanna
then more and more to
savanna. Then a grea
strip of bottomland smooth except with scattered trees, entrenched meanders of steam trending S.W., then more recent and swamps with trees in varying proportions. Large grassland area to north then a small rice area and a range of rough brown marshy vegetated hills, then and the several irregular clusters of such hills. Forest in valley, ridges, stream valleys, forest and jaragua north of them.

Then large area of rice land, with scattered trees a more likely terrrific mounds. These more numerous, then Battambang and a meandering river, same rice land and accorded stream bottom lands, then forming an irregular network. A large dark area, probably forest, from north. Drainage trending northeastward into a forest area with some small patches of grass this changing to swamp with low forest and emergent trees, contiguous patches of light green grass some with ponds (in south of course cult) and roads especially in large green areas& youth. West end of lake flat, to north, swamp with many small patches of open water, then meandering channels leading to lake of next south of lake completely inundated (photo) trees with crown striking out of water. Along edges of lake a yellow-brown "clay" as through straw was floating by and blown to south side of lake. Lake is a rather muddy color but not really very muddy. North side of lake appears to be a very low wave-cut scarp. Banks of this swamp and backs of swamp to perhaps the "scarp" is mainly the abrupt edge of tall grass. Disappears eastward and north shore is inundated in a distance to a lake (stream). Lake becomes more muddy eastward, but with
into a belt of clear land
water, along nearly
shore. The shore line
east off Sean Bang is
very sharply defined,
even though trace of
it is swamps and flooded
land.
Lake very muddy
at east end. Sand
around float bar
incinerated, village either
floating or on pilings.
Large expanse of water
below this, some floating
grass, trees with
emerged crowns. A
small village nest in
water channels
downstream marked
by drying bar reddish
mud flats. More inundated
land then dry land and
cultivating south of
sparsely vegetated islands
south of channel village.
This a large island
surrounded by flooded
land, part of this swamp
with meandering tidal
channels. Then light
brownish green grassland
with many ponds
andgreen meandering
lowland along stream
course soil light tan
beige color, mud and
more cultivation南部
Many small ponds
Small meandered very
muddy stream, dark
brown grassland (3), many
muddy ponds. A mosaic
of large areas of this
with scattered trees, and
light greenish tan
cultivated areas - farmland
and vicinity. Then dry
cultivated land with
bushy lowland along
stream course. Many
fields outlined by hedges.
Forest & north in distance,
large inundated land
with swamps and marshes,
patches of closely divided
cultivated ground outlined
by hedges - then large
area of a different type of
cultivation elongated fields.
Swamps and flooded land
plus back of a broad natural
level cultivated and with
a strip of village with trees
bordering the Mekong.
Large sand bars, completely
bare. Cultivation on said
banks - broad natural
Cambodia

levee. Melting siltly, much
barrage (photo). To east-
marshy wetland, evergreen
and wooded evergreen
with levee, large
patch of uniform grass
with geometrical bound-
ting areas in it cleared,
dark green, probably
replanted. Then larger
area of dark reddish
brown marsh with
muddy ponds and green
gallery forest along
meandering channels,
then more dry land in
rice and wooded patches.
These rather sparse and
ragged, some patches
of marsh, patches of
shifting agriculture
and of open rice culture
forming a mosaic.
Some roads. Then large
area of uneven woods,
probably mostly secondary
thicket, with small clearings
a savanna-patch, both
dull-brown and buff-brown.
Brown mudcracks, with
trails. This continues for
some distance, with varied
amounts of cleared land,
varied amounts of
wood with large trees,
meandering streams.
East of this a great
proportion of clearing and
savanna on grassland.
Then another forest with strips
of clearing. Probably
crossed Viet Nam
border.) Then mostly
savanna with some
cultivation. Some patches
of forest especially to
north. They Mountain
south of the Dal north
of Fay. Think a big farm.
The mountain covered
by sparse brush, some
of this in grass and
cultivation, north of it
wooded land.

Then a mosaic of varying
cultivation. Patches of
forest, plantations (mulberry?)
trees in rows, grass,
rice, villages, etc. north
of meandering river (Kali
Chu River). Then mosaic
of wet rice and dry
areas of small fields
and homes surrounded
by hedgerows (photo). Rice
is green, bright, land
Tulip, Arab, with, dark
green hedge now. Some
legends, marsh, area, in
in, many channels.
This mosaic for some
distance along north
of rice, large flooded
dress and rice fields,
along piers, considerable
marsh, the marsh, land,
less rice, eastward.
River, de Laigon in distance
to north. Most and more
marsh and wet grassed
as Laigon is approached.
A large canal crossing now
as an IAC chart. Then
higher land, cultivated
unlike and in garden
patches they surrounded
by tall hedge now. Many
roads. This area intensively
utilized.
Approaching airport
areas of homes, with
hedgegrows and many
small, elaborate, camellias,
and striking temples, patches
of planted brooks.
Minor trees, very
abundant along air strip.

Dec. 12 - air trip from Laigon
to Clark Field, Philippines.
Intensively cultivated
land, largely sugar cane,
on both sides of River de
Laigon. Channels and
ditches lined with trees.
Away from rice land
is slightly cultivated my
palm soil, patches of jest
and scrub. Small streams
have eroded land, with
sparse scrub. Rolling
land west of Lake Long Bi
river, largely in scrub
and scrub forest, some
cultivation, especially rice,
on low spots. East of rice
alternating area of
palm and dry land cultivation.
Then, an area of scrub
and scrub forest with scattered
emergent trees, then dense
forest, then more scrub.
A town along railroad. Much
of railroad a mosaic of
forest, savanna and some
cultivation. Forest predominates,
savanna and cultivation,
in broad strips with very
irregular margins, the
most prominent of these
following Dong Nai River.
Then solidly but poorly
wooded country. Visibility cut off by cloud. A few glimpses of forest through hole in cloud. A patch of reddish gray or cultivated land with a town, then a mosaic of forest, savanna and dry cultivation - soil wet. To north mostly forest. Closer to course numerous small clearings and large even planted trees. Then dense natural forest with a small river, not very muddy, some small roads. Then patches of shifting cultivation in various stages of resegregation. Here small bits of forest with large trees, some irregular patches of grassland.
A meandering river with very rocky bed, uneven, degraded forest. Then large savanna with gallery forest along meandering stream, west to south of it along course. Savanna extends east, some ponde in it, a closely meandering stream with no gallery forest. Tiny circular pools

and marshy spots. From patches of forest a range of hills and much forest to north of savanna eastward. Savanna more and more irregularly covered with trees, merging into forest in hilly country. Then much bright green savanna in hilly areas. Some small streams, then course locally rocky. The savanna merges with what appears to be sparsely and irregularly cleared patches. Range of more prominent hills directly on course well forested, scrub in lower hills north of these. Clouds obscure visibility. Hills covered by rather sparse and irregular sent past, cleared along streams. Forest sparse eastward, some bright green grass. (Inset) to northward on hill, mixed with forest. Eastward forest is sparse, and more irregular, reddish ground showing on hill
ridges, clearing only near stream courses. Changes to savanna, cloud obscure visibility. Irregular mosaic of savanna with some forest and woodland, some that are badly eroded, cattle trail on very narrow roads here and there. Terrain becomes more hilly and the wood more dense, though still generally sparse enough so the wood and ground show through in many places. Some patches of savanna on high ridges and slopes, hills higher now, slopes mostly wooded, scattered clearings and farm clearings. Then badly eroded low rolling country, mostly irregularly spaced wood. Then more irregularly wooded hills, with woodland, dense scrub, forest, and patches of savanna. More erosion, badly eroded country with irregular woodland, ravines, wooded, hills, savanna, woodland, changing eastward to savanna with gallery forest along stream courses. Then green flat rice land, pinyon pines, into hilly country from broad flat land, this somewhat to north along course of some small a woodland in alluvial fans at first, then poorly wooded rocky hills on course. To north green sand dunes, then cultivated land with areas of red sand dunes. They broad sand flats with little vegetation along shore of thing sea. Small estuary seaward. Green rice land a little north of course, then turns irregularly eastward along course. Range monte, make just back of narrow coastal plain, where coast turns north again. Ridge grassy, never wooded. Coast to north, very irregular. Beach, sandy, some bright color red, eroded a sandy area on very irregular peninsula fan to north. Island then open sea.
Dec. 14 - Taal Volcano -
a huge caldera with
outer slopes very gently
dipping. Inner slopes
sharply eroded in
very steep fashion.
The ash and tuff on
outer slopes regarded
as tertiary.

Dec. 14 - Between Taal and Manila the soil is
all derived from the
ejected "adobe stone" from
ancient Taal Volcano.
In about 30 km. from
Manila the ash and
tuff are laid
down in water and
are consolidated and
impermeable. The
soil is shallow, is
waterlogged the greater
part of the year, very
desiccates the other part.
It is suitable for wet
rice cultivation but
scarcely support tree.
The landscape is open,
with bamboo and
some trees around village,
also where there is rough
ground. From 3-5 km.
the general land surface
1957 Philippine

rises gently with a rolling topography to the caldera rim. In this part the pyroclastic material and ash were deposited subaerially. The composition is not so complete and the material is not so impervious. The general profile is that of the caldera soil described on bottom part of p. 94. Where this has not been seriously eroded the surface soil, where worked, is black. Where eroded, it is a reddish-brown, lighter where badly eroded.

Cavite Prov.
The area of the volcanic tuff may well never have been forested though this is impossible to determine now. The higher ground was doubtless well wooded but nothing remains of this now. The land is now a man-made site. Sugar, rice, and perhaps some other yield crops are common. Range areas are in coconut plantation. Mango, Chrysoxyllum, Greek, Landorium, Pandes, guava, Annona, Citrus, are generally abundant with no obvious regular arrangement, especially around houses. Papayas are scattered as well as in small plantation. Papayas and pineapples are in places planted together. Coffee plantations are shaded by Glicida.

Dec. 14 - dilang south of Manila, Cavite Province.

Psychotic in secondary thickets.

slimy fruit, orange, flabby, possibly slightly immature.
1957 Philippine L-9 Marine

Dec. 15 - Clark Field, Luzon

39130 Ficus
tree

street tree


3 81 Polycianas
common ornamental shrub


1 82 Ficus
occasional on golf course


3 83 Ficus
occasional on golf course

1 84 Antorea pine
occasional on golf course

Dec. 16 - Correg Island, Guam

2 95 Ipomoea repens
common on gravelly area washed over by salt water during typhoon.

Dec. 17 - Agana, Guam

1 86 Ficus pumila
creeping on old Spanish tiles

Luzon - Guam

small tree, dissected leaves from shrub from cut stubs; figs immature.

sterile shrub 1 m tall.

tree 1.5 m tall, trunk 2 cm dbh, leaves green beneath, fruit blackish.

small tree, lactiferous.

tree 20 m tall, sterile.

tufts, sending out runners.

creepers, younger branches tightly adherent to stone, those with large leaves erect; no fruit seen.
Dec. 10 - Coenz Island - Effects of typhoon of Nov. 19

Acc. Coast Guard, personnel went ashore from N.E. then S.E.

Waves came over seaward up of island from sea side and even well eastward up to top of high ground. Here are deposits of fresh coral material up in the lacunula which is badly battered but not dead along top of beach. Material carried up in coarse up to boulders 3-5 dm. across. Casuarina stand on seaward slope buried in seaward side of thicket on high ground, secluded part of deep platform swept clean. Waves from lagoon deposits much sand and some cobbles and boulders on grounds of coast guard latrine. Farm of Cyperum killed where covered by any amount of salt water. Potulcan hermanii and Cyperum rusticosus showing fast recovery.

Trunks of even the leaded clothing Casuarina are sending out tiny green shoots. Branches died apparently so.

Along inner beach on large crescent there seems to have been deposition toward the lagoon, and removal of at least 9 dm. or so on the deep part of the concavity, exposing the upper parts of the root systems of Casuarina trees and other shrubs. Along the beach east of this there seems to have been excavation in the concavities and deposition back of the eulup...
gathered and almost negligible. Only where plants are actually uprooted are they completely killed.

In the place where the 1949 typhoon resembled across the island this one said by the craft guard men to have cut it much farther. This appears to have been from the lee of the island side, but not really very much, as the rocks in the summer grass hurt are still blackened by algae. Perhaps material may have been removed from the 100 m. or so. Reyes confirms this.

Plants observed:
Casuarina equisetifolia
Leucaena leucocephala
Tremosphaena argentata
Codiaeum variegatum
Clerodendrum inerme
Thunbergia involuta
Euphorbia characias
Euphorbia hirta
Ceratostigma philippinum
Lepturus repens

Hymerocles per-capitae
Theophila populinus
Portulaca oleracea
Cyperus rotundus
Cynodon dactylon
Pemphi aculea (only on exposed rough limestone).

The Cynodon草坪 is pretty well killed out in low spots where salt water stood & green on higher ground except where swept by waves from seaweed. But even in low places are green patches. Possibly none of the grass is really killed.

Where the roots of Casuarina, Leucaena, Tremosphaena, etc. are partly exposed the plant is generally in bad shape. But none of the plants listed needed really killed except when uprooted.
Dec. 16 - Coast from Marajon around to Menigo. Trees show much browning, much breaking of branches and some of trunks, a few trees unknotted. In general, not as much defoliation as 3 months ago. Typhoonally few places show very washing away of soil or conspicuous effects of flooding by sea water. Perhaps more debris washed or blown into thicket than in 1950. Mangrove at Menigo severely affected. Nipa at Marajon and elsewhere burned somewhat but not broken. Ce mammals bedraggled looking but not killed. At Marajon, with leaves mostly browned, when hit by spray, but recovering.

1957 Marajon

Dec. 17 - Kotaod, in Naval Magazine Area.

Grassy slopes, some areas with Miceranthus, mostly without Miceranthus but with Caspallium, Fimbriate, Chrysochondra, Stachys, and other weedy herbs, abundant thickets of Centunc, Trifolatum, Pandana, Helicodes, Helicae, Pandana. Scattered trees of Pimenta. Some coconut and mangrove, bamboo, Casuarina, etc. Soil on slope is odd - a stiff black clay about 15-20 cm. in one thick, blocky when drying, over a yellow-brown or yellow sandy clay, also stiff and plastic, but crumby when drying. The surface black layer is crumby when wet; dry, not sticking on the surface when dry. This area belonged to the Agricultural Experiment Station before the war. Cattle were grazed here. Experimental grass plots nearby.
Dec. 17 - Kotad, south of Cross Island Road. Height secondary thicket
and weedy slope, disturbed
area.

39187 Tarenna sambucina
occasional

2 88 Pimenta racemosa
common, scattered tree.

2 37 Glochidion
occasional

2 90 Glochidion marianum
common

4 91 Heliotrope
locally abundant, gregarious.

3 96 (legume)
local under mangrove trees

4 93 Heliotrope
on bare soil

1 94 Hedyotis biflora (L.) Lam.

2 95 Phyllanthus simplex

occasional

2 96 Heliotis capitata
abundant

3 97 Timistola annua
common

100 m.

shrub 2 m tall, fruit
immature.

- small tree, 4 m tall,
strongly aromatic when
broken, taste.

- shrub 1.5 m tall, flowe
yellow

- shrub 2 m tall, leaf
- glaucous beneath, when
- young; flower yellow,
- erect, 1 m tall.

- prostrate, flowers purple
- flower lavender
- spreading branches
- erect, aromatic, flowers
white, "butane" cut stubs
- said to cause serious,
poisoned wounds, sometimes
- fatal.
39198 (grains)
2 common on bare soil
299 (grains)
occasionally
200 (alga)
parasites on Allocasia in garden

Plants seen in lushly pastime, Koted:
Urena lobata
Stachys lanata indica
Desmodium Uniflorum
Costus silvaticus
Sida acuta
Merremia hedracea
Aggeratum conyzoides
Morinda atrofleca
Psidium guajava
Triphasia trifolia
Pimenta acris
Alocasia marianum
Nepenthes renatula
Hypotis capitata
Paspalum ordunculare
Paspalum dubutatum
Paspalum conjugatum
Chrysopogon acicularis
Heliotropium multijulium
Centella asiatica
Carnia sophora
Ermilia javanica
Campona ednata
Elephantopus mills
Fimbristylis annua
Hibiscus tiliaceus

Some spreading
Solanum op.
Scaevola coccinea
Pandanus tectorius
Tarenna ambigua
Phylanthus amarus
Carica pinaiformis
Sideris op.
Baccharis vulgaris
Mangifera indica
Cucumis domestica
Vernonia cinerea
Legume
Chloris variata
Casuarina equisetifolia
Sida decipiens
Corchorus arunculoides
Dimeria chrysichlamys
Mitracarpum
Hedyotis trifida
Malvastum casmandelianum
Flagellaria indica
Polygala demascenda
Pyramia
Davallia rotunda
Mango
Ipomoea pes-caprae
Hypotis maculata
Zingiber geranum
Fimbristylis dichotoma
F. micrantha
Phylanthus simplex
Wallenia indica.
Dec. 13 - south boundary of Anderson 97B.

Bearing of boundary 70° W. of N.

Forest on forest edge at top of cliff - low, scrubby, at most 10 m. tall, trees to 2 dm dbh, mostly
Macaranga, Ficus, Chloroxylon, Guettarda, Haitiana longifolia, Undershrub of Cycas, Guania, Aglaia, Teca triflora,
Psychotria mariana, Triphasia, Munda citrifolia, Cynometra, such vines as Munda cambelliana,

Triphysis, Polygodium, Gymnosporia, Tastospermum, Danallia

m predict Asplenium bassianum

Monument at edge of Anderson 97B on top of ridge of rampart. Measured 560 ft. inland 70° W. of N. from monument.

Here is dense tangled thicket of Chloroxylon, Aglaia, Okhrosia, Macaranga, Cynometra, Guania, Munda, Triphorus, Pandanus tortrix, T. mariae, Cyma, Cycas, much Piper, in undergrowth. This thicket is dense but very irregular, occasional trees sticking out of top as emergents.

The land of Anderson 97B up to the boundary of the private land to the south has been bulldozed clean of vegetation, soil and all.
Dec. 18 - math end of Anac Conservation Reserve, just south of Andersen Air Force Base, in scrubby forest on thin soil on limestone.

39201 Stenotaphrum micranthum
common in small semi-open spots.

10 02 Heritiera longifolia, scarce, very local on slope above top of cliff.

1 03 Maytenus occasional in forest.

Dec. 19 - Dugout Conservation Reserve, n.w. of Biya, in West forest, mainly Pandanus, on limestone.

5 04 Asplenium candidatum epiphytic on small sapling.

1 05 Asplenium epiphytic on tree trunk.

1 06 Antrophyum setiferum epiphytic on tree trunk.

4 07 Ophiothrix tetragonum pendulum - epiphytic on tree trunk.

4 08 Trichomanes seen on one tree trunk.

5 09 Epiphyte on Eugenia reichenbachi.

162 m. prostrate.

170 m. Tree 15 m. tall, 3 dm. dbh., strongly buttressed, flowers greenish, semicladant shrub, flowers white, 4-5 parted, fruit immature.

162 m.

Front curved from dryness when collected.

Front, limb, and wilted from dryness when collected.

Front thin, not very firm, hanging vertically, root forming large mass, forming a mat, front curved from dryness.
Dec. 19.

Thick degraded forest. Trees mostly 5-10 cm. dbh, about 6 m. tall, spread 2-5 m. apart, mostly Pandanus tectorius, Premna obtusifolia, Aglaia, Oxandra oppositifolia, Hibiscus tiliaceus, Myrtus communis, Andira inermis, ground cover sparse, mainly small Nep不得超过is, Cineraea.

Epiphytes: Premna belvian, Davallia solida, Pityoschistum, Asplenium nidus, Vittaria, Pycnosorus, common. Epiphytic hepatics abundant on twigs + branches, epiphyllous at least on Triphasia leaves. Some epiphytic orchids. Freycinetia common climbing on trees.

Thick layer of Piper, Dicelysia, seedlings of Myrtus communis.
1957 Marianas

39210
2 11 epiphytic on Trifolium trifolium
5 12 epiphytic on G. canina
2 13 epiphytic on Stilt roots of Pandanus tectorius
2 14 epiphytic on twigs of small tree
3 15 epiphytic on small branch
3 16 epiphyllous on Moringa umbelata
3 17 epiphyllous on Flagellaria
3 18 epiphyllous on Aglaia
3 19 epiphyllous on Fagus sylvatica
4 20 epiphyllous on Discocaulys
2 21 epiphyllous on G. canina
2 22 epiphyllous on Asplenium nidus
2 23 epiphyllous on D. alba L. solid.
2 24 epiphyllous on Polygodium sedephanes
2 25 epiphyllous on Polygodium sp.
2 26 epiphyllous on Piper quinense

thin, not forming cushions.
epiphyllous on Nephrolepis
epiphyllous on Maytenus
epiphyllous on Ochna spicata
epiphyllous on Triphasia
epiphyllous on Antrophyos
Thuidium on coral limestone cobbles

Dec. 20 - Anao - Mati Conservation Reserve -
Edge of cliff - Wind-swept Vesu Bush locally at least over 50% Triphasia, butrich, Maytenus, Catalpa, Psychotria mariana, Ficus perkins, F. imbricata, Allophylus, Ochna carpos, Eup. Premna, Jasminum, Guamas.
Bare rough limestone at top of cliff has helminthanthus marianus, Diplazium ciliare, lepironia nephraxis, Wedelia biflora var. carnea, Rhododendron pilosum, Monstera, Adiantum, Pteridium.

Looking down on vegetation, no evidence of typhoon damage.

Transact v. approx. 100', through thicket-like forest with few trees above 3 m. tall and 1 dm. thick, some scattered large mega emergent but there have suffered much from typhoon. Most abundant small trees are Eup. carpos, Ochna spicata, Ecinus, Pteridium, Jasminum, Diodon, Cremnosia, Guamas, Chrysophyllum, Pandanus, Cecropia.
Epiphytes very few -

Pyrosia (?), Myriococcus, Ophioglossum, Peltiphyton, but not abundant, mostly shrubs not recorded on transect but present -

Maytenus, Hibiscus, Stachys, Blechera, Triphasia, Pipt.,

Macaranga (sp.)

Vine - Aloysia, Jasminum,

Mentis umbellata

Cycads show effects of drought or of typhon -

Old leaves and foliage,

on many plants have all been shed. New fronds are growing upright a dm or so high. But trunks tend to send up lateral branches.

Bleeding of Aglaia, lycas,

Ochnaceae, Pregnant Manoa, utillifolia, Triphasia, Jasminum, common

Sansevieria,

Triphasia, Gymnocalcium,

Aechmohia, less common.

Small clearing on trail just inside boundary of Lychnothamnus elongatus. Lichens, shrubs, vines, epiphytes common.

One plant of Bidens, tree of Lestrin, several Lecanicels. Transect

121

At top of cliff just south of top of trail made transect 3; in low dry forest about 4-5 m tall, closed, mixed Triphasia, most abundant, slope gentle, steeper toward top, average 8° slope, rough limestone, very little soil. No obvious signs of typhon damage here.

Back from the ridge of which the above is the front slope is a depression in which the forest is much more luxuriant than on the flat limestone farther inland. This broad trough apparently runs parallel to the cliff but there is no indication whether or not it runs the whole length of the reserve.

(on Dec. 12 this clearing had been slightly burned by the fire running somewhat into the woods, affecting the near end of the transect.)
1957 Mariana

Dec. 11 - Anas Conservation Reserve

39 Cyperus hylinginis?
local in trail

4 33 Ficus prolifica?
just back from top of cliff

6 34 Psychotria pretoiana Mem.
rare

1 35 Fleva maxima
on pitted limestone at cliff edge in full sun

2 36 Rangertia ciliata
on pitted limestone at cliff edge in full sun

4 37 Canthium odoratum var. torvum
in scrub on edge of limestone cliff

2 38 Usnea
on stems of Impatiens in exposed cliff edge

Dec. 13 - Anpa Heights, Cross Inland Road
Patch of Casuarina up to 9-10 m. tall, 15 cm. dbh.
growing in area of Dimin.

in gentle slope. Shading out the Dimin. plant
under it are best
flourishing Cerbera, Leucaena,
Myrtella, Vitexinum.

Melastrum, Marinda,
Tremain, Genipodium
Decaspermum, Phyllanthus
caffordii, Pandanus tenerrimus, and hel.
The blanket of needles
may have an adverse effect on the Dimin.

as well as the plants. Trees
spaced about 7 m. or
more but smaller when

crowded.
Dec. 21 - Cotal Conservation Reserve, Cross Island Road

Mosaic of Dimeria and Miscanthus types, with much Casuarina of all sizes up to 5-6 m in height on flat high ground.

In Dimeria area are patches and spots of bare ground or very sparse vegetation. These are washed out and wind scoured strips.

In many places are well-developed erosion scars assemblies of plants. In some spots, Chrysopogon rhizomes have been buried by deposited soil to several cm. Their shoots are appearing in profusion at the surface.

Miscanthus seems to be invading the Dimeria here, but this should be checked more carefully. Transects 4 & 5 are on flat ground with a good diversity of vegetation.

In eroded places are exposed curious mycorrhiza, apparently in Casuarina roots (but perhaps in Myrtella). These should be investigated. Collection made.
Dec. 21 - south of Yona
Paspalum limbriatum
roadside
1am.
Dec. 21 - back of Ylig, on Cross Island Road
40  longum
abundant along road
Dec. 21 - Cross Island Road just east of Agna Height
41  Machaerium meganii
in Casuarina scrum
Dec. 22 - Mt. Tenjo - top is densely overgrown with Miscanthus with scattered Rencaena. West side, at end of road is very densely covered by Rencaena. East shoulder with more flat top is largely covered by Miscanths with sparse Casuarina. Considerable forest grown from area started by military activity.
Slope slopes densely covered by Miscanths
East slope, main top with one or two Casuarina trees and dense growth of Rencaena
Dec. 22 - Ritidian Point - looking down from top of cliff reveals very little evidence of typhoon damage, though some limaning say the breadfruit trees in the coconut plantation had suffered severe damage.
Pluchea obovata is still persistent around lighthouse area, though not common. Also seen a half lemon more down the road from the point.
Variation in Ficus species is not at all simple...
1957 Mariana
Dec. 22 - Mt. Tenjo
39.342 Miconanthus sinclaii
Dominant on steep slopes

Dec. 22 - Nimiy Hill
top of Tumana Drive

43 Costularia rorida
Common in roadside ditches

Dec. 22 - Cotal Conservation
area, North Island Road
in Diceros grassland
on flat top of mesa in
red clay soil

44 Cupulabilis

5 45 Ipomoea littoralis B2
Common locally

Dec. 22 - Batidian Point
in scrub at top of cliff

46 Ficus prolisa var.

47 Eugenia kauaii

48 Ficus prolisa var.

49 Ficus prolisa var.

50 (few)

Dec. 22 - Agana Swamp

51 Ficus prolisa
roadside dikes of swamp

quan

280 m.
cane 1 m. tall, thin, the
only fruiting cane seen

flowers herb up to 5
0.5 m. tall, flowers yellow

erect, glandappendage
white

prostrate, creeper
flowers purple, stigma
white, bicapitate

shrub 3 m. tall, leafless
figs almost ripe, purple
white to green, speckled
shrub 1 m. tall, sterile
(buty locality)

small tree, more or less
sweeping habit, figs immature
small tree, figs immature

viv flowers simple
Dec. 23 - north end of Harmon Field

39 × 3 Melochia

common in secondary area in lime trees

Dec. 23 - northwest corner of Y-Piga conservation reserve dense tangled moist forest

4 53 Ficus robusta var. occidentalis

v 59 capsulata

epiphytic on banyan

v 55 race

epiphytic on banyan

v 56 Vittaria

common on tree trunks

v 57 Asplenium caudatum occasional epiphytic on tree trunks

v 58 Asplenium laceratifolium rare on tree trunks

v 59 Belvisia mucronata very common on tree trunks

Dec. 24 south side Y-Piga Conservation reserve thick moist forest

v 60 (indist)

common, epiphytic

v 61 (indist)

on tree trunks

shrub and tall. leaves grayish, flowing, flowers small, in center, subtill, distally.

16 cm.

banyan type tree (fallen but still alive) fruit on twig and in clusters on main stems.

pendent

pendent

leaves fleshy, not clearly distichous; flowers greenish white
1957 - Mariana

Dec. 29 - Back of Agriculture Demonstration Farm, 10 a.m.

m. of Rigs

Third fruit on this node and

19762 (orchid)

occasional epiphytic

63 (orchid)

rare epiphytic

64 Becca Triantoha Wk. occasional

leaves fleshy, not strictly distichous; flowers greenish.

tree-like shrub 3 m tall; flower buds greenish white.
Dec. 24 - Lack of Agriculture
Developed on farm. Yigo trees in wet forest
very thin soil on
rough limestone
Osmuria opportiva
Lemon Abacoda
Focus, perils
Cleoxylon malanama
Aglae, malanama
Pandanus tectorius
Marindo citrifolia
Guamia malanama
Autocarpus malanama
Hibiscus tiliaceus
Triphasia trifolia
Melampyris multipulchra
Guettarda species
Pitaya fryga
Cananga odorata
Dona trianthera
Maytenus Thompsonii
Pandanus dubius
Claecarpus joga
Dec. 25 - Top of cliffs just north of ASTM Pt. - cliffs here are of very rough limestone, not quite vertical, densely wooded.

At top are Thysanaria, Grevia, Papatoa, Agapia, Pandanus tecta, Gubula, Morea citrifolia, Eugenia reinwardtiana (only small seen), Cycas guamensis, Melaleuca, Cástro, Ficus pubescens (dead or fallen tree, only seen), Pipturus (seedlings), Ficus trianthis, Carica (in openings). Below, perhaps 25 m. down is a large Astrocarpus marianum with entire leaves. Ficus commum down a bit.

On rough limestone of cliff Asplenium solcatum is very common. Also Tectaria crenata, Epiphytes, Bryozoa, Dacalia, Polystichum lingueforme, Peristachium are common but not abundant. Mosses and hepatics common on trees and rocks, but not in profusion. Belanthus on ledges, masts of bunna (or perhaps Thysanaria).

On the flat at top of cliff is bold clean hard sand, savanna of Pennisetum setosum and small liiptums, and Triphasia, with Thorectes of Triphasia, with some Pandanus tecta, Blechnum, Achnasia, Cleodendrum inerme, etc. Back of this is an abandoned coconut plantation.

Dec. 25 - Pitidian Point, top of cliff.

Looking down with binoculars it is not possible to see much effect from typhoon. Are two trees broken or blown down on least terrace, some bare branches, possibly from this typhoon or others. Sun clear, tree tops visible, incl. its plateau. East of point on plateau is a fine stretch of forest very even, north dead trees, quite a variety of species. From within this forest is rather sober.

And disturbed. Agapia, Ficus, Gubula, Grevia are most abundant. Macaranga, Clerodendron, Pisonia, Guettarda, Miss. Miss.
Heritiera, Leptanthus, etc.

*Wilkesia*

Locally common

Trees generally about 3-10 m tall; few over 2dm dbh. except *Ficus, Ficus*, etc.

Dec. 25 - Ritidian Point

in rather scrubby forest

39 26 N 39 26 E

Hedysis, crumaria

in open hard ground of road

7 66 Wilkesia

locally common in shade

and in small openings

2 67 Wilkesia

8 69 Heritiera longifolia Kark.

vry rare, two old trees seen

15 69 Leptanthus melanum Max.

very rare, one tree seen

Dec. 25 south west corner of

Northwest Field, south of

Ritidian Point

4 70 Erigeron annus L. common locally


Dec. 25 - north cliffs of *Rhododendron*

4 71 Blandfordia

occasional on ledges of rough

limestone

very rough limestone

165 m.

flowers white.

shrub 2.5 m tall, with

long pendent branches;

flowers greenish, yellow.

sterile plant with

large leaves.

tree 3.5 m tall, 2.9 dm, dbh.

tree 12 m tall, flat topped;

with brown green cast; flowers

with corolla greenish white,

stamens crimson.

150 m.

very few rays white.

flowers deep salmon pink, parasites

on *Pemphis aculeata* (possibly

on *Trichosporum trifolii*).
Dec. 25 - about 1 mi. S. of Pott's Junction on bare coral roadside
39° 72' 30"
Dentella repens
common
73° 40' 40"
Conyza canadensis
abundant

Dec. 25 - top of cliffs at Male south of Edinbarra Point
5° 40' 40"
Desmanthus virgatus
now in thin brush of Rencaena, etc.

Dec. 27 - beach east of Marins
4° 50' 40"
Klyoa trigon megalocarpa (L.)
single tree in then area just back of top of beach.

Dec. 27 - Agfayan Bay
5° 10' 40"
Hemionitis littoralis
single tree near shore

Prostrate; flowers white
lobes toothed; fruit immature
erect, rays white

7 m. tall; flowers white

3.5 m. tree 5 m. tall, flowers white

7 m. tree 8 m. tall, sterile
Dec. 27 - Mt. Schrader Fire reported yesterday in south slope. Today when examined almost entire south slope except the forested areas had burned. Several small areas of green grass still remain just below the main ridge. Fire still burning downward on southeast slope below the steepest part.

On north side one very steep slope has burned and several small trees east of this. Cannot see how fire down on northeast side. Apparently the fire did not enter the wooded areas. Examined only from Meri's Anera though binoculars. Grass is burned clean in some areas, in others apparently leaves burned off, leaving cane. In several areas it did not burn at all.

1957 Mariana's

Quan

General notes - Typhoon Elsa depopulated most trees south of north end of Atoll, largely snapped out again by now. Many trees blown down in most part of island, even in protected places. Several trees seen with trunks snapped off 2-3 ft. from ground. Branches broken in large number. Aloe vera seems to be the most frequently damaged, though Oxicrome is blown over to some extent. Mangroves at Meri's not injured visibly, m. Nipa at Marajan.

Bidens pilosa var. radiata has spread over entire northern half of the island, is locally abundant and very hard to control. Wild Canna papaya is still fairly common but was nowhere seen in any abundance.

Trees blown over by Typhoon have spreading butt very shallow root systems, not penetrating limestone significantly.
Dec. 28 - Kwajalein, Naval Air Station

Chrysopogon aciculatus
large patch in lawn, somewhat protected and semi-shaded

Cassalpinia major (L. dec.) Dandy & Johnson
solitary, individual at top of beach in full sun

Erosion ramp near terminal very low, pitted with small potholes which tend to be in rows perpendicular to beach, tending to coalesce into grooves.

Lawn near terminal is a mixture of Dactylololoea, Desmodium canumum, Trifolium, Artemisia, Leptaden, Hedyotis, Vernonia cinerea, Poa pratensis, Phyllanthus amarus, Chrysanthemum, Euphorbia, portulaca, Cuphea, Eryngium, Convolvulus, Echinacea, Helianthus, oenothera, Lycium, Stachytarpheta indica, the last three uncommon. Paspalum vaginatum common near beach.
Jan. 3 - air trip, Hitcham to Hilo.

Ridges above Moana Moana and Mau and citrus are badly eroded on their tops just below forest edge, north end of Wai'anae Range likewise. Large bare areas lacking any significant vegetation. Slight traces of some sort of erosion in ridges of s.w. side, but this seems much less obvious than 20 years ago.

West Molokai seems to be greener than usual, bare red earth only extensive in interior of west end.

Even Lanai is much greener than usual, but still large bare red scars in top of west end and some on south slope. Striking perpendicular scars cut cliffs on south side of west part, with cactus and coves. Erosion scars on north part of plateau west of mountain. Top of mountain hidden by clouds.

N.W. coast slope very seriously eroding in upper parts, lower parts, grassy with clumps of grass, some 3 months, this form

a dense study just back of shore all along north end of forest in top of mountain just showing below cloud. Erosion on north side looks worse than 20 years ago.

Slopes of Kahoolawe have brownish scrub and grass, top largely bare and bright red. Small areas of grass. A small shallow well formed cove on highest peak on north side.

Many craters along s.w. ridge of Haleakula scattered down to s.e. ridge. Flow pattern very obvious on this slope except near top of ridge. Dissection increases with 1000 feet and 10 days.

vegetation thin, especially near top of ridge. Becomes more green north and east to Kauyo Gulf, which is wooded. Beyond this these slopes are densely forested.

Lava cliffs bare. In Kauyo Gulf, there appear to be almost all of olivine, about 1/3 the way up. Some olivine, northwest of the but at lower altitude, in graminea. Some have grassy floor.

Slope between Kauyo Falls and
which is above a wide savannah belt which is above the cane fields. Apparently most of sacred lands belt has been destroyed for pasture. Above the middle cinder, slopes, slopes, with thin brush. Toward hills, the narrow walls, in cane belt are not lined with casuarina but are normally wooded. At lower edge of forest belt are some conspicuous fairly large patches of dark colored forest, probably planted.
Jan. 3 - Kiluaea Military Camp
along trail in sparse vegetation
on ash beds

Crenanthus polychrome
west side

Jan. 4 - South Point, Kalae
low vegetation on windward
plain and cliffs over sea

Potulaca cyanosperms
marsh between rows of rocks
and on flat

Potulaca oleacea
marsh between rows of
road cut and on flat

Paspalum verticillatum
common in road cut cliffs.

Jacquemontia sandwicensis
common in

Jan. 5 - South Point, Kalae, near
lighthouse

Fimbristylis cymosa
in crevices in basalt trench
just above sea

Desbania tormentosa
occasional in flat ash soil
just above sea

Heliotrosum curassavicum
in basalt benches just above sea

Fimbristylis cymosa
very common in crevices of rocks cut by sea

Cassia leucomeriana,
Tribulus cistoides, etc.

Prostrate, fleshy, purplish,
flowers deep magenta pink,
shades toward center,
stems brownish, fleshy,
ascending, flowers
yellow Sun. amm.

Wire fruit immature
odor disagreeable.

Prostrate, stems in dry
branching: flowers pale
blue, stigmas white,
spatulate.

Prostrate, fleshy, flowers
magenta pink.

densely caespitose.

Prostrate mat-forming
shrub, flowers salmon etc.

Prostrate, fleshy, very glaucous,
flowers white with granulate,
densely caespitose
Jan. 4. South Point

Lava terrace about 5'3" above sea-cooky surface with bed of ash removed by 30' cliff on lava surface. Nama Spinifex is very present on lava bed. There is some sand in ash.

Main leavel hach of the terrace is a plain of yellow Pahala ash, a thin dust-like layer 1' deep on the flat surface. This plain is the surface of most of the South Point Peninsula, bounded on the east by a rough lava flow. The lava flow has Eucalyptus, Kandana, Sida, Furnica, etc., forming an uneven, not too high, vegetation. The ash plain is covered by Cryptoden fera, Ipomea imbricata, and various other low bushes. On the edges above the exposed lava.

Surfaces where the ash has been cut away by the sea, Helichrysum is common. Brachyosia is also.

On the way back from South Point to Waimea the vegetation soon becomes scrubby and is mainly Kandana, about 1m. tall, with grassy openings and is grazed. The Kandana benefits from the grazing and has almost covered some areas. After this, toward the main road, there is a taller sort of Helichrysum with some Eucalyptus growing form the junction with the main road. For some mile, it mainly sugar canes but with small patches of helichrysum and other mainly introduced shrubs and small trees and areas of Eucalyptus on lava flows in Podocarpus, Myxospermum, etc.
99. Lesueuria patulastrum var. gisera
common in bare eroded fine
ash soil near sea

2. 90. Cassida sandwicensis
rare on side of flat near sea

2. 91. Berberis
occasional on flat near sea

Jan. 8 - large flow just east
of south Point Kalae

3. 92. Potulastrum cyanocarpum, e.g.
local on accumulation
of ash soil

2. 93. Bidens cyparissias
very local around abandoned military installation

Jan. 4 - northeast of Pahala
on main highway, west side
of Kilauea

3. 94. Bidens pilosa var. radianca
locally common

4. 95. Euphorbia
abundant

prostrate, stems green;
leaves fleshy, not hirsute;
flowers white,
bud yellow; flowers white
in fleshy pedicel
prostrate, leaves rather
fleshy, white beneath,
custin, above, flowers white

prostrate, leaves tenate.

50.6 m. field, branchless;
rays conspicuous, white.
prostrate, gland appendages
white.
1938 Hawaiian Is.

Jan. 5 - Road from Kula's Prince Camp to Weather Bureau Station

2 mi. about Camp - 6,500'.
Open area in scrub 6,500' woodland - with
sparse setose of Geranium, Oenothera, Staphylea, Vaccinium
Cuprea, ericoides, Delphinium.
Several sterile grasses. Hypochoeris is the only
exotic plant apparent here. This scrub continues into
the woodland.
The geraniums seem to be
a hybrid swarm in 6,500'
between var. cuneatum and
and var. hypophyllum.

2 mi. 8,000' bare black lava mosaic
of flowers, both aa and pahoehoe
some weathered slightly to a
lighter color.

At 10,800' has more common in
the same situation, grass tufts
and more up at an estimated
12,000-13,000' to upper limit of
this exposure. Grass
only on upper part of this exposure
Moss only on north-facing
Pahoehoe, more exposed
up 4 p.m. sun, very few exposed
to 4:15 sun. Moss pellaeae seen on
this exposure.

Pahoehoe at 10,650' has
gray moss in north-facing
crevices only, grass and Pelloea
in deeper cracks a little covered
by debris facing chiefly n, but
to some extent in any direction.
The moss is very common,
the grass and fern only occasional.

Pahoehoe crossing road at
10,800' has moss common in
same situation, grass tufts
and moss up at an estimated
12,000-13,000' to upper limit of
this exposure. Grass
only on upper part of this exposure
Moss only on north-facing
Pahoehoe, more exposed
up 4 p.m. sun, very few exposed
to 4:15 sun. Moss pellaeae seen on
this exposure.

10,800' one tiny patch of pahoehoe
in an aa field is two small
grandiflorum Vaccinium bunches and
pellaeae in common, moss in common.
Here to some extent even more.

At 9,500' on a dull brown weather
pahoehoe are a few scattered
Vaccinium bunches, these
showing great variation
Mossy too, also.
At 9200-9300 m fresh-looking black paiohaleo Vaccinium fairly common.

at 9100' two small bushes noticed bet. 9100 & 9200' on light brownish, paiohaleo grass and Vaccinium fairly common, styphelis douglasii occasional.

Fields of fresh air.

Then, at 8900', two small bushes with thinly scattered bushes of styphelis, Vaccinium, Duschekii & grass on older paiohaleo getting over slightly into new.

At 8700' & 8500' broad flat black glassey paiohaleo flows with scattered Vaccinium, occasional styphelis and Duschekii. Manykiwaha at 8500' of paiohaleo with abundant shrubs.

At 8300' shrubs common on rather young aa. also first Metrosideros trees in kiwaha here. This kiwaha is large and has almost closed cover of many species.

At 8100' first waist-high weed, Heterochris indicata.

The north slope of Mauna Loa is a bleak white of interlaced lava flows of various ages. The road to the Weather Bureau High Altitude Station is a relatively recently built graded road bulldozed into the rough lava on a rather gentle grade spiralling up the mountain from Kulani around to the west overlooking the saddle between Mauna Loa and Mauna Kea. The lower part is through fine wet forest of Metrosideros, much of which, unmaintained, is being destroyed for grazing purposes. The forest decreases in stature somewhat upward but irregularly, depending on the age and character of the lava substratum. This forest ends abruptly where the lava flow cuts across it at about 6500'. After this there is intermittent woodland of low stature with scrub in the understorey and in the openings. This scrub is the typical montane (ctd. 6/162)
1958 Hawaiian Is.

Jan 5, Mauna Loa, road northwest of Weather Bureau Station
base lava flows

39 396 Delicatea silicola on juniperides in small strips of pahoehoe

4 97 Stephania douglasii highest altitude observed in pahoehoe flows

1 92 Hypochoeris radicata highest exotic observed in pahoehoe flows

1 99 Vaccinium pleuranum scattered on pahoehoe lava, occasional

99300 Vaccinium pleuranum scattered occasional on pahoehoe lava

3 01 Vaccinium reticulatum scattered occasional on pahoehoe lava

1 02 Vaccinium pleuranum scattered occasional on pahoehoe lava

2 03 Vaccinium reticulatum scattered occasional on pahoehoe lava

1 04 Vaccinium reticulatum scattered occasional in pahoehoe lava

1 05 Pellessia terrigera occasional in coniferous in pahoehoe flows

1 06 (Graes) Trisetum glomeratum (Hooker) Tin occasional in coniferous in pahoehoe flows

y 07 (most) Phacominum lanuginosum (Hooker) Tin very common in north-facing coniferous in pahoehoe flows

Kauai

1500' stiff shrub 0.4 m. high

7150' stiff compact shrub 0.8 m. high, fruit purple-red

8100' ray yellow

1000' small shrub

2890' small shrub, berries reddish, black above up

9400' small shrub, berries red, when ripe

7400' small sterile shrub

9400' small shrub, fruit immature, red

2075' small shrub

10350' small tuft

10550' gray

var. lanuginosum Hooker Wils. det. H. O. Miller 1958
Jan. 5 - Kalani Road 8 miles

about lava camps

opening in sparse

scabrous woodland on lava flow

Cales

2 20ji

Geranium cuneatum
abundant in sparse scrub

scrub in

(All from p. 159)  

the xerophytic

scrub of Styphelia, Vaccinium

Geranium, Dubautia

Eriocaulon, Dendronema and

small Metrosideros in

various proportions. It

is often to almost quite closed, usually rather sparse. At the

road climbs quite

of bare or almost bare

terrains, more often the rough

climbing a a type, become

more prevalent and the

vegetation more and

more reduced to small

"islands" or "bipulas" in

the lava fields. These

vary from very small

to several to many acres

in extent. The vegetation

is commonly open woodland.
below. Above this the aa is without life except for tufts of gray moss in pockets.
Crossing the aa to fields at about 7500 and 8700 are two fresh looking black shiny polychrome flows of low rounded relief with a few scattered Vaccinium bushes with occasional Styphelia and Dubautia. At 8800 are two small fields both with fairly abundant shrubs of the same three genera and tufts of grass (Triandrum?). This vegetation is mainly on the polychrome lava but slightly invades the aa around the edge. Above this are broad fields of fresh aa. The last lichens were noticed at about 9100.

Between 9100 and 9700 in light brownish weathered polychrome Vaccinium is fairly common, Styphelia dolgianii occasional.
Between 9700 and 9300 Vaccinium is fairly common on a fresh looking black polychrome. Above 9300 these shrubs are at best widely scattered but up to 9700 a number of individuals will likely be in any field of vision. Above this they are very local or absent. At 9900 a population of about 6 individual Vaccinium shrubs is seen. The gray moss is common here in north-facing cracks.

At about 10,300 on a tiny patch of rather rough polychrome were two small graded Vaccinium bushes, the highest woody plants seen on the road. Felcoa terriformis is fairly common here in crevices. This is also the highest spot where moss was seen on aa lava, which accounted for the patch of polychrome. Take here on up to 11,350 mostly aa lava with occasional exposures of an older polychrome, the cracks and cracks somewhat the cracks showing up because of an efflorescence of a white mineral. On an exposure of this at 10,550 a gray
moss is very common in tufts in south-facing crevices. Cellulae tenuifoliae and Trinectum are occasional in very small tufts in crevices but mostly exposed upward. These are either quite deep or are covered by an accumulation of small rock debris which protects the root crowns and subrhizomes from undue desiccation.

On a long gate pole, exposure from the road at 800', the same moss is common in south-facing crevices. It was noticed that none of these tufts were exposed to the direct sun at 4:00 p.m. (Jan. 5) but some were beginning to be hit by the sun at 4:15. Following up this exposure to its head tufts of Trinectum were seen near the top at perhaps 10,950' or 11,000', but no Cellulae. Another such exposure continued on up the slope beyond a short stretch of ana but time was not available for examination of this. In all probability at least the moss would have been present there as it showed no sign of becoming yellow or less vigorous to the top of the lower exposure.

However, in similar character just above and beyond the weather bureau station at perhaps 11,400' and 11,200', no plants at all, not even mosses were seen. Time was not available for explanation further up the mountain.

The interesting thing about all of these phenomena occurrences was that there seemed to be no ecological dependence whatever. The moss, grass, fern, and shrubs occurred in separate niches or isolated examples of the same niche. The moss did not seem in any way to preclude or prepare the way for the higher plants on the slope. The rhizomes of the fern seemed to be the only...
Jan. 6 - Kilauea Volcano

Galinsoga javanica Cav.

in street of military camp

Andropogon

flor of crater near Halemaumau

Melinis minutiflora has become common along
roadside generally and
even on the crater floor.

Cymbopogon capitatus is
general on bare ground; at
this season the culms are
a dull orange color.

Andropogon sp. is common
along roadside and scattered
in crater floor.

Hypophorus is conspicuous
along roadside.

Along Volcano Road between
Kilauea and Hilo are a great
variety of exotic trees and
shrubs. Below Mountain View
what appears to be Melinis

a Heliconia is abundantly
flowering. Locally almost
dominant in forest. Trees to 30' tall,
leaves arthritic, especially the
young ones. Flowers pink.

West slopes of West Maui are
only thinly vegetated to a considerable
altitude, at least 3/4 way to summit,
especially on ridges.

On Mauna Loa the Metrosideros
and Acacia taxa do not
form clear belts. Koa is
very common just above
Kilauea. Ferning forest,
as above. Bird lilies and
Metrosideros is dominant
in forests above Kilauea
near to limit of forest. Though
there is a patch of large
Acia at about 2,000

On the rainy side of Kilauea
Cibotium forms a conspicuous
understory in Metrosideros
forest.


East slopes of Kohala Peninsula
grassy above, more and more
wooded with Prunus (?) below
in place. Back of above a clear
forest, thinning out upward
and northward along shore.

West and north slopes of Kohala
grassy and sparsely covered with
Pipalii, especially in ravines.

North part of plateau mostly
bright red and tan.
South slopes of mountain on Lanai have considerable area almost bare, areas. Few
patches of dense, probably planted, fruit on lower slope,
end in gulches. Top covered
by thick forest, a few large trees
on ridge.

Outer slopes on east and
covered by grass, Santaana (2)
and cactus on south side,
grass and scrub (Papaya?)
except for abundant
eroded gullies. Pineapple except on east
and east-east side of mountain.
East end of mountain much
more eroded than west.

Patch of forest woodland on
point on long, sharp, pointed
on south, east, and

Muana's windbreaks on
north and still very continuous.
But those effects not altogether
clear. Long slopes on west
end, grassy, with some
forests in canyons.
1938 Virginia

Jan. 26 - Manassas, planted grounds of old latner estate

19317 Hedera helix L.
- climbing on old tower
- Hedera helix

14 1 Hedera helix L.
- same

15 2 Hedera helix L.
- same

2. 16 Hedera helix L.
- climbing on trees and
- ground

1. 1 Hedera helix L.
- ground

Tangled woody vine,
leaves dull green, small,
fruits branches
bushy, fruit not
quite mature
same, but fruit mature,
dull blue-black.
same
woody vine, sterile
branches prostrate on
ground, fruiting bushy,
climbing in tree, leaves
dull green with paler vein,
fruit blue-black, fleshy.