

RECORD

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F. R. Fosberg

Collection and Field Note Book

(July 12, 1953 - Nov. 10, 1953)

July 12 - 1953

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July 12 - 1953

[Faint, mostly illegible handwritten notes on the left page]

Collection and Field Note Book

No. 69

(July 12, 1963 - Nov. 10, 1963)

(43891 -- 44447)

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(over)



F. R. Fosberg  
Field Book No. 69

Start # 43891

End # 44447



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c/o National Research Council  
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for reward

1963 Borneo - Brunei

1

3

July 12 - B Series

Plants

Casuarina equisetifolia  
Ravenala madagascariensis  
Asplenium nidus  
Delonix regia  
Acacia auriculiformis  
Cocos nucifera  
Allamanda cathartica  
Allamanda violacea  
Codiaeum variegatum  
Acalypha arvensis v. wilkesiana  
Hibiscus tiliaceus  
Ipomoea pes-caprae  
Pteridium aquilinum s.f.  
Pithecolobium dulce  
Merium indicum  
Plumeria rubra  
Plumeria obtusifolia  
Musa sapientum

Arrangement of vegetation:  
Casuarina eq. strip on beach ridge  
belt of clearing <sup>meadow</sup> cult. + thickets  
belt of Dryobalanops forest.  
transition to peat swamp.  
several phases of peat  
swamp descr. by Anderson

1963 Borneo - Borneo

July 12 - Seria - Badar  
by narrow gauge railway  
dep. 7:45

Peat is a bicorves lens  
with clay <sup>subsoil</sup> in center, sandy  
ground nearer periphery.  
Periphery, except near beach,  
seems to be result of  
natural levee formation.

Originally was a bay with  
mangroves. Sea level fell.  
Peat developed rapidly at  
first, slowed down as dome  
formed. (J.A.R.A.)

Along r. is *Ischaemum*  
solid stand, on <sup>rt</sup> side a solid  
mass of *Blechnum* (*Heterochloa*) sp.  
with reddish young growth.

Dactylocladus is in  
all communities, has  
characteristic vertical  
conical pneumatophores.

Second stop in rather  
disturbed peat swamp  
of enormous *Shorea albida*  
trees on rather shallow  
peat. Climbers abundant  
mostly closely clinging  
to trunks. Ground layer  
almost entirely of  
seedlings and creepers.

and  
epiphytes

Third stop -  
thinner forest with  
mostly more slender  
trees, canopy still  
open - somewhat disturbed.  
epiphytes less abundant.  
Termite nests on trees  
just above high water.

Fourth stop - thicker  
forest of smaller trees.  
Canopy still rather open.  
Patch defoliated and  
killed by caterpillars.  
Secondary scrub forest  
of species from surrounding  
primary under story.

Fifth stop - smaller  
trees, full canopy, not  
more than 20-35 m high.  
few *Shorea albida*, many  
*Litsea palustris*. Shrub &  
small tree layer rather  
thick, but possible to walk.

Badar. *Agathis* forest on  
sand ridge. Sand white  
with organic horizon  
this very irregular,  
with cylindrical and  
wrinkle shaped irregularities.

Thick understory  
to 6 m. with great  
age this 30-40 m. towering  
above in an open stand.

Near river a shrub  
swamp. Hoopoe climbing  
in shrubs + trees. Shrubs  
& clumps of shrubs widely  
spaced, with mud between.

July 13 - <sup>east</sup> north of Senia

Dryobalanops forest on  
inner edge of old beach  
sands - pure stand of  
*Dryobalanops nappa*  
Trees to 25 m. tall, to 4-5 dm dbh  
spacing 3-5 m. canopy  
rather open.

Some *Dyera*, with large  
knob-like pneumatophores.  
These drip latex when  
scratched.

Transitional forest to  
fresh water swamp  
Trees to 30 m. tall, up  
to 5 dm dbh. some with  
~~pneumatophores~~. Canopy  
irregular, open to closed.  
Trees of all diameters.  
Second story not well  
defined but cover considerable.  
Shrub layer also not  
well defined. Shrubs  
from 0.5 m. to 1.5 m. grading  
into trees. Prominent  
but not dense enough  
to impede movement,  
except for occ. rattans  
and *Galacra*.

Herb layer of scattered  
sedges + many seedlings.  
75% ± of ground bare,  
covered by dead leaves.  
Occasional large  
emergents to 50 m. +  
1.5-2 m dbh.

(Photos of *Hentzia aurea* for  
Kostermans)

This is mostly on  
a complex of low natural  
levees along small  
meandering streams  
Deep yellow fine-silty sand soil.  
The swamp, itself,  
is much more open below,  
with large trees to



1963 Borneo

40 m. and 1 m. dbh.  
 Second story prominent  
 at 10-15 m.  
 Open beneath except  
 for scattered treelets.  
 Many lisp-like  
 pneumatophores  
 Pools & hummocks  
 on ground.  
 Said to be flooded  
 frequently, with  
 silty water.  
 Peat rather thin, on  
 white sand.

Mixed dipterocarp forest  
 on slope. Trees up to  
 57 m. (emergents)  
 photo below of termite  
 nest for Kostermans.

Whiteodendron  
 buttressed, 3 dm. about 6.  
 20 m.

On ridge a thick forest  
 of small trees about  
 20 m. tall, with scattered  
 emergents to 30 m. or more.  
 Few shrubs almost  
 no herbs. Thick layer  
 of leaves on ground.  
 Many of big trees buttressed,

Brunia

to 10-12 dm. dbh.  
 2 below photos.

On slopes more  
 undergrowth and  
 more medium sized  
 trees.

On ridge - gnetum (vine)  
 photo below

Colony of *Geophila pilosa*  
 on broad ridge top  
 in mixed dipterocarp  
 forest. Colony is rather  
 extensive, mostly sterile.

Soil on these ridges  
 is bright yellow deep  
 silty sand. No profile  
 development.

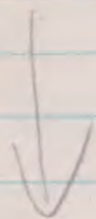
8

1963 Borneo - Brunei

Labels all done (check) to end Borneo

July 13 - Anduki Forest Reserve,  
Seria  
in tall "heath forest", the  
canopy layer an almost  
pure stand of *Dryobalanops rappa*,  
on peat-covered sand.

1-2 m.



43891 *Dryobalanops rappa* Becc.  
dominant tree

with  
A. 2  
2

92 *Timonius pedunculata*<sup>lata</sup>  
in shrub layer

93 *Hypolytrum*  
very common

94 *Psychotria* <sup>or *Discora*?</sup>  
rare in shrub layer

July 13 - Andulan Forest Reserve

no alt.

95 *Melastoma beccarixanum* Cogn.  
in bushy second-growth  
thickets on sandy soil

shrub 3 m. tall.

same ~~as~~ - in transitional  
forest on flattish stream  
bottom land

very dark green.

96 *Trichomanes*  
rare on forest floor

rhizome deeply buried  
under dense root mat  
of trees.

97 *Sclerzaea dichotoma* (L.) Sm.  
occasional

tall tree; fruits picked up  
from ground.

98 *Mussaendopsis* (or *Jachia*?)  
~~tall tree~~

Brunei

9

- same - in fresh water  
swamp forest
- 43899 *Polyalthia*  
occasional
- + 900 *Landoricum* cf. *maingayi* Hiern  
rare

same - ~~in~~ in mixed  
dipterocarp forest on  
low ridges

- 10 01 *Whiteodendron*  
rare
- 1 02 *Dipterocarpus sarawakensis* V.S.P.  
rare
- 5 03 *Memezyton*  
rare
- 1 04 (orch)  
rare
- 3 05 *Gnetum*  
rare
- 5 06 *Schizaea* (*Actinostachya*)  
common
- 1 07 *Serialbizya splendens* (Miq.) Kost  
rare
- 2 08 *Heritiera impressinervis* Kostermans  
rare
- 2 09 *Antidesma*  
rare
- 1 10 *Pentace*  
rare

slender, scarcely branched  
shrub about 4 m. tall.  
slender shrub or small  
tree, fruit immature, gray.

buttressed tree 20 m ± tall,  
3-4 dm diam. above buttresses.  
fruits and leaves from  
ground beneath large tree.  
small shrub, 1 m. tall.  
buds lavender, corolla lobes  
reflexed at anthesis, white  
inside, stamens purple.  
flowers white, each  
segment marked with a  
central stripe and distal  
spot of purple  
thick leaves with  
conspicuous nodes, sterile,  
erect.

enormous tree with clear  
bole, no buttresses; fruit  
picked up from ground.  
sterile tree

shrub; fruit immature

sterile tree

12

1963 Borneo - Brunei,  
north Borneo43911 *Polyalthia*

rare

17 *Geophila pilosa* A. Chevalier  
very local, fair sized  
colony on broad ridge-topsame - in secondary growth  
along road

5 13

July 14 - Brunei

14 *Acrostichum aureum* L.  
edge of ~~sea~~ estuary

July 14 - Jesselton, north Borneo

15 *Cordia*

roadside in hills

16 *Spermacoce suffruticosa* Jacq.

roadside ditch

17 *Hedyotis corymbosa*

roadside

18 *Phyllanthus*

roadside

Brunei - Sabah

13

small slender tree;  
cauliflorous.prostrate, petioles rather  
thick, stems and petioles  
dull maroon; leaf blades  
paler beneath, veins  
maroon; flowers ~~and~~  
fruits very rare; corolla  
white, lobes patent; fruit  
black, calyx lobes oblong  
obtus; corolla sparsely  
pilose without, lobes  
5-6, distally purplish without.

shrub, in bud only.

1 m.

sterile; young fronds reddish  
green.

50 m.

shrub 1 m. tall; flowers white.

3 m.

erect; flowers white.

↓

diffuse plant; flowers white

July 14 - trip by car Seria to Brunei.

Considerable grassy areas, both on flat ground around Seria and on hills beyond - dominated by *Ischaemum* cf. *magnum*. Almost no *Imperata*, a little only on roadsides in Seria.

## Plants

*Mimosa pudica*  
*Paspalum conjugatum*  
*Stenobolus cucullatus*  
*Centella asiatica*  
*Pennisetum*  
*Ipomoea*  
*Hevea brasiliensis*  
*Cordyline fruticosa*  
*Polypodium quinquefolium*  
*Quisqualis indica*  
*Spathodea campanulata*

~~July~~ July 14 - Brunei - Jesselton trip.  
 Foster Friendship, at side. 9:00  
 started 2:30

Low hills are wooded. Rubber plantations can be distinguished by uniformity except for partly deciduous trees. Island and peninsula with curious striated structures, probably sand ridges.

2:40 crossed coast opposite side of bay.

Gigantic tidal stream in fine-textured forest - black streams in same textured forest inland, then green grass with gallery forest along stream.

A black stream meandering along course. ~~For~~ mostly forest on other side of it. In distance a light, very muddy one meandering same direction.

2:44 A black lake ~~is~~ surrounded by swamp on course.

2:45 Coast with long curved sandy beach. Black stream parallel with and back of it, emptying near course. Large areas of forest.

1963 Barnes - North Borneo

probably peat swamps  
back of it. large clearing  
in distance. Crocker Range  
back of all in distance.

Out to sea, then closer  
to land again. More and  
more cleared land as  
we go along coast. a low  
isolated hill, wooded,  
on coast near an angle  
and river mouth.

Tiny rocky islet with  
clump of woods.

2:51 Small patch of  
mangrove near mouth  
of stream. Then hills  
run down to sea.

2:54 Small islands - hilly  
parts wooded, flatter  
part of larger one in coast.  
Hills on slope - steep slope  
terraced and cultivated

2:55 Complicated sand spits  
with Casuarina.

Appr. airport - some  
mangrove. Wooded hill.  
Small patches of coconuts  
Marrier island with Casuarina  
Avicennia swamps on  
mainland

2:57 Arrived Jesselton.

North Borneo

July 14 - Jesselton

Plants seen:

Eleusine indica  
Sporobolus diander  
Euphorbia prostrata  
Paspalum conjugatum  
Artocarpus ~~mass~~ altalis  
Malvaviscus arboreus  
Chloris inflata  
Euphorbia hirta  
Clidemia hirta  
Cordia variegata  
Imperata cylindrica  
Cananga odorata  
Pithecellobium dulce  
Bougainvillea spectabilis  
B. glabra  
Tecoma stans  
Catharanthus roseus  
Pedilanthus tithymaloides  
Cynodon Dactylon  
Stachytarpheta urticifolia  
Pityrogramma calomelanos  
Lycopodium cernuum  
Cyperus bylingia  
Chrysopogon aciculatus  
Cassia spectabilis?  
Cerbera pentandra  
Mangifera indica  
Samanea saman  
Delonix regia  
Passiflora foetida var. hirsuta  
Hyptis capitata  
Albizia falcata

1963 Borneo

*Lagerstroemia speciosa*  
*Scoparia dulcis*  
*Paspalum cf. orbiculare*  
*Desmodium triplorum*  
*Vernonia cinerea*  
*Cyperus rotundus*  
*Ipomoea cinerea*  
*Anacardium occidentale*  
*Nevea brasiliensis*  
*Caesalpinia pulcherrima*  
*Thunbergia grandiflora*  
*Arystaria gangetica*  
*Cyperus brevifolius*  
*Peltopodium ferrugineum*  
*Clitorea ternatea*

Sosopodon  
 (Front best house)

km. 17<sup>+</sup>

km 18 low photos begin  
 roll, in shifting aqua.  
*Solanum mammosum*

Kundasang -

*Tibouchina semidecandra*  
*Sassiflora foetida*  
*Dahlia variabilis*  
*Scoparia dulcis*  
*Paspalum conjugatum*  
*Axonopus compressus*  
*Salvia splendens*  
*Imperata cylindrica*  
*Bixa orellana*

several photos of Kinabalu  
 from Kundasang

near jet with Kinabalu rd.

*Setaria palmifolia*  
*Centella asiatica*

Hon. Donald Stephens

Member For Natural Resources

also Chairman Secretariat  
 Kinabalu Mem. Fund Jesselton W. Borneo (Sabah).  
 from

July 15 - bet. Jesselton + Tamparuli  
Tharun River 1 mile from Tamparuli  
Milletia vasta Kosterm.  
in secondary thicket on steep slope

93219

July 15 - Tamparuli  
Adenanthera cf. microsperma  
growing along street

July 15 - n.w. of Kokohitan Peak  
milestone 17 from Tamparuli  
on Renau Road, ridge w. of Kad  
in secondary thicket  
on steep slopes

occasional  
(lab.? verb.?) Bruchia  
occasional

(verb.?)  
occasional

(gran)  
very common

July 15 - <sup>near</sup> ~~n.w.~~ of Kokohitan Pk.  
milestone 18 from Tamparuli  
on Renau Road, ridge w. of Kadamaian

Abarema  
in secondary thicket

start  
Kinabalu

July 15 - Tenompok Pass,  
Mt. Kinabalu  
Solanum

100'  
30 m.

fair sized tree; flowers  
bright rose purple, fragrant.

100'  
30 m.

spreading tree; flowers  
pale yellow, becoming deeper  
yellow with age; pods  
curving on dehiscence.

2550'  
800 m.

Kadamaian River

small tree; stamens white.

erect herb; corolla white,  
palate with 2 yellow lines.  
erect herb; corollas white.

caespitose, many canes  
to about 2 m. tall, from base.

2700'  
830 m

River

stamens white

5500'  
1540 m

spreading herb, stems blackish  
purple; flowers bright purple;  
fruits green.



July 15 - above Kundasang

10  
43927 *Trigonobalanus verticillatus* Fernald  
in wet forest on top of hill on  
with W. Meijer ridge

July 16 - ridge from  
Ternopol Pass to  
Kamburongoh

2 28 *Grammitis* (Xiphopteris)  
occasional on bases of  
recently cut trees

6 29 *Trichomanes*  
very common on <sup>mossy</sup> tree trunks

2 with  
1 killed 30 (melast)

1 31 *Lithocarpus borneensis*

9 32 *Elatostemma*  
common on <sup>mossy</sup> ground and fallen logs

5 33 *Argostemma*  
common on mossy ground

2 34 *Asplenium*  
rare on mossy ground

2 35 *Cyathea*  
rare

3 36 *Elatostemma*  
colony on log, with # 43937

5 37 *Elatostemma*  
colony on log, with # 43936

5 38 *Argostemma?*  
common on mossy ground

~~39 *Sonerilla picta*  
occasional on mossy ground~~

2 39 *Sonerilla picta* Kuhn.  
occasional on mossy ground

tree, sterile.

1700-1800 m.

→ on ridge crest in montane rain forest

✓

shrub

tree

leaves white beneath,

small tree fern, trunk  
slender (about 5-6 cm diam)  
(slight intergradation with  
# 43937)

(slight intergradation  
with # 43936)

buds on ~~stems~~ recurved  
pedicels, becoming  
erect after flowering,  
corolla white, reflexed.  
leaves with white areas  
along veins; flowers pink.

July 16 - Trip up Kinabalu  
- started walking at 4500 ft

7:40 a.m. through tall  
mountain rain forest -

up to 20 m., ~~covered with~~ with  
<sup>numerous</sup> epiphytes, in places  
with great amounts of  
lianes, elsewhere not.

In places with trees of  
all sizes, no differentiation  
into layers, in other places  
only canopy and a  
thin low shrub layer.

This becomes lower  
and more hygrophilous  
toward Kamburongoh.

In gulcher it is very  
wet, filmy fern  
and bryophytes very  
luxuriant. Crests  
in places somewhat  
open. Ferns generally  
very abundant.

Passed, at one place,  
a vertical rock face  
with almost no  
vegetation - dripping.

At Kamburongoh  
is a large clearing.  
When it is not much  
trampled it is a tangle  
of *Blechnum*, *Gleichenia*,  
*Dicranella*, etc. When trampled  
*Haloragis* has become

Camp 3340 m

very abundant. This  
is a native species,  
rather rare in low,  
that has taken advantage  
of the open wet ground  
and become abundant  
here. *Gentiana borneensis*  
is also here. *Veconia*  
*pratula* is abundant.

Above this the forest  
has a lower stature  
and more gnarled  
appearance - is a true  
cloud-forest or mossy  
forest - better a scrub  
forest, perhaps 5-7 m.  
high, on ridge, probably  
taller in ravines. Blanket-  
ed with mosses and  
hepatics, lichens (Usnea)  
abundant on upper  
branches.

This changes abruptly  
with substratum -  
a large area of "ultrabasic"  
rocks - eroded in a rough  
jagged pattern.

Here is a sharp change  
in flora - ~~but~~ *Dacrydium*,  
*gibbale*, *Leptospermum*  
*recurvum* become very  
abundant. *Dipteris* drops  
to 1-30

- 43940 *Hymenophyllum obtusum*  
3 epiphytic on ~~the~~ tree trunk.
- 3 41 *Sonerilla*  
common along trail
- 2 42 *Lycopodium serratum*?  
rare on mossy ground
- 1 43 *Sonerilla*  
rare on mossy ground
- 1 44 *Sonerilla*?  
rare on mossy ground
- 3 45 *Religinella*  
common on mossy ground
- 3 46 *Histiopteris incisus* (Thbg.) J.Sm.  
local
- 1 47 *Argostemma*?  
rare
- 1 48 (sub.)  
rare
- 6 49 *Psychotria*  
common on ground and climbing  
on stumps and tree trunks
- 5 50 *Viola betonicaefolia* Sm.  
common on wet rocks along trail
- 3 51 *Elatostemma*  
very local, on wet vertical cliff
- 1 52 *Grammitis* (*Xiphopteris*)  
rare, on wet vertical cliff
- 2 53 *Adenostemma laevigata* (L.) O.Ktze  
rare on wet rocks along trail
- 3 54 *Trichomanes*?  
rare on tree trunk
- 2 55 *Mercuria granadensis* (L.f.) Druce  
very local, on rocks along trail

fronds pointed downward.

flowers pink.

leaves green (no white marks)  
flowers pink.

fronds erect or almost so.

1800-2000m. forming tangles.



semi-prostrate shrub,  
corollas white, waxy.  
creeper, flowering rarely  
but abundantly when it does.

stems up to 1 m. or more long,  
maroon, clinging to cliff,  
base of leaves below,  
dark green.

flowers white.

prostrate; fruit scarlet

- 43956 *Grammitis* (*Xiphopteris*)  
common on tree trunks
- 1 57 *Hedyotis*  
occasional along trail
- 1 58 *Grammitis* (*Xiphopteris*)  
rare on tree trunks
- 3 59 *Grammitis* (*Xiphopteris*)  
very local
- 3 60 *Cambros*  
common but not abundant
- 2 61 *Rhododendron*  
common
- 7 62 *Psychotria*  
rare
- July 16 - Kamburongoh  
on s. slope of Kinabalu  
in clearing around buildings
- 1 63 *Gentiana borneensis* Hook. f.  
~~common~~ local
- 1 64 *Coelogyne* cf. *sulphurea* Reich. f.  
on fallen log
- 3 65 *Hydrocotyle* cf. *javanica* Thunb.  
local
- 4 66 *Halorrhagis*  
abundant
- 2 66a *Picrocephala latifolia* DC.
- 3 67 *Dianella*  
in tangled herbaceous growth
- 3 68 *Rycopodium*  
common in tangled herbaceous growth.

erect; buds white.

exactly the climbing habit  
of *Chusquea*.  
shrub 2 m tall.

slender small tree 4 m. tall,  
ripe fruit yellow.

2130m.

↓  
flowers pale purple

flowers white, a pale yellow  
spot on middle of terminal  
part of lip, 2 orange spots  
on middle part.

prostrate

forming a mat on  
~~the~~ open ground  
flowers reddish.

flowers white; leaves  
glaucous, stem to 1 m. long.

1963 Borneo - north Borneo

*Schizaea fistulosa* in rock crevices.  
out. The stature

*Hedyotis*  
*monostachya*  
common  
here.

becomes much lower -  
3-4 m. at most, the  
two dominant species  
giving it a very weird  
aspect, the canopy  
very uneven.

This covers a substantial  
part of the slope here,  
the combination of  
gray-green of *Leptospermum*  
and yellow-green of the  
*Dacrydium* makes  
it easy to pick out,  
even from a distance.

Locally is a patch  
of dwarfed sparse  
vegetation - wisps  
of *Schoenus* making  
up the dominant species,  
dwarfed *Leptospermum*  
common. Only 4-5 species  
in most extreme area.

*Carex* sp. & *Cyathea* sp.  
(almost acaulescent)  
and a few other things  
added peripherally.

Just below Paka Cave  
the ~~vegetal~~ ultrabasic  
ends and granite  
begins. *Leptospermum*  
still remains an important  
part of the scrub, but  
*Dacrydium* drops out.

*Nertera* locally common  
just below the cave,  
along the trail and on  
bases of trees in mossy  
scrub.

*Coprosma* begins at  
the cave, and is common  
there and on up to just  
about the level of our higher  
camp, at 3940 m. From  
there it becomes less common  
up the steep part of the  
mountain. In upper area  
it becomes common again,  
especially toward, and even at  
summit. *Nertera* is only  
common in the vicinity of  
the cave. It has flat leaves,  
here, not at all crispate as  
in colony lower down.

Above 10500' scrub, mostly *Leptospermum*  
extends in strips on ridges and  
in ravines. Most of area is bare  
slopes of granite 30°-80°. Granite  
surface is rough, so one can walk  
up even a 30° slope. Plants are in  
crevices, small bogs, and small  
boggy crevices. In bogs *Oreobolus*,  
*Monostachya*, *Centrolepis*, and  
*Eriocaulon* acaule form striking  
rings, dead in center. (photos). Tiny  
*Leptospermum* shrubs in crevice  
are the most striking vegetation.  
A few species extend to summit.

- 43969 *Nepenthes lowii* Hook. f.  
very local in semi-open forest
- 70 *Blechnum*  
very common in weedy clearing
- 71 *Gahnia tristis* Nees  
abundant in weedy clearing

July 17 - ridge above  
Kamburongoh  
in ridge-crest phase  
of cloud-forest, low trees  
draped with epiphytes

- 72 *Hedyotis pulchella* Stapf.  
rare
- 73 *Lycopodium casuarinoides*  
common in semi-open forest
- 74 *Hymenophyllum*  
common on tree-trunks
- 75 *Polypodium*  
occasional on tree-trunks
- 76 *Pygeum*  
rare
- 77 (amb.)  
rare
- 78 *Diplocosis ciliolata* Hook. f.  
occasional
- 79 *Rhododendron* ~~angustifolium~~ <sup>stenophyllum</sup> Hook. f.  
common
- 80 *Trachypogon* ~~indica~~ <sup>meneg</sup>  
local in small grassy opening
- 81 *Rhododendron acuminatum* Hook. f.  
rare in undergrowth

wine 1-2 m. long, climbing  
over bushes,  
young growth ~~red~~  
conspicuously reddish.  
caespitose, branchlets  
of inflorescence drooping.

7000-7500'

7100-7300 m

V

erect shrub

climbing in low trees.

fronds curving downward

shrub 1.5 m. tall

slender understory  
shrub 3-4 m. tall, ripe  
fruit orange.

shrub 1.5 m. tall,  
flowers white.

shrub 1 m. tall, flowers  
orange red.

flowers white.

shrub 2 m. tall, flowers  
vermillion.

- 43982 *Hedyotis*  
5 common upward
- 3 83 *Eugenia*  
rare
- 2 84 *Psychotria*  
common
- 1 85 ~~*Leptospermum*~~  
common
- 3 86 *Embelia*  
rare
- 3 87 (rub.) *Urophyllum*  
rare
- 4 88 *Eurya obovata* var. *reticulata* ((Kortt.) De Wit  
occasional
- 2 89 ~~*Polyosma*~~ *Ternstroemia*  
occasional
- 4 90 *Polyosma*  
occasional
- 4 91 *Trachymene*  
occasional along trail
- 1 92 ~~*Dryas*~~ *Drimys piperita*  
occasional
- 73 93 *Pygeum*  
occasional
- 2 94 *Hedyotis*  
common
- 5 95 *Leptospermum flavescens* Sm.  
occasional
- 1 96 *Blechnum*  
common
- 2 97 *Blechnum*  
occasional
- 1 98 *Dipteris novoguineensis* Posth.  
very common

- shrub 0.5 - 0.7 m. tall;  
flowers white, hairy within.
- slender tree 5 m. tall  
fruits purplish red.
- climber, rarely flowering;  
buds only, and immature fruit.
- flowers white.
- scrambler

7500-8000' shrub, flowers white

2300-2460 m

erect shrub 2.5 m. tall.

shrubs 1 m. tall,  
fruit immature.

- shrub 2 m. tall; flowers  
dull maroon-pink, fruit  
black when ripe.

- ~~flower~~ plant reddish.

shrubs 2 m. tall, bark  
very acid; fruit immature.

shrubs 1.5 m. tall

shrubs 0.4 m. tall

shrubs 2 m. tall; flowers white.

young fronds red.

fertile fronds erect,

~~spore~~  
plant glaucous, young fronds  
reddish.

- 43999 *Blechnum*  
1 occasional
- 44000 *Hymenophyllum*  
3 local, on tree trunks
- 4 01 *Hymenophyllum*  
common, on tree trunks
- 2 02 *Isachne*  
common in small opening
- 3 03 *Dracopis ensiformis* (L.) DC.  
common in degraded forest  
same - <sup>in mossy scrub</sup> on ultrabasic rocks
- 6 04 *Hedyotis macrostachya*  
common
- 2 05 *Podocarpus imbricatus* var. *kinabaluensis*  
occasional
- 2 06 *Phyllocladus*  
common
- 1 2 07 *Vittaria*  
rare, on tree trunks
- 1 08 *Hedyotis macrostachya*  
common
- 2 09 *Elatostemma bulbosum* Stapf  
common on rocks
- 2 10 *Euphrasia*  
common on rocks
- 1 11 *Cyrtandra clarkii* Stapf  
rare
- 1 12 *Podocarpus brevifolius* Foxworthy  
occasional
- 2 13 *Daphniphyllum borneensis* Stapf
- 3 14 *Myrsine*  
common

very glaucous

7000'  
2100 m.



- erect shrub to 0.7 m. tall,  
flowers white, hairy within.
- shrub 2 m. tall, fruit  
immature.
- shrub 3 m. tall ♂
- shrub 0.5 m. tall, flowers  
white.
- leaves very rugose
- flowers white, purple outside
- flower crimson within,  
dull pink without.
- shrub 2 m tall,
- shrub 1.5 m. tall, flowers  
purple.
- shrub 1.5 m. tall.



- 44015 *Symplocos* sp. *buxifolia* Stapf  
occasional
- 16 *Dacrydium gibbsiae* Stapf  
very common, codominant
- 17 *Styphelia suavis* Less  
very common
- 18 *Ilex pluvialis*
- 19 *Leptospermum recurvatum* <sup>var</sup> Hook. f.  
abundant, codominant
- 20 *Calymmodon*?  
occasional on tree trunks
- 21 *Lobelia fistulosa* Labill.  
occasional in rock crevices
- 22 *Aletris*  
common
- 23 *Ilex*
- 24 *Hedyotis macrostachya*  
common
- 25 (cyp.) *Machaerina*  
occasional in area of dwarf  
open vegetation
- 26 *Drimys piperita* Hook. f.  
occasional
- 27 *Lithocarpus havilandii*
- 28 *Carex*  
occasional
- 29 *Cyathea* sp. *havilandii*  
abundant around an area  
of sparse dwarf vegetation

July 18 near Paka Cave  
s slope of Mt. Kinabalu  
in ~~the~~ mossy scrub forest

- 30 *Coprosma*

shrub 1.5 m. tall, flowers  
white

shrub 2 m. tall.

shrub 1.5 m. tall, flowers  
white.

shrub; ~~fruit~~ fruit red.

shrub 2 m. tall, flowers  
white.

shrub  
flowers white.

shrub 2 m. tall; fruit immatures.

shrub 2.5 m. tall

acaulescent (one seen with  
trunk 0.5 m.), fronds erect.

9700'

3000 m



spreading shrub

- 44031 *Dichrocephala*  
very rare along trail
- 1 32 *Coprosma*  
9. (+ 32a) common
- 2 33 *Blechnum*  
common locally
- 3 34 *Nertera granadensis* (L.f.) Oruce  
common locally on rocks  
and bases of trees
- 2 35 *Calymnophyton*  
on tree trunks
- 3 36 *Carex capillacea* Booth  
common along trail
- 1 37 *Polypodium*  
on rocks

July 17<sup>18</sup> Above Paka Cave  
s. slope Mt. Kinabalu  
in open boggy places

- 4 38 *Drosera*  
common
- 2 39 *Monostachya centrolepidioides*  
common
- 1 40 *Havilandia*  
very local
- 1 41 *Gaultheria borneensis* Stapf  
rare
- 1 42 *Ranunculus*  
very rare
- 1 43 *Pilea johnstoni* Oliver  
rare
- 1 44 *Gentiana lysopodioides* Stapf  
rare

spawling shrub

fertile fronds erect

prostrate, stems reddish,  
leaves not at all crisped;  
fruit red.

caespitose

2800-

10000'

3000-3050m

forming dense cushions

forming dense cushions.

prostrate, flowers white

prostrate, flowers white.

flowers yellow

forming dense cushions.

flower white

July 18 - ridge above Paka Cave,  
s. slope Mt. Kinabalu

in dense mossy scrub,  
largely *Leptospermum recurvum*

44045 *Rhododendron ericoides* Loos  
very common generally

2 46 *Polyosma*  
common

1 47 *Coprosma*  
common

~~48 *Saprosma*  
on open rockplate~~

2 48 *Phyllocladus*  
common

1 49 *Polyosma*  
common

5 50 *Ilex*  
occasional

2 51 *Rhododendron busifolium* <sup>Low</sup> ~~near~~ <sup>at</sup> ~~rocks~~  
var. *robustum*  
common

1 52 *Eugenia ampullaria* Stapf  
local

3 53 *Carex verticillata* Zoll. & Mor.  
on rocks

1 54 ~~to~~ *Belvisia*  
on rocks

1 55 *Lycopodium*  
on rocks

1 56  
2 56a *Carex* <sup>in muddy spot</sup> between large rocks  
July 18 - above Paka Cave  
s. slope <sup>mt</sup> Kinabalu  
in mossy scrub

1 57 *Ilex revoluta* Stapf  
occasional

10200-

11000'

3100-3350 m

small shrub, up to 1 m. tall,  
flowers vermillion.

shrub 1 m. tall. ripe  
fruit black.

depressed shrub

shrub, flowers dull purple

shrub 4 m. tall

shrub 2 m. tall,  
flowers crimson

shrub ~~1.5~~ 1.9 m. tall

44053a *Carex perakensis* var. <sup>borneensis (P.B.S.P.) Nees</sup> ~~perakensis~~

44053b *Carex filicina* Nees

shrub

10000'

3050 m

strictly erect shrub  
flowers white.

- 44058 *Coprosma*  
common
- 2 59 *Hedyotis macrostachya*  
occasional
- 5 60 *Coprosma*  
common
- 1 61 *Myrica borneensis*  
very local
- 4 62 *Phyllocladus*  
common
- 2 63 *Monostachya*  
in open boggy spot
- 1 64 *Eriocaulon acaule*  
common in boggy spot
- 1 65 *Rapenophora*  
rare in ~~the~~ open boggy spot
- 1 66 *Calymmodon*  
on tree trunk
- 1 67 *Centrolepis*  
in open boggy spot
- 4 68 *Schoenus*  
common in open boggy  
places and rock crevices
- 2 69 *Poa*  
common in open boggy places
- 2 70 *Styphelia suaveolens*  
in open boggy place
- 3 71 *Daphniphyllum borneense*
- July 18 - ravine about  
Palsa Cave, N. slope Mt Kinabalu  
on steep rock slope with local  
low scrub
- 1 72 *Coprosma*  
common

sprawling shrub

shrub 0.5 m. tall, flowers  
white, hairy within.

shrub 1.5 m. tall

shrub 2 m. tall

forming <sup>small</sup> cushions

forming small cushions

depressed shrub,  
flowers white

shrub, fruit immature.

9  
10000 - 3050 -  
3500 3200 m

depressed shrub

- 44073 *Carex capillacea*  
in rock crevices
- 2 74 *Lycopodium clavatum* L.  
local in scrub
- 1 75 *Lycopodium*  
local in scrub
- 2 76 *Leptospermum recurvatum*  
dominant in scrub
- 1 77 *Coprosma*  
occasional in scrub
- 1 78 *Coprosma*  
occasional in scrub
- 1 79 *Lycopodium*  
rare in scrub

July 18 - above ravine  
on ~~the steep rock slope~~  
on south slope of  
Mt. Kinabalu  
~~is on~~ on ~~steep~~ granite  
slope

- 2 80 *Schoenus*  
very common in crevices
- 1 81 *Anthoxanthum*?  
occasional in boggy spots
- 1 82 ~~Daphniphyllum~~ *Drapetes*  
rare in boggy spot
- 2 83 *Pilea*  
rare in wet crevices
- 2 84 *Carex*  
very common in crevices
- 1 85 *Leptospermum recurvatum*  
abundant in crevices
- 1 86 *Leptospermum recurvatum*  
abundant in crevices

tufted

creeping and scrambling

creeping

shrub (in talc), flowers  
white.

depressed shrub

depressed shrub

11500 -

12500'

3500 - 3800 m

flowers white.

prostrate

small tufts

dwarf shrub (green form)

dwarf shrub (with sericeous  
hairs)

1963 Borneo - north Borneo

- 44087 *Scirpus*  
common locally in boggy spots
- 1 88 *Euphorasia*  
very common in crevices
- same - in ravine
- 5 89 *Hedyotis gibbica*  
common on rock slopes
- 1 90 *Coprosma*  
occasional in rock crevice
- July 18 - summit area  
of Mt. Kinabalu  
on bare granite slopes
- 2 91 *Anthoxanthum*?  
in boggy crevices
- 1 92 *Potentilla*  
rare in boggy crevices
- 2 92a *Styphelia swaveolens*  
common in crevice
- 2 93 *Coprosma*  
common in crevices
- 1 94 *Gentiana lycopodioides*  
rare in boggy crevices
- 3 95 *Coprosma*  
common in crevices
- 6 96 *Drapetes*  
locally common in boggy
- 1 97 *Deschampsia flexuosa*? Trin.  
in rock crevice
- 1 98 *Coprosma*  
common in crevices
- 1 99 *Schoenus*  
common in boggy crevices

caespitose

flowers white within

11000'  
3350 mshrub 0.3 - 0.4 m tall,  
flowers white, hairy within13000' - 3960 - 4090 m  
13450'depressed shrub,  
flowers white,  
depressed shrub

prostrate,

depressed shrub, fruit  
orange red, ~~p~~ fleshy.  
flowers white.

spots

depressed shrub.

- 44100  
1  
3 01  
1 02  
2 03  
2 04  
4 05  
3 06  
4 07  
5 08  
1 09  
1 10  
1 11
- Coprosma*  
common in crevices
- Lycopodium*  
very local in shelter of boulders
- Coprosma*  
common in crevice
- Poa*  
~~rare~~ in boggy crevices
- Coprosma*  
common in crevices
- Deschampsia flexuosa*?  
local in boggy crevice
- Coprosma*  
common in crevice
- Monostachya*  
very common in boggy crevice
- Centrolepis*  
common in boggy crevices
- Lycopodium selago* L.  
occasional in crevices
- Eriocaulon acaule*  
~~at~~ occasional in boggy crevices
- Oreobolus*  
common in boggy crevices

July 19 - south ridge  
of Mt. Kinabalu below  
Kamburango  
in montane rain forest

- 1 12  
1 13
- Racemobambos*  
common
- Polyosma*  
4

depressed shrub

depressed shrub

depressed shrub

tufted

forming dense cushions.

forming small cushions

forming small cushions.

6800'

2070 m

"

climbing, habit of *Chusquea*  
small tree, 7-4 m. tall,  
sterile

- 44114 Hymenophyllum  
common on tree trunks
- 4  
with  
P.R. 15 Hoya  
rare on tree trunks
- same - in deep wet ravine  
near waterfall
- 5 16 Riccardia  
on decaying twigs
- 3 17 Asplenium  
common
- 3 18 Trichomanes  
common, terrestrial
- 5 19 Hymenophyllum  
common on wet soil slope
- 1 20 Calymmodon  
on small tree trunks
- 4 21 Trichomanes?  
common, terrestrial
- 1 22 Grammitis  
rare, on rock
- same - on steep wet slope  
at base of cliff, in open montane  
rain forest
- 2 23 Sphenomeris  
rare
- 1 24 Galium  
on bare wet cliff
- 4 25 Hydrocotyle cf. javanicum Thunb.  
common
- 7 26 Pratia

6800'  
2070 m

fleshy leaves; pale orange  
flowers.

6000'  
1830 m

fronds erect.

5800'  
1770 m

fronds erect

prostrate

scrambling herb, stems  
1-2 m. long; corolla white, pinkish  
within, split to base dorsally, fruit  
immature.



44127

Hoya

~~is~~ rare on tree trunk

same - in tall montane

7

28

~~Dioscorea~~ <sup>rain forest</sup> ~~carpus~~ <sup>imbricatus</sup> (Blume) de Laub. var. <sup>patulenta</sup>  
~~ostocarpus~~ <sup>imbricatus</sup> <sup>de Laub. cited by de</sup> <sup>Laubenfels, 1982.</sup>

common

1

29

Dioscorea

1

30

Calyptranthes

on tree trunk

3

31

Hymenocallis

on tree trunk

1

31a

Grammitis

on rock base

July 19 - near junction  
of Kinabalu Road below  
Tenompok Pass

1

32

Hypericum

wet roadside

2

33

~~is~~ Tarenia

wet roadside

July 19  
Kundasang

1

34 Jomvillea

rare in valley in wet, <sup>secondary</sup> forest

1

34 (gerani)

Agave sp.

rare, ~~is~~ creeping on ground  
and climbing on tree trunks.

5

35

~~is~~ <sup>Bombac.</sup> ~~Coelostegia borneensis~~ ~~Elaeagnus~~

in montane rain forest

4

36

Sphenomeris chusana (L.) Copel

on sunny earthy bank

~~is~~ leaves fleshy,  
flowers <sup>bud</sup> pale orange

5000' 1525 m

Tree 15 m. tall

tree 15 m. tall, fruit orange

prostrate; flowers purple;  
plant purplish.

4300 ft 1300 m

cane 1 m. tall.

creeping  
corolla scarlet, stamens & style  
purple.

tree 30-4 m. tall, fruit  
spiny, dehiscent, seeds with  
small aril at one end.

1969 Borneo - north Borneo

July 20 - Sorsopodan, about  
Kundasang, lower <sup>south</sup> slopes of  
mt. Kinabalu

in tall secondary forest

#44137

(balanoph.)

! 38

parasitic on roots of Macaranga sp.

! 39

Cephaelis

5000'

1525 m

bright crimson

fruit blue

July 21 - airstrip Jesselton - Kuching  
 Folkebergs Friendedrif left side.

3:48

Mangroves just south  
 of Jesselton on loop of river  
~~is~~ are tall open Avicennia  
 with dense understory  
 of Rhizophora (?)

3:51

Small billy islands  
 partly wooded partly  
 in coconut plantation

3:52

Many fires inland.  
 Beyond a small point  
 which is a range of hills  
 protruding into sea is  
 a flat area with some Myrsine  
 and mangrove back of  
 series of parallel beach  
 ridges, but mostly cult.  
 largely wet rice.

3:54

A series of southward  
 pointing sand-spits at  
 intervals along beach.

Country very smoky from  
 fires inland. Sandy beach  
 scarcely interrupted for  
 many miles.

3:58

Course cuts across a  
 large semicircular bay.  
 Some cultivation, some  
 forest

3:59

Rivers along this coast  
 tend to parallel coast just  
 back of beach, for several  
 miles to south before emptying

into sea.

4:00

Great peat swamp, showing  
 very distinctly the zonation  
 described by Anderson.

4:01

Grassy plain, partly  
 marshy, partly cultivated  
 esp. along streams, then.

4:02

A large meandering river  
 with gallery forest, also  
 along tributaries, traverses  
 this plain more or less along  
 course. Reddish, large trees

4:04

along some small tributaries  
 a patch of forest. Then  
 another meandering stream,  
 and between it and sea  
 an enormous swamp,

4:06

mostly fine textured, with  
 estuaries forming a network,  
 finer and finer subdivisions.  
 An area just back of beach  
 has been burned (perhaps  
 logged first).

4:08

Left coast to cross enormous  
 bay. Bay has a curious dark green color.  
 Huge river in distance  
 carrying much silt into sea.

4:10

Approaching island spit  
 a rather irregular boundary  
 between dark green and light  
 milky green, then brownish  
 silty water.

4:11

A long north pointing spit  
 has Casuarina and ~~persea~~

grass in parallel bands at base. An island inside it has distant wooded the rest parallel band of scrub & grass(?) with strip of wood around coast.

4:14 Mosaic of wooded hills flat sand with open forest, cleared patches of grass on flat ground. Then farmland now woods. In middle distance wooded low karst-like hills. Patches of grayish trees and a matrix of secondary scrub, more cultivation and patches of tall grass as we approach Brunei airport.

4:17 Rubber plantation around airport. landed Brunei.

4:45 Took off.

Now intricate little karst-like hills, with shifting agriculture and bits of primary forest.

4:47 Across main road is flat country, much of it cleared, apparently sandy. Stream with wide gallery forest. A large meandering river in distance.

4:49 Series of parallel ridges with woods - some rather good forest in places. Secondary thicket and clearings between

4:50 them. Course roughly follows

road for a distance, then road goes to left gradually. Some areas of grass, then good forest, probably peat swamp but phase 1 with a mixture of trees.

4:52 A couple of small hills have secondary thicket. A small closely meandering river, muddy. Some very black small streams.

4:53 Mosaic of grass and patches of forest.

4:54 A muddy lake in distance, drained by meandering stream with sand beaches on meander.

4:55 Complicated small hilly country with pine mixed forest, considerable extent. Shifting agriculture in distance.

4:56 apparently small swamp areas between hills.

4:57 larger and larger swamp areas, with a <sup>red</sup> muddy river meandering through them.

4:58 An enormous peat swamp area, almost all *Shorea albida*. A green strip of ~~swamp~~ low growth along meandering reddish river.

solid stands of *Shorea albida* with complete canopy except

- for numerous holes that may have been from lightning strikes scattered through them.
- 5:02 Spectacular patch, possibly killed by caterpillars, in this. Ox bows of black water.
- 5:03 Crossed large muddy river. Then more striking peat swamp with patches of caterpillar attack, also an enormous blow-down area, with a radiating pattern of streams running out to west. Good vegetation in swamp. A very long sinuous area parallel with course with low vegetation.
- 5:05 In distance an area of hills with terrific erosion scars.
- 5:06 Sharply dissected mass of hills with numerous land-slides. This continues along course - wooded except for landslides. Shifting agriculture beyond it. Beyond this several large swamp areas.
- 5:09 Hills end in rather irregular forest, then much shifting agriculture, dominating landscape except for certain apparently swampy spots which still have good forest. Communication here seems to be principally by a meandering

- river.
- 5:13 A wrinkled-looking area of small hills, mostly in shifting agriculture, then a part in good mixed forest.
- 5:14 Country an enormous mosaic of patches of shifting agriculture and of forest.
- 5:15 A small much meandering river of black water reaches the coast through a sandy flat with a parallel structure as though it were a series of beach ridges. Along coast this parallel structure is evident in forest back for a little distance from beach. Great undisturbed forested area for some distance back from beach. Shifting agriculture in distance. This forest stretches a long way along coast - must be peat swamp, because of uniformity of crown and blackness of streams.
- 5:19 Meandering small black river, muddy for some distance back of mouth. More extensive forest, but with a small cleared patch far inside it.

5:20 A series of southward pointing  
cusps or hooks in coast,  
Forest continues, except for  
5:22 a patch of shifting agriculture  
extending inland along a  
very small river.

Curious black margined  
reefs here and there interrupting  
beaches.

Forest extends with scarcely  
an interruption, for  
many miles. Looks slightly  
hilly back from beach, but  
now course is so far out to  
sea that it is hard to see  
clearly - also some haze.

5:25 More hooked cusps, but slightly  
irregular. Hills clearer here.

This entire coast is lined  
with a sandy beach, and  
almost no <sup>coral</sup> reefs except  
the curious tiny ones mentioned  
above. No apparent explanation.

5:30 Sizeable estuary, some shifting  
agriculture.

Visibility very poor, as we  
are far out to sea.

5:36 Approached coast again.

8 Vast forests with light colored  
emergents.

5:37 Large estuary.

5:38 Small streams pouring  
black water into sea, so  
there must be peat swamps.

Enormous areas with no  
sign of disturbance.

5:40 Considerable area of clearing  
with a few scraps of wood  
left. More and more forest  
as we go on, locally mostly  
clear. Becoming mostly

5:42 forest with only a few  
irregular strips of clearing,  
then none at all for a little way.

5:43 Then an intricately meandering  
river with a belt of clearing,  
especially on west side. Or lower,  
black ponds. Probably this  
forest may be swamp and  
the strip of clearing may  
be natural levee land.

5:45 Much shifting agriculture  
in distance, forest along course.

5:46 Another very meandering  
river and band of clearing.

Extremes of meanders touch  
uncleared forest. ~~River~~  
~~spreads~~ Upstream the  
clearing spreads out  
fan wise into distance.

Along course is undoubtedly  
peat swamp of *Phorea albida*.  
Many lightning holes  
and two fan-like blow-down  
patterns. Very black streams.

5:50 A very large river with a  
strip of clearing along ~~to~~ each  
side and one fairly large cleared

- 5:51 block in a bend; another, also in a bend. This seems to be a distributary from ~~enormous river~~ ~~enormous river~~. Large blocks of cultivation in angles with main river.
- 5:53 Town with small airstrip at junction of distributary with main river.
- 5:54 ~~Following~~ ~~main river~~. More large distributaries and some small tributaries (on other side), actually forming a network. Along each is a band of cleared land with gallery forest along small streamlets entering these at right angles.
- 5:56 clouds - great cumulus towering several miles above plain.
- 5:57 More of same stream network large river. but visibility very bad.
- 6:00 Stream network, with occasional huge estuaries, again.
- 6:01 Crossed coast. Some mangrove at mouths of estuaries - some of them only. Mangroves sparse rather straight coast with sandy beach. Mostly forest, some clearing back from coast. Course getting far from coast.
- 6:02

- 6:04 Great meandering rivers in distance. Shifting agriculture along them. ~~a~~ ~~number~~ of fires burning.
- 6:05 Visibility very poor. Crossing a very large bay, too far from land to make out detail except for smoke from fires.
- 6:15 Crossed coast again. A wide belt of mangrove with open *Avicennia* and closed lower story. Then extensive coconut plantations, then Lungei Sarawak with enormous meanders. Much of interior of tongue between meanders is cleared and planted to coconuts, etc. Enormous mangrove swamp on west side, cut by distributaries from river and by smaller rivers. Great areas of it are Nipa. Some clearing away from rivers.
- 6:19 Huge area of Nipa along Lungei Sarawak. Tiny streams meander through it. Nipa is several times as wide as river on each side. *Heritiera globosa* stands out with golden crowns near river.
- 6:21 landed at Kuching.

July 21 - air trip ~~to~~ Kuching - Singapore (same plane and seat)

7:47 took off from Kuching.

Shifting agriculture very general - many fires burning, making a bad haze.

Heritiera globosa common in mangroves close to rivers and small streams.

Kuching is quite spread out and open. New construction marked by bare areas of white soil.

7:51 Solid rubber plantations, blocks of different ages stand out.

7:52 Some peat swamps - black water streams.

7:54 Thick clouds. A few holes show forest and black streams. Then some forest on white sand, but visibility almost nil.

7:56 Holes in clouds - swamps with complicated tidal channels, visibility too poor to be sure if peat swamp or mangrove, prob. peat.

6:58 Vast unbroken forest, apparently peat swamp. Then some slight relief, probably mixed dipterocarp forest.

7:00 A small area of shifting agriculture several others in distance ahead.

7:01 Meandering small river with large areas of shifting agr.

7:02-03 alternating narrow bands of shifting agriculture and broad areas of forest.

7:06 clouds

7:12 Great networks of estuaries, but visibility too poor to see vegetation.

7:15 Crossed coastlines. Obvious parallel beach ridge patterns but details obscure. Sea looks muddy.



1963 Singapore

July 22 - Singapore

West end "almost uninhabited"  
acc. Burhill.*Cordia cylindrostachya*Flight Singapore to Hongkong  
in Comet - 4 left side  
over wing.

5:27 am Takeoff

patches of rubber and coconut  
plantation near airport.  
also prawn ponds along  
Strait of Johore. Some  
mangrove swamps on Johore  
side of Strait.Visibility immediately  
impossible because of sun  
shining on wing.

1963 Hong Kong

July 24 - Hong Kong Island

Mountains generally deforested, but green, with thin low scrub and grass, on lower slopes thickets of *Leucaena*, etc. Many trees around houses, mostly introduced. Pines planted but not doing well. Cultivated patches wherever sufficient soil.

Aberdeen side - dense pine plantations on slope, but only a few feet high. Photos (back) of fishing boats. Upper slope are of bare rock.

Photos of harbor + floating restaurants.

On upper road many slopes covered by *Pennisetum purpureum* for cattle fodder.

On the Peak, exposed slopes are rather grassy, rock cliffs bare. more sheltered slope have tall <sup>closed</sup> scrub or scrub forest. *Pinus massoniana* common said to be native.

Upper slopes of Mt. Parker are grassy.

Hong Kong

Plants seen

*Aleurites moluccana*  
*Lantana camara*  
*Pennisetum purpureum*  
*Leucaena glauca*  
*Hibiscus rosa-sinensis*  
*Delonix regia*  
*Panicum maximum*  
*Lantana camara*  
*Erythrina variegata*  
*Ipomoea cairica*  
*Plumeria rubra*  
*Eleusine indica*  
*Cyperus rotundus*  
*Canna papaya*  
*Chevillea robusta*  
*Gerbera jamesonii*  
~~*Merremia*~~ *tuberosa*  
*Solanum rigum*  
*Ficus elastica*  
*Mussaenda erythrophylla*  
*M. dona-anna*  
*Caladium bicolor*  
*Solanum pseudocapsicum*  
*Monstera deliciosa*  
*Zinnia elegans*  
*Portulaca oleracea*  
*Euphorbia hirta*  
*Cassipoua filiformis*  
*Ficus microphylla*  
*Catharanthus roseus*  
*Thevetia peruviana*  
*Beloperone guttata*  
*Asparagus sprengeri*

1963

Hong Kong

*Hymenocallis littoralis*  
*Jomplena globosa*  
*Tricholaena rosea*  
*Sterculia lanceolata*  
*Cyperus circinalis*  
*Casuarina equisetifolia*  
*Leivostoma chinensis*  
*Cynodon dactylon*  
*Neivium indicum*  
*Coleus scutellarioides*  
*Altemandra cathartica*  
     var. *hendersonii*  
*Cordia alliodora*  
*Phoenix roebelinii*  
*Antigonon leptopus*

July 24

Air trip - Hong Kong - Tokyo at side  
of Pan Am. Clipper.

The New Territory - lower  
slopes badly scarred  
by erosion and quarrying.

Upper slopes mostly  
grassy.

At this season these slopes  
are green, even

The coast of China north  
of Hong Kong is very intricate,  
with linear ranges protruding  
as capes into the China Sea, with  
some of them breaking into  
islands. Reddish-tawny beaches,  
very wide, extend in shallow

Hong Kong

crescents between these capes.  
 There are lagoons and  
 estuaries or large inlets  
 back of some of these  
 beaches. Several are bar  
 beaches connecting islands  
 to mainland. Too far  
 away to make <sup>out</sup> much detail.  
 W/ clouds.

July 24 - Niihau from air  
 South end flat, green,  
 hiawe forest? West part  
 of ~~south~~ north half of  
 south half has some  
 completely bare areas.  
 North end also hiawe  
 forest. Clouds piled up  
 over cliffs on east side  
 of north half and trailing  
 out down west slope.

Oahu - there still seem to  
 be some areas of the hiawe  
 forest on the Ewa local plain  
 intact - can be reached via  
 plantation roads, s. of Kanihuli.

July 26 - Cull Canyon,  
back of Castro Valley  
Dry hills, stream  
dammed up to form a  
small lake for swimming  
and boating. An East Bay  
Regional Park.

On the hill west of the  
lake is an old orchard.  
Toward the head of it  
and up a small side  
canyon are large  
*Eucalyptus globulus*,  
and along the west side  
of the canyon of the lake  
itself are *Quercus*  
*aquifolia*. The hills  
are covered with thin  
dry grass and a few  
weeds. On one area,  
west of the lake, is a  
poor-looking plantation  
of small pines. Along the  
lake *Matricaria matricari-*  
*oides*, *M. maritima*,  
*Picris echioides*, etc.

Along small trickle of  
water in side canyon  
are quite a number of  
plants, all with possible  
exception of <sup>*Cyrtium* sp.</sup> *Cyperus* sp. and  
*Eleocharis* sp. are Mediter-  
ranean weeds, as are all  
the other plants seen, except

a few straggling plants of  
*Baccharis pilularis* and the  
live oaks, also a few small  
unhealthy *Umbellularia*.  
The green plants, except  
the latter three, ~~and~~ and  
the pines, eucalypts, and  
orchard trees, are either  
weedy composites or  
are along the trickle of water.  
The surface of bare  
ground, where undisturbed,  
has, in places, a white  
efflorescence - probably  
quite alkaline.

The bottom of the lake  
margin is very muddy,  
black when stirred up.

Should be possible to  
establish a sod of  
*Eleocharis* or something  
of the sort, to keep the  
mud fixed. The margins,  
themselves, could be  
covered by *Lippia nodiflora*.

July 30 Rio Piedras

Cultivated plants seen:

*Scaevola purpurascens**Zamia* sp.*Pedilanthus tithymaloides**Polyscias* sp. (ends of leaflets  
trinate, terminal leaflet  
may be divided almost  
to base.)*Dracaena fragrans**Polyscias ficifolia**P. tricochleata**Alpinia purpurata**Jatropha* (large fld., leaves  
very diverse)*Catharanthus roseus**Ixora* (lvs. sessile, oblong-  
obovate, acute, base  
subcordate, corolla lobes  
acute)*Jasminum multiflorum**Peperomia obtusifolia**Dioscorea picta**Cochlearium variegatum**Cladium bicolor**Ruta graveolens**Phyllodendron bipinnatifidum*

(Red fld., anthers)

*Coleus scutellarioides**Portulaca* sp. (sterile, double  
fls. 1.5 cm, across, yellow,  
lvs flat oblong, appressed)*Tabernaemontana coronata**Ixora* cf. *chinensis* (rose pink fl.,  
large panicle)

## Weeds

*Vernonia cinerea**Pilea microphylla**Euphorbia prostrata**Euphorbia* cf. *glomerifera**Eleusine indica**Euphorbia heterophylla**Phoenix* cf. *dactylifera**Phoenix roebelinii**Acalypha wilkesiana**Cocos nucifera**Hymenocallis combraria**Cassia fistula**Saintpaulia (ordinaria)**Anthurium (ordinarium)*cult. *Sandwajia nobilis**Plumbago auriculata**Ficus "mandurata"**Psidium guajava**Persea americana**Chrysobalanus icaco**Manihot esculenta**Musa sapientum**Saccharum* sp.*Bixa orellana**Chrysophyllum cainito**Graptophyllum pectum**Ficus elastica (variegated)**Polyscias guilfoylei**Pelargonium zonale**Stenotaphrum secundatum**Wedelia trilobata*

all typed  
44140

July 30 - Rio Piedras  
Phyllanthus  
weed in garden

July 31 - Maricao Fish Hatchery, 17

- 1 41 Montezuma speciosissima  
in secondary scrub forest
- 2 42 Blechnum occidentale  
common on cut banks along trail.
- 2 43 Adiantum  
common on cut banks along trail.

July 31 Bosque Estatal de Maricao,  
about 6 mi. n.e. of San German  
in scrub forest on serpentine

- 2 44 Simarouba  
occasional
- 5 45 Guettarda  
occasional
- 2 46 Guettarda  
rare
- 2 47 Podocarpus  
common

Bosque Estatal de Maricao

July 31 same, about 8 mi. n.e.  
of San German  
on road cuts in deep <sup>red</sup> lateritic

- 1 48 Spermocoe  
common
- 2 49 Spermocoe  
common
- 1 50 Drymaria  
common

(to p. 88)

km n. of Maricao

510 m.

- ↓ slender tree 8 m. tall; flowers  
light brick-red.  
young leaves bright red.
- ↓ young fronds reddish.

Las Tetas de Cerro Gordo,

875 m.

- ↓ small tree 3-4 m. tall,
- small tree, flowers white
- ~~small~~ large shrub,  
flowers whitish.
- small tree, 4 m. tall,  
(others to 3 m.); receptacle of  
ripe fruit swollen, fleshy,  
dark red; fruit darker red.

800 m.

↓  
soil

- leaf veins prominent beneath,  
deeply impressed above. flowers white.
- leaf veins not especially  
prominent nor impressed. flowers white.
- diffuse plant; ripe pedicels  
fleshy, glutinous, caducous

July 31 - San German area.

Cult. species

*Aura crepitans*~~Lagerflora~~ *Honaea fistulosa**Antocarpus altalis**Albizia lebbek**Peltophorum* ~~laevigatum~~ *laevigatum**Delonix regia**Tricholena rosea**Mangifera indica**Cassia grandis**Roystonia regia**Clerodendron thomsonae**Euphorbia pulcherrima**Beloperone guttata**Nerium indicum**Nerium oleander**Caesalpinia speciosa**Antigonon leptopus*

weeds

*Digitaria insulari**Paspalum fimbriatum**Pennisetum purpureum**Eugenia jambos**Commelina diffusa**Momordica charantia**Greynia soredi**Chloris inflata**Gomphrena* (same as *gravel*)*Trinnesia martinicensis**Ruellia longifolia**Trianthema portulacastrum**Echinochloa colona*

Serpentine area

*Glinicidia sepium**Coniocladium dodonae*

(poisonous anacard.)

*Psidium guajava**Byrsorhiza cuneifolia**Petitia dominguenis**Cardia* sp.

forms a scrub,

partly opened up by  
grazing, where not  
grazed, continuous, in  
ravines ~~also~~ approaches  
scrub forest.The *Petitia* heavily infested  
with a branch parasite.*Tillandsia recurvata* is  
abundant on all trees.*Patropia garrykifolia**Hibiscus tiliaceus* n.*Leucaena leucocephala* n.*Andropogon glomeratus**Waltheria inaequalis*

1963 Puerto Rico

Laterite or laterol on  
hill on serpentine.

Blanketed with two  
species of Gleichenia,  
one of linearis. with  
scattered Calophyllum  
antillanum shrubs  
and Eucalyptus trees.

Pinnis ground -

scrub forest - very mixed  
Chrysophyllum, Podocarpus,  
Cordia, ~~Cordia~~ Clusia,  
Tabebuia, Plumeria alba,  
Conocladium glabrum, Trema  
lamarckiana, Guarea,  
Piptadenia, Citharexylum  
fruticosum, ~~Cordia~~  
Bidens leucantha  
Pithecairnia  
Acchmea

From tower - west the hills  
are mostly serpentine and  
scrub-covered. Eastward  
a very considerable area of  
mountains, mostly wooded  
with low montane rain  
forest, some clearing, more  
in distance. In this forest  
a few trees are bare.

Other side of ridge -  
deep red soil

Elephantopus nudiflorus  
Sauraueria sp.  
Paspalum conjugatum  
Sida rhombifolia  
Sida acuta



Maraca Fish Hatchery  
many things planted  
as ornamentals

*Monstera deliciosa*  
*Allamanda cath. Hendersonii*  
*Chrysalidocarpus lutescens*  
*Montezuma speciosissima*  
*Clerodendrum speciosissimum*  
*Duranta repens*  
*Tithonia diversifolia*  
*Terminalia catappa*  
*Rubus rosaeifolius*  
*Lantana camara*  
*Zehneria pendula*  
*Cordyline puticosa*  
*Colocasia esculenta*  
*Coffea arabica*  
*Bambusa arundinacea* (only)  
*Casuarina equisetifolia*

*Clerodendrum fragrans*

*Bahia forficata* - e. of  
Parquera. The bay, itself  
is surrounded by a narrow  
mangrove fringe. Also some  
mangrove cays in front. The  
capes to the west has a rather  
steep rocky shore. A string  
of summer cottages being gradually  
extended from Parquera, but has  
not reached the bay. The bottom

Aug. 1 - south of San German,  
on way to granico

~~The Hills~~

*Phlebotania cowellii*  
very rare Polygalae.

*Parthenium hysterophorum*  
*Prosopis cf. pallida*  
*Albizia lebbek*  
*Carica papaya*

Hills with open  
microphyllous forest of  
savanna. sparse on lower  
slopes. locally closed on hills.

*Banana*, *Prosopis*, *Bucida*  
etc. *Euphorbia antiquorum*  
hedges. *Crescentia cujete*  
on limestone. On these  
limestone hills closed  
scrub with many vine,  
locally open scrub forest.

Head of valley - open  
forest to savanna of *Prosopis*.

Epiphytic *Tillandsia*  
*cf. recurvata* common in all  
of these forests.

*Argemone mexicana*

*Thespesia populnea*

is with grass. Fish population  
large. *Thespesia* fluorescence spectacular  
even on bright moonlit night.  
Probably dependent on delicate ecol. balance.

1963 Puerto Rico

July 31 - 8 km. n. of Sabana Grande, n.e. of San Germán, in open <sup>thin</sup> serpentine soil

- 44151 Spermocoe  
1 common on steep exposure
- 3 52 Spermocoe  
common on flat or sloping ground
- 1 53 Diodia  
occasional on flat or sloping ground

same - on deep red soil on serpentine

- 3 54 Lycopodium  
common in ~~open~~ tangle of Gleichenia
- 2 55 Emilia sonchifolia  
common on roadside

Aug 1 - San Germán Interamerican University Arboretum

- 3 56 Olyra (said to be Anthrostyidium)  
local

Aug. 1 - hill just east of Guánica, on south coast.

- 2 57 Pisonia albida  
rare tree in serotrophic scrub forest

Aug. 1 - beyond Playa de Caña Gorda, 3 km. s.e. of Guánica

- 3 58 Gossypium hirsutum L. det. Fryxell  
in open maritime scrub

(T. V. 92)

-50 m



flowers white.

flowers white.

flowers very pale lavender or whitish.

flowers purple, only slightly exserted.

90 m.

canes 1-2 m. long, mottled with purple when young, from a root crown.

100 m.

small tree, 15 cm. dbh, 5 m. tall, abundant fruits on ground beneath, large leaves from sprouts.

shrub 1 m. tall, branches rather erect.

Guánica forest - just east of Guánica  
 Large areas on coastal hills covered by a scrub forest - closed, microphyllous, semi-deciduous to deciduous forest somewhat thorny, some cactus species, several thorny legumes, *Conocladium dodonaea*, *Bursera simaruba* common. *Pisonia albida* rare. *Tillandsia recurvata* very common on some species. Spacing 1-2m, ht. ? 5m.

W. photo  
 E. & W.  
 end road.

At Guánica, a broad bar salt flat back of a narrow mangrove belt.

East along coast - or semi-open xerophytic scrub to scrub forest - an arborescent *Opuntia* locally common. Mangroves around a small bay. Rocky bluffs with sparse scrub.

The plain bet. San German + Mayaguez is flat, mostly in sugar cane, with a few ditches and streams. *Bambusa* sp. (*vulgaris*?) is very prominent in the landscape, forming graceful clumps, rows, lining streams, etc.

March back of Mayaguez with *Typha*, *Cyperus*, etc.

Mayaguez: ornamentals:

*Ruellia equisetiformis*  
*Lantana camara*  
*Rhaphidophora aurea*  
~~*Paulownia*~~  
 lf. shallowly emarg. broad, fl. red 3 stamens.

*Posoquenia latifolia*

*Veitchia merilliana*  
*Petrea (shrub)*  
*Inna (indian)*

*Ficus pumila*  
*Ficus microcarpa*  
*Cordyline quinensis*  
*Zea mays*  
*Mussaenda erythrophylla*  
*Mussaenda cf. sericea*  
*Rhoeo spathacea*

weeds:

*Malvastrum coromandelianum*  
*Tridax procumbens*  
*Euphorbia hirta*  
*Vernonia cinerea*  
*Cyperus rotundus*

1943 Puerto Rico

Aug. 1 - Mayaguez,  
University campus  
cultivated as an ornamental

44159 *Mussaenda*  
3

1 60 *Hibiscus* ~~laticus~~

1 61 *Posoqueria latifolia*

Aug. 4 - ~~5 m. s.w. of Caguas~~

~~62 *Hibiscus*~~  
common on weedy area

Aug. 4 - <sup>1 km. n. of Las Cruces</sup>  
~~5 m. s.w.~~ <sup>8.5 km.</sup> s.w. of Caguas

2 62 *Spermocoe*  
common on weedy roadside  
on clay soil.

Aug. 4 - n.w. of Punta Cubano  
east of Vega Alta

2 63 *Spermocoe*  
common on grassy roadside  
on limestone soil

2 64 *Randia*  
common <sup>in scrub</sup> on lower slopes of  
limestone "mogote" or hill.

2 65 *Chiococca racemosa*  
common in scrub on lower  
slopes of limestone "mogote" or hill.

40 m.  
~~40 m.~~



shrub 2.5 m. tall,  
enlarged calyx lobe white;  
fruit immature.

8 m. tree with erect trunk,  
flowers brick red (lying on  
ground).

tree 6-7 m. tall, abundantly  
flowering, buds zygomorphic  
flowers in rather fan-shaped  
downward directed spray,  
collars white, not ~~apoclytic~~  
zygomorphic when open.

450 m.

erect; flowers white.

70 m.

75 m

shrub; flowers white;  
fruit immature.

75 m

semi-scandent shrub;  
fruit white, fleshy.

Aug. 2 - trip by auto  
 Mayaguez to Rio Piedra -  
 Plain north of Mayaguez  
 in sugar cane - many fields  
 submerged by rain. Rio Casci  
 red and thick with mud.

Cerro La Ladena - largely  
 denuded, grassy with scattered  
 trees, patches of wood or scrub  
 esp. in ravines + valleys.

These hills are bedded, shaly.  
 The forest is a mixture  
 of Cecropia, Artocarpus, Mangifera,  
 Roptonea, Ochroma, Bambusa -  
 some coffee plantation. Musa.

Limestone hills around + e. of  
 Victoria are generally scrub-  
 covered - well developed karst  
 Leucaena is an important component.  
 Some seem to have less  
 disturbed vegetation, scrub forest.

The limestone seems to  
 be a rather argillaceous  
 type, yellowish, earthy.

Then a rolling semi-open  
 area. Commonest trees are  
 Artocarpus altilis + Mangifera.  
 Cassia spectabilis, Delonix,  
 (Bet. Corralis + Mora.)

Roads generally lined by trees.  
 Pasture, cane, maize, some bananas,  
 papayas.

*Quisqualis indica*

Before Guajataca beach,  
 a gorge through limestone.  
 Then a good view  
 westward from point  
 where there is a shelter  
 and picnic tables.

Vegetation being cleared  
 by park dept.

East of this a largely  
 cleared rolling area.  
 Some low limestone hills.

To right a large area  
 of karst hills + mogotes,  
 closer and closer to road.  
 but also lower and more  
 rounded. Road follows a  
 rolling terrace, cleared, mostly  
 with very thin soil, in poor  
 pasture.

Alcantarilla

*Gynerium* local along streams.  
*Delonix* very common along  
 road. Also *Albizia lebbekii*,  
*Lamanea* more rare. *Thespesia*,  
*Terminalia catappa*. *Cocos*.

Beyond Arecibo, to right in  
 distance a very impressive  
 karst. Large flat area of  
 cane plantation this side of  
 the hills. River smaller + muddy.  
 Marshes with taro along it.  
*Terminalia catappa* very  
 common along roads.

Karst approaches immediately along road about opposite airport. Scrub-forest-covered. Some red soil. Lower slope of some clear. Scattered *Casuarina equisetifolia*, *Cassia spectabilis*, *C. grandis*?, *Delonix* along rd.

Road enters "Haystack Hill". Here the mogotes are more isolated with flat ground between some of them. Some rather large sink-hole valleys - pineapple fields in them. Also sugar, etc.

This terrain, with scattered mogotes, continues for some distance. Appears to be a long valley with mogotes strung along on both sides.

Then only on right, sand dunes, fully vegetated, on left Vega Baja.

Road continues with mogotes on it, sugar cane on left.

Rio Cibuco very muddy.

Then through ~~to~~ a patch of very good mogotes, into a flat valley surrounded by karst ridges.

Vega Alta.

The limestone east of Vega Alta is very argillaceous pinkish red.

Very spectacular mogote on left.

Aug. 3 - east from San Juan by road - all the lower hills are cleared and grassy - sugar cane on some of lowest, as well as on flat coastal terrace and valley bottoms.

Hedgerows & roadsides of trees. clumps of bamboo in fields.

Cap San Juan permanently grassy hills, largely built up. Coconut groves on flat places. Small mangrove swamps with *Rhizophora*, *Laguncularia* & 2 sp. of *Avicennia* in inlets, as at Boroco.

Maritime scrub of *Gossypium hirsutum*, *Leucaena*, *Indigofera*, etc. Dwarf scrub of *Borreria capitata* with *Sporobolus caprae*, *Heliotropium curassavicum*, *Stachytarpheta jamaicensis*, *Crotalaria mucronata*, *Sesuvium*, etc.

The coastal area around the east end of the island is in pasture and cane -

depending on the terrain. Cane is planted on some rather steep slopes and generally hilly ground, but not to very great altitudes.

The valley complex around Yabucoa is flat, entirely planted to cane. South of Yabucoa the road crosses the Cuadrilla de Pandura, a rugged granite range with the slopes a jumble of enormous granite boulders with here and there, sudden torrents of water rushing down between them. Would be worth a serious collecting trip.

Just east of Guayama the landscape begins to show some signs of aridity - Prosopis + other microphyllous trees - shrubs. Rapidly becomes more so.

From somewhat east of Ponce west to beyond Guayanilla, even though the general landscape is arid, there are large areas of marsh - mainly very tall Typha perhaps 3 m. or more, and locally other marsh species. Back of the marsh is cane. Some spots in the marsh are very saline. Along the

shore considerable areas are fringed by small mangrove swamps.

The beach at Ponce is lined by warehouses and other unsightly structures. At Guayanilla is a huge refinery and a chemical plant. A super-highway along this coast (under construction) is ruining most of the features of the shore. Weekend shacks take care of the rest.

Aug 4 - auto trip, Ponce - Coamo - Aibonito, Cayey-Caguas - Bayamon.

This entire route is essentially cleared. Cane occupies flat land and low hills at least almost to Coamo.

Above the cane the land is mostly in pasture with scattered trees, patches of wood in ravine, and rows of trees along roads. These vary from place to place, but Delonix is a constant component. At higher altitude, Bursera is common. Toward Caguas and on toward Bayamon Erythrina is found.

1963 Puerto Rico

Aug. 4 - beach 1.5 mi. e. of  
Punta Boca Juana  
on fine slope of low dune  
ridge above beach

- 44166 *Cabildo lanceolata*  
2 common locally  
2 67 *comp. Melanthera nivea* (L.) Small - det. H.E. Robinson, 1974  
common  
4 68 *Sporobolus*  
abundant

Aug. 5 El Yunque  
in upper montane, mossy  
forest

- 2 69 *Sauraueria erecta*  
common along trails  
1 70 *Cochlidium serculatum* (Sw.) L.E. Bishop det. Dalling 1978  
common on tree trunks  
2 71 *Lobelia*  
common along trails in openings  
1 72 *Trichomanes rigida*  
common on cut banks  
and wet cliffs.  
1 73 *Rhipidopteris peltata*  
common on tree trunks  
2 74 *Psychotria*  
occasional on tree trunks  
2 75 *Polypodium*  
locally common on tree trunks  
3 76 *Vittaria*  
locally common on tree trunks  
(To p. 106)

3 m.

fleshy, much branched;  
flowers white.

semi-prostrate,  
extensively branched,  
heads white.

erect branches from  
deeply buried rhizome.  
leaves flat, slightly  
glaucous.

900-1050 m.

↓

flowers white

herb 1.5-2 m. tall, flowers  
greenish to deep purple.

vine, leaves rather fleshy;  
infl. reddish; buds white.  
fronds curved downward



Aug. 4 - Mogotes east of Vega Alta - the vegetation varies from a dense scrub to a dense scrub forest with little herbaceous growth. One mogote that was cut by the road is white and chalky inside, of varying hardness from completely soft powder to rock that cannot be scratched with fingernail. Honeycombed with holes in which some sort of small animal lives, not seen but holes look used. (sample)

Somewhat farther east, near Puntas Cubano, another hill is cut by road - here also the material is soft, but earthy and reddish, with globs of reddish clay (sample). Many seem to be like this, and are readily demolished by steam shovels, etc.

Some palms in the vegetation on these.  
(photos)

Aug. 4 beach east of Dorado and Punta Boca Juanu. Brownish sand with considerable broken up shell fragments. A continuous low dune ridge about 3-4 m. high is back of the beach and separates it from the mangrove swamps and marshes. On the ridge is *Coccoloba*. On its front slope are *Sporobolus*, *Cabrita*, *Melanthera*, ~~etc.~~ etc. In the *Coccoloba* scrub is abundant *Caesalpinia cristata* (v) (large stipules).

### Aug. 5 - El Yunque

Wind sheared mixture of  
*Ocotea spathulata*  
*Eugenia bingquensis*  
*Halenianthus obovata*  
*Celotropium squamulosum*  
*Tabebuia rigida*

on exposed places. In protected areas the same but larger trees with *Cyrilla racemosa* + *Magnolia splendens* + *Miconia garcinifolia*. But 90% of area is

1963 Puerto Rico

completely dominated by *Euterpe globosa*, (photos) which seems to be a successional stage resulting from hurricane damage.

(Wadsworth says after a hurricane ~~is~~ fully 90% of woody plants broken or uprooted (not just limbs broken))

This damage is in localized areas - some areas as low as 30%.

Immediate result is *Rhynchospora* + *Scleria canescens* dominance

or, if seed available, *Cecropia peltata*.

Palms replace these.

They may be destroyed by landslides, also by hurricanes to some extent.

Patches of *Cecropia* scattered here and there in palm forest.

Along the ridge toward South Peak are patches of open mossy scrub in a drier type of mossy forest, and small patches of open sedge land with 3 spp. *Utricularia*, 2 spp.

of *Lycopodium* (*L. cernuum*, *L. cf. carolinianum* - same as that in Trinidad savanna) 2 or 3 spp. *Xyris*, 2 spp. *Rhynchospora*, *Elycharis* sp., *Scleria villosa*, *Isachne* sp., *Panicum paertoricensis*.

Said to be hardpan 1 ft. or more down in each of these open types - iron-pan. Soil is clay and fine sand.

Downward the palm forest gives way gradually to sclerophyll and orthophyll trees till, at 1800' or so there is a typical lower montane forest, with many epiphytes but not moss-covered as is that on ridges farther up.

This, even on ridge-top, is rather tall (up to 35 m) and with rather ~~the trees~~ large trunks, to 5 dm dbh.

Less damaged on ridge than in valley bottoms, judging by number of palms and general good condition of forest on ridges.

Very good along Big Tree Trail.

- 44177 *Peperomia quadripinata*  
occasional on tree trunks
- 1
- 2 78 *Thelypteris*  
local on cut bank above trail
- 2 79 *Blechnum fragile* (Liebm.) Morton & Killinger  
Schumannii Nees det. Killinger, 1971  
local on cut bank above road
- 2 80 *Blechnum fragile* (Liebm.) Morton & Killinger  
Schumannii Nees det. DBL 1979  
~~local~~ common on cut banks above trail
- 1 81 *Grammitis*  
rare on tree trunks
- 3 82 *Psychotria*  
common in understory
- 1 83 *Blechnum divergens* (Kunze) Mett.  
terrestrial
- 2 84 *Adenostemma* *Adenostemma verbesina* (L.) O. Kuntz - det. H. E. Robinson, 1974  
common along trail
- 3 85 *Blechnum fragile* (Liebm.) Morton & Killinger  
occasional, climbing on tree trunks.
- 1 86 *Hillia parasitica*  
common on tree trunks
- 4 87 *Psychotria*  
occasional in undergrowth
- 2 88 *Cordia glabra* *bozingerensis* Urb.  
occasional in scrubby forest on ridge
- 2 89  
between stones on road
- 1 90 *Scleria canescens*  
very abundant in undergrowth in open parts

det. Killinger, 1975

- creeping; fruiting spikes rare.
- young fronds distinctly reddish.
- young fronds not reddish.
- shrub 4 m. tall (others taller), ripe fruit black.
- det. Killinger 1971
- heads whitish, erect.
- rhizome climbing; young fronds with only the faintest suggestion of pink.
- shrubby epiphyte.
- shrub 1 m. tall foetid when broken; collar white.
- small tree; fruit green.
- forming dense mat; flowers tiny, white.
- forming low tangles; very scabrous, cuts skin.

same - in ~~same~~ open  
sclerophyll ridge-top  
forest

44191 Calyptranthes

4 common

2 92 Psychotria

occasional in edge of

1 93 Lycopodium tasifolium  
rare in edge of open  
forest, on fallen tree

1 94 Grammitis

common on tree trunks

in edge of

1 95 Blechnum

occasional

3 96 Nephrolepis Rivularis (Vahl) Mett. ex.

occasional on tree trunks

det. Sellinger, 1978

same - in small

wet open patch,

dominated by sedges

1 97 Scleria villosa

occasional

2 98 Rhynchospora cyperoides

common

3 99 Rhynchospora

common

44200 Xyris

3 locally common

1 01 Xyris

occasional

1 02 Xyris

rare

1000 m.

↓

shrub 2.5 m. tall.

shrub 1 m. tall

corollas white, fruit green.

young fronds reddish green.

fronds pendent;  
tubers none.

Krug.

1000 m.

corollas yellow

Aug. 5 - beginning of Big Tree Trail, El Yunque

44203  
6

*Psychotria ebracteata*  
locally common

MAMEYES

Aug. 5 - Rio Mameyes, 1.5 km. S. of Mameyes

3

04 *Hernandia sonora*  
very local along stream

Aug. 5 - Dorado forest, just back of beach n. w. of Dorado

1

05 *Acrostichum aureum* L. (det. Sellinger 1978)  
in fresh-water marshy place

1

06 *Mulpighia coccigera*  
common in undergrowth

900 m.

shrub 2 m. tall, corollas greenish white, campanulate lobes appendiculate; fruits immature (said to be bright blue when ripe).

200 m.

tree 8 m. tall; flowers grayish green; fruiting envelope with orifice not toothed.

1 m.

acaulescent; young fronds not at all reddish; fertile fronds fertile only distally. shrub 0.6 m. tall, petals pink.

Aug. 6 - Dorado

Coastal forest (± 75 acres)

*Calophyllum antillanum*

*Acrocomia*

*Roystonea elata*

*Sibioxylon foetidissimum*

*Bucida buceras* (deciduous)

*Diospyros ebenaster*

*Mammea americana*

*Pimenta racemosa* var. *grisea*

(understory)

*Bursera simaruba* (decid.)

*Clusia rosea*

*Nectandra caribaea* (understory)

*Manihara* ~~mitis~~ *bidantata*

This forest has had  
the shrub layer removed.

*Aerostichum danaeifolium*  
said to be freshwater  
form, fertile fronds only fertile  
above, areolation different.

*Pterocarpus swartzii*

*Pterocarpus officinalis*

*Bucida buceras* are  
the dominant.

(photos)

extensive buttresses

no herbs except ~~at~~

seedling on knees.

*Inga laurina*

*Bactris*  
very hard wood.

*Zanthoxylum*  
*martianum*

*Dryopteris alba*  
(understory)

Aug 10 - Hawksbill Mt.

A road has been built to the summit, taking off from Skyline Drive at just beyond m.p. 47.

At the top a shelter, "Byrd's Nest no. 2" has been built, surrounded by a picnic ground and with vegetation cleared between it and the cliff, along the edge of which an unsightly cable is stretched. The ground has been leveled, gravel paths and picnic tables installed, and on the extreme summit a stone enclosure has been constructed for viewing the landscape. East of this an acre or two of forest has been cleared, to assure a view in that direction. Just below the enclosure a tiny rather bedraggled patch of *Spiraea latifolia* var. *septentrionalis* still hangs on. The *Potentilla laxiflora* and *Solidago* are still common locally on the rocks. Many firs, especially on exposed open rocky areas, are dead. Young ones are common in the forest and many of the older ones in the forest are dead.

Aug 11 - Big Meadows Swamp  
Openings in the thickets of *Betula*, *Crataegus*, *Pyrus*, *Corylus*, etc. are choked with a scrub 1-1.5 m. high of *Spiraea latifolia*, *Lysichiton ligustrinus*, *Rosa palustris*, locally pure stands of *Cornus pennsylvanica*. Where the scrub is thin there are

- e *Epilobium angustifolium*
- o *Sambucus canadensis*
- c *Sanguinaria canadensis*
- r *Veronica virginica* (white)
- o *Achillea millefolium*
- c *Onoclea sensibilis*
- c *Vernonia* cf. *novboracensis*

In open places is a herbaceous growth of *Sanguinaria*, *Carex*, *Epilobium* sp., *Solidago rugosa*, *Scirpus* sp., *Caltha palustris*, *Pyrus* cf. *arbutifolia*, or *melanocarpa*, and a grass. In the lowest part *Lobelia cardinalis*, *Galium* sp., *Juncus* spp. and *Sphagnum*, with a colony a few feet across of *Menyanthes trifoliata*. This lowest spot was muddy but had no standing water at all.

The ditches in the edge of the swamp have wet soil but no water.

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1963 Virginia

✓ Aug. 10 - Skyline Drive  
just south of Dickey Ridge  
Visitor Center

44207

Vitis

1 very common on trees in  
edge of forest

1 08

Vitis

occasional on trees in edge  
of forest

✓ Aug. 10 - Old Rag View, Skyline  
Drive east of Hawksbill

5 09

Lycopodium tristachyum

thriving colony in open scrub forest

2 10

Lesqueris cf. alba

roadside in parking overlook.

✓ Aug. 10 - Skyline Drive at  
Entrance to Hawksbill F.R.  
S. of milestone 47.

1 11

Habenaria

in moist boggy patch beside road

1 12

Solidago

common along road embankment

✓ Aug. 10 - South ~~west~~ slope of  
Hawksbill Mt.

1 13

Solidago cf. odorata det.

local in crevices of rock outcrop

3 14

Rhododendron

rare in forest

Shenandoah National Park 117

1600 m

woody vine, leaves dark  
green above, glaucous beneath.

Woody vine, leaves green  
beneath.

1120 m

rhizome deeply buried,  
spikes erect.

corolla white, stamens  
purple, exserted.

1020 m

flowers white.

flowers yellow; leaves  
aromatic when broken.

1400 m

leaves aromatic when broken.

shrub 1.5 m. tall, glaucous.



✓ Aug. 10 <sup>with</sup> Upper Hawksbill Trail, east slope of Hawksbill Mt. in hardwood forest on rocky ground

44215 (umbell)

occasional

1 16 (umbell)

rare

1 17 (umbell)

locally common

3 18 *Pseudotsunidia montana*

very local

4 19 *Zizia Thaspium trifoliatum* (L.) Gray

common in openings

1 19a *Aquilegia canadensis*

Aug. 10 Summit of Hawksbill Mt. at tops of greenstone cliffs

XI 20 *Solidago canadensis* v. *monticola*

common in rock crevices

XI 21 *Maianthemum canadense*

locally common

Aug. 10 - south ridge of Hawksbill Mt. in woods

XI 22 *Clintonia*

rare

XI 23 *Thelypteris dryopteris*

local colony in woods,

rhizome deep between rocks

Aug. 10 Summit of Hawksbill Mt.

XI 24 *Hemlock*

in rock crevices in woods

1700 m.

herb 1 m. tall, odor of celery

leaves thick, some plants purplish.

sepals and spur red, petals and stamens yellow

200 m.

flowers yellow

sterile

nearly erect

44225  
X2

*Barbarea* ~~*vulgaris*~~ <sup>*vulgaris*</sup> ~~*officinalis*~~ <sup>*officinalis*</sup>  
occasional in picnic ground

Aug. 11 - South slope of  
Chapman Mt. north of  
Rapidan River  
on dry slope in *Quercus prinus*

X3 26 *Aureolaria laevigata* Raf.  
common

X1 27 *Aureolaria laevigata* Raf.  
occasional

~~Aug. 11~~ Aug. 11 - Horner Camp,  
Mill Prong of Rapidan River

28 *Holidago* in hemlocks  
common forest in rocky  
bottom of valley

X1 28 *Holidago*  
common locally

X1 29 *Carex*  
on dry roadside

X1 30 *Mitchella repens* L.  
common under hemlocks

5 X 31 *Hlex montana* T. & G.  
in undergrowth

X5 32 *Laportea canadensis* (L.) Wedd.  
common

X1 33 *Impatiens capensis*  
common in opening

460 m.  
1500'

forest

stem single or several from  
base; corolla yellow.

stem green; corolla yellow.

760 m.  
2500'

flowers yellow

culms spreading, arching.

prostrate, forming loose  
mats, this year's fruits  
green, immature, some of  
last year's persisting, scarlet.  
shrub 2-3 m. tall, arching;  
fruit green.

erect stinging herb;  
inflorescence racemes somewhat  
swollen, fleshy; fruit fleshy.  
much branched herb, to 1.5 m.  
tall. flowers orange marked  
with red; fruit green,  
dehiscing elastically.

122

1963 Virginia

- X1 44234 *Galinsoga ciliata*  
occasional
- X2 35 *Veronica officinalis*  
on roadside
- X1 36 *Amphicarpa bracteata* (L.) Fern.  
weedy roadside

Aug. 10 - below Boyler Gap,  
headwaters of Rapidan River

- Xr 37 *Vitis aestivalis* m. *argentifolia*  
on bushes by roadside (Munson) Fern.

Aug. 11 - Big Meadows ~~Forest~~  
edge of swamp

- X2 38 *Salix humilis* Marsh.  
occasional in meadow at
- X1 39 *Epilobium*  
common in ditch in
- X1 40 *Epilobium*  
common in ditch in
- X2 41 *Galium*  
occasional in open ditch in
- X6 3-3 42 *Gratiola*  
common in open ditch

- X1 { 43 *Corylus cf. americana*
- X1 { 44 " "
- X1 { 45 " "
- X1 { 46 " "
- X1 { 47 " "

common in semi-open scrub in

- X1 48 *Corylus cornuta*  
rare in semi-open scrub in
- X4 49 *Juncus*  
common in open ditch in

Shenandoah Nat. Park 123

700 m.

rare white.  
prostrate, spikes ascending.  
twining; corolla lavender,  
calyx almost white.

woody vine; leaves very  
glaucous beneath.

shrub 1.3 m. tall.

erect, flowers pink.

erect, flowers pinkish

erect, bushy, corolla 4-lobed, white.

stems fleshy, procumbent,  
flowers with tube yellowish,  
limb white.

shrub

shrub 1-1.5 m. tall

44250  
X4

*Juncus*  
common in open ditch in

same - in swamp

X1  
X1  
X1  
X1  
X1  
X2

51 *Corylus cf. americana*  
52 " "  
53 " "  
54 " "  
55 " "  
56 " "

shrub 1.5-2 m. tall  
" " "  
" " "  
" " "  
" " "

X2

57 *Lycopus americanus*  
in small opening in swamp

flowers white.

V5

58 *Veronica virginica f. virginica*  
rare in small opening in swamp

erect herb to 1.5 m. tall,  
flowers white.

X1  
X1  
X1  
X1  
X1  
X1  
X1  
X1  
X1

59 *Corylus cf. americana*  
60 " "  
61 " "  
62 " "  
63 " "  
64 " "  
65 " "  
66 " "  
67 " "

shrub  
"  
"  
"  
"  
"  
"  
"  
"

in swamp

X1

68 *Sambucus canadensis*  
in small opening in swamp

~~shrub~~ 1.5 m. tall, flowers  
cream white.

V3

69 *Cirsium muticum* Michx.  
in small opening in swamp

plant 2 m. tall, much branched  
above, with many heads; tips of  
inner phyllaries deep purple;  
flowers rose pink.

same - edge of swamp

X2

70 *Prunella vulgaris v. lanceolata*  
common in open ditch in

calyx purplish, especially  
on margins, corolla deep purple.

X1

71 *Cerastium semidecandrum?*  
rare in open ditch in

flowers white, small.

126

1963 Virginia

- 44272 *Scirpus cf. atrovirens* or *polyphyllus*  
occasional along bank of open ditch
- ✓4 73 *Juncus effusus*  
abundant in open ditch
- ✓5 74 *Hypericum punctatum* Lam.  
local on bank of ditch
- ✓4 75 *Galium*  
local on weedy bank of  
open ditch
- ✓4 76 *Eleocharis*  
abundant in open ditch
- ✓3 77 *Callitriche*  
abundant in open ditch  
on moist soil.

Shenandoah National Park 127

- caespitose, erect, branches  
of panicle drooping.
- caespitose
- erect, ~~se~~ flowers pale yellow
- stems elongate  
scrambling over weeds.
- caespitose
- prostrate, forming  
small mats.

Aug. 16 - 3.5 miles s.s.e. of  
 Mercersburg  
 in thicket of *Ailanthus*  
 with scattered larger  
 trees of native hardwoods,  
 thick weedy undergrowth,  
 on flattish sandy loam  
 soil.

- #4278 *Lappula*  
 occasional  
 ✓ 79 *Verbena*  
 rare  
 ✓ 80 *Juncus canadense*  
 abundant  
 ✓ 81 *Chenopodium*  
 common  
 x 82 *Commelina*  
 rare

Aug. 17 Powdermill  
 Nature Reserve, Recta

- 15 83 *Phlox paniculata*  
 common very locally in wet <sup>spot</sup>  
 old field with herbaceous  
 perennials,  
 x 84 *Lobelia puberula*  
 rare in ~~in~~ second-growth  
 woods on rocky slope  
 12 85 *Athyrium thelypteroides*  
 occasional in woods on slope  
 x 86 (fern)  
 rare, in woods on gentle slope  
 (old. n. 137)

erect, <sup>to 1.5 m tall,</sup> corolla white.

erect, flowers white

several to many stems  
 from base, petals white.

flowers pale blue, 2 petals  
 larger; anthers yellow, no  
 dark connective.

1200'  
 365 m.

erect flowers magenta.  
 (inflorescence unusually  
 narrow - whole population  
 is this form).

erect; corolla blue-violet,  
 with 2 white lines on lower side.

sterile

## Powdermill

*Cyrtopleuris fragilis*  
growing on old ash leaf  
in bottom of an abandoned  
~~house~~ house foundation where  
rubbish was burned  
last year. Thriving  
colony. Not found  
elsewhere in vicinity.

Artificial pond, fed by  
springs and surface flow -  
established Sept. 1961, filled  
by 27-28 Dec. 1961.

Has golden shiners and  
large mouth black bass.

Considerable flora of  
emergent aquatics has  
come in, incl *Typha*,  
*Mimulus*, *Juncus*, *Eleocharis*,  
*Hypericum* spp., *Leersia*,  
*Sagittaria*

Old field, abandoned  
10 years, dominated by  
*Solidago* spp. with  
various other herbaceous  
perennials. common.

A scattering of *Crataegus* spp.  
*Populus* cf. *coronaria*, *Prunus serotina*

but not enough to yet  
change the character  
of the vegetation

The reserve is available  
for manipulation or manage-  
ment in northern 300 acres -  
southern 1200 acres is kept  
undisturbed except for  
slight disturbance along  
roads and around cottages,  
and for controlled deer  
hunting, some mushroom  
hunters & ginseng hunters.

On rocky bottomlands  
along stream, in second  
growth mixed hardwood  
*Ephedrium acaule* is  
common (acc. G.H.).

The forest on bottom-land  
is second growth - evidenced  
by old rock piles with  
trees on them.

Old sawdust piles, <sup>at least 50 years old,</sup> from  
portable saw mills, <sup>1 1/2</sup> have  
herbaceous growth - *Impatiens*,  
*Eupatorium rugosum*, etc.

Forest on slopes with about  
95% complete, but not very dense  
canopy have almost no under-  
growth and mostly ferns in ground layer.

44287  
19 Thelypteris noveboracensis  
generally abundant  
in ~~at~~ edges of woods

Aug. 20 - ~~road~~ near Fairview,  
6 mi. n. of Mercer, Mercer Co.  
Penn.

12 88 Dryopteris  
common in patch of deciduous  
woods on gentle <sup>northerly</sup> slope.

Aug. 21 - Mendon Ponds Park,  
10 miles south of Rochester,  
Monroe Co., N. Y.

11 89 Equisetum arvense  
very common on slope  
in deciduous forest.

11 90 Coptis groenlandica  
abundant in ~~at~~ Acer  
rubrum swamps

12 91 Eupatorium maculatum L.  
common in marshy edge  
of pond

13 92 Decodon verticillatus (L.) Ell.  
abundant, tending to be  
in pure stands in water.

12 93 Cornus <sup>obliqua Raf.</sup> ~~arborescens~~ Mill.  
very common in edges  
of swamp

12 94 Cornus racemosa Lam.  
very common in edges  
of swamp

rhizomes prostrate,  
shallowly buried.

rhizome short, erect.

stems prostrate, bright  
yellow.

erect, flowers ~~are~~ dull  
rose pink, stems  
solid, reddish; panicle  
tending to be flat topped,  
older ~~flowers~~ <sup>heads</sup> in center  
subshrub, stems very  
spongy at base, branches  
conspicuously arching,  
flowers magenta.

shrub 1-2 m. tall, lvs. glaucous  
beneath, fruits dull blue.

shrub 1-2 m tall; cymes  
red, leaves glaucous  
beneath, almost ripe  
fruit pale green.



Startech Camera  
Eastman.  
attachments from  
Lester A. Dine Co.  
102 Jericho Tpk.  
Floral Park, L. I., N.Y.

127 film pinhole ~~8~~ 8 to 2 inches

Second growth across  
from museum - flat  
ground - trees 2.5 - 10 cm  
dbh. spacing 0.3 - 7 m.  
ht. to 8 m.

- trees Crataegus
- Liriodendron
- Acer rubrum
- Cornus florida
- Quercus cf. rubra
- Carya sp.
- Pyrus coronaria
- Magnolia acuminata

Carthamus  
Hammamelis

- scarcely any shrub layer
- herbs (a) Thelypteris noveboracensis
- (a) Mitchella repens
- lc Viola sp.
- lc Carex spp.
- Potentilla cf. canadensis
- ~~Carex stricta~~
- lc Polypodium acrostichoides
- o Agrostis
- o Eupatorium rugosum
- o Urtica sessilis

Aug 20 - north from  
Pittsburgh to Erie -  
the common old-field  
shrub, especially  
northward, is Crataegus.  
Hemlock is common in  
woods near Pittsburgh.  
In the vicinity of Lake  
Erie the woodlots are  
characteristically  
beech-maple, but with  
no conifers. The general  
landscape is cultivated,  
with scattered dense  
woodlots. Occasional  
neglected pastures with  
scattered Crataegus.

Aug. 21 - Mendon Ponds  
Red maple swamp tree  
about 25 m. tall, maple  
completely dominant, canopy  
90-95% trees 3-6 m. apart  
Asmundia, Vaccinium cf.  
corymbosum and a few  
larger shrubs in a 1 m. layer,  
a little sphagnum,  
much Maianthemum,  
Coptis, toward edges  
Penthoris in ground  
layer, also Dryopteris "spinulosa"  
shrubs esp. Prunus serotina  
form a definite shrub  
layer, 1-2 m. tall near edges

1963 New York

The ponds have waterlilies, *Ceratophyllum*, etc. in great quantity in the smaller pond a large patch of *Nelumbo lutea*.

Edges of pond have areas of *Najas*, others of ~~waterlilies~~ *Decodon verticillatus*, with scrub of *Cornus* spp. around edges of this.

Another swamp is *Cornus* with much young *Acer rubrum*.

Corn

Mystic Marsh  
(b/w photos of marsh and area back of it - marina)

John Corbett

NPS Research reports

Higher up *Quercus alba* & *Betula lenta* are more abundant.

Mamacoke Island

b/w - Photos of salt marsh with woods on higher ground in background.  
(Full Corn arb.)  
(reg. map.)

The marsh shows a sequence of *Spartina alterniflora*, *Juncus gerardi*, *Spartina patens*.

On Mamacoke *Quercus* on island is - *Quercus velutina* forest with other species

*Q. alba*,*Carya* spp.*Prunus serotina**Fagus grandifolia*

Sparsely shrub layer  
*Rubus* spp.  
*Viburnum acerifolium*

Locally a *Sarcocornus* *Spartanaceae* layer, fairly dense.  
Thin ground layer of  
*Parthenocissus*  
etc.

Beautiful rock ledges

1963 New York - Conn.  
etd. from p. 132

44295 *Cornus sericea* L.  
✓<sup>2</sup> ~~common~~ in edge of water

✓<sup>2</sup> 96 *Cornus sericea* L.  
common in edge of swamp

Aug. 25 - Barn Island marsh,  
Conn.

in salt marsh

XI 97 *Juncus gerardi*  
dominant in outer part  
of salt marsh

XI 98 *Limonium carolinianum*  
common locally, in patches,  
with *halimolobos* and *Triglochin*

XI 99 *Triglochin maritimum*  
common locally, in patches  
with *Limonium* and *halimolobos*

44300 ~~Agalinis~~  
X I very locally common

91 01 *Agalinis*  
occasional, with ~~purple~~ lavender form

Aug. 30 - Amherst,

✓<sup>2</sup> 02 *Marsilea quadrifolia* L.  
forming a dense sod around  
margins of pond

sparsely branched  
shrub 1 m tall, flowers  
white. stems green, turning reddish.  
shrub 1.5 m tall, stems  
red; flowers white.

leaves of flowering plant  
mostly dried up.

flowers deep lavender.

flowers white

fronds erect.

Aug. 25 - Pequot - Lepore Sanctuary

Aug. 25 Barn Island Marsh  
Jones, in from alder thicket  
1 *Panicum virgatum*  
*Spartina alterniflora*

2 *Spartina patens*

3 *Spartina alterniflora*

4 *Juncus gerardi*  
strip back of beach ridge  
& patches farther back.  
Patches of *Rumex* + *triglochin*

Most of the zones are quite patchy

Beach ridge has *S. v.*  
& locally *Arthrocnemum*

Patches of dead and dying grass evidently due to salinity from trapped evaporating sea water. Advanced stages are bare.

Marshes were ditched to eliminate mosquito breeding pools. This killed the fish that controlled the mosquitoes and created more pools to breed more mosquitoes. Ditching has been abandoned and ditches are gradually filling. Many have very small natural levees impounding more water.

The ditching has broken up the zonation.

Occasional big boulders scattered here and there, also a strip of stones running out to the edge. Slight accumulation of higher material around stones with *Juncus*, *Spartina*, gulls drop *Pecten* and other shells on rocks to crack them.

One small piece of undoubtedly coral found here. Looked as though had been attached to a shell or other smooth object.

Bottom of bay is sand.

A levee was built across the marsh a couple of hundred yards from the sea, to impound water. This changed the marsh from salt to fresh. *Typha angustifolia* and *Phragmites* came in and now dominate.

Aug. 26 - Bechley Bog  
(photo from) of *Nymphaea*  
at edge of pond.

4 trees 1.5-2.0 dm dbh cut down by beavers (see photos) all ~~are~~ *Populus grandidentata*. These from 5-3-40 m. from edge of pond.

A plain of some width and about 1-2 m above lake level all along the east side, lined by a sort of ridge 4-6 dm higher than depression back of it. Large boulders in it. Could be a very old road worn into plain leaving this rim. but no good traces

of road left if so. Trees up to 2 dm aspens, red maple, hemlock etc on this area.

The plain, to 30 m wide, is <sup>very</sup> gently sloping from foot of steeper slope toward pond. Some large boulders on it. No very large trees. Toward north this narrows and becomes boggy.

In the bog part of the pond there are open bog areas and scrubby areas, irregularly distributed, apparently with no

Aug. 30 - Amherst, Mass.

Pond on campus, covered by azolla. Abundant *Madrialea* forming a band in mud around edges of pond, up to 10 m wide, blades emerged to 5-10 cm.

Aug. 30 N.W. Massachusetts - beautiful wooded mountainous country. Greylock Reservation should be a good place to study it.

1963

New York

Aug. 30 - near Albany  
Rt. Interstate 90 <sup>west</sup> where it  
separates from Rt. south  
and from there west for  
several miles is a vegetation  
of a shrub layer of *Quercus*  
*ilicifolia* with scattered  
trees of *Pinus* cf. *rigida*.

The pine stand varies in  
density, but the trees are  
not large. Where it  
becomes at all dense,  
even where the trees are  
separated by about crown  
width, the shrub layer  
becomes rather sparse.

This looks exactly  
from the road like the  
*Q. ilicifolia* - *P. rigida*  
vegetation on ~~flat~~ <sup>flat</sup> ~~scars~~  
in the Shen. Nat. Park.  
No inf. on associated  
species. The soil appears  
to be sandy.

North of Amsterdam, along  
thoroughway bet. there and Fulton  
ville on river terraces, *Lythrum*  
*salicaria* is abundantly flowering.

N.Y.

The Montezuma National  
Wildlife Refuge, ~~at~~ about  
35 ~~miles~~ miles east of Rochester,  
is a large area of low  
flat marshy ground,  
some of it under  
cultivation, some in  
*Typha*, some mixed  
herbs esp. *Lythrum*  
*salicaria*, a large  
area of forest, dead on  
south side of road  
(probably from flooding),  
in poor shape on north  
side. I would judge that  
this area is very severely  
managed. It has some  
open water.

Aug. 31 Chimney Bluffs,  
Lake Ontario east ofodus Bay  
Badlands eroded into  
bluffs of till up to 25-30 m.  
high, many weird pinnacles.  
Pioneer plants on lower  
slopes of raw till:

- a *Salix bebbiana*
- c *Daucus carota*
- c *Achillea millefolium*
- lc *Fragaria* sp. (center tooth subequal <sup>short</sup>)
- lc *Oenothera biennis*
- Daucus carota*
- la *Populus deltoides*
- c *Poa*
- n *arostis*

1969 New York

- r *Chrysanthemum leucanthemum* V
- c *Aster cordifolius*
- o *Teracium vulgare*
- o *Prunella vulgare*
- r *Sonchus oleraceus*
- r *Pteridium aquilinum*
- r *Potentilla cf. recta*
- r *Plantago lanceolata*
- lc *Solidago cf.*
- lc *Cuthamis graminifolia*
- r *Cirsium vulgare*
- r *Phleum pratense*
- lc *Melilotus alba*
- r *Cirsium arvense*
- r *Lychnis cornaria*
- o *Hypericum perforatum*
- l *Lactuca scariola*
- la *Equisetum arvense*
- o *Plantago major*
- r *P. rugelii*

Most in the gullies, where moisture, and presumably nutrients, are more abundant, there are other species. Also near the ends of this series of bluffs where they are lower, other species come in.

N.Y.

Sept. 1. Watkins Glen State Park  
Gorge cut in flat shales and phyllite beds. Vertical cliffs, waterfalls, and deep pools. Walls have many ferns and native flowering plants.

Forest above is a mixture of white pine, ash, tulip (!), hemlock, *Ostrya*, red maple, *Tilia*, yellow birch, chestnut oak, red pine, black birch, *Juglans sp.*, red oak (R), and chestnut sprouts. Proportions vary greatly. Hemlock tends to occur in groves. *Quercus alba* rare.

Aug. 31 - Orchard Beach Camp Ground north of ~~hodus~~ on Lake Ontario

✓ 44303

*Oxalis stricta* L.

✓ 3

common under trees in grassy orchard on glacial till soil.

Aug. 31 - head of Hodus Bay, Lake of Ontario

in ~~water~~ edge of water with abundant aquatic

✓ 3

04 *Wolffia punctata* Griseb. abundant floating

✓ 5

05 *Lemna trisulca* L.

abundant, submerged

Aug. 31 - Chimney Bluffs south shore of Lake Ontario east of Hodus Bay

on bare eroded till slopes just above lake shore

✓ 1

06 *Lychnis coronaria* (L.) Desv. rare

✓ 1

07 *Lactuca scariola* rare

✓ 1

08 *Hypericum perforatum* L. rare

✓ 3

09 *Salsola kali* L. var. *kali* abundant

✓ 1

10 *Plantago rugelii* rare

✓ 1

11 *Plantago major* L. rare

✓ 2

12 *Cirsium arvense* (L.) Scop. rare

stems decumbent at base, ~~stems~~ stolons rose pink, flowers yellow, buds nodding; fruits erect, pedicels not deflexed.

plants

top thallus oblong, top flattened hemicylindric, bottom pale, swollen.

already old and dead.

erect; leaves <sup>glades</sup> vertical, more or less in one plane. flowers deep yellow.

leaves fleshy.

leaves purple at base of petiole.

flowers light purple.



- x1 44313 *Achillea millefolium* L.  
cf. var. *lanulosa* (Nutt.)  
common
- x1 14 *Aster cordifolius* L.  
occasional
- x1 15 *Sonchus arvensis* L.  
rare
- x1 16 *Populus deltoides*  
common, colonizing
- 13 17 *Equisetum arvense*  
cf. *E. pseudoalpinum*  
large colonies
- ✓ 2 18 *Poa*?  
common
- x1 19 *Agrostis*  
rare

Sept. 1 - north of Soodus

- 12 20 *Digitaria*  
abundant in cultivated field
- Sept. 1 1 mi. s. of Glenora, hills west of Seneca Lake, Yates Co.
- 13 21 *Echinochloa*  
in moist roadside ditch, common
- Sept. 1 Watkins Glen, Schuyler Co.
- x1 22 *Lobelia palmaria* L.  
common in wet crevices in cuts in flat shale beds

- flowers white; plant single-stemmed (others seen many stemmed from base)
- ray flowers lavender, disk pale yellow.
- erect, flowers bright yellow.
- shrub 1.5 m tall; petioles somewhat flattened, red.
- branchlets strongly ascending to erect.
- tufts, culms decumbent at base, ascending.

culms decumbent at base, ascending; racemes blackish-purple.

culms ascending to erect, leaf sheaths forming a flat mass at base.

flowers blue and white.

1963 Virginia

Sept. 19 - Balls Bluff  
n. of Leesburg

Bottomland forest -  
 Platanus, Quercus prinus  
 Ulmus sp., Juglans nigra,  
 Celtis, Asimina (to 6-7 m.)  
 Lindera (to 4 m), Acer negundo  
 Pawpaws ~~are~~ full-sized  
 but not ripe yet.

la Rapanea  
 lc Urtica  
 l Pilea  
 lc Boehmeria  
 a Gleasonia

On slopes in forest  
 Collinsonia  
 Liatris

154

1943 Virginia

Sept. 15 Ball's Bluff, Potomac  
River n.e. of Leesburg  
in bottomland forest

#

44323

*Quercus prinus*

✓ 1

occasional

✓ 2

24

*Hibiscus militaris* CAV.

occasional along river

✓ 2

25

*Laportea canadensis*

abundant locally

~~26~~

on bank of river

x 1

26

*Eclipta prostrata* (L.) L.

occasional

x 1

27

*Artemisia annua* L.

common

on eroded Triassic shale  
or sandstone terraces in  
sparse second-growth  
hardwood forest

✓ 2

28

(Cabr.) *Perilla frutescens* (L.) Britt.

locally abundant

x 1

29

*Prunella vulgaris* v. *concolorata*

occasional

✓ 2

30

*Lespedeza procumbens*

common

~~31~~

x 1

31

*Spiranthes tuberosa* Raf.

rare

Loudoun Co.

155

CONNECTICUT STATE BOARD OF FISHERIES AND GAME

BARN ISLAND SHOOTING AREA

The survey of coastal wetlands made by the Department and the U. S. Fish and Wildlife Service in 1954 shows a continuous marsh area around Barn Island of about 370 acres. Of this acreage about 75 acres is described as shallow fresh marsh, 250 acres as salt meadow and 45 acres as regularly flooded salt meadow. A considerable part of this marsh acreage is included in the 557 acres of State-owned marsh and upland known as the Barn Island Shooting Area.

Departmental purchases in this area began in 1944; none have been made in the past ten years.

From 1945 to 1947, four dikes, totaling somewhat more than 2,000 feet, which impounded a maximum of about 135 acres, were built. In 1955, a ditch about 12 feet wide, 4 feet deep, and 600 feet long was dug across the neck of marsh connecting Barn Island with the mainland. At the same time, two semi-circular pools about 400 feet by 120 feet were dug in the marsh area in front of the Brucker property, with the spoil deposited in piles adjacent to the pools. Some other rather minor development work of an experimental nature has been done on both the marshes and the upland. An access, parking, and boat launching area, that has since been enlarged, was established at the present site in 1957.

From 1947 through 1950, the Department sponsored a variety of investigations on the area by graduate students and others. One publication, Vegetation of the Wequetequock-Pawcatuck Tidal Marshes, Connecticut - Miller and Egler - Ecological Monographs, 20: 143 - 172, April 1950, resulted from these investigations.

The Barn Island area, historically, was an exceptionally good waterfowl and shore bird hunting area. For a number of years it was leased to a group of sportsmen for this purpose. These marshes were mosquito ditched in 1929 - 1932. Following the ditching, the sportsmen's group are reported to have reduced their lease offer and then cancelled the lease due to the absence of birds.

The impoundments have provided excellent waterfowl production, and feeding and resting area for birds in spring migration. They also make the area attractive to fall migrants, but their use during the open season is sharply reduced by hunting. Management work here is presently at a minimum.

Some added acquisition is necessary to round out the area, insure the rather limited supply of fresh water, and furnish buffer for existing and planned impoundments. Such purchase might give impetus to further development and more intensive management.

JSB/B  
8/20/63

Sept. 15 Ball's Bluff, Potomac  
River n.e. of Leesburg  
in bottomland forest

- 44323 *Quercus prinus*  
occasional
- ✓ 2 24 *Hibiscus militaris* CAV.  
occasional along river
- ✓ 2 25 *Laportea canadensis*  
abundant locally

~~26~~

on bank of river

- ✓ 1 26 *Eclipta prostrata* (L.) L.  
occasional
- ✓ 1 27 *Artemisia annua* L.  
common

on eroded Triassic shale  
or sandstone terraces in  
sparse second-growth  
hardwood forest

- ✓ 2 28 (*Palmetto*) *Perilla frutescens* (L.) Britt.  
locally abundant
- ✓ 1 29 *Prunella vulgaris* v. *lanceolata*  
occasional
- ✓ 2 30 *Lespedeza procumbens*  
common
- ~~31~~
- ✓ 1 31 *Spiranthes tuberosa* Raf.  
rare

70 m

twigs cut (by squirrels?)  
from a tree 30 m tall, leaves  
glaucous beneath.  
shrub 1-1.5 m. tall,  
~~the~~ stinging herb up to  
0.8 dm. tall, fruits  
swollen, fleshy,  
translucent pale green.

prostrate, rays white.

herbage fragrant

90 m

~~leaves~~ stems dark red,  
leaves redded beneath,  
flowers pink.  
lips of corolla violet

stems procumbent,  
flowers pink, standards  
red in center  
erect, flowers white,  
conspicuous by spirally  
arranged.

Sept. 22 - just south of Markham

44372

*Dianthus* ?

✓ 5

common in grassy meadow  
on rocky hill

Sept. 22 - 1 mi south of Markham  
in poor second-growth  
deciduous woods on  
rocky hill

✓ 2

33

*Hedyotis ~~longifolia~~ purpurea* var.  
occasional on slope

✓ 81

34

*Galium latifolium* Michx.  
common in shade

✓ 35

35

*Woodsia obtusa* (Spreng.) Torr.  
common in rocky bottom of  
broad ravine

✓ 2

36

*Asplenium platyneuron*  
very common in bottom of  
broad ravine

✓ 2

37

*Hedeoma pulegioides*  
local in rocky bottom  
of broad ravine

✓ 1

38a

*Ulmus rubra*  
common

flowers deep lavender

loosely caespitose,  
procumbent; roots  
deep yellow, turning red.  
fronds turning yellow

very aromatic

slender tree 6 m. tall.

1963 Virginia

Sept. 28 - Stony Point,  
Albemarle Co

Pasture being invaded  
by *Juniperus virginiana* (photo)  
This is rolling land,  
with fairly high hills  
to the east a mile or so.

Mostly pasture with  
patches of woods,  
scraps of old orchard,  
hedgerows and thickets.  
Patches of *Pinus virginiana*  
here and there.

Fall coloring just begin-  
ning to appear.

Fernbrook Woods -

Along road - tulip,  
red maple, spanish oak.

Corner over bluff  
mixed low juniper,  
*Pinus virginiana*, *Sassafras*,  
etc. Fringe of large

black oaks at top of bluff  
undergrowth of *Carpinus*  
2-4 m. tall, some *Celtis*.

Much *hijey* snuck at first  
in corner, but none farther down.

Below is north fork of Rivanna R.

~~Walnut~~ on bluff.

*Asarum virginianum*  
Small patch of *Taxus*  
at top of cliff.

7 good plain with *Acer*  
*negundo*, *Celtis*, *Juglans*  
*Carya*, *Platanus* (s.)

Much *Pinus echinata*  
some *P. virginiana* on ridges.

Across ravine scattered  
white pine, largest  
10' girth b.b.

Much *P. strobus* reproduction  
in forest - saplings  
to 5 m. tall.

*Quercus falcata*  
mixed with *P. echinata*  
+ *P. strobus*,

understory of *Cornus florida*.

Large old beech wolf tree  
at lower left corner.

*Chimaphila mac-*  
generally abundant

On main broad ridge  
mostly oak above  
middle.

Tulip on lower ground  
toward lake.

1943 Virginia

Sept. 29 - Milam's Gap  
Meadow with scattered  
*Panicum purgens*, *P. virginianum*  
abundant aster cond.

*Aster ericoides* (?)

Scattered *Pyrus malus*,  
*Crataegus*.

Both *Crataegus* & *Pyrus*  
attached by *cruciatum*.

*Solidago* abundant,  
about 4 spp.

Evidence of slight  
frost.

*Rubus* sp. *flagellans*  
forms large patches.

*Rhus*, *Acer rubrum*,  
*Fraxinus* well turned to  
autumn color. *Rubus* &  
*Vaccinium* also.  
*Yanthocissus* also

Tanner Ridge Overlook  
3460'

Meadow almost covered  
with *Corylus*, *Vaccinium*,  
*Robinia* scattered pine.

(photos)



nos checked  
162

1963 Virginia

labels typed  
HK

Sept. 29 - Skyline Drive,  
Tanners Ridge Overlook

44338  
✓ 2

*Solidago altissima* L.  
common in meadow

✓

Sept. 29 Tanners Ridge  
in <sup>open</sup> second growth woods

✓ 3 39

*Ipomoea triloba* L. det. v.d. Werff  
common

✓ 2 40

*Corylus cornuta* Marsh.  
abundant as undergrowth

✓ 1 41

*Oxalis cornuta* <sup>incubata</sup> var  
common along trail

✓ 1 42

*Botrychium dissectum* f. *occidentale* (Gill.) (det.)  
rare

✓ 2 43

*Aster azureus* Lindl.  
locally common

✓

Sept. 29 Appalachian Trail  
bet. Milam's Gap and Tanners Ridge  
in thick second-growth woods on

✓ 2 44

*Aster cordifolius* var. *racemiflorus* Fern.  
common, locally abundant

✓ 2 45

*Physalis* ~~heterophylla~~ <sup>heterophylla</sup> var. *nyctaginea* (Rumel) Fern.  
rare in semi-open place

✓

same in semi-open ~~open~~  
second-growth thickets

✓ 4 46

*Polygonum cristatum* Engelm. Gray  
very local in

3 47

~~*Alnus serrulata*~~  
~~local~~  
same - in dense <sup>second growth</sup> woods

✓ 3 48

*Alnus serrulata*

Shenandoah National Park 163

1075 m

several stems in <sup>rose</sup> clump,  
erect; flowers yellow.

1028 m

rays lavender, disk  
turning dark red.  
shrub 2 m. tall.

erect.

frond green

rays pale lavender,  
disk yellow turning red.

1000 m

west slope

ray flowers lavender, disk  
pale yellow, turning ~~red~~ red.  
several stems spreading  
from base.

twining over weeds

several stems from base  
about 5-6 m. tall

44348

*Pilea pumila*

X3

common very locally

X1

49

*Asplenium platyneuron* (L.) Oakes  
very common, ~~is~~ more  
so in openings and  
meadows, this at  
edge of thicket

✓

same - in openings between  
thickets on gentle slope

X2

50

*Solidago canadensis*  
locally common

X2

51

*Aster pilosus* var. *dematus* Blake  
locally common

✓

Sept. 29 Melams Gap  
in weedy meadow  
with scattered trees  
and patches of shrubs

X2

52

*Botrychium multifidum*  
occasional

X2

53

*Crataegus succulentus* v. *neoflorialis*  
(Ashe) Palmer  
common

X2

54

*Solidago arguta* Ait.  
very common

✓2

55

*Lycopodium complanatum*  
locally abundant

X5

56

*Solidago nemoralis* Ait.  
very common

X2

57

*Aster cordifolius* var. *cordifolius*  
very common or abundant

stems fleshy, translucent

erect, flowers yellow.

rays white, disk dull  
yellow turning dull reddish.

segments ~~leaves~~ leathery, beginning  
to turn purplish.

~~small~~ bushy dense tree-like  
shrub, 3 m. tall, fruit bright  
red, soft mostly attached by fungus.  
stems red; heads past  
flowering.

~~stem~~ <sup>rhizome</sup> prostrate, on or in  
surface of ground; leaves  
tending to be glaucous  
(resembles *L. thymochrysum* but  
for superficial rhizomes).  
cinereous; fls. yellow.

rays lavender, disk reddish.

no. checked

166

44358

*Cirsium discolor* (Muhl.) Spreng.  
occasional

Sept. 29 - Hazletop Ridge  
Overlook, Skyline Drive  
in edge of deciduous forest

3265'  
995m

flowers bright purple

X2 59 *Aster lowricanus* Pater  
common

rays lavender, disk pale yellow, turning red.

X1 60 *Aster cordifolius* v. *racemiflorus* Fern.  
occasional

rays lavender, disk pale yellow, turning reddish.

- X1 { 61
- X1 { 62 *Cladonia*
- X1 { 63 *Cladonia*
- X1 { 64 *Uvae*
- X1 { 65 *Umbilicaria*
- X1 { 66 *Parmelia*
- X1 { 67 *Parmelia*

on large sloping rock at edge of

X2 68 *Solidago petiolaris* Ait. var?  
occasional

flowers yellow  
(thyrses very short and compact)

X4 69 *Solidago petiolaris* Ait.  
abundant

flowers yellow  
(thyrses elongate, loose)

same - ~~weedy~~ weedy areas

X4 70 (grass)  
rare in parking overlook

branched at base, loose clump, stems weak.

X3 71 *Aster filozus* v. *filozus*  
rare in parking overlook

rays white, disk yellow, turning reddish.

X3 72 *Aster filozus* var. *demotus* Blake  
on embankment below road

rays white, disk yellow, turning reddish.

X4 73 *Aster simplex* var. *ramosissimus* (T. & G.) Cronq.?  
common at edge of parking overlook

erect, rays very pale lavender, disk yellow, turning reddish.

X3 74 *Aster cordifolius*  
common on embankment

rays pinkish lavender, wide disk reddish.

no checked 1963 Virginia

168

- 44375 Aster cordifolius L.  
common on embankment
- 76 Aster cordifolius L.  
common on embankment
- 77 Rudbeckia laciniata var. humilis Gray?  
rare on weedy embankment
- 78 Solidago flexicaulis L.  
common on weedy embankment
- 79 Aster simplex var. ramosissimus  
common on weedy embankment <sup>(7+9) long.</sup>

Shenandoah National Park 169

- rays very narrow  
lavender, disk reddish.
- rays medium width,  
lavender, disk reddish
- rays pale yellow, disk  
dull dark greenish, live.  
flowers yellow.
- rays very pale lavender,  
disk <sup>light</sup> yellow, turning reddish.

un-checked  
170  
Labels typed  
JK

1963 Virginia

Sept. 28 - Stony Point  
in <sup>mixed</sup> second-growth woods

- 44390 *Viburnum acerifolium*?  
common
- 81 *Gleditsia triacanthos*  
rare

Oct. 5 - Belvedere Farm,  
Rappahannock River below  
Fredricksburg

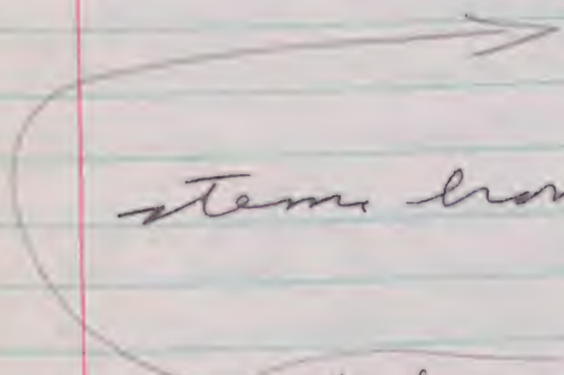
- 82 *Epifagus virginiana*  
under beech tree in  
wooded ravine

Oct. 20 - same  
on flood-plain

- 3 83 ~~Viburnum~~ *Actinomeris alternifolia*  
abundant, especially  
in grazed open forest
- 3 84 *Cyperus*  
in open desiccating  
margin of slough.
- 1 85 *Hypericum*  
on stump in edge of slough
- 2 86 *Cuscuta*  
parasitic on *Boehmeria cylindrica*
- 1 87 *Viola*  
rare in pasture
- 5 88 *Lemna cf. minor* L.  
common in scum of  
*Lemna* and *Wolffia* in desiccated
- 5 89 *Wolffia columbiana* Karst.  
very abundant, forming scum  
on water of desiccating slough.

Albemarle Co. - 171  
Spottsylvania Co.

shrub 1.5 m. tall, sterile.  
dying old snag, no thorns.



stem bronze purplish.

Spottsylvania Co.

erect, to 2 m. tall; flowers  
bright orange-yellow.

culms closely  
appressed to ground.

flowers and fruits white.

flowers violet, claw of  
lower petal white with dark  
lines.

thalli green above, deep  
purple beneath.  
slough

~~to~~ Oct. 5 Belvedere Farm  
 Large tract of second  
 growth - mostly mixed  
 oak forest - in low spots  
pin oak - sweet gum,  
 on higher level ground  
 largely white oak,  
occ. scarlet <sup>oak</sup> willow oak,  
 on ~~to~~ low rolling hills  
 more mixed oak, with  
 scattered small pumpers  
 and more and more  
scrub pine. An old  
 civil war entrenchment  
 pine is dominant, a  
 few P. rigida and V. echinata  
 these up to 20 cm. dbh,  
 close together, some dying  
 no new stumps seen  
 scattered small pumpers  
spanish oak.

On slopes a good  
 encroaching shrub layer  
 good Desmodium layer  
 in oak forest not so  
 much in pine.

A Myrica at least 8 m tall  
 Carpets of Mitchell's

Considerable Carya mixed  
 with oak on flat  
 ground.

Q. alba, occum, stellata  
phellos, etc. largest up to 2' dbh

Ravine on lower end of  
 farm has abundant Rhododendron  
maximum, very large  
 trees - Tulip, several  
 oaks, Fagus, Carpinus  
 trees 30-35 m tall.

Ravine is about 25-30 m  
 deep. canopy very thick  
 & low wind stream, even  
 in this very dry season.

Asarum virginicum  
Collinsonia canadensis  
Lindera benzoin

On peninsula in meander  
 of river - Platanus, oaks  
negundo, Q. palustris

A large pond filled  
 with dead snags  
 covered by ferns  
 and Wolffia.

Many ducks, a blue  
 heron many doves.

A flock of seven of  
 vultures - black and turkey  
 roosting in trees right  
 near farm house

Pileated woodpecker,

Flicker a large hawk - not tailed?

The peninsula is flood-plain,  
 heavily pastured.

Oct. 12 - Falls Church  
*Aster macrophyllus*  
 has spread and is  
 flowering very abundantly  
 in sweet-gum forest from  
 stock planted a few  
 years ago.

Oct. 20 - Prince William  
 Forest Park - Fall  
 coloring about at its  
 best - *Acer rubrum* and  
*Nyssa sylvatica* very  
 bright red, *Liriodendron*  
 and *Carya* rich yellow.  
 Oaks not at their brightest  
 yet, but some rather  
 good. *Cornus florida*  
 rich red. Coloring  
 less bright in ravines.

Oct 20 Belvedere Farm  
 Birds Turkey Vultures  
 Chickadee  
 Flicker  
 Bluebird?  
 Nuthatch  
 Woodpecker (pilated? (smaller))  
 Woodpecker (smaller)  
 Crow  
 Black vultures  
 Blue jay?  
 Great Blue heron  
 Wood duck?

Trees on floodplain

- c *Juglans nigra*
- c *Salix nigra*
- a *Platanus occidentalis*
- o *T. radicans* sp.
- a *Acer negundo*
- c *Betula nigra*
- o *Celtis occidentalis*
- o *Populus deltoides*
- o *Ulmus americana*
- o *Liquidambar virginiana*
- c *Liquidambar virginiana*
- ~ *Quercus palustris*
- ~ *Morus rubra*
- l *Liquidambar styraciflua*
- ~ *Fraxinus* sp.
- ~ *Hecopaea*
- l *Ulmus serrulata*
- la *Juniperus virginiana*
- ~ *Prunus serotina*
- lc *Robinia*

Raccoon tracks  
 muskrat gnawing  
 beaver letter & dam

fallen *Populus* 32 paces tall, 1 m dbh.  
 on steep slope in  
 forest of *Juglans* & *Quercus* sp.  
*Liquidambar*, *Liriodendron*

Flowing spring emerges  
 at bottom of this slope about  
 50 m from beaver dam.

- 44390 Cyperus  
3 on desiccating margin of  
slough
- 3 92 Ludwigia decurrens  
on beaver dam and  
in mud beside it
- 1 93 Cyperus <sup>(Hyllinon)</sup> tenuifolius (Steud.) Dandy  
very rare on desiccating  
~~margin~~ <sup>margin</sup> of slough
- 1 94 Panicum  
occasional on desiccating  
~~margin~~ <sup>margin</sup> of slough
- 2 95 Polygonum punctatum  
rare on desiccating  
margin of slough
- 96 Gratiola  
~~sp~~ on desiccating margin  
of slough
- 2 97 Bidens  
on desiccating margin of slough
- 7 98 Leersia  
occasional on desiccating  
margin of slough
- 1 99 Polygonum  
occasional on desiccating  
margin of slough
- 44400 Echinochloa  
2 rare on desiccating margin  
of slough.
- 2 01 Cleocharis  
occasional on desiccating  
margin of slough
- 2 02 Saururus cernuus  
abundant on desiccating  
margins of slough

herb up to 1 m. tall,  
petals yellow, tending  
to be rhombic, falling easily.  
heads pale green.

culms spreading, prostrate.

stem ascending,  
flowers white.

prostrate; corolla pale  
lavender.

flowers yellow

culms spreading

stems reddish, ascending;  
flowers pinkish.

culms spreading

tufted

stems to 1 m. tall,  
swollen at base.



- √44403 Callitriche  
on desiccating margin of slough.
- √3 04 Ludwigia  
abundant on desiccating margin of slough
- √1 05 Polygonum  
rare on desiccating margin of slough
- √1 06 Bidens  
rare, on log in ~~slough~~ margin of slough.
- √2 07 Polygonum  
occasional on desiccating margin of slough
- √1 08 Eclipta  
on desiccating margin of slough and on logs
- √2 09 Polygonum  
on desiccating margin of slough
- √1 10 Juncus  
rare on desiccating margin of slough
- √1 11 Polygonum pennsylvanicum  
rare on desiccating margin of slough
- √7 12 Bidens  
common on desiccating margin of slough
- √3 13 Cyperus  
common on desiccating margin of slough
- √2 14 Polygonum  
occasional on desiccating margin of slough

- prostrate, forming a close mat.
- prostrate leaves purple.
- flowers white.
- stems ascending, flowers pink.
- flowers white.
- flowers pinkish
- prostrate, flowers pale lavender, corolla falling very easily.  
flowers pale pink.
- stems ascending; flowers pink.

Oct. 26 - headw. of Powhatan Cr.  
Swamp of *Acer rubrum*,  
*Quercus prinus*  
*Liquidambar*

with  
*Caltha palustris*  
*Aster lateriflorus*  
*Asmunda regalis*  
*Lymnopus*  
*Impatiens*  
~~*Quercus prinus*~~  
*Bidens* sp.  
*Lacunosus cernuus*  
*Solidago*  
*Onoclea*

*Chrysanthemum*  
*Cineraria*  
*Decumana*  
*Rhus vernix*  
*Ulmus alata*  
*Asimina*  
*Smilax rotundifolia*  
*Trillium pauciflorum* v. *virginicum*  
*Taccinum corymbosum*  
*Smilax bona-nox*  
*Magnolia virginiana*  
*Ilex opaca*

*Botrychium dissectum*  
*Rudbeckia lacineata*  
*Woodwardia virginica*  
*Medeola*  
*Lilium*  
*Cinna arundinacea*

same - slope above ~~the~~  
swamp

Quercus alba  
Fagus  
Pinus taeda  
Quercus prinus

Mitchella  
Pteridium  
Vaccinium vacillans  
Polystichum  
Asplenium platyneuron

Swamp on east side  
that has been logged  
recently

Lobelia cardinalis  
Caltha palustris  
Hypericum mutilum  
Aster lateriflorus  
Jussiaea  
Penthorum  
Ilex laevigata:  
Cinna  
Viburnum cf.  
Campsis radicans  
Gratiola  
Orontium  
(scrub)

This has been logged  
so no significant  
sized trees are left.

Oct. 26 - Powhatan Creek  
lower down

Logged out cypress  
swamp.

Old cypress stump 1 m dbh.  
Acer rubrum cut out, too.

*Caltha palustris*  
*Saururus cernuus*  
*Pilea pumila*  
*Lycopus* sp.  
*Peltandra virginica*  
*Bartonia*  
(scrub.)  
*Impatiens*  
*Erechtites hieracifolia*  
*Athyrium filix-ferma*

One cypress seedling and  
a few sprouts seen.

Oct. 27 - Woods back of Providence  
Hall, Williamsburg

Mixed deciduous  
woods. Tilia (one tree almost  
4' dbh) *Quercus alba*, beech,  
*Platanus*,

various trees bet. 3-4 ft.

a deep ravine with  
tulip + white oak *Q. falcata*,  
about 5-8 m deep.

extends along between  
golf course and Rockefeller  
property.

Understory of young beech,  
*Asimina*, *Cornus florida*.

A few pines - a very  
large *P. virginiana*  
a few *P. taeda*.

*Thelypteris hexagonifolia*  
*Polystichum acrostichoides*

Ground mostly over-  
grown with *Lonicera* sp.

Several *Q.* velvety but  
with curiously whitish  
platy bark. Inner bark yellow.  
One or more large *Q. coccinea*.

a few small *Pinus virginiana*  
seedlings in woods, below  
a very small opening  
in canopy in lower part  
on east bank.

No *Lonicera* in this area,  
which is mostly Rockefeller prop.

Kingsmill Tract } Rockefeller  
Stewartia } prop.  
"Jamestown Lily" }

by HK

Oct. 26 Powhatan Swamp

recently logged swamp  
with Taxodium and Acer rubrum

44415

Ilex verticillata (L.) GRAY

X5

occasional

X1

16

Itea virginica L.

rare

✓1

17

Athyrium filix-femina (L.) ROTH

common on slightly higher ground

X1

18

Cuscuta compacta Juss.

parasitic on Smilax  
and Lindsaea

✓1

19

Callicarpa americana L.

X1

20

Bartonia virginica

rare, on moss cushions

Oct. 26 - North Branch,  
headwaters of Powhatan Creek

in deciduous swamp

X1

21

Smilax hispida

det. D. Greene

occasional

X5

22

Botrychium dissectum v. obliquum

occasional

✓3

23

(umbell) Cicuta bulbifera L.

common

X2

24

(comp.)

rare

✓1

25

Solidago

rare

✓1

26

(comp.)

rare

shrub, fruit scarlet,  
fleshy.  
shrub

fronds erect.

inflorescences swollen,  
flowers white.

shrub, fruits bright  
purple.  
flowers whitish.

sterile

leaf somewhat purplish.

flowers white; fruit immature.

flowers yellow.

involucre almost black,  
disk almost black, rays yellow.

- X 4427 *Chrysopsis graminifolia*  
rare on slightly higher ground
- X 1 28 *Ilex verticillata* var. *cyclophylla*  
locally common
- X 1 29 *Botrychium dissectum* f. *dissectum*  
rare
- X 1 30 *Ranunculus pusciius* Poir.  
rare in mud
- 13 31 (scrub)  
common very locally in mud

- flowers yellow.
- Robins shrub 15m. tall; fruit  
scarlet, fleshy.  
leaves slightly purplish.
- petals yellow, minute.
- plant depressed;  
flower white, throat yellow.

Oct. 27 - flight around  
Williamsburg - Cypress  
swamp, Chickahominy R.  
Jamestown - Kingsmill area -

striking feature of  
yellow tulip trees mixed  
with green pine and  
reddish maples and oaks.  
Marshy creeks with  
meandering channel west  
of airport toward Camp Peary  
About 90% of area is still  
wooded.

Marshy creeks

Angular patches of pine  
repr. old clearing  
stream courses outlined  
by bare trees. These have  
barred streams.

Large areas of marsh  
on Chickahominy R.

Cypress swamp on small  
stream - photo  
area bet this & James R.  
mostly oak, maple, pine  
few tulip.

Lower reaches of most or  
all streams lined by  
marsh, upper by bare trees.  
photos.

Rocky Woods  
Partly pine, partly  
mixed.

Reservoir has bare  
shores.

College Woods -  
Primarily deciduous -  
some Pinus taeda  
Prob. logged in 1920's.

Fagus

Q. prinus

Pinus taeda

Q. alba

Liriodendron

Q. balcata

Q. stellata

Cicer rubrum

Q. velutina

P. virginiana

Carya sp.

Pechinata

Understory

Cornus florida

Myrica

Aralia spinosa

Ilex opaca

Castanea pumila

Aspidodermum

Kalmia latifolia

*Erigeron pulchellus*  
*Osmunda cinnamomea*  
*Epipagus*  
*Galax*  
*Asarum virginianum*  
*Asarum canadense*  
*Cypripedium acaule*  
*C. calceolus*  
*Epigaea*

## Shrub layer

*Viburnum acerifolium*  
*Gaylussacia baccata*  
 (continuous layer)  
*Chimaphila*  
*Vacc. corymbosum*  
*Viburnum rufidulum*  
*Rhus copallina*

## Mitchella

*Medeola*  
*Woodwardia virginica*  
*Chimaphila mas.*  
*Solidago bicolor*  
*S. odonata*

## Sphagnum

Pileated woodpecker



Nov. 10 Wildcat Mt.

west side

Slope viewed from road (photos) most trees are still colored - probably mostly oaks. (first photos from old house, next from nest high hill.)

Mainly range from green to yellow through range of hills. 3 more photos from base of hills - Platanus in p. 9.

Red tailed hawk

Great Horned Owl (heard)

Woodchuck (skull)

Meadow at base of slope

*Solidago altissima*

*Rubus argutus*

*Agrimonia gryposepala*

*Panicum clandestinum*

*Lonicera japonica*

*Rosa carolina*

*Cirsium cf. discolor*

*Eragrostis spectabilis*

*Tridens*

*Phleum pratense*

Edge of wood

*Viburnum nudiflorum*

*Epilobium* sp. (large) in ravine

*Quercus alba* (common tree)

*Juniperus virginiana*

*Platanus occidentalis*

abundant in lower ravine

*Phytolacca americana*

*Ailanthus altissima*

*Lonicera japonica*

*Quercus palustris*

*Smilax rotundifolia*

*S. hispida*

Lower slope forest.

*Lonicera japonica*

*Quercus alba*

*Ostrya virginiana*

*Kalmia latifolia*

Outcrop of large rocks

*Hammamelis virginica* (flowering)

*Quercus rubra*?

*Q. coccinea*

*Q. prinus*

*Pinus rigida*?

*P. virginiana*

*Juniperus virginiana*

*Quercus velutina*?

*Polypodium vulgare*

*Vaccinium vacillans*

*Ceanothus*

*Cornus nigricarpa*

Nov. 10 - Wildcat Mountain Preserve, west base of mountain in edge of woods

- 44432 *Ailanthus altissima*  
occasional
- 33 *Smilax hispida*  
common
- 34 *Elephantopus carolinianus*  
occasional
- 35 *Muhlenbergia schreberi*  
common
- 36 *Epilobium glandulosum* Lehm.  
common in bottom of small ravine.
- 37 *Solidago*  
occasional
- 38 *Rubus occidentalis*  
common
- same - in meadow
- 39 *Hypericum mutilum* L.  
occasional
- same - on lower rocky slopes in woods.
- 40 *Hammamelis virginiana*  
common
- 41 *Ostrya virginiana* (Mill.) K. Koch  
common
- 42 *Hepatica americana*  
occasional
- 43 *Galium circaeazans*  
occasional
- 44 *Hystrix patula*  
locally common

- small tree, leaflets at this season.
- stems green; leaves falling; fruit blue-black. plant dried up.
- decumbent.
- dry except sprouts at base.
- leaves turning reddish above.
- canes arching, very glaucous.
- shrub 3 m. tall, flowers bright yellow.
- small tree about 7-8 m. tall, leafless. leaves purplish

- 44445 *Anemone virginiana*  
*common in this area*
- X3 46 *Solidago caesia* L.  
*common*
- X1 47 *Aster*  
*occasional*

*leaves purple.*

1

200

44

✓1

X3

X1

✓



