RECORD

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F.R. Fosberg

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Field and Collection Note Book

No. 42

(June 4, 1956 - June 24, 1956)

(37362 - 37363)

RYUKYU ISLANDS

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Field and Collection Note Book

No. 45

(June 4, 1956 - June 24, 1956)

(37262 -- 37736)

RYUKYU ISLANDS

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A BOORUM & PEASE PRODUCT

Ishigaki
Taketomi

Ishigaki

1

June 4 - above Inota

(40) (Photo 955-54)

Secondary scrubby forest,
dense, full canopy,
lianas abundant
esp. Flagellaria + Smilax.
Trees mainly secondary
species - Ficus, Macaranga,
Mallotus, Diospyros,
Cannellia, Ardisia,
Schefflera, Trema.

Undergrowth of Psychotria, ^{Lasiacanthus}
and abundant ferns,
Angiopteris, Tectaria,
Polypodium, etc.
especially in gulches.
Arenga common.

Leeches abundant on
dead sticks & leaves
on ground.

(4) (Photo 950-54)

Dense forest of small trees not over 10 m. tall.

Quercus, Ficus, etc.

~~Antididyma~~ shrub layer very marked. *Lasianthus*, *Psychotria*, *Ardisia*, *Myrsine*

Lanceanthe ~~various~~ *Antididyma*, various other sterile shrubs; ~~about~~ about

2 m. tall, stems average 3-5 m. apart.

Trees 2-5 m. apart.

Few ferns, few lianes. Some Zingiberaceae. Almost no other ground cover.

Dead leaves over bare soil general. A few seedlings.

Much logging going on here, even of trees down to 10 cm. dbh. No obvious preference of species - *Styrag*, ~~Lauraceae~~, *Lauraceae*, etc. as well as *Quercus*, *Elaeocarpus*, etc.

Locally there are patches of several ferns, apparently spreading by running rhizomes, also of *Alpinia* sp.

But even where there is a slight gully or steep slope the fern ground cover becomes very abundant.

A few *Asplenium* nodos on tree trunks, otherwise epiphytes confined to a few crustose lichens, algae, etc. one small fern.

But several close clinging vines, incl. *Psychotria serpens*, and one or two others are quite common running up into trees.

Tree trunks here quite commonly up to 3 dm. dbh., occasionally larger.

Additional trees in top layer *Ardisia*, *Elaeocarpus*, *Myrsine*.

Ficus not abundant on ridge tops.

1954

(42)

Deep gulch with small stream, huge boulders and some alluvium in bottom.

Trees here are 15 m. or even more tall, many kinds incl. Ficus, Libotium,

Ferns very abundant and many kinds angiopteris and a small tree fern-like sterile species, a big Polypodium, Thelypteris, Oxypteris, etc.

Arenca common, also a big araceous vine and what looks like a Hoya but non-lactiferous, climbing on rocks.

Mosquitoes in great numbers (Aedes)

1956 Ryukyu Is.

Inoda Yama, ^{W of m.} June 4 - 1-1.5 km. 60° ^{W. of N.} of Inodadeep wet ^{wooded} gulch

37262

3

~~Psychotria~~ ^{Psychotria} ^{discolorata (Red) Copel.}
common on steep banks
~~near~~ along bottom ~~of deep gulch~~^{Ophiorhiza chinensis Hayata}

6

63

~~Psychotria~~

occasional in bottom of

5

64

Psychotria ^{chinensis Hatusima?}

occasional in bottom of

4

65

Ficus ^{angelica Burm. f.}

common in

on rounded wooded ridge

1

66

Ardisia ^{quinquegona Bl.}

common

7

67

Ardisia ^{quinquegona Bl.}

common

6

68

Ilex mutchagana Mak.

~~one tree seen~~ ^{I. mutchagana}

1

69

Ardisia sieboldii Mig.?

5

70

^(few) ^{Leuconophyllum microphyllum Presl}

epiphytic on tree-trunks.

71

Lasianthus ^{tashiroi var. pubescens}

rare

ISHIGAKI ISLAND.

100-150 m.

"bird's nest" habit, sterile
fronds spreading and
ascending, fertile ones
more erect.

shrub 0.7 m. tall;

flowers white.

shrub 1.5 m. tall,

flowers whitish

tree 15 m. tall, 20 cm. d.b.h.
somewhat buttressed.

200 m.

66

shrub 2 m. tall;

fruit immature

67

shrub 2-3 m. tall;

very young fruit red.

68

tree about 10 m. tall,

cut for timber, log

about 15 cm. thick; flowers

white.

69

shrub 1.5 m. tall;

flowers pinkish white,

anthers turning very

dark in age, punctate

when young and pinkish.

70

vine clinging

very closely to tree-trunk.

(Matsum.)

71

small shrub;

Naka: veins glossy above.

- 37272 *Ilex goshiensis* Hayata
6 one tree seen
- 3 73 *Korthalsella opuntia* (Thunb.) Merr.
parasitic on #37272
- 5 74 *Quercus cuspidata* Thunb.
Castanopsis cuspidata (Thunb.) Schott
common
- 5 75 *Elaeocarpus japonicus* S. & Z.
common
- 6 76 *Daphniphyllum*?
Dactyloctenium aegyptium S. & Z.
occasional
- 5 77 *Dryopteris varia* (L.) Oakes
common, especially in
small ravines and depressions
- 5 78 *Cyclosorus triphyllus* (Sw.) Copl.
very common in patches,
especially on slopes and
in depressions, terrestrial
- 5 79 *Alpinia chinensis* (Willd.) Roscoe
common
- 5 80 *Styrax japonica*
rare
Styrax japonica (Thunb.) Merr.
- 5 81 *Randia*
occasional *Tournefortia*

- tree about 10 m. tall,
cut for timber; inflorescence
~~from~~ appear abnormal.
- OK dark green, branchlets
flattened perpendicularly
to ~~branch~~ plane of
flattening of branches,
but basal joint of a
branchlet often terete.
- tree 10 or 12 m. tall,
cut for timber; leaves
bronze beneath,
fruit immature.
- OK tree 10 m. tall, cut for
timber, a few leaves
red; fruit immature.
- 76 Tree 10 m., cut for timber.
- Terrestrial
- 78 running rhizomes
forming patches.
- 19 ~~stems~~ rhizome horizontal,
aromatic when broken;
flowers white, lip with
2 deep pink stripes.
- 80 tree 8 m. tall 12 cm. dbh.
cut for timber.
- 81 shrub 2 m. tall,
flowers white.

- same *Syzygium brevifolium* H. & A.
- 37282 *Eugenia microphylla* Abel
occasional
- 5 83 *Ardisia quinquegona* Bl.
common
- 5 84 *Psychotria* *P. rubra* Poir.
very common, making up
a large part of shrub layer
- 3 85 (orchid) *Stereosandra badiyunnanensis* Ohwi (?)
very local, one colony seen
- 5 86 *Psychotria serpens* L.
common, climbing in
trees
- 5 87 (laurel) *Daphniphyllum teijsmannii* (var.)
occasional
- 5 88 ~~fern~~ (fern) *Homogramma densum* (Hook.) Copel.
~~rare~~ rare in small draw
- 2 89 *Callicarpa inornata* Maxim.
occasional in ravine
- 2 90 (laurel) *Machilus thunbergii* S. & Z.
occasional
- 7 91 *Myrsine sequeirii* Torr.
common
- 5 92 *Ilex goshiensis* Hayata
occasional
- 2 93 *Antidesma*
occasional
- 5 94 *Ilex goshiensis* Hayata
occasional

150-175m.

- shrub 2 m. tall,
flowers with white stamens.
- shrub 2.5 m. tall;
fruit immature
- shrub 2 m. tall; flowers
greenish.
- S. javanica* (Bl.)
det. L. A. Garay
erect, stems whitish
from a fleshy tuber; flower
parts purple-tipped.
- OK
young vines very
closely appressed to
tree-trunk, growing up
from ground. ramifying
in upper branches of
trees; flowers pale greenish.
- Shimawana*
Humansawa
tree 6 m. tall, fruit
immature.
- det. H. H.
Moldenke 89
shrub 2 m. tall,
fruit immature.
- 90 small tree, sterile;
leaves glaucous beneath.
- 91 tree 8 m. tall; fruit
immature
- 92 small tree;
fruit immature
- 93 shrub 1.5 m. tall,
fruit immature.
- 94 small tree,
fruit immature

37295 Dendropanax

3

in deep wet wooded gulch

1 96 ~~from~~ *Bolbitis subcordata* (Copel.) Ching

rare

1 97 *Cephalomanes javanicum* (Bl.) van der Bosch

local, on vertical clay bank

2 98 *Asplenium unilaterale* Lam.

local, on vertical clay bank

3 99 *Randia?* *R. canthioides* Champ.
occasionalJune 5 - south of base
of Maishi Take(43) Chert outcrop in semi-
cultivated area. Has
been burned over not
too long ago.Between the chert boulders
are areas of grass - partly
Imperata, partly *Paspalum*,
Andropogon, etc.On the rocks is a
scrubby woody vegetation
of *Ficus*, *Toddalia*, *Mallotus*,
Euphorbia (?), *Melia*, *Psidium*,
Boehmeria, *Pongamia*?,
Arenca, andone or two other shrubs,
clumps of *Miscanthus*,
and *Polypodium*,
Scelopendria and
Nephrolepis, *Dianella*

96 fertile fronds erect

97 dark green.

99 small tree or large shrub,
fruit immature.Tangled in this are
Vitex, *Ampelopsis*, *Smilax*,
Bauhinia, *Alysicarpus*?
Pueraria, *Lygodium*,
a thorny trifoliate vine,
and *Hoya*.Some *Rubus*, *Cyperus*,
Thelypteris, *Lilium*
longiflorum, *Pittosporum*,
Laubmoos?, *Rosa*,
and *Agave americana*.
Murraya, *Cummins*, *Carmona*,
Oxalis, *Kimilia*,
Leucaea, *Setaria*, (Melast.?)
Gynura, *Conyza*, *Paspalum*,
Wahlenbergia, *Andropogon*,
Artemisia.Peppery fields abandoned
or fallow - pure stands
of *Caribaea*.

1956

June 5 - Chert hills
above Water works.

(44) Unburned chert
outcrops.

Few species noted
here that were not
on the burned hills -
Polygala, *Viola*,
Polypodium thunbergii,
Psychotria serpens,
Vernonia cinerea,
Nephrolepis exaltata,
but everything is
much more luxuriant.
Less weeds, grass thicker
around base.

Abandoned or fallow
paddy fields nearby
are covered by a pure
stand of *Panicum*.

Well up the slope *Dendro-
panax*, then *Quercus*, come
in. *Podocarpus* general
but only saplings.

(June 5 - just south of
base of Maishi Take.)

small hill of chert,
with bare rocks and
bushy vegetation.

- 37300 *Polygala japonica* Houtt.
in rock crevices
1 01 *Viola*
at base of rock face
3 02 *Polypodium Thunbergianum*
in crevices on rock face

same - roadside

- 2 03 *Echinochloa hispidula* (Retz.) Keng det A. Chase
in thick grass
5 04 *Vitex trifolia* var. *heterophylla* (Makr.)
on steep bank
7 05 *Ficus erecta* Thunb.
on steep bank

June 5 - 1 km. s.s.e. Maishi Take

roadside thicket

- 5 06 *Ficus septica* Burm. f.
common
5 07 *Acacia confusa* Merr.
abundant, probably planted
along shallow ravine
3 08 *Cerbera manghas* L.
common

80 m.

Pleopeltis thunbergiana Kaulf.

- 17 October 04 shrub 1.3 m. tall,
flowers violet.
05 shrub 2.5 m. tall,
ripe figs red, mostly
immature.

40 m.

- 06 low bushy tree 6 m. tall,
figs immature.
OK 07 low tree 3 m. tall (others
to 6 m.), trunk crooked,
flowers yellow, fruit immature.
OK 08 small tree, flowers
white, center red, calyx
pale green, tube slightly
dilated only near top.

same - small
chert outcrop with
some soil.

37309 *Conyza* ^{*veronica cinerea* (L.) Less.}
5 common on soil

5 10 *Ernia souchifolia* (L.) DC.
common on soil

5 11 *Cyperus* ^{*distans* L. f. OK J H Kern}
common on soil

5 12 *Ficus* ^{*superba* var. *japonica* Miq.}
very common

1 13 (grass) *Botriochloa glabra* (Rostk.) A. Camus
rare

6 14 *Ampelopsis* ^{*brevipedunculata* (var.)}
very common climbing
on rocks and bushes

5 15 *Mallotus* ^{*japonicus* M. & A.}
common on rocks

3 16 *Nephrolepis* ^{*lissinata* (Sw.) Schott}
common on rocks

5 17 *Polypodium scolopendria* ^{*microsorium*}
common on rocks

3 18 *Polypodium scolopendria* ^{Burm. f.}
common around base of rocks

5 19 *Erodia* ^{*Fagaria nitida* Rostk (= *Xanthoxylum*)}
common clambering over rocks

2 20 *Faya carnosia* (L.) R. Br.
common, climbing on
rocks.

45 m.

erect

10 base of stem purplish.
flowers purple, little
exceeding involucre.

11 erect culms scattered,
solitary

12 shrub 2 m. tall,
mostly sterile at this season.

13 ^{det A. Chao} erect, one fertile culm,
several tillers.

14 ^{*maximowiczii* (Regel) Rehd.?} vine, flowers greenish,
petals very caducous,
fruit blue when ripe,
mostly immature.

15 shrub 1-1.5 m. tall,
leaves green beneath
except when very young
fronds plane, leathery,
pendent

17 ^{Burm. f.} probably same as #37318
but dwarfed by unfavorable
habitat.

11 18 fronds erect

19 ^{*nitidum* (L.)} scrambling shrub,
strong odor when broken.

20 ^{OK} prostrate vine, leaves
very fleshy, flowers white
with red center, waxy-fleshy.

37321 (Apor.) *Trachelospermum asiaticum* Nakai?
common on rocks

3 22 *Raphiolepis liukiuensis* (Koidz.) Nakai
common on rocks

5 23 *Bauhinia japonica* Maxim.
local on rocks

same - weedy cultivated
sweet-potato patch.

1 24 *Euphorbia hirta* L.
occasional

5 25 *Setaria verticillata* (L.) Beauv.
rare

3 26 *Daucus carota* L.
occasional

2 27 *Digitaria chinensis*
occasional *D. violascens* Link

3 28 ~~Mentha~~ *Orthodon scaber* (Thunb.) H. & M.?
occasional

5 29 *Ranunculus sieboldii* Mig.
common

5 30 *Digitaria ~~pestinata~~*
common *D. sanguinalis* (L.) Scop.
check author?

scandent or semi-scandent
shrub, lactiferous, mostly
sterile

erect shrub $\pm$ 1-1.5 m.
tall, fruit immature.

scandent shrub,
flowers pale yellow.

40 m.

OK

purplish

det. A.
Chase

spreading, caespitose

OK BHW

erect, flowers white

culms spreading

det. A.
Chase

fragrant when
broken; flowers pale lavender.
stoloniferous; petals yellow

det. A.

Chase

culms spreading,
rooting at nodes,
scapes somewhat ascending

1956 Ryukyu Is.

mts. 1-2 km. sw.
June 6 1st of Kabira

(nos. 45-62 on photo 950-65)

- (45) lower slopes mixed small pine and various secondary shrubs and small trees. In more open places *Miscanthus* is common but not very dense. Much *Pteridium*, *Elephantopus scollis*.

- (46) Pines become thicker, especially saplings, upward. When sharp ridge is reached, of granitic boulders, the n.w. side is covered by a scrub forest 3-4 m tall of slender trees of various kinds.

(47) On ridge itself the same, with some cycads, pine, Pandanus. On other side, pines.

- (48) Ridge with tangled low vegetation - pines, Ficus, etc. difficult to traverse even constantly using machete. Much *Lygodium*, some *Miscanthus*.

Small yellow jacket nest. The insects do not seem to be bothersome until the tree the nest is on is touched. Then sting viciously. (hadzi Y) (hadzi J) Usually 2-3 wasps on nest (3 cm diam.) Mosquitoes present on ridge, rather aggressive. A small black species, also an Aedes. Possibly breeds in Pandanus axils.

Most common tree in broadleaf scrub forest is pinnate leaved one with 3 follicles. Stinging caterpillar "yamagi" said to like this tree.

- 49 Upward on n.w. slope, scrub forest gets a bit taller, perhaps ~~to~~ 5 m. canopy dense. Shrub layer fairly well developed, almost nothing on ground, a few ferns + sedges + seedlings. Can be walked thru with little use of machete in places.

*Yuccinia
spicata*
rare
here.

"Yamagi" seen on
Cinnamomum rather
 surrounds twig, is
 brown, 2 rows of black
 and yellow specks on
 back, sparse short
 black bristles, longer
 stiff bristles pointing
 downward on legs,
 seeming to help cling
 to twig.

50 In very rocky ground
 stature of scrub is lower
Eurya, *Eugenia*, other
 aridaceous lft. plants
 more prominent.

51 Near top ^{side ridges} ~~stature~~
 becomes lower scrub
 thicker, 2-4 m. tall.
 trunks 2-5 cm. thick.

51 Taller & larger trees
 in shallow draws.

200 m. 52 On first main top the
 vegetation is a dense
 scrub about 4 m. tall.
 Many species, including
Myrsine (a *Ternstroemia*)
Ficus, *Dendropanax*,

Cinnamomum, *Eurya*,
Eugenia, *Clacagnus*, etc.

53

On broad flat ridge
 west from this is a
 forest 5-7 m. tall, trees
 up to 20 (-nearly 30) cm., mostly
 up to 10 cm. full canopy,
 sparse shrub layer,
 many species of trees
 + shrubs. *Garcinia spicata*
 rare here. Trees 1-1.5 m.

apart. Some lianes.
Flagellaria, *Smilax*, etc.
 Ferns fairly abundant
 on ground.

In places the forest is
 largely *Ficus*, *Elaeagnus*
 (sp.), several *Sauraceae*,
Camellia,
 in other places largely
Quercus cuspidata.

at about 200 m. or a
 little higher *Pleuroblastus*
 comes in, at first
 mixed with forest,
~~etc~~ then forming
 almost pure brakes.
 A few old pines scattered
 around edges and on
 ridges in these brakes.
 Canes finger size or smaller,
 orange to greenish.

54

Clump forming but also with underground horizontal rhizomes, clumps coming from side branches from these, single culms also. Blade of culm sheaths appressed and divergent on same culm.

These brakes are about 4 m. tall. They occur in patches on the ~~n.e.~~ sides of the high crests, but the highest peak has none, but is wooded all over. On high crests the brakes are lower in stature, 1.5-2 m.

(55) ~~50~~

(56)

In the canyon behind Kabira are patches of bamboo down to 150 m or even lower. No pattern to distribution except that they are on ridges separated by wooded ravines. All have a few spreading umbrella-shaped pines.

Some low scrub in with bamboo near crests.

(59)

Main ridge to west seems to have better forest, but trees very gnarled and spreading.

57

In saddles the forest is about 10 m. high, trees up to 15-20 cm. dbh. many of them clusters of stump sprouts. Canopy full, but not dense, shrub layer well developed. Main canopy largely oak. Ilex forms a loose second story. Little on ground - a few ferns, terrestrial orchids, sedges, *Ligularia* etc.

(58)

(59)

In main draw leading up to west ridge and on ridge, itself, mentioned above, trees to 15 m. and 3 dm. dbh. Many ferns on ground. Dense canopy. Leeches in bottom of ravine. Well developed shrub layer. Many species of trees, esp *Quercus* + *Elavocarpus*. One tree seen 5-6 dm. dbh. 15-18 m. tall.

60 ~~upper part of~~ at head of small
~~mouth~~ ridge of valley
 has thick forest
 about 6-8 dm. tall.
 Many spp. incl.
 Dendropanax, Ydessa,
 etc. Tangled with
 Freycinetia, Smilax
 Eleoagnus, Flagellaria, etc.

61 S. Slope of ~~valley~~ ridge
 far from ~~valley~~ mouth - dense
 forest about 8-10 m.
 High trees mostly
 small, 10-15 m. dbh.
 occasional large
 Ficus with compound
 trunk.
 Lianas, incl. Entada,
 abundant. Many
 ferns. Shrub layer
 very sparse.
 Some Alocasia.

62 Near the bottom
 of the valley Ficus
 become abundant.
 Maera and Alocasia
 common. Secondary
 species, as Mallotys
 become dominant.
 Vines, esp. Flagellaria
 become more abundant.

1956 Is Ryukyu Is.

June 6 - about 1 km. s.w. of
Kabira
in steep trail in semi-
open vegetation

37331 *Mitrasacme pygmaea* R. Br.
very local

37331 a *Digitalis purpurea* (L.) Buse
in scrub forest on steep
slope

2 32 *Citrus depressa* Hayata?
wild

1 33 *Ligularia tussilaginea* (Burm. f.) Makino det
Walther 1974
Farfugium tussilaginea
common *F. japonicum* (L.) Kitam.

2 34 *Cinnamomum*?
common *C. japonicum* Sieb. ex Hance

ridge east of ~~Mae~~ Mae Take
June 6 - 1.5-2 km. s.w. of Kabira
on high wooded ridge

1 35 *Ardisia crenata* Sims
occasional

2 36 (Lam.) *Psychotria thurbergii* S. & Z.
occasional

5 37 *Elaeocarpus japonicus* S. & Z.
common in ~~woods~~

5 38 *Ficus erecta* Thunb.
common occasional

5 39 *Elaeocarpus sylvestris* (Lam.) var.
common *ellipticus* (Thunb.) Hance

1 40 *Pleuroblastus hispidus* (Munro) Nakai
locally abundant on
high crests and on patches
on north slopes.

40 m.

31 flowers white

det A
clax

100 m. 2 slender ~~small~~ small
tree, 3-4 m. tall; fruit
very immature.

125 m. sterile "yama-gobo" (?)

34 sterile shrub, host for
brown "yamagi" or
stinging caterpillar.
"shiro tabi"

200 m.

35 small slender shrub
0.8 m. tall; fruit immature.

36 small tree, sterile.
"aka tabi", bark used
for "okinawa incense".

ok

37 tree 5 m. tall; fruit immature.

38 small slender tree 4 m. tall.

39 tree 8 m. tall.

det F A
Mischocarpus (Mischocarpus)

sheath forming dense brakes 2-4 m. tall,
canes greenish to orange,
in clumps or solitary, clumps and
solitary canes from branches ^{top} bottom
of running rhizome;

- 37341 *Adiantum flabellulatum* L.
common, terrestrial
- ✓ 42 ~~*Adiantum*~~ *Lindsaea commixta* Tagawa
occasional, terrestrial
- 7 43 ~~sub~~ *Tricalysia dubia* (Lindl.) Ohwi
occasional
- 44 *Dendropanax*
common

petioles black

petioles green

tree 8m. tall (others seen taller)
fruit immature, seeds in cell.
tree 3 m. tall, flowers
green.

June 7 - above Yochubara
(nos. on Photo 950-113)

- (63) Forest in lower part of canyon above water
undergrowth of *Ficus*, *Mallotus*, *Andisia*, *Diplospora*, *Cyathea*, *Quercus*, *Wendlandia*, *Schefflera*, tangled undergrowth of *Arenca*, large ferns, diaceous vines, *Cassalpinia*, shrubs, etc.

- (64) At about 100 m. on the east wall of the gulch *Quercus* becomes dominant forming a loose forest 10 m or so tall with thin undergrowth. *Cyathea*, *Claoxarpus*, *Andisia*, etc. also common. Terrestrial ferns, *Blechnum*, etc. common. On some gentler slopes a complete understory of the diminutive tree fern. trunk 2 m. or less, fronds to 2 m. now. sections of trunk used as bases for house plants.

- (65) On a ridge coming down to west of this gulch *Quercus* is dominant in a drier type of forest 10-12 m. tall. A distinct second story 5-8 m. tall formed of *Andisia*, *Diplospora*, *Eugenia*, etc. flrubs' layer of *Psychotria*, *Lasiacanthus*, *Antidesma*, small *Cyathea*, *Eugenia*, *Angiopteris* etc.

Ground cover sparse, of ferns, seedlings, *Alpinia*, broad leafed grass, etc.

Some *Smilax* but lianes not prominent.

- (66) Upward forest becomes more diversified. *Freycinetia* common. Some epiphytic *Asplenium nidus*. "*Sada mushiri*" a "*Sarumushiri*" young fronds eaten, cooked, at time incense is burned. Cooked fronds have an odor much appreciated by older men & women. Not eaten much now.

- (67) On level ridges at higher altitudes the trees reach 15 m. tall and 5 dm. dbh. Mostly 3-4 dm. or smaller. *Quercus* most abundant but many others. thick shrub layer about 2 m. *Psychotria*, *Antidesma*, *Schefflera*, etc. a few small bunches of *Pleioblastus*.

- (68) Near summit stature of trees becomes lower. ferns both terrestrial and epiphytic become more abundant. Bamboo becomes more abundant. Tree trunks 2-3 dm. dbh.

- (69) At summit is a patch of bamboo with only a few scattered stunted trees. The patch is on the north side. Oaks and small lauraceae are most common trees around summit.

Bamboo is about 4 m. tall.

- (70) Next mountain eastward is much higher, and has a very large patch of bamboo, with low forest in shallow ravines.

- (69) The bamboo here seems identical in every respect with that on Kabira Mts.

1956 Ryukyu Is.

June 7 - ^{mountain} ridge above
Yoshihara Villagein thick wet woods
near summit

- 37345 *Polypodium thunbergianum*
5 occasional, epiphytic
well up on tree trunks.
- 5 46 ~~*Elaphoglossum*~~
large colony on shaded rocks
- 6 47 ~~*Neolitsea*~~ *cinnamomum* ^{= *desorderlinii* Engl.}
common around edges
of bamboo brake
- 1 48 *Raphiolepis*? ^{*lutea* (Koidz.) Nakai}
common in edges of
bamboo brake
- 2 49 *Podocarpus macrophyllus* (Thunb.) D. Don
occasional in understory,
(~~not forming a~~ ^{det. C.K. Allen}
^{N. *hoshii*} *sericea* (Bl.) Koidz.?)
- 6 50 *Neolitsea* ^{N. *hoshii*} *sericea* (Bl.) Koidz.?
occasional in canopy layer
- 6 51 *Ardisia* ^{*quinquegona* Bl.}
common
- 6 52 *Ilex* ^{*gashimensis* Hayata}
occasional
- 6 53 ~~*Dioscorea*~~ ^{*Randia* *sandwichiana* Champ.}
common
- 5 54 *Randia*
occasional
- 5 55 *Eunymus* ^{*luteolucens* T. Ito}
rare
- 6 56 *Antidesma* ^{*japonica* S. & Z.}
common in undergrowth
- 5 57 *Scleria* ^{*tenax* (L.) Fernald}
occasional

400 m.

Pleopeltis thunbergiana Kaulf.

- cheimophylla bicuspis* (Bl.) Presl
sterile fronds mostly
~~def~~ curved downward.
- 48 small tree, 5 m. tall,
ends of branches
bunchy, compact.
- 48 small tree 4 m. tall;
fruit immature.
- 49 sapling 2 m. tall,
sterile (no mature trees seen)
- 50 tree 10 m. tall; fruit
immature.
- 51 small tree very young
fruits pinkish.
- 52 small tree; fruit immature.
- 53 tree 8 m. tall; fruit
immature.
- 54 small tree; bud only.
- 55 small shrub, stems
green.
- 56 small shrub, fruit
immature.
- 57 caespitose

same - ³ high wooded ridge
37353 ~~Styrax~~ *Adinandra yauyauensis* Ohwi
5 ~~very~~ rare

2 59 ~~Vaccinium?~~ *Camellia lutchuensis* Ito
rare

3 60 ~~Polygodium~~
occasional on mossy boulders

6 61 ~~Cinnamomum?~~
occasional *Styrax japonica* S. & Z. (?)

same - wooded ridge
3 62 *Lasianthus* *L. tashiroi* var. *pubescens*
rare

2 63 *Ardisia* *quinquegona* Bl.
common

4 64 *Lasianthus* *cyaneocarpus* Jack.
occasional

5 65 *Cinnamomum* *doederleinii* Engl.
rare

6 66 *Pteris* *dispar* Kunze? *P. semipinnata*
common locally in
disturbed part of forest

4 67 ~~Asplenium~~
common locally, terrestrial

5 68 *Tectaria* *variolosa* (Wall.) Copel.
very common, terrestrial

~~same - small wooded valley~~
5 69 *Croton* *unningii* M. & A.
very local

350 m.

ex char.

tree 7 m. tall, leaves
somewhat glaucous beneath.
shrub 2.5 m. tall, sterile.

Proxypia kamashiroi (Hayata) Natsai

tree 8 m. tall; fruit immature
var. *kotoensis* (Hayata) Masam. & Suzuki

200-300 m.

(Matsum.) Natsai

63 shrub, fruit pink.

64 shrub

65 small tree; leaves
glaucous beneath

var. *dispar* (Kunze) Baker

Athyrium lanceum (Thunb.) ^{Milde} Wagner, ined.

69 shrub 1.5 m. tall

same - small wet
wooded valley

37370

Cyathea

abundant, forming
a large part of understory

37370A

Gymnosphaera podophylla (Hook.) Copel.

same - Tangled disturbed
forest on lower slopes
in valley mouth

37371

Capricorn amnum L.

rare

2

72

Elaeagnus
common

1

73

Polygonum chinense L. ?
common

6

74

Turpinia ternata Nelsai
common

2

75

~~*Psychotria*~~ *Ophiorhiza linkiensis*
common *Ophiorhiza*

5

76

Costus ?
very local

same - wet valley bottom

4

77

~~*Pleurostachys*~~ *bambusoides* S. & Z. vel aff.
occasional

150 m.

trunk 1.5 m. tall,
leaves ascending.
(2 leaves represented,
one with tip from another
from same plant).

80-100 m.

OK

71 tangled herb, fruits
red, not very hot.

72 scandent shrub,
sterile; fruit said to be
eaten "subing"

73 scandent; succulent
young stems slightly
acid, peeled and eaten
"sume"

74 tree 6 m. tall, fruit
immature.

Hayata

75 erect, 0.5 m. tall; flowers
white.

76 herb 1 m. tall, leaves
conspicuously spiralled,
flowers white.

80 m.

det F.A.

McClure

(provisionally

juvenile)

77 rhizomes deeply buried,
horizontal, branches
arising from the bottom
of rhizome at intervals
of 0.5 m. or more.

1956 Ryukyu Is.

June 8 - Reef on east coast north of Todoraki # Gawa perhaps 1000 m. wide

~~self~~ reef margin not at all raised. gently sloping off to a margin cut by surge channels, a few of which penetrate 50 m. or so, the outer the zone where a number of species of flat, short-branched corals are common. Seems to be basically a growth surface with a smooth Porolithon in area of numerous surge channels but not ~~a~~ very actively growing.

The zone of few surge channels shows abrasion and some flat corals, also abundant Turbinaria on back part, making an almost continuous dark drab green band about 20 m wide.

Then typical rather minutely rough reef flat for 300 m. or so, with thin algal felt.

The growth surface on the outer 50 m. is evidently a veneer on an old cut surface ~~about~~²⁻³ dm. below the reef flat level. A few remnants of the old level remain, badly eaten and undercut.

No obvious agent ~~of~~ of abrasion but much abrasion evident on all bumps and points on algal surface and on reef flat remnants. A few loose rocks in deep tide pools, none lying on surface.

The 300 m. of reef flat is very slightly rolling in topography and slopes very slightly toward back and front from a central high area. The total relief is probably not 2-3 dm. covered by a rather good cover of Liagora.

inner has
hills
rounded
cobbles
stony
shallow
over it.

The 400 m. next inward is lower and has a very irregular surface with a relief of perhaps ~~to~~ 1 m. ^{some} patches being deep and sand bottomed, others shallow and rough and covered

1956 Ryukyu Is.

by a large brown alga. This area has water flowing strongly northward at low tide, as there is no escape seaward through the reef ridge.

In shallower sand bottom pools is a sod of *Thalassia*, *Halophila* and *Cymodocea*.

The 200 m. between here and beach is shallower not so rough but not smooth, with many large boulders covered by an algal felt with sand.

Bordered just below beach by a typical erosion ramp.

see 44.54

37378

Turbinaria

dominant on a strip just back of reef margin

~ 79

Largassum

dominant on shallower ~~flat~~ areas in central part of reef.

~ 80

abundant on inner part of outer reef flat.

0 m.

mustard brown, soft.

- 37381 *Halimeda stipitata*
common on outer part
of reef at low tide level.
- 2 82 *Liagora*
dominant on outer reef flat
- 83 *Halophila ovalis* (R.Br.) Harb. f.
abundant locally
in sandy areas at
about mean low tide
level on outer edge of
inner reef flat.
- 3 84 ~~*Cymodocea*~~ ^{*Halodule*} *uninervis* (Forst.)
abundant locally in
sandy areas at about
mean low tide level
on outer edge of inner
reef flat.
- 4 85 *Thalassia hemprichii* (Ehrenb.)
abundant in sandy
areas at and somewhat
below mean low tide
level on middle part
and inner part of reef.

June 8 - mouth of Mizara Gawa
mangrove swamp

- 5 86 *Bruguiera conjugata* (L.) Merr.
common
- 3 87 *Kandelia candel* (L.) Merr.
rare
- 4 88 *Rhizophora mucronata*
abundant

erect from stalk
buried in sand.

rhizomes buried in sand
leaves partly protruding

Aschers. det. C. den Hartog 1969

rhizomes buried in sand.

Aschers. in
Petermann
det. C. den Hartog 1969

rhizomes deeply buried
in sand.

0 m.

small tree, 3 m. tall,
calyx red, radicle
pendent, hexagonal
in cross section.

shrub 2 m. tall, buds
whitish.

small trees, 3-4 m. tall,
with stilt roots

June 9 - above Kaiman,
on Miyama

(71)
(Photo
950-10)

airfoliate
tree
Diospyros

Lowland thickets of
Ficus, *Macaranga*,
Premna, *Boehmeria*,
Mallotus, *Diospyros*,
Barringtonia
tangled with *Caesalpinia*,
Canavalia, *Flacellaria*,
Ampelopsis, *Smilax*,
Pongamia?, *Cibotium*, *Glochidion*,
undergrowth of *Alocasia*,
Alpinia speciosa ~~is~~
Psychotria, *Evodia*, *Maesa*

Paspalum conjugatum
abundant along trails.

A large *Ficus*, 15-18 m. tall,
covered by epiphytes and
aroids suggests what
the forest may have been

(72)

Farther along the
secondary thicket becomes
more scrubby and
has more native forest
species in its composition
at about 100 m. *Quercus*
~~lescuri~~ and *Fraxinus* appear,
also *Antidesma*, etc.

(73)

Old fields at about 100-120 m.
being invaded by *Melia*,
Xanthoxylum, *Macaranga*,
Mallotus, etc.

A small colony of *Sporobolus per-caprae*

(74)

Lower slopes covered
by a dense low wood
of many species,
mostly those associated
with *Quercus*, but
a few secondary ones.
Trees mostly 5-8 m
tall, less than 10 cm. dbh.
Many are clusters
of stump sprouts.

75

Along the stream valley
the trees are taller about
10 m., considerable diversity
of species, but few trees
over 10-12 cm. dbh.
Shrub layer rather
marked, but possible
to walk without much
cutting. Rather few lianes.

(76)
(photo
949-
950-11)

300 m?
350

Up the valley the forest becomes taller, more and more big trees, much wetter, more ferns and much *Fragaria*.

Epiphytes more common here. Small species of tree fern common.

Much lumbering ~~is~~ is being done in this area.

(77)

Upward the forest becomes wetter, more luxuriant, but of lower stature.

epiphytes very common.

This would almost be regarded as rain forest. On ridge stature is still lower.

(78)

On a broad horizontal ridge just below summit is ~~thick~~ forest 10 m. or so tall.

Here are mud flats, locally, with no groundcover and little or no shrub layer.

Where there is no mud, shrub layer and ferns very well developed.

soil on summit Amotsan

pH 6 surface soil - brown

pH 4.5-5 3-10" down strong brown

pH 4-4.5 10"-30" " " "

Summit covered by extensive brake of *Pleiothlasia* - about 2 m tall on exposed summit, taller lower down. To 4 m.

A few shrubs scattered in the bamboo - *Cinnamomum*, *Viburnum*

Ground cover very well developed in bamboo of *Aplasmium*, ferns, etc. *Ligularia*

Going down s.w. ridge the same sequence is repeated in reverse. The forest is quite wet for a good distance down. Then a ridge that is drier, the forest largely *Quercus* but small size, ferns few in number, undergrowth not luxuriant.

Then in valley bottoms above Shira Mäzu there is tangled lowland forest.

June 9 - Shira Mizer, tribute, any
~~top~~ upper part of north
 branch of Nagara-Gawa.

37389 *Mallotus japonicus* M.-A.
 in thicket in ~~steep~~
 deep river ravine

4 90 *Eugenia jambos* L. ^{OK}
~~June 9~~ bottom of stream
 valley ^{ENW}

June 9 - southwest
 slopes of Omoto-san,
 above Shira-Mizer

6 91 *Tapinidium pinnatum* (Cav.) C. Chr.
 on earth banks along
 trail in woods

2 92 *Asarum*
 common in wet woods

6 93 *Camellia lutchensis* T. Ito
 common in wet woods

3 94 *Damnacanthus*
 occasional in wet woods

June 9 - plateau just
 south of summit of
 Omoto-san ~~Peak~~ Lake
 in wet low forest

6 95 *Ligustrum lilalinensis* Koidz. ?
 rare.

9 96 *Scleria ternstrois* (L.) Fernald
 common

30 m. small tree or large shrub.

50 m. spreading tree,
 fruit pinkish yellow
 when mature, edible,
 with strong flavor.

250
~~200~~ m

450 m. sterile; rhizome with
 strong odor, between
 licorice and Vicks
 Vapo-rub.

475 m. small tree 3 m. tall.

500 m. shrub 5 m. tall,
 leaves glossy; fruit
 immature.

500 m.

small tree 4 m. tall;
 flowers white, fragrant.
~~several~~ stems from base.

- 37397 *Psychotria*
common in undergrowth
- 5 98 *Polypodium*
occasional, climbing
tree trunks
- 5 99 (~~Psychotria~~) *Skimmia japonica* Thunb. (? = *S. lutchensis*)
occasional
- 37400 *Eurya*? *Eurya sakishimensis* Hatusima
rare
~~*Casimira lutchensis* Itô~~
- 3 01 (fungus)
rare
- 4 02 *Mussaenda*
occasional

June 9 - summit area
of Omoto - ~~san~~ Dake
in ~~the~~ dense brake of dwarf
bamboo (*Pleioblastus*)

- 3 03 ~~*Asplenium*~~ *Athyrium fraxinifolium* (Hook.) Milde
very common under
bamboo (also seen in
forest below)
- 2 04 *Pleioblastus* *shimo* (Fr. & Sav.) Makino
dominant on summit
- 5 05 { *Ilex fobergiana* Hu
Ilex muchagana Makino
occasional in ^{summit of Omoto -}
cane-brake ^{June 9, 1956}
- 2 06 *Schefflera odorata*?
in "fox-hole" on summit ~~Omoto~~
Stauntonia hexaphylla (Thunb.) Decaisne

shrub 2 m. tall,
flowers pale green.
Microsorium hancockii (Baker) Ching?

- ~~*Crucis Nakai*~~ small tree, bark and leaves
highly aromatic; fruit immature
- 400 small tree, sterile,
(attacked by fungus #37401)
covering dead portions
of *Eurya* sp. tree with
a silvery white coating,
giving an eerie impression
in wet shady forest.
- 01 scandent shrub,
calyx lobe white, corolla
yellow.

520 m.

→ *Diplazium donianum* (Mett.) Tard. - Bl.
det. C.V. Morton

- det. A. Chose 04 densely crowded,
forming a brake 2-4 m. tall,
canes orange color when
mature.

Dake
9, 1956

- 06 sterile scandent shrub or vine,
leaves conspicuously fallacious
reticulate beneath, aromatic.

June 9 - south ridges of
Omoto-san ^{Dake}
in thick low wet forest

37407 (~~tree~~) *Actinodaphne longifolia* (Bl.) Nakai
occasional

3 08 *Hydrangea scandens* ^{ssp. chinensis}
occasional (Maxim.) Mcl.

5 09 *Lindsaea* ^{*macraea* (H. & A.) Copel.}
occasional, climbing
on tree-trunks.

3 10 (~~tree~~?) *Styrax japonica* S. & Z.
occasional

June 9 - gulches at
northeast base of Omoto-san ^{Dake}

11 *Maesa* ^{*tenera* Mez}
common in second growth

June 9 - valley of Miyara-
gawa, 1 mile north of
Kairan Village

10 12 *Fraxinus* ^{*griffithii* C. B. Clarke}
in second growth thickets

2 13 *Vincetoxicum* ^{*cynanchum* *linhense* Warb.}
climbing in second-
growth thickets

5 14 *Ficus* ^{*ampelas* Burm. f.}
in second-growth thicket

15 *Bridela* ^{*ovata* Decaisne}
in second-growth thicket

475 m small tree 6 m. tall,
in bud only; leaves
glaucous beneath.

475 m. small tree 5 m. tall,
flowers green, sterile
flower greenish white

475 m.

475 m.

200 m.

shrub 1 m. tall, showing
a common abnormality.

100 m

tree 8 m. tall

13 vine twining in trees,
petals bronze with
greenish centers,
corolla white.

14 small tree

15 small tree, leaves
glaucous beneath,
fruit immature.

June 10 -

(79)

(Photo
945-24)

small mangrove swamp

low scrubby growth
with considerable
open ~~so~~ sandy, gravelly
mud.

Excoecaria and
Rhizophora mucronata
most abundant, with
considerable *Bruguiera*
conjugata, some *Pumnitzera*
racemosa, and with
Aerodendrum inerme
getting down into swamp,
also *Vitex* (prostrate form).
Some open areas covered
by *Paspalum vaginatum*,
others, less low and
wet, by *Panicum ambiguum*.

General height of
~~the next~~ woody
plants here is 2-3
m., with some *Excoecaria*
reaching 4 m.

(80)

(Photo
945-24)

second small
swamp toward
Nagara, at mouth
of small stream,
has principally
Bruguiera, with
some *Rhizophora*
especially toward
the sea.

borings yield a dark
gray shell and coral
marl, rather clayey
in places, elsewhere
gravelly.

General height of
woody plants here
about 2 m.

June 10 - mouth of
Nagura-gawa

(81)
(photo
945-24)

broad open flats
with no vegetation
except here and there
areas of sea-grass.

Areas of low mangrove
mostly *Rhizophora*,
some *Burquina*, a very
little *Avicennia* and
Sonneratia, also areas of *Paspalum vaginatum*.

None of this more than
2-3 m. tall

Exposed chert or
schist rocks bear
Limbristylis, *Hedyotis*,
etc.

(82)

Along river bank
a mixed forest of
Hibiscus, *Pongamia*,
Ficus, *Pandanus*,
Peritiera, *Raphirolepis*,
Porteria, *Excoecaria*,
Premna, etc. festooned
with *Caesalpinia*, *Derris*,
Dalbergia vines.

This is dense, tangled
and penetrated with
difficulty. It merges
into the mangrove
swamp in places.

(83)

Back of this is an
open, grassy area,
varied with thickets.
Here the grass is principally
Ischaemum muticum,
with some *Imperata*.

1956 Ryukyu Is.

June 10 - ~~3.4~~ km. n.w. of Nagura, along coast s. of

- 37416 *Paspalum vaginatum* Swartz
dominant in many wet saline places, usually submerged by high tide.

Shira Hama, at
June 10 - mouth of small stream ~~2.7~~ 2.7 km. n.w. of Nagura

in mangrove swamp on muddy shell and coral marl.

- 17 *Bruguiera conjugata* (L.) Merr.
commonest species

~~June 10 - mouth of Nagura - Gaiwa~~

- 8 18 *Summitzera racemosa* (Sack) Vahl
occasional

June 10 - mouth of Nagura + Gaiwa

- 7 19 *Ischaemum muticum* L.
abundant in low open ground back of river bank thickets.

- 2 20 *Fimbristylis cymosa* R.Br.
on chert boulder in river-mouth mud-flat

Kera laki
~~M. laka~~

- OK A. Chao
1 m. culms ascending, forming a loose sod.

0 m.

OK

shrub 2 m. tall, with closely crowded prop roots and small "knees" or loops of root protruding above the mud; flowers with calyx red, petals dull orange.

1 Vahl OK

shrub 1.5 m. tall; leaves fleshy-coriaceous; flowers white.

1-2 m.

OK A. Chao

rhizome prostrate, on surface of ground, fruiting culms erect.

OK

caespitose

1956 Ryukyu Is.

- 37421 *Caesalpinia* *naga* (Willd.) Ait.
common in riverbank ~~forest~~
thickets
- 3 22 *Zostera japonica* Aschers. & Gr. det. C. den Hartog
~~Cyrtodactylus latundata Aschers. & Schreb.~~
forming a thin sod on sandy
mud-flat exposed at very low tides
- 5 23 *Pousteria* *obovata* (R.Br.) Baehni
occasional in river-bank
thicket.
- 5 24 *Catharanthus roseus* (L.) G. Don
large colony in open area
back of riverbank thicket
- 5 25 *Avicennia officinalis*
A. marina (Forsk.) Vahl
local in edge of
mangrove swamp
- 3 26 *Raphirolepis* *liukiuensis* (Koidz.) Nakai
occasional in
river-bank thicket.
- 3 27 *Ficus* *superba* var. *japonica* Miq
common in riverbank
thicket

woody climber.

1969

0 m.

1 m. 23 shrub 2.5 m. tall.

2 m. OK 24 flowers magenta.

0 m. 25 shrub to 2 m. tall,
flowers orange, on
spreading lower branches.1 m. 26 ~~shrub~~ shrub 2.5 m.
tall.27 small tree, almost
deciduous, at this
season, fruits pink to
purplish.

June 11 - Miyara River
3 km. n.w. of Miyara

(84)
(photo 940-26)

trifoliate
secondary
tree!

Thickets and woods
along river on banks
and limestone bluffs.

Hibiscus tiliaceus and
several species of *Ficus*,
Melia, *Pterocarpus*, *Cordia*,
a tall bamboo *Ochrosia*,
Melaleuca, and a number
of other trees, tangled
and festooned with
Caesalpinia 2 spp., *Clematis*,
Ipomoea ampelopsis,
Canavalia, *Clerodendrum*
inermis, *Wedelia biflora*
and other vines and scrambling
shrubs. *Flagellaria*, *Smilax*, *Dioscorea*,
Dioscorea.

The ground, in many
open places, is grass
covered, especially *Oplismenus*,
in more shaded
places, fern covered, by
Thelypteris.

June 11 - 3 km. n.n.w. of
Miyara

(85)

Outcrop of volcanic rock
covered by grove of small
pines, periphery by
Imperata. Under pines
growth is sparse, with
Lilium, *Ancilema*, *Vernonia*,
Elephantopus, *Polygonum*,
Cornmelina, *Oplismenus*,
Desmodium, *Osbeckia*,
Clematis, *Viola*, *Oxalis*,
several other weeds, most
of them quite underdeveloped.
Ground mostly covered by
pine needles.

June 11 - 0.7 km. e. of
4 km. n. of Miyara

(86)

Outcrop of thinly bedded
schist. Covered by sparse,
recently burned *Imperata*,
with considerable
Andropogon, various
other grassland species,
as *Wahlenbergia*, etc.
in small amounts.

June 11 - 1.5 km.
north of Miyara

87

dissected limestone roughly aligned in parallel short ridges and rows of rough outcrops, some with furrows or very shallow ravines between them, more commonly with elongate cultivated patches between them. Where there are cultivated patches the ridges are accentuated by throwing of coral picked up in the patches on the ridges.

Where not cultivated the spaces between the ridges are covered by *Imperata* with many associated species. *Rosa* and *Psidium* are very conspicuous.

Setaria, *Themeda*, *Paspalum*, *obiculare*, *Fimbristylis*, *Lycopodium*, *Labiates*, *Lespedeza cuneata*, *Centella*, *Elephantopus* are all common.

Ridges vary from almost bare to bushy. Usually some *Miscanthus*, *Ficus*, *Ampelopsis*, *Polypodium*. On larger ones *Pandanus*, *Toddalia*, *Morus*, *Pipturus*, *Arenga*, *Allophylus*, *Smilax*, *Lycopodium*, *Thelypteris*, *Broussonetia*, *Crataeva*, etc.

88

Patch of woods of *Ficus* 2-3 spp., *Hibiscus tiliaceus*, *Morus*, *Rhus*, *Pipturus*, *Melia*, etc. *Melaleuca*, *Pterocarpus*, forming a fair canopy, tangled with *Ipomoea*, *Smilax*, etc. *Lycopodium*, *Flagellaria*, *Clematis*, thick undergrowth of *Andisia*, *Psychotria*, *Damynacanthus*, *Alocasia*, *Boehmeria*, *Euridia*.

89

across road is outcropping of Eocene limestone.

June 11 - 1.5 km. n. of Miyara,
s. of Miyara, Makinaka
in grass on shallow soil
between limestone outcrops.

- 37428 (~~det.~~) *Tenium viscidulum* var. *miquelianum*
occasional
3 29 *Fimbristylis monostachya* (L.) —
occasional
3 30 *Fimbristylis dichotoma* (L.) Vahl
occasional
5 31 ~~*Thespesia japonica*~~
locally common *Apluda mutica* L.

- same - cultivated field
2 32 *Duchesnea indica* (Andr.) Focke
weed in cultivated
field, in full sun.

- same - on rough limestone outcrops
3 33 *Polypodium scolopendria* Burm. f.
common *Microsorium scolopendria* (Burm. f.) Copel.

- 2 34 *Thelypteris*
common *Cyrtosorus acuminatus* (Hollett.) Nakai

- 2 35 *Randia sinensis* (Lour.) R. & S.
occasional

- 2 36 *Broussonetia papyrifera* (L.) L'Her.
occasional

- 2 37 *Crataeva religiosa* G. Forst.
rare

- 4 38 *Allophylus timorensis* (DC.) Bl.
rare

- 3 39 *Polygonum chinense* L.
common

65 ~~80 m.~~
↓

(Maxim.) Hara
flowers ^{with lobes} deep pink, tube white.

Harb.

30 culms single or in
tufts of 2 or 3.

31 culms single, ~~are~~ erect
from prostrate base
on stilt roots.

32 prostrate; petals yellow.

33 fronds erect.

35 shrub, fruit immature
branches rigidly decussate.

36 shrub; sterile.

37 shrub; sterile.

38 shrub, flowers white

39 extensive scrambling
herb. flowers white.
~~creeping~~ prostrate stems
rooting at tips.

1956 Ryukyu Is.

37440 *Phascelus*
occasionalsame - in patch of
dense tangled woods1 41 *Morus* (australis var.?)
common2 42 *Muraya paniculata* (L.) Jack.
occasional, edge of wood5 43 *Randia sinensis* (Lour.) R. & S.
very common in undergrowth2 44 *Psychotria*
common in undergrowth

25

Akashita,
June 11 - bridge over
Miyara River, 3 km.
n.w. of Miyarain old quarry in
argillaceous limestone5 45 *Nephrolepis exaltata* (L.) Schott
abundant5 46 *Pteris vittata* L.
common5 47 (grass) *Pogonatherum crinitum* (Thunb.) Kunth
common1 48 *Euphorbia* *chamaesyce parannaquensis*
occasional5 49 *Wedelia biflora*
common4 50 *Melanolepis multiglandulosa*
commonin thicket on side of
road cutflowers yellow,
keel twisted.

80 m.

tree 6 m. tall, spreading.

ok 42 shrub 1.5 m. tall;
flowers white.

43 shrub 2.5 m. tall.

44 shrub.

70 m.

ok 45 fronds erect.

46 fronds ascending

det A.
Chase48 erect, tip arching,
(Blanco) Hara flowers white.ok 49 sprawling herb,
flowers yellow.

ok

- same - in river terrace forest, limestone soil
- 37451 ~~bamboo~~ *Bambusa multiplex* (Lam.) Rensch.
2 common
- 5 52 *Ageratum houstonianum* Miell.
occasional in small opening.
- 5 53 *Orchid* *Nervilia aragoana* Gand.
small colony in grass under trees
- 5 54 *Eurardia* *Melicope awadani* (Hatusima) Ohashi & Hatusima
common in understory
- 5 55 *Eurardia* *same*
common in understory
- 5 56 *Oplismenus compositus* *O. patens* Honda det. A. Chase
carpeting ground under trees
- 5 57 *Cordia dichotoma* Forst.
common
- 5 58 (~~Antidesma~~) *Antidesma pentandrum* var. *barbatum* Merr.
occasional
- 1 59 *Mucuna urens* *same as 58*
rare

June 11 - 0.7 km. e. of Kawahara,
4 km. n. of Miyako
grassy schist outcrop

- 1 60 *Lagenophora repidioides* Koidz.

15 m.

det.
F.A.
McClure

- culms scattered, green, erect, 8 m. tall.
- 52 ~~flower~~ sprawling branched herb, flowers mauve blue.
- 53 erect from ~~depressed~~ globose ~~growing~~ corm, sepals and petals green, lip white with purple lateral veins.
- 54 shrub 2 m. tall, ♂
- 55 shrub 2 m. tall ♀
- 56 stems prostrate fruiting culms ascending
- 57 tree 5 m. tall, almost leafless at this season; fruits green.
- 58 woody vine, catkins greenish.
- 59 pods hanging on dead vine.

40 m.

1956 Ryukyu Is.

June 11 - 3.5 km. n.n.w. of
Miyara, 0.5 km. n.e. of Akashita
in small grove of pines
on volcanic outcrop
Lilium longifolium
common

37461
5

June 12 - 2 km. s.e. of
Dacho-zaki to 2.2 km. e. of
Dacho-zaki

Smooth grassy hills,
rather closely grazed.
Grass mainly *Imperata*,
with much *Pteridium*
of small size, fronds
not more than 3(-4) dm.
long. Many herbs
such as *Evolvulus*,
Blumea, *Gynura*, *Lygodium*,
peculiar lythraceous one,
Thelypteris, etc.

Scattered fairly large
spreading pines.
These mostly show
fire scars and charring
on lower part of bark.

Undoubtedly the area has
been burned not long ago.
Patches of *Alpinia speciosa*
on upper slopes.

Acc. H. Foster this was
burned about 10 months ago.

Scattered small
depressed shrubs of

(90)
Wood 843-56

(91)

bulb scales bright yellow,
white within.

Psidium and *Rosa*.

(91)

In shade of pines are
more species of herbs
as *Ligularia*, *Yungia*,
Desmodium.

92

Steep east-facing cliff
has some scraggly pines,
Miscanthus, *Asbeckia*,
Eurya 2 spp., *Smilax*,
shrubby *Quercus cuspidata*,
and, notably, *Leucocarpus*
of *sericea* + a few other
shrubs, on steeper parts,
on gentler slopes *Imperata*
and *Pteridium*.

(93)

Upper open pine woods
with *Pteridium* and scattered
shrubs grades into a

(94)

mixture of pine and
dense scrub forest of

Wentlandia, Eurya, Cyathea, Ficus, and many other broad-leaf evergreen shrubs and small trees. Loose shrub layer inside with ferns and figs. Dense around edges with shrubs Psidium, Miscanthus, Pteridium, etc.

95 In head of large wooded ravine is a considerable colony of Livistona - many trees, from small rosettes to trees with trunks 5 m. tall. Leaf tips droop, but not as much as in some cultivated specimens. All petioles seen are spiny, the spines long, sharp, and well separated. Older trees have last year's inflorescences, no new ones seen.

96 On some exposed ^{steep} south slopes the vegetation is a mixed scrub.

97 High pine woods tend to have undergrowth largely Miscanthus in places.

98 (Photo 945-347) Wind beaten Eurya and Rhododendron shrubs common in edges of open pine, some Miscanthus superata, Ligularia, Rosa, or high rose. One Caesalpinchia bush.

Back a little bit Rhododendron, Eurya, Glochidion, etc. Liquidambar, etc. form a dense scrub. A few pine on edges.

99 From here up to crest is thick forest, 10-12 m. high of Diospyros, Ardisia, Lauraceae, etc. Trees as much as 2.5 dm. dbh. (or even 4 dm.) shrub layer of Psychotria, Croton, etc. badly disturbed by cattle. Ferns abundant on ground. Some lianes.

100 Forest on crest much the same, but slightly lower stature. Ficus becomes an important component. Livistona and Arenga fairly common. One Livistona seen 10 m. tall.

101 at the summit the forest is somewhat drier, more

open beneath less ferns and other ground cover, though this may be due to grazing as on one side of fence there is more luxuriant ground cover.

A few epiphytic ferns, incl. *Asplenium nidus*, *Pyrrosia*, *Nephrolepis*.

(101) The crest is a broad rounded ridge, rising to a gentle peak then descending to a saddle.

(102) In the saddle the forest is somewhat taller, to 15 m. and has some enormous *Ficus*.

A few secondary trees seen here, cf. *Macaranga*, *Frema*, *Livingstonia* rather common. Some seen with petioles prickly only half or $\frac{1}{3}$ to top. Only 15-20 cm. of segment tips drooping. *Garcinia spicata* occasional.

A climbing *Piper* and an aroid, cf. *Raphidophora*, very common here.

An enormous centipede

seen 1.5 m. up in a bush. Another seen the other day also in bush. "ngaga" (Pigeon) said to bite fiercely.

(103) Back from saddle southward on west slope is a considerable grove of *Livingstonia* up to 10 m. tall. All have petioles thorny in lower half or $\frac{1}{3}$. Most have some half grown fruit. Ground tends to be bare beneath them, but with a few ferns and with *Figularia*. Very few dead leaves persist on palms.

Trunk base outer layers tend to be eaten off by insects, so leaf scars become obscured. Longitudinal fissure prominent. Color a dull to reddish tan.

Slope forest on contour with bottom of saddle mixed, palms prominent. *Ardisia*, *Diospyros*, *Ficus* etc. Ferns very luxuriant especially in gulch bottom. Forest 10-15 m. high. Some epiphytes.

(104)

(105)

Ravines in dissected coastal terrace are filled with thickets. Trees seen include Pinus, Rhus, Glochidion, Macaranga, ~~Alseodaphne~~ ~~Cerbera~~, Ficus, Pandanus, ~~Podocarpus~~, Mallotus, Elaeagnus.

Kura, Dadifu Saki
June 12 - 2 km. s.e. of ~~Dadifu Saki~~, on north peninsula.

on grassy slopes and low hills with scattered pines

37462 Melastoma *Osbeckia*
5 common locally on low ground in deep grass.

2 63 (~~base~~) *M. achilum thunbergii* S. + Z.
common in low wooded ravines

4 64 *Ehretia dictionii* ~~var japonica Nak.~~ *dicksonii*
common in low wooded ravine

ridge s. of Kura Dake
~~same~~ - upper edges of forest along crests of ridges

2 65 *Itea formosana* H. L. Li

2 66 Hibiscus *mutabilis* L.
rare

5 67 Eurya
common

6 68 Pinus luchuensis Mayr.
abundant, dominant locally, scattered elsewhere

35 m.

dimensis L.

flowers rose pink.

small tree; leaves somewhat glaucous beneath; old inflorescence red.

OK

small tree, fruit greenish yellow.

150 m

65 shrub 2 m. tall

66 shrub 2 m. tall

67 shrub 1.5 m. tall,

fruit immature
spreading tree 10 m. tall, 3 dm. dbh.

- 37469 *Viburnum awabuki* K. Koch
common
6
c 70 *Scaevola* ~~sericea~~ *sericea* var.
rare on brink of cliff
in open grassy nose
3 71 *Ficus foveolata* var. *thunbergii*
local, clinging to rocks
in edge of pine ~~forest~~

Kura Dake,

June 12 - 2-2.2 km. e. of
Dachozaki Dadifu Saki
in dense moist forest
9 72 *Asplenium* ^{*Colysis wrightii* (Hook.) Ching}
abundant in bottom
of moist ravine cut in
Schist

- 5 73 *Alpinia*
common ^{*Scaevola sericea* Nakai}

- 4 74 *Heterosmilax japonica* Kunth.
occasional det. T. Koyama 1959

- 2 75 orchid *Calanthe fauriei* Schl.
occasional, terrestrial

- 2 76 ^{*Stauntonia hexaphylla* (Thunb.) Decaisne}
Schefflera odorata
rare

- 150m OK 69 small tree 6 m. tall;
fruit red, not quite mature.
OK 90 shrub 1.5 m. tall
flower white with
purple veins.
(Maxim.) King OK 91 vine, clinging to
rock but with
erect branches, also
with characteristic
witches brooms; sterile.

200-250 m

- 72 dark green, fertile
fronds erect, sterile
spreading.
73 rhizome aromatic,
stems ascending.
fruit immature, smooth.
74 extensive climbing
stem from a hard
tuberous rhizome;
fruit immature
75 ~~flowers~~ leaves a dull
translucent grayish
green; flowers white
with ~~a~~ a bright
orange spot in middle
of leaf.
76 sterile woody vine,
leaves with conspicuous
reticulate venation beneath.

June 13 - s.w. base of Banna-dake
on weedy roadside

37477 *Crotalaria* *mucronata* Desv.
occasional

5 78 *Paspalum conjugatum* Berg.
abundant

3 79 *Ipomoea pes-caprae* var. *brasiliensis*
several plants seen

1 80 *Artemisia* *capillaris* Thunb.
common

1 81 *Wedelia* *chinensis* (Osbeck) Merr.
common

5 82 *Cynanchum* *linbianense* Warb.
Vincetoxicum
occasional in thicket

3 83 *Helicteres* *angustifolia* L.
Melochia corchorifolia?
common

1 84 *Hedyotis*
rare *H. diffusa*?

5 85 *Distylium* *saccharinum* (L.) Merr.
common in thickets

5 86 *Ageratum conyzoides* L.
common

1 87 *Lysiuma* *mauritanica* Lam.
occasional

erect much-branched herb
1 m. tall, flowers bright
yellow with dark brown
spot at base of wing.

OK A. Chase

erect culms from
creeping superficial
rhizomes.

prostrate, flowers
bright purple collapsing
about 4 p.m.

erect herb, odor not
very strong.

prostrate, flowering
stems ascending,
flowers yellow (rare at
this season)

milky herbaceous
vine, flowers with
corolla lobes reddish
with green centers,

corolla white; pods green.
flowers pale lavender.

flowers white.

shrub 2 m. tall,
flowers white.

erect strong smelling
herb; flowers white,
leaves fleshy, flowers
white.

s. w. base of Banna-lake
small shrine with
no forest around it.

(106)

(photo
940-8)

The gently sloping
land at the foot of the
mountain is covered
by an irregular mixture
of thickets and grassy
or weedy patches. The
thickets are mainly
Acacia confusa, probably
planted, and pine, perhaps
planted. The younger
thickets have consider-
able ground cover of ferns,
etc. Older ones have very
little. Mixed with the
planted trees are native
ones, such as *Ficus*,
Distylium, etc. Some
Miscanthus here and
there in edges and thin

spots. The small
road is lined with
weeds, dominantly
Paspalum conjugatum
and *Imperata*, but
many other species.

(107)

The slopes above, examined
with binoculars, are
semi-open, with
bushes and grass,
mostly *Miscanthus*
in most places.

Acacia confusa goes
well up the slopes.

June 15 - ^{shot} southeast of
Hirai

(photo
247-8)

- (108) Beach ridge with scrub
of *Scaevola*, *Premna*,
Pandanus, *Miscanthus*,
Hibiscus, *Vitex*, *Messerschmidia*,
Wikstroemia, *Clerodendrum inerme*,
mostly closed, varying from
1.5 (or even 3) m. in height.

a little
guettarda
terminalis
cassipou
Wedelia
biflora

- (110) From the front of the ridge
a rough but abraded limestone
platform protrudes about
20-25 m., about 3 m. above
a well developed erosion ramp,
this notably abraded and
with an accumulation of
well rounded cobbles and
pebbles at top and scattered
in pits and pot holes on it.
Platform in places undercut
as much as 2 m. the top very
well abraded, elsewhere not
undercut, fringed by a pebble
or cobble beach. Ramp about 1 m. high.
In undercut places fresh
water dripping from ceiling
(heavy rain yesterday and
last night).

Locally some patches of
sandy beach. Here are
scattered *Pomoea per-caprae*,
Euphorbia charisensis,

Lepturus repens, etc.

On the top of the platform
the relief is about 1 m.
generally. The vegetation
is a mixture of *Forsydia tenuifolia*,
Pemphis (very prostrate),
Carmona (very prostrate),
Hedyotis, *Lepturus*, *Indigofera*,
Limonium (?), and patches
of low bushes of *Hibiscus*,
Messerschmidia, *Scaevola*,
Cinnam, *Vitex*, *Euphorbia*, *Artemisia*, etc.
The cover is rather full
but in places there is
considerable limestone
showing.

Thunaea
Asparagus
Premna
Cassipou
Lilium
Wedelia
Fimbristylis

- (111) Large stretch of beach
on photo has been somewhat
eroded, exposing patches
of the platform and
large areas of pebbles
and cobbles. This
has scattered tufts of
Euphorbia, *Lepturus*, *Messer-*
schmidia (very small
bushes, *Scaevola* seedling,
etc. Some *Thunaea*.
The sand is being
excavated and hauled off.

(109)

plain back of beach ridge where coral is very close to surface and is exposed here and there. Some small areas of this are cultivated. Mostly it is in grass, chiefly *Imperata*.

Close to the beach ridge there are scattered bushes of *Decasola*, *Premna*, *Vitex*, etc. especially on limestone outcrops.

Away from the ridge there are more and more replaced by *Psidium*, *Rosa*, *Osteomeles* (?), *Raphirolepis*, *Ampelopsis*, *Rubus*, *Callicarpa*, etc.

Many herbs, especially *Evolvulus*, *Lespedeza*, *Desmodium*, *Leucas*, etc. in grass.

Farther away from beach *Psidium* becomes very abundant in grass. In places it may form half the cover.

Patches of *Agave americana* are occasional. Cycads are not common here but are found.

June 15 Ohama - mouth of inlet

(112)
(photo 847-46)
scrubby forest on rough limestone. Mixture of *Hibiscus*, *Ficus*, *Artusa*, *Broussonetia*, *Pandanus*, *Pouteria*, *Muraya*, *Mallotus*, *Carmona*, away from sea, *Macaranga*, *Ficus* sp., *Melanolepis*, *Erythrina*.

Enormous orb-weaving spiders with leg spread of 18 cm. or more. Several colors, very small males or else another species, not more than 1.5 cm. across commensal in same web. Large overeating scarabs.

Interrupted inland by small patches of garden between outcrops. Trees get taller inland. Varies from about 2 m. on outer edge to even 8 m. inland. Some *Calophyllum*, *Casuarina* and *Acacia* inland, perhaps planted.

This whole forest very dense and tangled with vines, *Ampelopsis*, *Caesalpinia*, *Clematis*, *Polygonum*, *Toddalia*, *Vitis*,

(113)

On west side of inlet is well developed beach rock with seeps of fresh water trickling down over it and seeping out of it. Maximum thickness seen about 0.3 m. Mostly rather fine grained. ~~Maximum thickness~~

Upper parts rather pitted lower parts in places broken up. Some loose beach sand locally. A *Phyllanthus*-like shrub but leaves not distichous, common at base of cliffs and on upper part of beach, with *Hibiscus*, *Clerodendrum*, various grasses, etc.

On limestone bluff is scrub of *Hibiscus*, *Pandanus*, *Arenca*, *Erythrina*, *Pipturus*, *Ficus*, etc. *Pittosporum*, *Ligustrum*, *Cannona*, *Raphirolepis*, *Premna*, *Garcinia*. Dense tangled, 2-4 m. high. *Pandanus* and *Hibiscus* are most abundant.

On eroded beach rock well below high tide level, *Limonium* (?) *Zoysia*, etc. grow abundantly in pits and crevices. Above this, especially on sandy spots, *Sporobolus pes-caprae* and *Zoysia tenuifolia*, *Euphorbia*, *Chamissoa*, etc. are abundant.

114

East of Ohama along shore is rather extensive beach scrub of *Scaevola*, *Hibiscus*, *Pandanus*, *Premna*, etc. *Clerodendrum*, etc. The shore here is low and shelving, composed of a mixture of sand and coral gravel, occasional outcrops of post-miocene limestone some of them huge boulders or remnants. The sandy and gravelly flats here where not covered by beach scrub, are grassy, with *Sporobolus virginicus* below high tide level, several other halophytes, *Zoysia tenuifolia* and *Sporobolus pes-caprae* in patches above

high tide.

In large limestone boulders ~~is~~ is a sparse scrub of *Premna*, *Pittosporum*, *Carmona*, *Ficus*, *Persea*, *Messerschmidia*, *Raphiolepis*, ~~with~~ *Lepturus*, *Zoysia tenuifolia*, *Hedyotis*, etc.

June 15 - Between Miyara and Shirasu

(114) Wide coral plain between road and coast, very little of it in cultivation, mostly in pasture.

The half nearest the road is a mixture of *Imperata* with *Miscanthus* probably *M. sinensis*, judging by the very narrow leaves. The soil is thin and scab-like outcroppings of the rough limestone are frequent. Many herbs and considerable *Psidium* mixed with the grass. Large areas have broken coral rock in pebble sizes instead of soil. A few small clumps of *Cycas*.

115

116

Toward the sea the *Miscanthus* drops out and *Imperata* and *Pectaria* are the abundant grasses. ~~The~~ *Psidium* is frequent. *Rosa* also. Many herbs and a few shrubs are mixed in.

Principal herbs seen are:

Lespedeza cuneata
Artemisia
Galium
Euphorbia hirta
Leucas
Panicum reptans
Conyza bonariensis
Emilia sonchifolia
Fimbristylis monostachya
Centella asiatica
Vernonia cinerea
Desmodium spp.
Phaseolus

June 15 - just east of Shirasu-saki

119

The shore here is peculiar. There is an erosion ramp about 50 m. wide, pitted and covered by solution basins. ^{little of no} ~~no~~ ^{abundant} ~~abundant~~ ^{is} ~~is~~ ^{abundant} here, below high tide level. A little

Sesuvium with it.

118

Heavily
grazed

Behind this is a flat about 30 m. wide, of a veneer of sand covered by a dense stand of *Zoysia tenuifolia* with a few miscellaneous herbs. Many young *Messerschmidia* along landward margin.

117

Then a broad boulder-cobble ridge, covered by a low beach scrub of *Messerschmidia*, *Pandanus*, *Cleodendrum*, *Scaevola*, with *Thuarea*, *Vitex*, *Zoysia*, etc. in openings.

In grassy flat back of boulder ridge 300 m or more from sea are many large pieces of pumice lying on the ground, or rough coral.

Here the rough limestone outcrops are arranged somewhat in rows, rather zigzag, perpendicular to the coast.

120

June 15 just west of Shiraharu band of low tangled brushy vegetation on limestone. A mixture of *Pandanus*, *Cycas*, *Alpinia speciosa*, *Miscanthus*, *Toddalia*, *Carrnora*, *Calophyllum*, *Albophyllum*, *Premna*, *Psidium*, *Munroa*, *Mallotus*, *Ficus*, etc.

This is tangled with *Ampelopsis*, *Wedelia*, and *Clematis*.

This is mostly 2-3 m. tall, but where there is much *Calophyllum* it may be 5-6 m.

Here and there patches are cleared in this and planted to 2 varieties of *Sorghum* and *Puffa* (?).

June 15 - ~~Miyasa~~ 1 km. e.
of Miyara Miyara

in grassland on soil
between outcrops of
rough limestone.

37488

~~Portulaca~~*Crotalaria linifolia* L.f.

occasional

3

2 89 *Vernonia cinerea* L.
common2 90 *Conyza bonariensis*
common *Erigeron bonariensis*1 91 (rub) *Knoxia conyulosa* L.
rare1 92 *Wahlenbergia gracilis* (Forst.) A. DC.
occasional

June 15 - 1 km. ~~West~~ of Ohama,
on Miyara-Wan, near Isobe

3 93 *Lotus australensis* Ands.
occasional on sandy beach3 94 *Lophora tomentosa* L.
rare on limestone boulders3 95 *Pemphis acidula* Forst. f.
occasional on rough limestone5 96 *Ficus vetusa* var. *nitida* (Thunb.)
occasional on rough
limestone boulders7 97 *Lesuvium portulacastrum*
salt flat, inundated
by high tide

37488a *Scaevola taccada*
(Gaertn.) Roxb.

(5) erect, flowers yellow.

flowers purplish.

small plants flowering,
larger ones not yet.

flowers bluish violet.

1 m.

prostrate, flowers white.

OK

small shrub

OK

depressed shrub,
flowers white.

King

depressed shrub,
figs purplish.

(L.) L.

OK

prostrate, very fleshy,
stems greenish with
reddish nodes, leaves
green, glossy, compressed,
flowers pink.

- 37498 *Suaeda australis* (R.Br.) Moq.
5 local on saline flat,
inundated by high tide
- 2 99 *Galium*
on rough limestone in
edges of brush.
- 37500 *Sporobolus virginicus* (L.) Kunth
2 dominant on sand flats
below ~~high~~ tide level.

June 15 - just east of
Ohamma, on Miyara Wan

- 2 01 *Limonium arbusculum* (Maxim.) Makino
abundant on rough
limestone below high tide level.
- 5 02 *Ligustrum japonicum* Thunb.
common on low limestone
bluffs above beach
- 5 03 *Phyllanthus*? *flueggeoides* M. & A.
Securinega common at top of beach
- 6 04 *Solanum verbascifolium* L.
rare in scrub on rough
limestone
- 6 05 *Polystichum cyrtomium falcatum* (L.f.) Presl
on shaded limestone cliff

June 15 - Tada Hama,
on coast s.e. of Hirai

on sandy beach ridge

- 2 06 *Digitaria*
occasional
- 5 07 *Leaevola sericea* Vahl
very common in beach scrub

erect, very fleshy.

OK A. Chase

- 1 dwarf shrub, mostly
sterile, a few in bud.
- 2 shrub 1-1.5 m. tall,
fruits very immature.
- 3 shrub 1 m. tall
- 4 shrub 2 m. tall; flowers
white, ripe fruit yellow.

1-3 m.

- 6 culms spreading
- OK 7 shrub 1.5 m. tall;
flowers white, fruit white.

- 37508 *Allophylus* *tumorensis* (DC.) Bl.
occasional in beach ridge scrub.
- 2 09 *Scaevola* *sericea* var.
common in beach ridge scrub.
- 6 10 *Ipomoea* *littoralis* Bl.
gracilis R. Br.
common at edges of beach ridge scrub.
- 5 11 *Chenopodium* *acuminatum* Willd.
common on sandy patches on limestone terrace just above sea.
- 2 12 *Indigofera* *liukienensis* Makino
common on rough limestone just above sea.
- 2 13 *Cassytha* *filiformis*
occasional, parasitic on various plants on rough limestone near sea.
- 1 14 *Lepturus* *repens* (Forst.) R. Br.
very common on rough limestone near sea.
- 2 15 *Artemisia* *capillaris* Thunb.
common on rough limestone near sea.
- 5 16 *Leucas*
common on rough limestone near sea.
- 2 17 *Lotus* *australis* Andr.
occasional on rough limestone.
- June 15 - Yuriga Harma,
1 km. e. s. e. of Miyara
on coast.
- 1 18 *Pilea* *peplides* H. & A.
on rough limestone at top of beach, in

- shrub 1 m. tall.
- shrub 1 m. tall, flowers purplish, fruit white.
- prostrate, flowers rose purple, darker in throat.
- erect
- prostrate, flowers red; pods quadrangular.
- Twining yellow stems.
- OK A. Chase
- flowers white.
- prostrate, flowers white
- 1 m.
- Eastern fleshy.
pits and crevices,

June 16 - north of Ozata
east of Kara-lake

(121)
(Photo
950-4)

Scattered pines on
grassland on schist
gullies either grassy or
filled with Pandanus scrub.
Some admixture of miscellaneous
shrubs and small trees.

- 122 Ecene limestone area
~~covered by~~; where it is
not much dissected -
covered by a thick forest
of Ficus, Diospyros,
Ardisia, etc. scarcely
any undergrowth except
tangled bases of lianes.
Scattered second story
trees.

Canopy irregular
6-10 m. Mainly Ficus
and Diospyros, but
occasional Melanolepis
and Macaranga, Garcinia.
Ardisia, Viburnum and
small Diospyros in
second story.

Lianas are Smilax,
Piper, Clematis, Eleagnus, Carpathian
spiny Randia, Pisonia aculeata

Almost nothing
on ground except a
few creeping Piper vines.
Much bare angular
rock exposed, mostly
limestone but some of
it rather sandy.
Some Alocasia, and
very few ferns.

Locally ^{in central part of forest} several other
trees. Pisonia aculeata
very commonly climbing
through trees. ~~Fruits~~ fallen
fruit abundant on
ground and hanging
in trees. Arenga common
generally.

123

In ~~scattered~~ ^{central} part are
enormous jointed
castle-like blocks of
limestone, simulating
human construction.
Banyan roots enveloping
many of these.

124

The higher parts
of the forest are
perhaps 15-20 m. and
are principally enormous
banyans. Under them
are Diospyros, Garcinia,
Murraya, ^{sparsely} ~~laced~~ with
Smilax, Flagellaria, etc.

Working gradually seaward and downward over a series of escarpments, encountered more and more post-Miocene limestone, but never completely ~~lost~~ left the Eocene limestone. Finally, at the same time, there were quantities of large pumice cobbles and Hibiscus and Hernandia became common, then dominant. To these Diospyros and Ficus, with some Cordia and Garcinia had made up the greater part of the forest.

(125) The marginal 100 m. or so are a solid, somewhat windswept, stand of Hibiscus and Hernandia with some Pandanus.

At the top of the beach is a belt of Viter, Ipomoea pes-caprae, Clerodendrum and small bushes.

The inner edge of the reef flat is littered with a great abundance of large boulders, up to 2 m. or more in diameter. Most of these are post-Miocene limestone, a few

are Eocene.

126

At the mouth of the southernmost dry inlet are some fine Eocene boulders out in open similar to those in forest. Also a contact, vertical(?) between Eocene and post-Miocene. The contact is in the bottom of the inlet with Eocene much higher on south side of inlet.

Trees & shrubs at top of beach - Calophyllum, Clerodendrum, Wikstroemia, Terminalia catappa, Thespesia, Messerschmidia, Dodonaea, Lophos, Colubrina, Guettarda. All except the first 3 and Messerschmidia are rather scarce.

Scaevola seen only on the north end, within a ~~few~~ couple of hundred meters of the stream mouth.

127

Along the stream is a clearing that is filled with ^{m.}old-field scrub, + pass. Viter, Dodonaea, Scaevola, Pandanus, Fraxinus?

128

A small patch of Bruguiera in stream above bridge. Below bridge stream is lined

with *Excoecaria*. Back
of this is a scrubby
mixture of *Erythrina*,
Ficus, *Cerbera*,
Scaevola, *Ehretia*,
Dodonaea, and *Pandanus*.
Clerodendrum *incense*,
Cassia, *Psidium*,
Alpinia *speciosa*,
Calophyllum *leucaneum*,
Fraxinus?, *Heinandia*, etc.
3-5 m. tall.

n.e. of Ozato,
June 16 - coast east of
~~Kana-dake~~ south of mouth
of Toro-gawa.

on sand flat at top of beach

37519 ~~(37519)~~ *Pongdyia indica* var. *argenteifolia*

rare

3 20 *Guetarda speciosa* L.
rare in edge of forest.

5 21 *Wedelia prostrata* (H. & A.) Hemsl.
local in grassy area

6 22 *Allophylus timorensis* (Dc.) Bl.
rare in edge of forest

3 23 *Colubrina asiatica* (L.) Brongn.
rare at edge of forest

3 24 *Dodonaea viscosa* (L.) Jacq.
rare at edge of forest

1 25 *Ipomoea stolonifera* (Cyn.) J. F. Gmel.
rare and local

June 16 - s.w. base of
Banna-dake

Rice field weeds - *Ageratum*
conyzoides, *Eclipta alba*,
Hypericum sp., *Marsilea* sp.,
Lindernia sp.,
Arthraxon hispidum,
Centella asiatica,
Gnaphalium sonchifolia,
Panicum repens,
Echinochloa crus-galli,
Monochoria vaginalis,
Polygonum sp.

2 m.

(Wight) Wedd.

fruits red, plumed.

shrub 2 m. tall.

very prostrate,
flowers yellow.

shrub 1.5 m. tall, buds
white; fruit, not quite mature.
shrub 1 m. tall, sterile.

shrub 1.5 m. tall, sterile.

prostrate, flower white.

- 37526 *Ilex japonica* (Burm.) Nakai?
common on bare sand
- 1 27 *Ilex repens* (L.) A. Gr.
common on bare sand
- 2 28 *Chenopodium acuminatum* Willd.
occasional on bare sand
- 2 29 *Lepturus repens* var.
occasional
- 30 ~~(illib.)~~ *Cassia* *Indigofera kotoensis* var.
occasional at edge of forest
- 31 ~~(illib.)~~ *Philoxerus wrightii* Hook. f.
common
- 32 *Limonium arbusculum* (Maxim.) Makino
common

June 14 - terraces ^{n.e.} of
~~Karadake~~ Ozato
in dense forest on
dissected Eocene limestone

- 2 33 *Damnacanthus*
rare
- 6 34 *Premna obtusifolia* R. Br.
common locally
- 1 35 ~~And~~ *Mucuna*
common locally

- rhizome buried, running,
flowers yellow.
- rhizome buried, running,
leaf blades flat on
surface of sand; flowers yellow.
erect
- OK A. Chamae
tufted
- shrub 1.5 m. tall
kuhiensis (Matsum.) Okuni
- 1 m.
- forming dense mats
and cushions; fruits
red.
- dwarf shrub, buds only.

10-20 m.

- very small shrub,
sterile.
- tree 8 m. tall, flowers
pale green, ripe fruit black.
(seeds picked up)
vine climbing in tops of
trees (seeds picked up
on ground beneath).

116

1956 Ryukyu Is.

37536 (euph.) *Mallotus philippensis* (Lam.) M.-A.

10

rare

5 37 *Pisonia aculeata* L.
common3 38 *Boehmeria formosana* Hayata
rare3 39 *Lysimachia sibiriana* Miq.
local3 40 *Randia canthioides* Champ.?
common5 41 *Viburnum awakei* Lindl.
rare5 42 *Ficus konishii* Hayata
commonFeb 17 - north of mouth of
Todoroki-gawa5 43 *Zanthoxylum armottianum* Maxim.
common on sand ridge
back of beach

Ishigaki I.

117

36 small tree 6 m. tall;
fruit red.

OK

37 scrambling vine
climbing in tree tops,
thorny and ~~has~~ spiny
and spineless, not
certain if different
plants or branches of same,
& spiny branches may
be from different plants,
fruits picked up on ground.

38 herb 1 m. tall.

39 flowers yellow

40 scrambling ~~shrub~~ shrub
with tendency to
produce rigid short
branches; fruit immature.41 small tree, 4 m. tall,
fruits immature.

OK

42 tree with large
buttresses at base of
trunk, fruits on small
branchlets coming out of
trunk and large limbs.

4 m.

43 rounded densely branched
bush; leaves glossy,
fruits green, glandular.

June 17 - Ishigaki City -

Cultivated plants observed:

Trees: *Garcinia spicata**Calophyllum inophyllum**Morus* sp.*Prunus persica**Carica papaya*2. *Cocos nucifera*2. *Areca cathecu**Ficus retusa**Casuarina equisetifolia**Podocarpus macrophyllus**Ehretia**Citrus**Melia**Livistona**Hernandia**Delonix regia*

Erythrina
Hibiscus
tiliaceus
H. schroyer

shrubs: *Codiaeum variegatum**Cycas revoluta**Hibiscus* (anamental hybrid)*Rosa**Cordyline**Polyscias guilfoylei**Bougainvillea**Acalypha*garden plants: *Luffa* sp.?*Xanthoroma sagittata**Musa**Cremora**Luffa**Cucurbita*

Shrine forest:

Calophyllum inophyllum - large, 300 yrs.*Casuarina equisetifolia**Ficus retusa**Ficus**Hernandia*

June 13 - Taketomi, shore
near pier -
narrow sandy beach
backed by a low sea wall.
Back of the wall is a
narrow strip of
scrub.

Between the pier and
Hazama is agricultural
land. It is merely
the accumulated soil
between closely spaced
outcroppings of rough
limestone. On there, and
even on piles and fences of
weir picked up from the fields,
Cycas is very abundant.

In the small fields or
plots sugar cane, sesame,
~~many beans~~
~~cassia~~ sweet potatoes
and millet were observed.

Acacia confusa (~~not~~ soshiji)
planted for typhoon protection
and for wood.

Hazama Village:

Rosa sp., Chrysanthemum sp.,
Asclepias curassavica,
Catharanthus roseus, Canna
hybrid, Codiaeum variegatum
Zephryanthus rosea
Lancearia, Podocarpus, Morus,
garcinia, Gladiolus sp. planted in one yard

Hazama Village -

The streets are lined
with Garcinia, Morus,
Podocarpus, Erythrina, Livistona,
Cordia.

Morus used in sericulture.
Garcinia used for house construction.

Island is 2.5 ~~mi~~ ^{around.} ri (1 ri = 4000m).
223 families on island, 1100 pop.
88 cattle and some goats.

Nishito shrine -

Ficus retusa

Pouteria

Melanolepis

Ficus gibbosa

Garcinia

monument to grave of
Nishito, historical figure
who worked on Okinawa
in construction of Shuri Castle.
grave is here. Old shrine
was replaced in 1953.
Some stones said to have
been brought from Okinawa.

Akayama.

Tower on paleozoic outcrop
about 10-12 m. above surrounding
country. General aspect
of country from here is
wooded, but this due
to wind breaks or hedges
mainly of Acacia confusa.

Sei mei Otake

Calophyllum (Yanabu)

Garcinia

Melanolepis

~~Ficus retusa~~

Pongamia or V. terocarpus

Pouteria

Trema

Laurac.?

Ficus (large lf. depressed fr.)

Kuninaka Otake

Garcinia (fukugi)
(enormous)

Pouteria

Ficus retusa

Laurac.? (tabu) (bark used
for incense)

Arenca

Diospyros

Pisonia aculeata (vine)

Murraya

Kohamato Otake

Laurac. (tabu)

Garcinia

Pouteria

Diospyros

Melanolepis

Ficus gibbosa

Ficus retusa

Livistona

Alocasia very abundant

Large rock outcrop

Portulaca pilosa

(giroba gusa) brought
in by a person named
giroba. Has become a pest.Artemisia (native) juice
used for stomach aches.
(nūpan (Y))

Phaseolus

"nyokun zui" used for
(green) (bean)bean sprouts. Taken on
long voyages for Trochus
where fresh vegetables
otherwise unobtainable.

Elaeagnus

"kinashii" (T) "inuchii" (I, O)
wood for construction

A few Areca, but not used.

Codiaeum, Acalypha amentacea,
Ipomoea erecta, Alternanthera
versicolor, Canna, Tagetes,
Rosa, Ficus retusa, Acacia
confusa, Erythrina, as
ornamentals around school.Piper sp. growing over
walls. Young leaves used
cooked with rice. Ripe fruit
dried and used as pepper.

neither wet or dry rice cultivation on Taketomi. Soil is shallow. Water is short.

Even drinking water is a problem. When rains are plentiful some well water is used. Some rain is stored in cisterns. Otherwise water must be brought from Ishigaki.

Ramie is commonly cultivated, also mung beans, sweet potatoes, sugar cane. Black sugar like panela is produced. Bananas are common, especially around villages. When they are not destroyed by typhoons enough are produced to ship to Ishigaki.

Mr. Yonaguni, village chief, supplied most of the above information that could not be gained by superficial direct observation. He says there are some habu here.

Weeds in fields and along paths:

Euphorbia heterophylla
Bidens pilosa
Ligustrum orientale
Setaria sp.

Artemisia vulgaris
Solanum aculeatissimum
Ipomoea elongata

Conyza canadensis
Euphorbia hirta
Conyza canadensis

Kalanchoe pinnata
Boehmeria nivea
Lonchocarpus

Digitaria

Verbena

Erigeron sonchifolius

Cardiospermum

Cyperus rotundus

Echinochloa colona

Euphorbia hirta

Cleome indica

Synedrella nodiflora

Gynura

Imperata cylindrica

Artemisia

Conyza

Setaria

~~(128)~~ on rock piles and outcrops between the fields. Cycas is generally common, but more so at lower elevations. Higher, Musa sp., Miscanthus sp., etc. are also very common.

Shrine toward east end.

(129)
(photo
865-25)
(nos 129-131)

Garcinia
Ficus retusa
Laurus.
Diospyros
Canica
Terminalia catappa
Podocarpus
Arenca (forming thick underground)
Melanolepis
Ehretia
Psychotria
Porteria Rhabdophora

Another farther east:

(130) Diospyros, Garcinia
Melanolepis, Melia,
Murraya, Ficus
retusa, Broussonetia
Laurus, Canica
Rhabdophora, Psychotria
undergrowth of Arenca
Porteria, Elaeodendron,
Diospyros fovea? Hibiscus
tiliaceus

(131) Toward east on limestone outcrops are thickets of Murraya, acacia, Toddalia, Rhusa, Cycas, Miscanthus etc.

(132) A few small plots of acacia confusa, in addition to much of it along trails and on outcrops and stone fences with Cycas, etc.

(133) East of this more open country, still coral outcrops, but fewer hedges and thickets. Some scattered Calophyllum and Erythrina trees.

1956 Ryukyu Is.

Plants seen in thickets
and hedgerows.*Cycas revoluta**Acacia confusa**Psidium guajava**Miscanthus floridulus**Ampelopsis**Arundo donax*?*Clematis**Vitis*

Taketomi I.

(134)

(Photo
865-25
and
150-27)

Beach scrub forest
on east coast
slopes toward beach
from height of
back from beach is
mainly *Hernandia* and
Pandanus, with
Calophyllum, *Pouteria*
Approaching beach
Laevola becomes dominant,
with *Messerschmidia*
Guettarda, *Sophora*, *Agave*,
Premna, *Wikstroemia*, *Pittosporum*

Along beach *Zoysia*,
Vigna, *Euphorbia*,
Wedelia, *Cassytha*,
Ischaemum, *Spernocarpus*,
Persea, *Thuarea*,
Cinnamomum, *Chenopodium*,
Vitex, *Spinifex*, *Ilex*,
Sporobolus, *Lescuria*, etc.
form a belt back of the active beach, widest
at the point.
South of the east point

(135)

~~At the south end~~ is a
shrine forest that is
merely a very luxuriant
place in the beach forest
with giant *Calophyllum*,
Erythrina, *Ficus retusa*,
Pouteria and *Guettarda*
trees. These trees are
generally with very low
trunks and widely spreading

limbs. The canopy is complete, at about 10 m. There is little undergrowth but a good ground cover of *Nephrolepis*, *Flagellaria* some seedlings of the trees, esp. *Calophyllum*.

There is no actual edifice here, only an open sandy space, oval in outline, about 6 m. across, 10 m. long, with a round stone receptacle with sand for burning incense and a rotted stump with small vases.

It is a quiet and very impressive spot. Some *Aedes* mosquitoes, though, as in all other shrine forests.

Near south end there is a low escarpment of rough limestone rising to 2-4 m.

(136)

At its base in the forest is a layer of pumice up to 3 dm. thick.

The limestone is covered generally by ~~beach~~ scrub of

Scaevola, *Dandanus*, *Guettarda*, *Messerschmidia*, *Remynia*, *Ficus vetus* etc. *Ledum* on edges in pits.

Exposed parts have conspicuous mps from about high tide level to 3 m. ~~There~~ A strongly developed erosion ramp about 15 m. wide at base, with solution basins and patches of *Limonium*.

Here the ~~beach~~ forest or scrub is quite narrow. Where the exposed limestone ledge disappears, to the east, the forest gets wider. A dune ridge has accumulated on the outer side of it, just back from the beach. This may be 1-1.5 m. high or even a little more, sloping gradually away from the highest part back of the top of the beach.

Just back of the forest is a large area of *Miscanthus* and small thickets. The stand is irregular but generally

1956 Ryukyu Is.

thick, difficult to
traverse, hiding
rough limestone boulders
and outcrops.

June 18 - e.s.e. of Hazama
broken cultivated land
with rough limestone
outcrops, rock piles, and
stone walls.

- 37544 *Berchemia* ^{*B. linearis* DC.} *thamnioides*
rare on rocky places
- 2 45 *Conyza canadensis*
common in cultivated land
- 2 46 ~~*Conyza*~~ *Eriochloa villosa* (Thunb.) Kuntze
occasional in fallow
grassy field
- 1 47 *Acalypha* ^{*australis* L.}
occasional in fallow grassy field
- 5 48 *Clematis*
common in thickets
and on rock fences
- 2 49 *Imperata cylindrica* ^{var. *major* (Nees)}
dominant in fallow grassy field
- 2 50 *Zephyranthes* ~~*carinata*~~
rare in fallow grassy field
^{*Z. carinata* Herb.}
- 3 51 *Euphorbia heterophylla* (L.) Klotz.
common on roadsides
and in fallow fields
- 5 52 *Abutilon indicum* (L.) Sweet
occasional along trails

Taketsumi Is.

20 m.

prostrate.

det. A.
Chase

spreading and ascending.

extensive
climbing vine, flowers
cream white, very fragrant.

det. A.
Chase
E.C. Hulb.

rhizomes deeply buried

flowers bright pink;
locally believed that the
blooming of this flower
indicates that it will rain.
herb up to 0.8 m. tall, lower
parts of bracts scarlet

OK

shrub up to 1 m. tall,
flowers orange.

Erechtithis hieracifolia var. *cazaboides* (Fisch. & Sprngl.)
crassifolia (Fisch. & Sprngl.)
capitata (Fisch. & Sprngl.)
capitata (Fisch. & Sprngl.)

37553

Gynura

2

common weed in fields

2

54 Siegesbeckia orientalis L.

common weed in fields

2

55 Lysedella nodiflora (L.) Gaertn.

common weed in fields

3

56 Munaya paniculata (L.)

common in thickets

2

57 Ampelopsis *Evripedunculata* var.

common in thickets

1

58 Musa

abundant in thickets

2

59 Verbena officinalis L.

common along paths

2

60 Digitaria *sanguinalis* (L.) Dulac

common in fields

2

61 Abutilon *indicum* (L.) Sweet

occasional along paths

2

62 Leucas

common in fields and rocky places.

2

63 Cardiospermum *halicacabum* var.

common along trails and edges of fields

2

64 Emilia sonchifolia (L.) DC.

common in fields

2

65 Bidens pilosa var.

common in fields

1

66 Lonicera *oblongifolia* L.

occasional along trails

det. R. O. Belcher

2

spherical, aromatic; disk
 red, tubes of flowers yellow
 flowers yellow.

flowers yellow

Jack.

56 shrub 1.5 m. tall.

leaves bright green

57 vine, with greenish
 flowers and blue berries.

58 small plant, 2 m. tall,

"trunk" dull ~~brown~~ gray-
 brown.

bracts glaucous,

bronze purple,

flowers dull yellow.

flowers bright lavender

det. H.

Chapman

60 culms spreading

62 flowers white

Microcarpum (H.B.K.) DC.

63 climbing, flowers white.

64 flowers purple

not much exceeding involucre.

65 disk yellow, rays

short, white

June 18 - east of Hazama
in edges of shrine forest

- 37567 *Ehretia dicksoni* var. *japonica* —
common

- 6 68 *Psychotria* *liukiuensis* Hatusima?
common in undergrowth

- 4 69 *Croton* *cumingii* M.-A.
common in undergrowth

- 2 70 *Ehretia* *microphylla* Lam.
Carmichaelia *retusa*
occasional in undergrowth

- 3 71 ~~*Elaeagnus*~~
occasional *Euonymus japonicus* Thunb.

- 72 *Diospyros* *persea* ? var. *buxifolia*
occasional *Pistia* ?

June 18 - Hazama
in village

- 2 73 *Phaseolus* *mungo*
cultivated in small fields
on coral limestone soil

- 2 74 *Artemisia* *capillaris* Thunb.
common along paths

- 2 75 *Echinochloa* *colorum* (L.) Link.
weed in bean field

20 m.

- Nakai OK 67 small tree, ripe fruit
yellow. Wood used in
construction
"kinashi" (Taketomi) "inuchiri"
(Ishigaki, Okinawa)

- 68 shrub 2.5 m. tall;
flowers greenish white; fruit immature;
stipules small, triangular.

- 69 shrub 1 m. tall

- 70 shrub 1 m. tall; fruit
immature.

- 71 large shrub or small tree,
flowers pale green.

- 72 small tree; fruit
immature

20 m.

- 73 flowers greenish yellow,
keel twisted.

"nyokuzi" (J) (b. green bean)

said to be used for bean
sprouts, also made into
sweet soup.

- 74 erect herb, branched
from base, somewhat
aromatic.

OK
Archae

- culms ascending

37576 *Solanum aculeatissimum* Jacq.
2 edges of thickets

3 77 *Piper hamiei* Maxim.
very common, climbing
on stone walls

2 78 *Boerhavia mutabilis* R.Br.
around stone steps
in ~~the~~ public place

4 79 *Portulaca pilosa* L.
common in paths and
fields.

Aibaru Tabi,
June 18 near east point
of island
littoral ~~forest~~ scrub forest

2 80 *Hibiscus tiliaceus* L.
common in

2 81 ~~Cassia~~ *Byronopsis laevis* (L.) Maudsl.
common on inner edge of

3 82 *Toddalia asiatica* Lam.
common generally in thickets
and on inner edge of

OK edges of thickets.

herb 0.8 m. tall, ripe
fruit scarlet.

77 vine, fruit immature,
(red when ripe), "piosh" (T)
young tips ~~are~~ of plant
used to flavor rice,
mature fruit dried and
used for pepper.

del. ~~Forsteria~~
prostrate; flowers
pinkish white;
leaves purplish beneath.

OK 78 prostrate, leaves
fleshy; flowers magenta,
about 6-8 mm. across.
said to have been brought
in as an ornamental
but now has spread
and is a pest. Brought
by one jiruku, so is
called "jiruku-gusa".

2-3 m.

OK small tree, flowers
yellow with maroon
center, turning reddish.
vine climbing in bushes,
flowers yellow, immature
fruit with white strips.
herbage with numerous odor when bruised
OK scrambling shrub.

- 37583 *Vitis* *parvifolia* Roxb.
in thickets
occasional on inner edge of
- 2 84 *Wedelia* *biflora* (L.) DC.
common on edges of
- 3 85 *Colubrina asiatica* (L.) Brongn.
occasional in edges of
- 2 86 *Allophylus* *limosensis* (DC) Bl.
occasional in edges of
- 2 87 *Hernandia sonora* L.
dominant in
same
at top of sandy beach
- 2 88 *Ischaemum muticum*
common
- 2 89 *Angelica* *japonica* A. Gray
occasional
- 2 90 *Cimicifuga asiatica* var.
occasional *japonica* Baker
- 2 91 *Chamaesyce atoto* (G. Forst.) Crispat
Euphorbia charnissensis Boiss.
common
- 2 92 *Sparganium* *littoreum* (Burm. f.) Merr.
common
- 1 93 *Chenopodium acuminatum* Willd.
occasional
- 2 94 *Cirsium* *brevicaule* A. Gray
common
- 3 95 *Vigna muna* Burm.
common *Phaseolus*
- ✓ 96 *Portulacastrum* *lescurianum* (L.) L.
common
- 2 97 *Lotus* *australis* Andr.
common

- vine, flowers greenish.
- 84 scrambling aromatic
herb, flowers yellow.
- ok 86 low shrub, flowers white
- ok 87 small tree 4-5 m. tall,
flowers whitish.
- 1-2 m.
- 88 prostrate, branches
ascending to erect.
- 89 erect herb 1.5 m. tall,
now dry and leafless.
- 90 rosettes of curved leaves,
erect scapes to 0.8 m. tall,
flowers white, stamens
and style purple.
- 91 stems spreading to
ascending.
- 92 forming loose mats
- 93 erect.
- 94 heads bright purple.
- 95 prostrate, forming
huge mats; flowers yellow
- 96 prostrate, fleshy,
flowers pink.
- 97 prostrate, flowers white

~~sames~~ Busashi,
June 13. - south coast
of island
on pitted eroded edges
of limestone terrace

37597_a

Sedum formosum N.E. Br.
locally common.

Hazama Village
Lagerania cult.
on walls.

3 m.

fleshy, flowers yellow.

138

June 19 - Kuntomari-saki
extensive sand flat
covered by ~~low~~ scrub
tangled mass of *Scaevola*,
Pandanus, *Guetarda*,
Clerodendrum, *Pouteria*,
Pittosporum, *Allophylus*,
Flagellaria, *Sophora*,

139

South of here is a dune
ridge 1-2 m. high. In
this is a low forest of
Hernandia, *Ficus*, *Pouteria*,
Pandanus, *Elaeodendron*,
Scaevola, *Messerschmidia*,
~~*Portulaca*~~ *Guetarda*, *Hibiscus*,
Persea, *Calophyllum*, etc.
Back of this is a strip
of *Sesuvium* thickets
and cultivated patches.

This strip of forest is generally only 50-100 m. wide.

Near its north end is a trail leading in to a primitive shrine, only a circle of stones with a hollowed out cylindrical one with sand for burning incense. This forest around the shrine is principally *Hernandia*, some *Guttarda*, *Ficus* and *Porteria*. It is 10-12 m. high, with loose undergrowth of *Elaeodendron* & *Morinda*, etc.

Southward the dune ridge is replaced by a rough limestone terrace, covered by essentially the same forest.

At the first good exposure of this the sand beach sounds hollow when tramped upon.

up to
5 dm.
5 ft.

Along the whole southwest coast the forest comes down to the top of the beach, with little or no herbaceous growth. No sand flat with grass, etc. as on the other side. On the north side of Kuntomorisaki proper there is a rather broad strip of *Schinifex*, *Thuarea*, etc.

Then along the west coast there is solid beach rock, clear up to the low beach ridge which is covered by tall scrub. North the ridge is replaced by a ledge of limestone, still with a broad ramp of smooth beach rock.

The scrub along this coast is 2-4 m. high, about the same composition as that south of the point. A few *Casuarina*, and very rarely, *Thespesia*. A rather narrow strip, backed by *Leucaena* and *Acacia*.

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East of village -
cultivated patches
and considerable
thickets of *Calophyllum*,
Cycas, *Melaleuca*,
Podocarpus, *Rochfordia*,
Acacia *confusa*.
Mussa, *Melia*, *Ficus wightiana*,
Pandanus (abundant
locally)

Just back of the littoral
forest is a dense growth
of *Leucaena*. Several
small patches of
densely planted *Calophyllum*
also one of *Podocarpus*.

Thick undergrowth of
Cycas in one *Calophyllum*
patch. *Leucaena* in others
has been cut out.

143

Littoral forest very dense
Calophyllum, *Hernandia*,
Pandanus, *Hibiscus*
about 4-5 m high. Comes
clear to sea wall.

June 19 - Taketomi island

The vegetation may be mapped, though not too satisfactorily, by setting up the following units (outlined on photo # 150-27):

1. Village area - street lined with stone walls around the house-lots.

Ehretia ^{and} *Mour* trees (about 4 m. tall) ^{and} *Garcinia*, ^{and} *Podocarpus* trees, tending to be taller, grow along the streets just inside the stone walls. Inside the walls, also, are garden plots and many ornamentals. Vacant lots have patches of sweet potatoes, mung beans, etc.

2. Open cultivated area - a patchwork of small cultivated plots, separated by stone walls, outcrops, hedges, etc. The stone walls and outcrops are covered by clumps of *Cycas revoluta* and thickets of *Acacia* and various shrubs. The principal

crops are sugar cane, mung beans, sweet potatoes, sesame, millet, ^{bananas}, ramie, in about order named.

3. Cultivated area with thickets: similar to unit #2 except that as much as 25% of the area may be covered by thickets and small plantings of *Acacia confusa*, *Leucaena glauca*, and various bushes, *Miscanthus*, etc. *Melaleuca* is common.

4. Swind grass - This seems to be abandoned cultivated land, where the rock outcrops are too numerous and soil is too shallow even for these people to farm successfully. The area is a mixture of dense *Miscanthus* up to 2-3 m. tall and woody thickets. Progress through this is very slow and uncomfortable. Hidden rock outcrops, boulders, and holes make walking even more painful.

5. Littoral forest and scrub.

This is a strip around the coast, on sand and rough limestone, of tangled growth of various strand species, in places forming a scrub 1-2 m. high, in other places a low forest, up to 10 m.

The composition varies. The scrubby aspects are usually dominated by *Scaevola sericea* with various accessory species.

The ~~scrub~~ forested part is most often dominated by *Hernandia*, but in some places by *Pouteria*, *Ficus*, or *Pandanus*.

The seaward side usually slopes smoothly toward the beach, suggesting that wind and spray are important elements in the local climate.

On the southeast side and locally elsewhere there is a herbaceous strip, usually on level sand, between the edge of the scrub and the top of the beach. Here may be found *Vitis*, *Sporobolus* *pro-capsa*.

Spinifex, *Thuarea*, *Ilex*, *Sporobolus*, *Zoysia*, etc.

6. Shrub forests:

There are small patches of usually dense woods containing some of the largest trees to be found on the island. The composition varies greatly. *Garcinia*, *Ficus*, "tabu", *Melaleuca*, *Diospyros*, *Calophyllum* and *Pouteria* are the trees most usually found.

Weeds seen, not collected:

Euphorbia prostrata

E. hirta

Portulaca oleracea

Kalanchoe pinnata

melilotus

152

1956 Ryukyu Is.

June 19 ^{0 masu} Northwest coast
on sand above sea wall

37598 *Ipomoea pes-caprae* var. *brasilience*
common

5 99 *Ipomoea* ^{*littoralis* Bl.}
^{*gracilis* R. Br.}
common

37600 *Zoysia tenuifolia* Willd.
common

3 01 *Thuarea involuta* (Forst.) R. & S.
common

June 19 - east of Hayama
2 02 *Polypodium scolopendria*
local on pile of limestone
between fields.

June 19 - coast west of
Hayama
2 03 *Pemphis acidula* Forst.
rare on eroded limestone
about high tide level.

2 04 *Clerodendrum inerme* (L.) Gaertn.
common, edge of littoral scrub

3 05 *Vitex* ^{*trifolia* var. *simplifolia* Cham.}
common, at edge of
littoral scrub

~~06 *Raph*~~

June 19 - near Kuntomari-saki
littoral scrub forest

2 06 *Raphiolepis* ^{*luisianensis* (Koidz.) Nakai}
rare in edge of

Taketomi!

153

2 m.

trailing; flowers purple,
collapsing about mid-
afternoon.

trailing, flowers rose
purple, much deeper
in throat.

OK A. Chase

5. 11 11 Trailing, forming loose
mats.

20 m.

Burm. f. 02 fronds erect.

Microrium scolopendria (Burm. f.) Copel.

1 m.

OK 03 prostrate shrub,
flowers white.

OK 04 shrub 1 m. tall;
flowers white.

05 prostrate, flowers
blue-violet.

2-3 m.

06 shrub 2 m. tall,
fruit immature

- 37607 *Scaevola sericea* Vahl
common in edge of
- 2 08 *Messerschmidia argentea* (L.f.) Johnston.
common in edge of
- 2 09 *Pouteria obovata* (R.Br.) Boehmi
common in
- 2 10 *Scaevola sericea* Vahl
common in edge of
- 2 11 *Persea obtusifolia* R.Br.
occasional in edge of
- ~~12 *Wikstroemia elliptica*~~
- 2 12 *Wikstroemia elliptica*
rare in edge of *W. retusa* A. Gray
- 2 13 *Lepturus rebeus* var.
occasional in sand at edge of
- 2 14 *Morinda citrifolia* L.
in undergrowth in
- 3 15 *Pandanus tectorius* var. *lindsiensis* Wob. 9
common in
- 3 16 *Smilax china* v. *kusa* Takaguchi & Kamamoto
rare at inner edge of
- 5 17 *Oplismenus patens* Honda
common in inner edge of
- 3 18 *Ficus insignitissima*
rare at inner edge of *F. superba* var. *japonica* Mig.
- 2 19 *Boehmeria nipponensis* var. *condolensis* (Maxim.)
rare in undergrowth at inner edge of
- 2 20 *Guettarda speciosa* L.
important component of
- 2 21 *Lophora tomentosa* L.
occasional at edge of

- 2-3 07 shrub 1 m. tall,
flowers purple.
- Johnst. OK 08 shrub 1.5 m. tall,
flowers white.
- 09 Tree 8 m. tall,
fruit immature.
- OK 10 shrub 2 m. tall,
flowers white.
- OK 11 shrub 1 m. tall,
flowers pale green,
fruit immature.
- 12 sterile shrub, 1 m. tall.
- OK 14 sterile shrub 1.5 m. tall
- 15 small tree 3 m. tall, staminate,
bracts cream white.
- 16 vine, tangled in shrubs;
fruit immature.
- det A. Chase 17 culms almost erect,
decumbent bases
on stilt roots.
- OK 18 small tree 4 m. tall, figs pinkish.
- ohwi 19 weak shrub
- OK 20 tree 5 m. tall
flowers white, fragrant
- OK 21 shrub 1.5 m. tall

156

1956 Ryukyu Is.

- 37622 *Pandanus tectarius* var.
 5 common in *linkiensis* Warb.?
 2 23 *Terminalia catappa* L.
 rare in
 2 24 *Pittosporum tobira* (Willd.) Ait.
 occasional in scrub
 margin

June 19 - coast west of
 Hazama, edge of scrub
 in edge of scrub on
 sand flat

- 2 25 *Ipomoea indica* (Burm. f.)
 rare *I. congesta* R. Br.
 2 26 *Lysimachia mauritiana*
 occasional
 2 27 *Paspalum vaginatum* Swartz
 local along beach
 1 28 *Ixeris japonica* (Burm.) Nakai?
 local along beach
 1 29 *Rhaphanus*
 occasional along beach
 30 (acanth)

June 19 - Hazama
 around village

- 2 30 (acanth.) *Justicia procumbens* L. var. *procumbens*
 common in yard
 2 31 *Commelina auriculata* Bl.
 common on roadsides
 2 32 *Polygonum chinense* L.
 common climbing over walls
 2 33 *Commelina ~~radiflora~~* *C. diffusa* Burm. f.
 common on roadsides

Taketomi I.

157

- small tree 3 m. tall.
 fruit yellow when ripe.
 shrub or small tree,
 3 m. tall, bud only.
 shrub, 1 m. tall, fruit
 immature

1-2 m.

- vine tangled in scrub;
 flowers blue, turning purple.
 flowers white
 culms ascending.
 rhizomes deeply buried.
 flowers purple; plants
 mostly dry and fruiting.

20 m.

det. E.C.
Leonard

det. F.R.F.

det.
F.R.F.

flowers pinkish.

plant creeping,
 flowers blue, 2 petals
 large.

vine; flowers white.

prostrate, flower blue, 3 petals
large.

158

1956 Ryukyu Is

June 19 - ^{Omasu} ~~northwest~~
northeast of Hazama

37634

Cycas revoluta L.

5

very common on
walls and limestone
outcrops.

Taketomi I.

159

5 m.

OK. trunk 1.5 m. high,
cone erect. leaves pro-
immediately around base.

June 20 - end of Kabira peninsula
back of Ishi-saki

- (144) Pasture on flat ground
with largest part of area
in mixed palatable grasses
and herbs, with bunches
of *Imperata* scarcely
eaten. At foot of volcanic
hills.

- (145) Rocky hill, mainly grassy
with principally *Imperata*,
Rosa, etc. Scattered
Cycas on slopes and
especially near the top.
The rock is a volcanic
breccia. Many herbs
of various sorts in
grass and between
rocks.

- (146) almost pure stands of
Cycas on very rocky hills.
Some *Pipturus*, *Mallotus* etc.
apparently burned recently
(dead bushes)

- (147) Hill with mixed
broad-leaf woods. - *Ficus*
retusa, *F. ~~pubescens~~ ^{vigata}*, *Hibiscus*
tiliaceus. *Mascaranga*, *Ponteder*
Diospyros in second story.
much *Alcorno* and *Cycas*

- (148) Strip of littoral forest,
dominantly *Hernandia*, but
on sea side mostly *Pandanus*,
with *Scaevola*, *Messerschmidia*,
Porteria etc.

- (149) Mostly on a dung ridge
2-3 m. high, but here and
there projections of undercut limestone
hills with scattering of
bushes in grass and patches
of almost pure *Cycas*
on steeper more rocky places.

- (150) Cliffs and bluffs on south
side covered with thicket,
more level ground above grassy,
pastured, in places with
bunchy *Imperata*.

(151)

1956 Ryukyu Is.

Takamari, near

June 20 - end of Kabira
Peninsula, back of Ishi-saki
on knobs of volcanic rock37635 ~~(Lab.)~~ *Anisomeles indica* (L.) O.K.Tg.
thickets36 *Physalis peruviana* L. vel aff.
among cycads in pasture37 *Euphorbia*
chamaesyce parannaquensis (Blanco) Hara
grassy pasture38 *Adiantum pilosa* Ledeb.
in edge of patch of woods39 *Panicum*
cyrtococcum patens (L.) A. Camus
in rocky pasture40 ~~(cucurbit.)~~ *Melothria maderaspatana* (L.) Cogn.
climbing on rocks41 ~~(grass)~~ *Bracharia eruciformis* (T.E.)
in grassy pasture42 *Torilis*? *T. tiradiata*?
among rocks in pasture43 *Hedyotis tenelliflora* Bl.
among rocks in pasture44 *Leucas*
among rocks45 ~~*Lathyrus*~~ *Clinopodium chinense* O.K.Tg.
among rocks46 *Evolvulus alsinoides* L.
common among rocks47 *Graphalium japonicum*?
rare among rocks Thunb.

same - inner edge of littoral forest

48 *Antidesma pentandrum* var. *barbatum* Merr.
rare at

Ishigaki Is.

20 m.

↓ 36 flowers pale greenish yellow

37 flowers white.

OK 38 ~~same~~ flowers yellow.

40 m.

↓ 39 Trailing; ~~ripe fruit red.~~

Smith) grass. Mt. A. Chaz.

42 flowers white.

43 flowers white.

30 m.

↓ 44 flowers white

45 flowers rose-purple.

OK 46 flowers bluish

OK

2-3 m.

48 shrub 2 m. tall; fruit
green, pleasantly acid.

1956 Ryukyu Is.

June 20 - YCAT Compound

3 km. n.w. of Ishigaki City

weeds in disturbed open ground

37649 *Cenchrus echinatus* L.
2 common2 50 *Euphorbia hirta*
common *Chamaesyce hirta* (L.) Millsp.2 51 *Cyperus rotundus* L. OK J.H. Kern
small colonies5 52 (~~acanth?~~) *Justicia procumbens* var. *hirsuta* Yamam.
common5 53 *Solanum nigrum* L.
common

1-2 m.

OK
H. closedet. E.C. Leonard
OK
5² flower lavender pink
with 3-lobed purple
mark in center of lip.
erect, flowers white,
ripe fruit black.

June 21 - ridge above Ozata
west of Kara-lake

(152)
(Photo
978-4)

Forest on ridge of schist -
the lowest parts of
this are dense and tangled
and scrubby, perhaps
are secondary. (60-100 m.)

(153)

The main part of the
ridge is in a mixed
forest that is dominantly
Ficus of several species
but has many Lauraceae
Raphiolepis, Randia, etc.
Thick undergrowth of
Arenca, Psychotria,
Lasianthus, Alocasia,
etc. Garcinia, Lauraceae,
many ferns, lianes
such as flagellaria, etc.
(100-150 m.)

154

Upward along the ridge (150-180 m.)
the Ficus becomes less
dominant but still common.
Diospyros becomes
commoner, also Ardisia,
and many other trees
come in. A little
Freycinetia and large
Aroid vine.
Some ilaeocarpaceae, Schefflera;

Lauraceae, thick
undergrowth of
Psychotria, Arenca,
Lauraceae shrubs
and seedlings, many
ferns and Centotheca
on ground.

On next ridge (180-200 m.)
the Ficus becomes less
common, but still present.
Diospyros, Ardisia,
Lauraceae, Porteria,
Glaucarpus, ~~Bischoffia~~
Styrax, Mallotus philippinensis
some Garcinia. One
Dendropanax seen, small.
Some secondary species - e.g.
Macaranga, Mallotus,
Bischoffia, etc. probably
the result of the intensive
logging that is obvious
here.

Ferns cover the ground
under a loose shrub
layer of Psychotria,
Lasianthus, etc.
Tectaria most abundant.
Some Asplenium nidus
in trees. Aroids climbing
in trees - perhaps Epipremnum.

(156)

(photo
950-110)

Here on a long ^(200 m.) more or less level ridge *Quercus* comes in in considerable numbers. Some *Elaeocarpus*, *Dendropanax*, much *Ardisia*, *Diospyros*, many *Lauraceae*. Ferns abundant. Some *Freyinetia*.

On ridge the forest is about 10-12 (-15) m. tall, a few trees to 2.5-3 dm. mostly 10-20 cm., some larger *Ficus*.

Undergrowth rather thin - *Psychotria*, *Antidesma*, *Lauraceae*, many ferns.

Ntana Yama,
June 21 - ridge above Ozato,
~~west of Kanasake~~

in degraded, Tanglep forest, dominantly *Ficus*
Smilax ^{Heterosmilax japonica Kunth.}
^{det. T. Koyama 1959}

37654

5

occasional

5

55

Xanthoxylum
occasional

Fagaria cuspidata (Champ.) Engler (= *Zanthoxylum cuspidatum* Champ.)

2

56

Tubocapsicum?

rare along trail

5

57

*Centotheca lappacea*common locally *Idnanthus vicinus*

3

58

Arenga tremula (Blanco) Becc.

common in undergrowth

A. engleri Becc. det H.E. Moore

100-150 m.

vine climbing in trees,
fruit immature.

small tree, tangled
in mass of vegetation,
fruits green.

branched herb, 0.8 m. tall,
fruit bright red, soft.

prostrate to ascending

(F.M. Bailey) Merr.

OK

several stems from base
inflorescence reaching
about 2 m. high, leaves 3-4,
stem ~~not~~ covered by
sheathing leaf bases.

same - in mixed broad-leaf
evergreen forest on broad
ridge top.

37659 *Flagellaria indica* L.
common generally

2 60 *Diospyros* *maritima* Bl.
common generally

5 61 *Smilax* *Veterosmilax japonica* Kunth
det. T. Koyawa 1959
common

5 62 *Citrus* *depressa* Hayata
occasional in understory

5 63 (~~orchid~~) *Calanthe laurieri* Schl.
occasional, terrestrial

2 64 *Carnellia japonica* (var. *macrocarpa* Masam.)
occasional

5 65 *Ficus* *ampelas* Burm. f.
occasional

5 66 *Ophiorhiza* *linbiensis* Hayata
common locally

2 67 (~~orchid~~) *Hetaeria oblongifolia* Bl.
rare, terrestrial, det. L.A. Garay

5 68 *Neolitsea* *Cocculus laurifolius* DC.
occasional

3 69 ~~for~~ *Ctenitis subglandulosa* (Hance) Ching
common

same - in montane forest,
with much *Quercus*

5 70 *Antidesma japonicum* S. & Z.
common in undergrowth

5 71 *Ficus retusa* var. *nitida* (Thunb.)
occasional

150-200m.

OK 59 tangled vine climbing
into tree-tops; fruit immature.

60 small tree, fruit dull
brownish orange

61 vine climbing in trees,
fruit immature.

62 small tree 4 m. tall,
fruit immature, aromatic.

63 in small clumps,
flowers white

64 small tree; fruit immature.

65 large spreading tree
with single, somewhat
buttressed trunk
no aerial roots, yellow fruit.

66 suffrutescent, 4 dm. tall,
flowers white.

67 stems twisting,
flowers minute, bronzed.

68 small tree; fruit immature

200-225m.

70 shrub 1 m. tall, fruit
immature

King 71 large spreading tree
with complex trunk

1954

- 37672 *Ardisia* ^{quinquegona Bl.}
 3 common
 3 73 *Vittaria* ^{elongata Swartz}
 epiphytic
 5 74 *Nephrolepis* ^{liserata (Swartz) Schott}
 epiphytic, ~~fronds pendent~~
 6 75 *Ardisia* ^{sieboldii Miq.}
 common

June 22 - ~~near~~ Banna Lake

(157) n.w. base. Pine wood. fairly
 (photo) good stand on gently
 940-10) sloping terrace - trees up
 to 20 m tall and 2-3 dm. dbh.
 spaced 3-5 m.

Very few shrubs beneath,
 sparse stand of *Miscanthus*
 some *Paspalum conjugatum*
 with *Elephantopus mollis*.
 Has been somewhat
 pastured.

(158) On lower slopes a tangled
 scrubby mass of *Mallotus*
~~glossus~~ *Wendlandia*, *Heliconia*
 and other secondary shrubs
 with *Miscanthus*.
 A little pine and *Acacia*.

shrub 2 m. tall

74 fronds pendent

75 small tree 4 m. tall,
 branches disarticulating.

(159)

upper slopes and
 summit are covered
 by a low scrubby
 very dense wood
 of trees 3-5 m. tall
 mostly things such
 as *Quercus*, *Ilex*, *Diospyros*,
Elaeocarpus, ~~etc.~~ etc.
 with rather small
 coriaceous leaves.

(160)

On the inner side
 of the rather V shaped
 series of ridges
 larger trees seen
 more abundant on
 the mid slopes and
 tree ferns are common
 in ravines.

On the main ridge the low forest is very dense, 4-5 m. tall. *Quercus* is common, also *Camellia*, *Ardisia* "tabu", *Trema*, *Mallotus*, *Macaranga*, *Diospyros*, *Dendropanax*, *Ilex*, *Ficus* 3 spp. *Rhus*, *Wendlandia*, *Phyllanthus*, *Eugenia*, *Psychotria*, *Cinnamomum*, *Euscaptia*, *Antidesma*, *Styrax*, *Larandra*.

The stems are mostly 2-5 cm. d.b.h. a few much larger, these mostly *Quercus*. The spacing is mostly 0.5-1 m.

On the ground are scattered ferns (*Polystichum*) etc., tufts of sedge (*Scleria*?) and *Carex* *alpina*.

Some *Freyinetia* in saddle. also much *Colysis*.

Yamagii, brown with dark bands, or *Ardisia*.

Contour trail around to east from beyond saddle - on steeper slopes the vegetation does not differ much from on ridge, except that stature may be a little greater and ferns (*Colysis*) locally more abundant.

This trail leads around to what almost amounts to a terrace - an area of very gentle slope. Here the trees are taller, up to 10 or more m. and more widely spaced. Composition does not differ conspicuously. More *Ficus* here but not dominant. *Quercus* still common. Ferns common but not abundant.

Another trail from bottom of saddle around to west and south through essentially similar vegetation to that on ridge, on steep slope. Down somewhat the stature is some higher. *Ardisia* more common.

Two Yamagi seen on Smilax. These were brighter brown than usual and decorated with 2 rows of yellow and black points. The two transverse ~~rows~~ of bands of black hair on antenae are hidden when animal is quiet, asserted when excited. Crawled off Smilax onto trunk of *Cinnamomum doederleinii*.

Koya Yama
June 22 - Pass west of Banna-lake

in low coppice-like wood

- 37676 *Dianella ensifolia* (L.) DC.
5 common on walls of road-cut on ~~schist~~ weathered schist.
- 5 77 *Stephanis japonica* (Thunb.) Miq.
edge of wood
- 6 78 *Bridelia arata* Decaisne
occasional
- 6 79 *Vaccinium wrightii* A. Gray
occasional
- 6 80 *Alnus formosana* (Burkill) Makino
common, especially in lower moist spots
- 5 81 *Vitex trifolia* L.
on wall of road cut

In Pass, on west side, is a coppice-like growth of *Quercus*, *Hamamelis*, *Schima*, *Alnus*, *Myrsine* (?), *Laurac.* etc.

about 3-4 m. tall, all apparently clumps of stump sprouts.

50 m.

OK - flowers light blue, ripe fruit bluish purple.

77 vine twining in trees; fruit red.

78 small tree 4 m. tall, fruit green.

79 slender shrub 2.5 m. tall; fruit immature

80 small tree

OK shrub 1 m. tall
flowers deep lavender to violet.

1954 Ryukyu Is

Tsuburatsaki,

37

June 22 - s.w. base of
Banna-lake

37682

Jussiaea *suffruticosa* L.
roadside

5

Muibaga,

June 22 - s.w. ridge
of Banna-lakeroadside in scrubby
woods.

5 83

Iscleria *terrestris* (L.) Farnett

common in deep grass

8 84

Smilax *sebeana* Miq.

occasional

Det. T. Koyama
1959

6 85

Tanacetum *suffruticosa* L.

occasional in pine woods

86

Glochidion
common

Taramani,

June 22 - Banna-lake,
in ~~scrub~~ scrubby woods near
summit

2 87

Machilus *thunbergii* S. & Z.

rare in

5 88

Ficus *erecta* var. *becheyana* (H. & A.) King

occasional

5 89

Osmanthus *bracteatus* Matsum.

occasional

5 90

Osmanthus *bracteatus* Matsum.

occasional

Foster 37685 is
Daphne phylloglaucens
ssp. *Teijsmannii* (Zoll.)
Huang

Det. H. H. Walther

Det. H. H. Walther

You might
want to
record this
in your
notebooks.

I haven't determined the name yet

white

You might
want to
record this
in your

notebook.

I haven't determined the name yet

Fosberg 37685 is
Daphniphyllum glaucescens
ssp. *teijsmannii* (Zoll.)

Huang

Det. E. H. Walther

Det. E. H. Walther

Ch'ien, Ch'ung-shu; Wu, Ch'ang-i^{and}, Ch'ên, Ch'ang-t'u.

1956

The vegetation types of

China. Act. Geogr. Sin. 22: 37-92.

In Chinese, with English summary; describes 12 forest, steppe, meadow and desert types.

1954 Ryukyu Is

Tsuburatsaki,

June 22 - s.w. base of
Bana-dake37682 *Jussiaea* *suffruticosa* L.
roadsideMuibaga,
June 22 - s.w. ridge
of Banna-dake
roadside in scrubby
woods.5 83 *Iscleria* *terrestris* (L.) Farnett

common in deep grass

8 84 *Smilax* *obovata* Miq. det T. Koyama
occasional 19596 85 *Jussiaea* *suffruticosa* L.
occasional in pine woods86 *Glochidion*
commonTaramani,
June 22 - Banna-dake,
in scrubby woods near
summit2 87 *Machilus* *thunbergii* S. & Z.
rare5 88 *Ficus* *erecta* var. *becheyana* (H. & A.) King
occasional5 89 *Osmanthus* *bracteatus* Matsum.
occasional5 90 *Osmanthus* *bracteatus* Matsum.
occasional

80 m.

Much branched herb
1.5 m. tall, petals
yellow, emarginate, 1 cm. long.

180 m.

84 forming tangle; fruit
yellow-green, probably
nearly mature.85 small tree, fruit
immature.86 shrub 3 m. tall;
flowers yellow.

220 m.

87 shrub 2 m. tall
inflorescence red, fruit dark green.88 shrub 2 m. tall,
figs greenish.89 small tree, flowers
pale yellowish green.
fragrant with a sourish
sweet odor.90 small tree; flowers
white

180

1956 Ryukyu Is.

- 37691 *Ilex warburgii* Los.
occasional
- 5 92 ~~Parrotia?~~ *Torreya*
rare
- 2 93 *Morinda umbellata* L.
rare
- 5 94 *Ilex maximowicziana* Los., vel aff.
occasional
- 6 95 *Bridelia ovata* Decaisne
rare
- 6 96 *Premna obtusifolia* R. Br.
occasional

June 22 - north ridge
of ~~Banana Lake~~ Taramani
in ^{low} scrubby dense moist
forest

- 6 97 *Ardisia*
common
- 98 *Rhus succedanea* L.
common

181

- small tree, fruit immature.
- 92 shrub; buds white.
- OK 93 vine, climbing in trees.
- 94 small tree; fruit
immature.
- 95 small tree; fruit
immature.
- OK 96 small tree, aromatic
when broken; flowers
pale green.

200 m.

- slender shrub 2m.
tall; fruit immature.
- OK small tree, leaves
tending to turn red;
fruit green.

1996 Ryukyu Is.

June 23 - ~~marsh lake~~
~~steep slope~~,
 steep slope ($45^\circ +$) of chert
 covered by a mixture
 of grass and low brush.
 The grass is a mixture
 of *Imperata*, small
Andropogon (?), *Paspalum*,
 etc. *Sporobolus elongatus*.

(161)

(photo
 940-7 fm
 #161-167)

Brushes are

a *Osbeckia* o *Psidium*
 o *Rhodomyrtus* o *Symplocos*

p.c. *Eurya* 2 spp.c *Ficus* 3 spp.l.a., c *Pinus* (seedlings)o *Glochidion*o *Mallotus*much *Nephrolepis exaltata*c *Dianella ensifolia*f *Elephantopus mollis*f *Eupatorium* sp.f, l.a. *Lygodium*some c *Rubus* (small sp.)~ *Bidens pilosa*~ *Commelina*~ *Adiantum* sp.c l.a. *Thelypteris* sp.~ *Wahlenbergia*~ *Fimbristylis*~ *Emilia sonchifolia*c *Melast.* or *Lyth.*o *Lepidoptera curvata*

Same colonies of *Gleichenia*
linearis on steep places.

(162)

Toward the top of the
 ridge *Symplocos*
 becomes abundant and
 very near the top *Vaccinium*
 appears in some number.
Thelypteris is very
 abundant at the top,
 some *Andropogon*, much
Eupatorium.

Miscanthus is scattered
 on top, especially in
 edges of brush.

(163)

The east slope is
 densely brush-covered,
 the brush coming up
 to a sharp line at the
 crest. A few larger
 pines on the ~~so~~ crest, many
 saplings locally.

The scrub on the north
 slope is mixed in compo-
 sition:

*Raphiolepis**Eurya**Vaccinium**Mallotus**Symplocos**Distylium* etc.*Celastr.**Dendropanax**Eugenia**Pittosporum**Randia**Ardisia**Ilex**Ficus* 2 spp.*Psychotria**Wendlandia*

This scrub is a dwarf forest about 3-4 m. tall, of erect slender stems mostly under 6 cm. thick, some larger, mostly in clumps as though ~~the~~ groups of stump sprouts. A very few shrubs - Psychotria. Sparse ground cover of ferns (*Polystichum*, *Pteris*, etc.) and seedlings. Small *Asplenium nidus* on chert boulders.

Some vines - *Asclepiads*, *Smilax*.

Scattered tufts of a broad leaved grass, sterile.

(164)

Slopes below summit ^{on} west side are thickly covered by a mixture of *Miscanthus* and such shrubs as *Eurya*, *Rhus*, *Ficus*, *Symplocos*, *Psidium* and seedling pines, with a few scattered larger pines. Much *Smilax* and several other vines.

(165)

Pandanus in tangled scrub in shallow ravine on west slope almost to top of ridge at saddle.

(166)

At the foot of the hill is a band of dense *Acacia confusa* with chimls filled by *Miscanthus*. Very little undergrowth or ground cover, but some *Smilax* vines.

(167)

Below this, on flattish ground, just above the paddy fields is a solid stand of *Paspalum conjugatum*.

This scrub is a dwarf forest, about 3-4 m. tall, of erect slender stems mostly under 1 cm. thick, some larger, mostly in clumps as though bunches of stump sprouts.

~~Almost~~ Ground layer very sparse - scattered ferns (*Polystichum*, etc.) and seedlings.

June 23 - Masaki Lake, summit ridge

in open brush and grass

- 37699 *Canavalia microcarpa*
rare, climbing in bushes
- 37700 *Aeginetia indica* L.
rare on open bits of soil

- 2 01 *Hypericum japonicum* Thunb.
very local in thin place in grass

- 2 02 (~~det.~~) *Fagaya nitida* Roxb. (= *Zanthoxylum nitidum*)
common locally

- 2 03 (~~pass~~) *Sacciolepis indica* (L.) Chase
occasional

63

185 m

- vine; flowers rose pink, pods somewhat inflated.
- 01c 700 leafless, from mass of fleshy roots on the bottom of a thickened stem or corm; stem ~~long~~ and spathe bronze, striped with purple, corolla white, slightly purplish toward base, lobes deep purple.
- 01 erect, flowers orange-yellow.

- 02 scandent shrub;
fruits somewhat immature, aromatic when crushed.

det. A. Chase

June 23 - same - in
edges of dwarf forest

37704 ~~Asclepias~~ *Anadenanthera affine* (H. & A.) Druce.
climbing in trees

5 05 *Euonymus tanakae* Maxim.
common

✓ 06 *Randia olavetta* Tarema
rare

5 07 *Vincetoxicum* ~~*cinereum*~~ *liukiuense* Warb.
common, climbing in trees

00

June 23 - Massiatake,
south slopes

5 08 *Mussaenda* *parviflora* Miq.?
in acacia thicket

c 09 *Rhodomyrtus tomentosa*
occasional on slope

5 10 *Eupatorium* *formosum* var.
common *quasitripartitum* (Hay.)
quasitripartitum

180 m.

woody vine.

05 shrub 2 m. tall; fruit
immature.

06 shrub 1.5 m. tall, flowers
white.

07 vine; petals maroon,
bronze in center of lobes,
corolla white.

100 m.

08 scandent shrub,
twining in shrubs,
flowers yellow;
fruit immature.

140 m.

09 shrub 1 m. tall

150 m.

Kitam. 10 erect suffrutescent
herb; flowers, pale lavender,
honey-scented.

May 24.

Schist outcrops in
Imperata pasture.

Andropogon 2 spp.

Lilium longiflorum

Lespedeza cuneata

Boerhaavia

Oxalis corniculata

Setaria

Wahlenbergia

Artemisia

Rubus

Lygodium

Lactuca

Psidium

Centella

D. haeculus

Urena

Gynura

Cyperus 2 spp.

Panicum

Fimbristylis.

Imperata

Ernia souchifolia

Ficus erecta

Ficus retusa

Morus

Carmona

May 24 - Tozota

patches of Eocene
and post Miocene
limestones covered by
a bushy forest of
Pipturus, Ficus,
Macaranga, Clerodendrum,
Melia, Murraya,
with Alocasia
around edges.

Cultivated patches
of beach deposit soil
(Thioya?) - sugar
cane, sweet potatoes,
lesame, etc.

1956 Ryukyu Is.
back of Hoshima,
June 24 - Tozato Distr.

- 37711 *Sesamum indicum* L.
5 cultivated on limestone soil
6 12 *Pipturus arborescens* (Link.) C.B. Rob.
important part of vegetation
on limestone
5 13 *Pipturus arborescens* (Link.) C.B. Rob.
important part of vegetation
on limestone
5 14 *Boehmeria* ^{B. nymphaeacea var. caricola (Makino)} ~~nivea~~
on rough limestone
5 15 *Amaranthus* ^{gracilis Desv.}
weed in edges of cultivated
fields.

~~June 24~~
June 24 - 2 km 25° W. of m. of
mouth of Todoroki-gawa
in small desiccating
fallow rice field

- 5 16 *Fimbristylis* ^{dichotoma (L.) Vahl}
common
5 17 *Cyperus* ^{haspan L.}
common ^{OK J.H. Kim "correct spelling halpan I think"}
2 18 *Sinnoaphila* ^{cordifolia (Cobson.) Merr.}
occasional ^{18a} *L. angustifolia* (Benth.) Wettst.
19 *Hypericum* ^{japonicum Thunb. (=)}
common ^{Sarothra japonica (Thunb.)}

(over)

40 m.

- OK erect, flowers white,
turning faintly lavender.
Rob. OK shrub 3 m. tall,
flowers green, fruit
with white fleshy
receptacle, nutlets
borne in pits, not adnate
to receptacle.
OK shrub
Nalsai 14 ~~shrub~~ bush 1.5 m. tall,
sprawling.

50 m.
↓
Morigama Distr.

OK J.H. Kim

- 17 caespitose, stems soft,
light green.

- erect, flowers deep yellow
Y. Kimura

June 24 - same -
on schist exposures in
grassy pasture

37720

Andropogon

4

occasional

Cymbopogon (Perhaps C.

2

21

Scleria

levis Retz.

[= S. hebecarpa Nees]

rare

2

22

Fimbristylis

dichotoma (L.) Vahl

rare

1

23

Euphorbia

Chamaesyce

paranaquensis (Blanco) Hara

occasional

2

24

Mikasaema nudicaulis Reinw.

occasional

1

25

~~Bambusa~~

Hedyotis tenelliflora Bl.

rare

2

26

Panicum

Brachiaria eruciformis (J. E. Smith)

common

50m.

↓

det. A. Chase

tortilis (Presl) A. Camus, but very uncertain. Inflascens
few, abnormal.

23 erect, flowers white.

24 flowers white

50m.

griseb. det.
A. Chase

196

197

3879

COMPILATION METHODS

Photo-planimetric

Map

Japan, 1:50,000, Japanese Imperial Land Survey, Kyoto, Northwest, 1932, (controlled ground survey, reliability good).
Date of aerial photography: 1945.

- Kyoto-fu
- Funai-gun
 - Gomago-mura
 - Gokasho-mura
 - Saki-mura
 - Kawabe-mura
 - Shinjo-mura
 - Tomimoto-mura
 - Yoshitomi-mura
 - Maki-mura
 - Higashi-homma-mura
 - Yagi-machi
 - Kita-kuwada-gun
 - Shizen-machi
 - Yamaguni-mura
 - Utsu-mura
 - Hosono-mura
 - Kamiyoshi-mura
 - Koroda-mura
 - Kadono-gun
 - Onogo-mura
 - Nekagawa-mura
 - Otagi-gun
 - Kumogahata-mura
 - Kurama-mura
 - Shizuchino-mura
 - Minami-kuwada-gun
 - Miyasaki-mura
 - Chiyohawa-mura
 - Umaji-mura
 - Asahi-mura
 - Homma-mura
 - Hiedano-mura
 - Omura
 - Kawarajiri-mura
 - Chitose-mura
 - Hozu-mura
 - Anakawa-mura
 - Sogabe-mura
 - Kameoka-machi
 - Shino-mura
 - Kyoto-shi
 - Ukyo-ku
 - Kamigyō-ku
 - Nakagyō-ku
 - Shinogyō-ku
- 3875
- 3874
- 3873
- 35°00'
- 135°45'10.4"

64TH ENGR BASE TOPO BN - BN 2573 - K4 - 2/52 - 3 M

COMPILED BY METHOD

Scale: 1:50,000. Japanese Ground Land Survey, Kanto, Surinami, etc. (published ground survey, relative point). Scale of map: 1:50,000.

INDEX TO BOUNDARIES

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3873

35°00' 135°45' 10.4'

64TH ENGR BASE TOPO BN - BN 2573 - K4 - 2/52 - 3 M

INDEX TO ADJOINING SHEETS

135°15' 10"	135°00' 10"
510 I	510 IV
510 II	510 III

2 3 Miles

4000 Meters

4000 Yards

CONTOURS

TER UNIVERSAL

EL SPHEROID

GRID ZONE DESIGNATION

510

TO GIVE A STANDARD DIFFERENCE ON THIS SHEET TO NEAREST 100 METERS

28 June 1956 AM

Eocene Limestone:

Mallotus moluccanus, *Ficus erecta*, *F. superba* var. *japonica*,
F. "riboedfruit"; *Alocasia cucullata*; *Smilax* sp.; *Morus australis*;
Garcinia spicata; *Bischofia javanica*; *Stictocardia*
tiliaefolia; *Macaranga tanarius*; *Mallotus moluccanus*;
Braussonetia papyrifera; *Rhus succedenae*; *Ardisia*
sieboldii; *Microlepia* sp; *Arenca Engleri*; *Fagaria indica*(?);
Diospyros maritima; *Smilax*; *Murraya paniculata*;
Peperomia sp.; *Rhaphidopsis lukienensis*; *Premna obtusifolia*;
Hernandia peltata; *Eberita thyrsoiflora*; *Asplenium nidus*;
Ptilosporum tobira; *Calli carpa japonica*; *Hoya carnosae*;

- 3879
3878
3877
3876
3875
3874
3873
1. Takao-yama
2. Goshiki-yama
3. Shikado-yama
4. Shikado-yama
5. Shikado-yama
6. Shikado-yama
7. Shikado-yama
8. Shikado-yama
9. Shikado-yama
10. Shikado-yama
11. Shikado-yama
12. Shikado-yama
13. Shikado-yama
14. Shikado-yama
15. Shikado-yama
16. Shikado-yama
17. Shikado-yama
18. Shikado-yama
19. Shikado-yama
20. Shikado-yama

64TH ENGR BASE TOPO BN BN 2573 K4-2/52-3 M

CONTOURS

TER UNIVERSAL
EL SPHEROID

GRID ZONE DESIGNATION
53S
TO GIVE A STANDARD REFERENCE ON
THIS SHEET TO NEAREST 100 METERS

INDEX TO ADJOINING SHEETS

135° 15' 10"	136° 00' 10"	
35° 20'		
5152 I	5152 IV	5152 I
5152 II	5152 III	5152 II

28 June 1956

Afternoon.

Eocene Limestone:

Mallotus paniculatus; *M. moluccanus*;
Pisonia umbellifera; *Ficus erecta*; *F. superba* var. *japonica*;
F. retusa var. *brida*; *F.* "ribbed fruit"; *Smilax* sp.;
Alocasia cucullata; *Colocasia* sp.; *Monstera deliciosa*;
Diospyros morrisiana; *D. japonica*; *Hoya carnosa*;
Arenga engleri; *Pteris* sp.; *Asplenium* sp.; *Asplenium*
nidus (*Neottopteris nidus*); *Nephrolepis cordifolia*;
Lygodium scandens var. *microphyllum*; *L. flexuosum*;
Piper sp.; *Peperomia japonica*; *Fagaria indica* (?);
Pittosporum tobira; *Psychotria serpens*; *Glycosmis pentaphylla*;
Tournefortia japonica (not in flora Okinawa); *Callicarpa japonica*;
Zanthoxylum armottianum; *Toddalia asiatica*;
Murraya paniculata; *Fraxinus griffithii*; *Breynia rhamnoides*;
Sapium sp.; *Phyllanthus* sp.; *Morus australis*; *Hibiscus*
tiliaceus; *Boemeria* sp.; *Rhus succedenae*; *Carmona retusa*;
Pueraria tonkinensis; *Quercus miyagii*; *Cudrania cochinchinensis*

Callicarpa dichotoma (Lour.) K. Koch
38552

C. iniomotensis Masam. 37191,
37289

C. japonica Thunb.

38407, 38315, 38546, 38180.

C. japonica var. *luxurians* Rehd.

37869, 38067, 38298,

37763, 37857, 37066

det Moldenke

H.N.

Determinations by E. H. Walker,
Book 45

- obovate-nudish*
- (4) ✓ 37028 *Securinega flueggeoides* M.-A.
 - ✓ 37160 *Sarcandra glabra* (Thunb.) Nakai
 - ✓ 37192 *Gymonosphaera podophylla* (Hook.) Copel. det C. V. Morton
 - ~~372~~
 - ✓ 37211 *Castanopsis* ~~sp.~~ *cuspidata* (Thunb.) Schott
 - ✓ 37225 *Sarcandra glabra* (Thunb.) Nakai
 - ✓ 37256 *Alchornea trewioides* M.-A. (var. *formosana* Pax?) (not *Mallotus* as previously reported).

- obovate-nudish*
am. stat.
- (1) ← 36976 *Spiranthes stylitis* Zoll.
 - "(1)" ← 36994 *Tarenna gyokushinkwa* Ohwi (not *Randia cochinchinensis*)
 - ✓ 37011 *Smilax* (*Heterosmilax*?)
 - ✓ 37019 *Canavalia* sp.
 - ✓ 37170 *Spathoglottis* ^l*picata* Bl.
 - ✓ 37239 *Calanthe fauriei* Schl.
 - ~~37285 *Stereosandra javanica* Bl. det. L. A. Garay~~

- make slips*
- ✓ 36990 *Lygodium microstachyum* var. *glabrescens* Nakai
 - ✓ 37071 " "
 - ✓ 37148 *Ficus benguetensis* Merr.
 - ✓ 37214 *Elaeocarpus sylvestris* var. *ellipticus* (Thunb.) Hara

- ✓ 38050 *Neolitsea ohbana* Koidz. det. C. K. Allen
- ✓ 37822a *Eleocharis ochrostachys* Steud. det. H. K. Svenson