RECORD

F. R. Fosberg

Collection and Field Note Book

No. 61

(March 24, 1961 - June 25, 1961)

(#1723 --- #1861)

Hawaiian Islands

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(41723 --- 41861)

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F.R. Fosberg
Field Note Book # 61
beginning with # 41723
ending with # 41861.

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Mar. 25 - Kipuka Puaua
 0.1 mi. on Trunk Road on right
 in grassy opening -
 8 Hibiscadelphus trees
 of varying sizes up to
 4 m. tall, planted in a
 group. Several of them
 seem to be rather chlorotic
 and dying back from tips -
 these in sun. ~~These~~ ^{Four} in shade
 look better, but of these,
 the 2 largest seem to be
 affected by a mosaic
 similar to that on Gossypium
 tomentosum. One flowering & fruiting.

- 1 small "Aiea"
- 1 small Pisonia
- 1 small Alphitonia
- 4 ~~to~~ healthy Pittosporum boomeri
- 1 Hibiscus trachenridgei (1.3 m) leafless
- 2 "Papala" 1 small Kokia

Clearing surrounded by
 large Sapindus, one or two large
 Leuca, ^{a number of} ~~several~~ Myrsine sp.
 clumps of Ripturus, one or two
 small Psychotria, 2 Pelea sp., several
 Rophaea

Thicket of kod saplings by
 road.

Weeds: Pasp. dilatatum, Cyperus brevifolius,
 Mentha spicata, Holcus, Verbena
 bonariensis, Cynodon dactylon
 Commelina diffusa, 1 Bonchus sp.
 (canensis?), Ranunculus sp.
 Pteridium Rubus penetrans around edges.

*Persea
 carolin.*

March 24 - Captain Cook,
South Kona

- 41723 *Hibiscus brackenridgei* v. *kauaiensis* Cunn.
cultivated in garden of Amy Greenwell

- Mar. 24 - Kealikekua, South Kona
2 24 *Sambucus mexicana* v. *bipinnatifida*
planted generally around
houses, no tendency to escape
noted.

Mar. 24 - Kaupulehu Forest Reserve,
North Kona

- 3 25 *Coccoloba*
in open dry forest on a large slope
locally common in openings

- 4 26 *Cyperus hillebrandii* Boeckl.
common

- 4 27 *Colubrina oppositifolia*
occasional

- 2 28 *Canavalia galeata* var.
occasional in open

- 3 29 *Nothocestrum breviflorum* Gray
occasional

- 4 30 *Diospyros ^{ferrea} sandwicensis* var. *pubescens* Forst.
dominant tree

- 1 31 *Asplenium adiantum-nigrum* L.
rare, in rock crevices

400 m.

depressed spreading plant;
flowers butter yellow with
maroon center.

450 m.

shrub 3-4 m. tall; flowers
white. lvs. tending to
be folded, a few with
lower pinnae trifoliate.

640 m.

twines, flowers with calyx
whitish, petals yellow,
narrowly triangular with
blunt apex.
culms solitary, ascending.

tree 8 m. tall; fruit
immature.

— twining vine; flowers maroon,
standard with white spot
and lines at base. (fruit
from different plant, nearby).
Tree 6 m. tall.

— small tree 5 m. tall,
spreading, much branched,
corolla light maroon; fruit
immature

- 41732 *Asplenium trichomanes*
rare, in rock crevices
- 4 33 *Ostermeles anthyllidifolia* (Sm.) Lindl.
occasional
- √3 34 *Licys*
rare in opening
- 3 35 *Korthalsella cylindrica*
abundant locally on
Diospyros fereca ~~area~~
- 4 36 *Pouteria*
rare
- 4 37 *Cocculus*
local
- 1 38 *Kobesia ~~agnaroides~~ rockii* Lewt.
rare
- 1 39 *Peperomia leptostachya*
common in rock crevices
- 2 40 *Argemone ~~alboglauc~~ glauca* var. *inermis* Deg.
rare in opening
- 4 41 *Sida fallax*
very common in openings
- 3 42 *Chenopodium oahuense*
very common, especially in opening
- 3 43 *Nototrichium sandwicense*
very common
- 3 44 *Lipochaeta*
rare in opening
- 3 45 *Xylocarpus ~~hawaiiensis~~ hillebrandii* Wawra
rare

tree 3 m. tall; fruit immature.

wine creeping over ground;
flowers whitish.

joints cylindric; branches
decussate; flowers all around
nodes.

Tree 8 m. tall; buds and
young growth rusty brown.

twines; ~~flowers~~ ^{calyx} whitish;
petals yellow at base,
white distally, narrowly

triangular, emarginate at apex.
slender tree 5 m. tall:

involucral bracts patent,
stiff, purple above, green
with reddish veins beneath.

stem and leaves fleshy

odn of fls. like ~~stake~~ ^{penetration} erect, very glaucous, 1.7 m.

Tall, sap yellow; petals white.

~~herb~~ slender shrub 1.3 m. tall,
branched; calyx maroon;
corolla orange with red
centers.

erect shrub, 2 m. tall,

somewhat disagreeable odn
small tree, 3 m. tall,

grayish.

sterile small tree with
drooping branchlets.

- 41746 *Senecio mikanoides* Ohs
occasional in openings

March 24 - ¹⁵~~10~~ mi. ^{n.w.} of Kailua,
on road to Waiman

- 4 47 *Canthium odoratum*
common
- 3 48 *Diospyros fereca* var. *pubescens* Forb.
abundant

Mar. 24 - Puu Huluhulu,
Hammula saddle

- 1 49 *Bromus rigidus*
locally abundant in on grassy slope
- 1 50 *Poa pratensis*
locally common on grassy slope.
- 2 51 *Rubus macraei*?
locally abundant in low forest

- 3 52 *Coprosma montana* var. *montana* Hbd. ♀
53 *Coprosma montana* var. *montana* fruit
54 *Coprosma* " " ♂
base of cinder cone at edge of lava flow

Mar. 25 - Kipuka Puanui, Hawaii National Park

- 3 55 ~~*Hydrocotyle*~~ *Hydrocotyle sibthorpioides* var. *aedipus* Deg.
locally abundant in grass in open areas with scattered trees
- 1 56 *Pipturus*
local around margin
- 1 57 *Pipturus albidus* (H. & A.) Gray
under trees

Twiner; flowers yellow.

600 m.

small tree 4 m. tall;
leaves glossy; fruit immature.
small tree 5 m. tall;
fruit immature.

2100 m.

forming dense masses
1.5 m. tall; petals rose purple.

shrub 1.5 - 2.5 m. tall.

1225 m.

shrub 2-3 m. tall.

shrub 2 m. tall.

Mar. 25. Ripulea Puaulea
Regular trail.

Goes in through tall
lehua forest, rather open.
Around edges Dodonaea
and Styphelia bushes
and grass.

From top of first small
rise mixed mesophytic
forest with lehua,
Sapindus, Lophora
Psychotria, Osmanthus,
Coprosma, Myrsine, Pipturus

one small planted Kolia on edge
Main canopy layer here
is mostly lehua with
some Sapindus

under story Coprosma,
Psychotria, Osmanthus
~~Pisonia~~

Fragaria on ground.
patches of Microlepis
Geranium, Commelina (in open)

Soon Sapindus become
dominant in canopy.

Understory more or less
same. but with Pisonia.

Then open park-like
area, with Sapindus
not nearly so tall, one or
two tall lehuas, one Persa. &
clump of Libotium. Lophora
abundant bracken, with
grass (Anthoxanthum, Polus,
Paspalum dil.)

Coprosma + Psychotria + Pipturus
saplings strictly under
Sapindus + lehua.

Some masses of Microlepia
and Pipturus.

Gouldia tree on rt. marked
by stake 17, type tree of one
of my new forms.

One Pelea, several Lophora
Myrsine, all rather small.

Entering another small
parkland, then Sapindus
stop; a thicket of large
Lophora on left, good
isolated trees.

Just above trail here is
a Sapindus with a good
mass of epiphytic Peperomia
reflexa on side away from trail.

Photos - 3 of lehua forest
at entrance, both dense
and sparse (away from park),
several in parkland,
incl. Gouldia tree, one of
koa. general view, then
2 more of koas.
final roll on open lehua - koa
next roll TriX - shots in forest
of lehua trunks, views, *Calotum*
Microlepia. Views above & below trail in lehua fm.

Then mixed lehua - sapindus
with *Cheraphentia*,
Coprosma, *Psychotria*,
Sapindus in understory.

ground largely bare
except masses of
Nephrolepis and *Microlepia*
and a large mass of
Peperomia - 2 forms of
P. reflexa, large on ground,
small on tree trunk,
side by side. (stake 24)

Then into open
park like lehua with
some koa, some *Coprosma*
and *Sapindus*, *Pipturus*.
Grass and *Nephrolepis exaltata*
(golden pubescence on rachis
but blunt lvs.).

Pteridium is generally
abundant, with *Cynodon*,
Anthoxanthum, *Pasp-dil.*
Veronica pulegioides.

Rather dense lehua
forest with understory
of *Coprosma*, *Psychotria*,
Pipturus, *Osmanthus*,
Pelea.

strawberries and *Poa* on ground.
locally *Microlepia* & *Pteridium*.
much bare ground. ~~Hypnum~~
Hypolepis?

On side trail giant koa
4 times my arm spread around.
perhaps 25 m. tall.

Along trail lehua forest
with little undergrowth,
below with much, esp.
Coprosma.

Photo - large lehua trunk
with enormous ferns.
views in lehua forest. end roll on
Peperomia reflexa ground cover.

Most open part, with
Passiflora, *Staurisma*, *Coprosma*
& *Pipturus* in understory. *Myrsine*.
Osmanthus, *Sapindus*.

Then on rt. generally dense Sapindus + lehua with thick under story, on left more open, lehua, then low savanna.

Then on rt. Sapindus lehua parkland. some Psychotria etc. under bigger trees. Trail goes into this and it gets closer - typically open forest.

Hibiscadelphus planted on right, flowering and fruiting well. 3 m. tall.

Smaller one above it, more glabrous, marked Hibiscus giffardianus. Hibiscus brackenridgei planted 30 m. below it.

Then, mixed mes-forest on rt, low-lehua savanna on left.

Mar. 25 - path to crater rim across from KMC.

Herb of Styphelia, Vaccinium, stunted lehuas, Dodonaea

Polypodium pellucidum on left in low lehua bushes. rt. also. Several Sadleria, becoming commoner toward the crater rim.

Mar. 26 - same.

On open spaces of bare ground Conyza canadensis var. pusilla and Bulbostylis capillaris are very common. The latter is found anywhere where there is loose ash of a sandy texture.

Coming to the rim on awesome view of a solidified lake of swirling lava presents itself, with the gaping pit of Halemau-man in the middle distance.

Tiny tufts of vegetation are scattered over this lava, and plumes of steam rise here and there. Sections of the cliff rim are separated by great cracks and seem about ready to fall into the crater.

(to page 17)

Mar. 26 Flat in front of
Wentworth House, Haw. Nat. Park

Scattered lehua up to
about 3 m. tall. spaced
2-6 m., trunks up to 3-10 cm.
dbh.

Ground generally covered
by *Gleichenia*.

A few *Ilex* and *Santalum*
scattered in this, much
smaller than the lehua.

Astelia common. *Machraera*
fairly common. *Lycopodium*
cernuum common. *Smilax*
occasional. *Dubautia*
scabra and *Dubautia*
occasional.

Vaccinium reticulatum
very common. / up to 4 dm.
tall; *Styphelia* com.
common, up to ^{2.2} m. usually
to 0.5.

Sadleria cyath. common.
one small colony of *Rubus*
seen.

Coprosma ernodioides
local in thin places in the
Gleichenia.

Saccilepis occasional.
another grass rare. (coll.)

~~*Rhaphidophora*~~ rare.

Gahnia gahniiformis rare

Hypochaeris radicata rare

Fragaria rare.

Vaccinium puberulum? ~~at~~ c.

Vacc. calycinum rare

Polypod. pellucidum occ.

Wianella common

Uncinia occ.

Setaria sp. 1. *Holcus* n.

The above description
applies to a strip about 100 m.
from the cliff base. It is
cut by many cracks.

Out from this the
lehuas are larger, more
widely spaced. Between
them is a rather open scrub,
irregular, 0.3-1, rarely 2 m.
(the shrubs over 1 m are young
lehua), of *Styphelia*,
Vaccinium ret. *Dodonaea*,
lehua.

In addition there are,

n. *Sadleria*

c. *Pteridium*

c. *Lyc. com.*

o. *Setaria*

c. *Hypochaeris rad.*

c. la. *Fragaria*

c. *Hypericum jap.*

c. *Deschampsia*

c. *Sporobolus* (with smut)

o. *Phajus grandifolius*

oc. *Polypod. pell.*

o. *Rubus penetrans*

c. *Coprosma ernod.*

Cladonia is common on ground. 1 andropogon clump seen.

Farther out the lebrua is closer together again

A straight swath has been cut through this to below the Cummin house from

The effect of this road may be foreseen by observing the land along the present dirt road running in from the front corner of KMC. and crossing this

Grasses have spread in for about 10 m on either side. Other weeds also.

Mar 26 Crater Rim Trail from front of KMC. turn left -

The vegetation here is the same loose scrub of *Styphelia*, *Vaccinium*, *Dodonaea*, *Sadleria*, and *Polypodium*, with scattered small *Metrosideros*. In the *Brachy Sadleria* is abundant. The plant with linear hard grass like leaves is *Machaerina angustifolia*. Tangled *Gleichenia linearis* var. *torventosa* is common a bit away from the rim.

The large yellow flowers are *Oenothera stricta*, the smaller ones *Hypochaeris radicata*. *Dubautia*

is the small shrub with conspicuously 6-ranked short lance-oblance leaves. It has small yellow heads in clusters when in bloom. *Cyperus*

is an occasional weed along the trail, as are *Andropogon virginicum*, *Sporobolus elongatus* and *Laciniopsis contracta*.

A native tussock-forming

grass, not so common, is *Deschampsia*.

The abundant soft red berries are *Vaccinium reticulatum* (ohelo) and are quite edible.

The trail follows the rim, a few feet from it. Some variation made noted in the lehuas - a bright green bush is on the right a short distance down the trail - but most of the trees are the common var. *incana*, which colonize ash and lava.

As the trail goes down a short defile *Sphenomeria chinensis*, *Nephrolepis exaltata*, and *Wikstroemia* sp. ~~mas~~ and *Gahnia gahniiformis* may be seen together on the bank to the left.

On the slightly lower level at the bottom of this the vegetation generally is much sparser and lichens cover much of the ground.

A few yards along from this are distance and direction signs.

Among the weedy grasses along this trail is the common ~~both~~ European *Anthoxanthum odoratum*, ^(sweet vernal grass) familiar in many parts of the world, also *Setaria geniculata*.

If the *Vaccinium* fruit is ripe great variation in size, color, and taste will be evident.

Just before the trail comes out onto the steaming flats *Gleichenia linearis* becomes abundant on the right, with *Lycopodium complanatum*, the strange little tree-like plant with hanging cones on the tips of its branches and long runners arching between the erect fruiting stems.

The ~~most~~ ^{most} like grass in the trail, with unpleasant tiny needle-like fruits is *Chrysopsis aciculatus*.

On the steaming flats the vegetation becomes very low and dwarfed. The lehuas, now very widely scattered, are here only about 1 m. tall.

everything else is less than half that. The abundant gray moss that shares the bare spots with the lichens is the widespread

In the first steam crack, on the right dwarfed *Sphenomeris* and *Nephrolepis* may be seen lining the edges. (Experiment with smoke)

In the second opening *Paspalum abiculare* is common, and *Pityrogramma calomelanos*. The right hand branch of the trail follows a great steam crack filled with luxuriant *Nephrolepis* cf. *biseriata*. Carpet grass (*Asiomaticum compressum*) lines the margin and is abundant out on the flats.

The small purple flowered herb in the cracks is *Cyperus carthagenensis*.

The Hawaiian *Luzula* L. *campestris* var. is also there.

Clumps of *Andropogon* and several of *Arundina* and *Spathoglottis* are found back of the steaming bluffs. ~~The~~ The steaming also carries *Leschenaultiana*.

bluff, largely bare of vegetation at the top, is just to the right of the trail. Below it a slope of lava covered by *Lehua* and *Gleichenia*.

The trail down to the Caldera floor may be seen opposite around the curve in the cliff.

Then another large steam crack on left.

At the intersection there is a choice of three trails. ~~Going~~ ^{Following} the one to the right, ^{the handwood point} enters a low open *Lehua* forest with an abundant tangled ground layer of *Gleichenia*. ~~Across~~ ^{Across} a large crack a good growth of *Nephrolepis exaltata* (or *N. hirsutula*) may be seen on the right of the trail.

The next crack is a large one and in it is a giant *Thelypteris* fern.

In the next one a slender *Pteris* and *Pityrogramma* in addition to the common ferns. *Spathoglottis plicata* in the crack and along the trail.

The under story gradually

changes from *Gleichenia*
to *Ladleria cyathoides*.
Wikstroemia is occasional,
as well as *Coprosma* (glab.)
Before ^{and after} the third bridge
Eupatorium riparium has
gained a foothold.
On the right *Dubautia*

100 m or so beyond this bridge
the sandalwood trees for
which the trail is named
may be seen. Their broad
leaves and yellow green color
identifies them (L. Pan.).
Just before them *Smilax*
sandy. Twine over a tree
at the rt. *Coprosma*
enoderoides forms masses ^{in grass}
Claphoglossum hirtum
a small tuft on a tree.
Astelias menziesii
on ground beneath the
Smilax.

If the *Santalum* is
in flower its delicious
odor may be noted.

Beyond the *Santalum*,
on the left ~~is~~ ^{the} small
bamboo-like grass is *Isachne*
distichophylla, representative
of an important Pacific genus.
The silvery leaves of *Astelias*
are just beyond, by the

next bridge, with
Wikstroemia.

This forest is a fairly
well developed *lehua* forest
and represents a stage
toward the giant forests
to be seen on older lavas.
The abundance of *Lycopodium*,
Ladleria, *Machaerina*
and *Gleichenia* shows that
it is still a relatively
young forest. It may
be noted that as yet there
are ~~few~~ ^{some} tree ferns, though
a ~~few~~ ^{some} may be seen farther
in the forest to the left.

Paspalum conjugatum
and *Cyperus compressus*
along trail.

The great crack on the
left shows that the section
of the crater rim on which
the trail ~~is~~ ^{may be} destined,
sometime, to fall into the
caldera. *Lycopodium*
cernuum is unusually
abundant (Degener story).

As the trail descends
and starts along a ledge
on the cliff *Smilax* is
on cliff ^{to} right.

In the distance ahead
may be seen the bare new
cinder cone at Kilauea Iki, formed
in 1959.

Andropogon glomeratus
on edge of cliff, also *Pteridium*
aquilinum along trail.

Andropogon *virg.* ^{occ.} ~~on~~ left.
Sarciolepis contracta
and *Throldius elongatus*
(smooth one) along trail. *Selam*

Fragaria along trail.

Trail out on shelf away
from cliff on left. Then
turns down to left to
foot of cliff where
Halemauman trail
branches off in taller
lehua forest with more
Cibotium.

Trail climbs scrub
covered cliff to left.
Santalum on cliff
with small lehua
and *Dodonaea*. Weedy
grasses along and above trail.
Eupatorium riparium.
Hypericum japonicum

Spectacular cliffs,
and caldera floor, and
Bryon ledge to it.

On cliff to left a
ginger, prob. *Hedyotis*
Zingiber zumbet (or *Hedyotis*?)
Also *Lythrum maritimum*
by steps. *Cyperus brevifolius*
in it. tall *virgata*

shrub with stiff pointed
leaves ^{below huge rock on it.} in *Hedyotis glomerata*
var. *centranthoides*.

Fuchsia magellanica ~~on~~
~~left~~ slender shrub
along overhanging trail.

Above narrow defile
tree ferns, *Cibotium cham.*
(hapu). At end of
defile, mt. *Cyrtandra*
cf. *cordifolia*.

Under ~~of~~ tall *Cibotium*
abundant ~~of~~ *Hedyotis* sp.
and mat of *Selaginella* sp.
Tritoma. *Commelina diffusa*.

Climbing trail - *Psidium*
cath. single slender sapling
to it. Mat of *Hypericum*
jap on ground along side
of trail. *Lehua* forest gets lower.
Hedyotis glom. very common
on ~~middle~~ ^{upper} part of ~~trail~~ slope
in ~~open~~ low *lehua* forest.

On left after trail levels
off. *Coprosma* - (small lf. pub.
twig).

Scattered *Cibotium*, forest
more open. Tangles of *Gleichenia*.
Intersection. Trail to it. to
park Hg. *Hedyotis*
abundant. Escaped *Rosa*
Eriogon karwinskyi

Tritoma, *Eupatorium*, *Commelina*,
abundant. Torch ginger. *Heterocentron*?

Volcano
House

Foot Path Valcano House to KMC.

Through a sparse young
koa planting ~~with~~ weedy
grass area.

Erigeron *hain.*, *Tritoma*,
Cynnelina, *Cyperus breviflorus*
Cynodon dactylon, *Rubus*
penetrans, *Rosa* (balywa)
Cyperus compressus, *Paspalum*
dilatatum, *Cyperus* sp.

Desmodium uncinatum
Bidens pilosa, *Saccrolepis*
contracta, *Anthosanthum*
odoratum, *Hypochaeris radiata*
Cherokee rose. *Pennisetum claud.*
Holcus lanatus.

Tritoma forms great
masses by veg. exud.

At end of meadow a
clump of ornamental *Rhododendron* on rt., *Tibouchina* on
left, on rt. a thicket of
Morus sp. and *Tibouchina*,
Hedychium, *Psidium guajava*
a slender bamboo.

Enter open lehua wood,
with *Hedychium* and *Tibouchina*.

Road
~~Trail~~ in to Sulphur Banks,
to rt. through open lehua
with *Gleichenia*, forming
deep tangles, with *Lyc. cern.*

Off road to left a small
trail leads to ^{new} steaming
vents with sulphur
deposited on earth and on
plants.

Across from this, at end of
road, is a spectacular
deposit of sulphur on a
steaming bank, practically
devoid of vegetation.

In front of this is a
flat with very low
vegetation - *Gleichenia* *lin.*,
Lyc. cernuum, *Pasp. obiculare*
Luzula, a few small *lehua*
and *Dodonaea*, to 1.5 m. tall.

Erectitites var. (purple) (rare)

l *Arundina* ~~can.~~

l *Styphelia*

l *Vaccinium reticulatum*

l *Andropogon virg.*

o *Sphenomeria chinensis*

l *Spathoglottis*

l *Gahnia gahniaciformis*

c *Cyperus* sp. (comp.?)

l *Dodonaea*

Much bare ground in
center of basin ^{shaped depression} with sparse
depressed *Fimbristylis dichotoma*,
Dodonaea, gray moss, *cladonia*,
Waltheria (v.), *Saccrolepis*,
Coryza can. patches of *Neph.*
exalt. (dwarfed), *Sphenomeria*,

along trail *Gleichenia*
gradually dominates.
occ. *Machaerina* ang.
becoming commoner, *Rehmannia*
becomes commoner.

Forest to left.

Then *Leptosoma* enod.
along trail, *Hypericum* jip.
Phorolobus along.

Then strip of *Rehmannia*
forest with abundant
Sadleria.

to open *Gleichenia*
tangles with scattered
small *Lehua*.

to steaming flats, with
great steam cracks.

Right fork at sign
then low *Gleichenia*
Lyc. cern. *Gahnia*, *Vacc*
Dodonaea, gray moss mistle.

giving way to low
Gleichenia tangles.

Pluchea odorata in trail.

Nephrolepis cf. *hirsutula*
locally abundant.

esp. around steam vent.

Trail shifts inner
edge of flat along edge
of forest, then *Gleichenia*
tangles.

Small trail to left
into moss covered flat

with *Melinis* clumps,
large erratic boulders
(thrown by 1924 eruption?)
back to trail which
continues through
Gleichenia, patches
of open ground with
lichens and moss. low
Vacc. *Dod.* *Styph.* weeds.
More *Gleichenia*.

Cordylone to rt. at foot
of low cliff. scarp.

Where trail turns toward
low cliff some *Conchium*
sch. var. *billeb.* *Grass*,
Rubus per. *Desmodium*
uncinatum, *Pharbitis*
Nephr. + *Lyc. cern.* dominant.
Rosa seems sterile but
has spread.

Climb scarp onto flat
with open low
Lehua and brush
of *Lehua* *Dodonaea*,
Styphelia, *Pteridium*,
Sadleria, *Gleichenia*,
Vaccinium ret. *Durbania*
Polypod. pell. weeds

In grassy opening and
Oenothera, *Gahnia*
scattered, *Sentabum*:
come out at K.M.C.

Mar. 26 - Crater Rim Dr.

Left at Bird Park Jct.

Veg. a *Styphelia*-*Dodonaea* scrub with scattered small lehua, becoming rapidly sparser till more ground than scrub shows.

Observatory. Much steam coming up from all around pit, and from many places on caldera floor. Dizzly weather probably makes much more steam.

Vegetation on this high ground both sparse and depressed. Ground of rounded low tumuli covered by ash. *Bulbostylis* abundant in open ash. Down hill both scrub and trees become more dense.

Where road flattens out again view left shows very sparsely vegetated ash beds on lower level.

Then a bare watercourse. Then road is down on lower level. Vegetation very sparse - scattered lehua 1-3 m. tall, small *Styphelia* & *Dodonaea*. Thin *Bulbostylis* *Conyza* and tufts of several

weedy grasses. This ash surface here is somewhat indurated into a crust. Where extreme almost no vegetation south of Halemau mau.

But in a bowl shaped depression to left of road a dense mixture of shrubs - *Dodonaea*, *Styphelia* and weedy grasses, sedges, *Desmodium*, etc. on fine black sand.

Beyond here rolling land with very little vegetation - an ash desert. *Graphalium* sp. scattered with *Conyza* can. and an occasional little tuft of *Hibiscus*, *Styphelia*, etc. in places where loose ash has accumulated on the indurated layers.

Cross a series of cracks which are the s.w. rift of Kilauea.

Then a ^{low} punier field with notable weed veg.

Desmodium uncinatum

Plantago lance.

Sporobolus elong.

Setaria

Verbena bonariensis

Cyperus compressus
Oenothera stricta

Rinnaria canadensis
Cynodon dactylon
Hypochaeris rad.

Bidens pilosa

A few clumps of
Rumex giganteus
 and *Dodonaea*

Pennisetum ruppellii
 and a ~~couple of~~ unknowns.

Silene strobiloides
 Surrounding area
 on this side of Halemau-man
 an almost complete
 desert of ash and pahoehoe.

Halemau-man Overlook.

Up toward rim again
 more and more *Styphelia*
 and *Vaccinium*.

Boulders on flat here
 thrown out by explosive
 eruption in 1924

Upper flats have a sparse
 scrub, of *Dodonaea*, *Vaccinium*,
Dubautia, *Styphelia*, *lehua*,
 growing up thru a deep
 layer of fine pumice lapilli 1959
 Keana-hoi crater -

pumice field in bottom.

Low *lehua* forest beginning
 to recover from 1959 damage by

pumice or pumice. Deep lapilli
 layer.

Gradually changes
 to dense uninjured *lehua*
 forest with *Styphelia*
 understory at Kilavea
 Iki Overlook Jet.

Mar. 27 - Tree Mold Road

The road winds
 through open *lehua*
 woodland, similar
 to that along the main
 road, up over a low
 lava bluff.

On top is *Styphelia*-*Vacc.*
 scrub, open, with
 few trees ~~in~~ it, grassy.
 There is a considerable
 area of this, with, trees
 on it locally, but very
 scattered.

Around the loop at
 the end of the road are
 many young *Acacia*
koa.

Here are a number of
 excellent tree molds, shells
 of ~~the~~ lava that have
 hardened around tree trunks
 during a flow, before the
 wood has burned out.

Here also an excellent opportunity
 to observe transition stages between
 juvenile *koa* leaves with comp. blades and phyllodes.

Oenothera
 common

much larger
 than any
 trees in
 area now

Mar. 26 - east of Kilauea
Military Camp, Hawaii
National Park
in low Metrosideros forest.

- 41758 *Astelia menziesiana* Sm.
common, terrestrial
- 2 59 ~~grass~~ *Deschampsia nubigena* Hbd. 2. l.
rare
- 1 60 *Luzula ~~composita~~ var. hawaiiensis*
rare Buch.
- 1 61 *Carex*
rare
- 1 62 *Setaria geniculata* (Lam.) Beauv.
occasional
- 1 63 *Vaccinium reticulatum* Sm. ?
occasional
- 4 64 *Stenogyne*
local on broken rocks at base
of cliff
- 1 65 *Cenchrus echinatus* var. *hillebrandii*

Mar. 26 - near Volcano House,
Hawaii National Park

- 2 66 *Cyperus polytachyos* Rothb.
very common in ^{grassy} meadows
- 1 67 *Heterocentron ~~roseum~~ ? subtriplicatum*
local in low weedy brush
- 3 68 *Selaginella baueriana* A. Br.
abundant in wet place at
foot of cliffs on Sandalwood Trail

1220 m.

fruit yellow.

dense tussock

bristles somewhat yellowish

leaves concave.

arching, scrambling
plant, ^{up to} 2 m. long; flowers
bronzc color. leaves concave.

1200 m

(L. & O.) A. Br. & Baiche

flowers white.

prostrate, forming
a loose mat.

Mar. 26 - Sulphur Banks,
Hawaii National Park
in open depressed area

41769 *Agrostis avenacea*
rare

1 70 ~~Cyperus~~ *Fimbristylis dichotoma*
very common, the only vascular
plant in lowest part of
depression

Mar. 26 - Flats southeast
of Halemauuman in
Kilauea Caldera, Hawaii
National Park

2 71 *Rumex giganteus* f. *giganteus*
occasional in open
pumice bed

2 72 *Dubautia ciliolata* (DC.) Keck
occasional on pumice beds

1 73 *Agrostis avenacea* Gmel.
rare on 1790 ~~ash~~ crusted
ash surface.

1 74 *Grapphalium sandwicense* var. *bilaueanum*
locally common on bare ash

1 75 *Silene struthioloides* Gray
locally common on bare ash surface

1 76
very rare on ~~the~~ pumice.

1200 m.

culms solitary or almost so,
prostrate, whole population
thus dwarfed.

1100 m.

clump 0.7 m. high; ~~not~~
flowers light green; mature
fruiting calyx before
drying, ~~the~~ very pale green.
shrub 0.5 m. tall,
flowers yellow.

Deg. & Shuff
surface

subshrub with thick
fleshy tap root.
prostrate

Mar. 27 - Crater Rim from
K.M.C. - turn rt. at rim.
through irregular scrub
with along rim. Note that
the section of rim you are
on is separated by a big
crack in it. Will eventually
fall in crater. *Polypodium*
pellucidum abundant.
Similar sands. in trees
on it. *Astelias* under trees
Hadleria cyath. very
good here. Note anthocyanin
in young lvs.

Bulbostylis in trail.
Note slight revegetation
on lava lake.

Scrub here is of *Styphelia*,
Lehua, *Dodonaea*, *Gleichenia*,
Vaccinium, *Coprosma* *ernod.*
Hadleria, *Machaerina* ang.

After 100 m. or so cross
at first opportunity to main
travelled trail. 10¹⁵ m. away
from rim.

Veg. becomes a bit sparser.
more in cracks than on
level ground.

Gahnia *gahn.* & *Ruzula*
may be seen near edges of
cracks sheltered by bushes.

Open ground has lichen
Bulbostylis, *Hypochaeris*,
Coryza can.

Colony of *Polypodium*
scleranthoides in trail over 200 m. along.
Leontodon in scrub.
Phemerium.

Scrub becomes more
luxuriant, trees larger.
for a short distance.
Leontodon rather common.
Then on it. a large bush
of *Myrica* *faya*, with
conspicuous erect branches.
Shortly after, the
vegetation again becomes
open lower and more open.

Oenothera common
in open places.

Veg. becomes lower,
more open. *Lehua* fewer,
until there is as much or
more open ground than veg.
Occasional great boulders
near trail were thrown out
by steam blast in 1924.

Veg. more and more sparse.
Then up a lava scarp -
more small trees on top scarp.
(Just before this, *Trifolium*
pratense - tiny colony in ash.)
No trees on top, sparse
scrub with consp. elongate
Coprosma *ernod.*
Volcan. obs. *Uwekahuna*

Lookout with good view of Caldera & Halemau-mau. Circular faults, steam, etc.

~~From front~~
From high ground bet. Observatory and Kipuka

Mar. 27 - Kipuka Puau, ~~Hale~~
Hawaii National Park

- 41777 *Hibiscadelphus giffardianus* Rods.
small planted tree in edge of mesophytic forest

- 78 *Hibiscus hualalaensis*
small planted tree in opening in ~~the~~ mesophytic forest.

- 79 *Pisonia ~~indensis~~ ^{fosterianus, Endl. ex Walp. & Schauer}*
common *P. umbellifera* (Forst.) Seem.

Mar. 27 - Crater Rim Trail bet. Kilauea Military Camp and Volcano Observatory
Hawaii National Park

- 4 80 *Santalum ^{ellipticum var.} paniculatum*
common locally in mixed scrub

- 7 81 *Polypodium ^{procumbens L.} scolanthoides*
common in trail for a short distance, not seen elsewhere.

- 2 82 *Myrica faya*
single tree in mixed scrub.

Puau Pt. on clear day a very good view of the Kipuka and mosaic of vegetation on slopes of Mauna Loa.

1200m

Tree 4 m. tall, flowering abundantly, ~~the~~ corolla maroon, curved, not opening. - fruiting (fruits tardily dehiscent).
tree 4 m. tall, flowering sparsely; corolla green, bright yellow-green within, curved, not opening.
small tree 5 m. tall.

1200m.

shrub 2 m. tall, leaves dull, yellowish-green, fruit immature.

1961

Air trip Kila - Maui
 Mar. 28 - N. slopes relatively
 solid wet forest above
 plantations, then a belt
 of grassland. ~~and~~ To
 west this widens
 downward with lower
 part a mixture of forest
 and grassland. To
 where it merges with
 Parker Ranch Pasture.
 Above grass belt is a
 belt of scrub (and
 mami forest?).
 Above this the bare top of
 the mt.

Maui - Wet forest on
 steep slopes s. w. of Hana.
 Some clearings at bottom.
 Forest in Kampo Gap, but
 grass below mouth of gap,
 forest on lower flow slopes
 or brush?

S. W. of Kampo gap very
 steep, bare ~~eroded~~ deeply
 eroded slope - upper third
 scrub, lower bare or grassy.
 The

This deep erosion for about
 1/3 or 1/2 way to Ulupalakua.
 Beyond this upper slope
 scrub-covered, lower flow
 slope bare, grassy.
 Very top of Haleakala bare red ash.

Grassy slope just below
 scrub in western part
 with scattered trees,
 becoming denser to west of
 Anahulu, westward, also,
 the scrub belt becomes
 thicker and taller, perhaps
 some lehua forest.

A road around into this -
 is this the Anahulu Rd? no??

Lower slopes & Isthmus
 hiawe forest, dense above,
 to open and sparse, almost
 savanna in lower
 flatter area. Savanna
 on flat part of Isthmus
 where not in cane.

Lower ridges of W. Maui,
 s. of Iro V. badly eroded.
 S. shoulder grassy in
 lower 3/4.

Trip around East Maui by car -
 start 10 a.m.

94.9 Airport. Kiawe etc. Cane fields
~~to~~ with Greville's wind-break.
 Then cane without wind break to
 near Puhalani pt. with a few
Eugenia cinnamomi & heave.

Pineapples & pasture.
 03.9 Puhalani pt. Eucalyptus plantings
 Pineapples & pasture, to
 Upper Kula Rd.
Jacaranda, *Aravicania*, *Casuarina*
 in small numbers. *Cyperus* also

Considerable Eucalyptus plantation. Grevillea and Jacaranda.

Pasture with some *Opuntia*. *Sporobolus indicus* on fences.

Acacia dealbata abundant at higher levels.

10.6 Haleakala Hwy. Jct. Upper Kula Rd.

Pasture with small farms, gardens - temp. zone flowers and vegetables.

Eucalyptus & *Acacia dealbata* plantings and thickets.

Foeniculum vulgare very common along rd. *Cyperus macrocarpa* planted.

Walton Rd. to Polipoli Hts.

Acacia dealbata ~~is~~ fruit below road, farms above. then farms below. Higher slopes pasture.

Then Lantana, mostly leafless, on lava flows.

16.6 Kula Sanatorium at Keokea

then pasture largely invaded and dominated by Lantana, locally much *Opuntia*.

(Pond on left visible at head of bay).

18.3 views of Kahoolawe ahead and Panai to rt.

Sporobolus indicus along rd. *Abutilon* molle. much *Opuntia*

and Lantana.

Views of Molokini - Kahoolawe.

Pennisetum sp. with trifoliate lvs, white fls. large stipules, green fruit turning yellow. common on walls and bushes. *Kalanchoe* abundant.

Melia trees scattered in pasture.

21.3 Jct. Makaha Rd.

Kahoolawe - red top.

Eucalyptus planting.

Ulapalukua Ranch.

Old mill ~~smoke~~ chimneys.

27.6 Jct. with Kanai Rd.

Baccharis frutescens on left.

Cinder cone with guava scrub, cut in black sand, on left.

Lava beds and cinder cone below on rt along coast. *Leucaena* below road on rt.

Open Lantana scrub on weathered aa flow. with *Kalanchoe*.

Scattered *Reynoldsia* trees. *Nicotiana glauca* on aa. *Dodonaea*.

Hemiphragma mex.

very common. Some

Leucaena.

Bare cinder cone on rt. Prime

Open Lantana scrub.

Nic. glauca common along rd.
Weathered aa.

Black lava below along coast.

27.2 aa with ^{sparse} Dodonaea. some
Opuntia, very bare lower
down.

29.0 - 3 scraps of dry forest
with Diospyros, Reynoldia,
Myoporum, Canthium,
Nothocestrum, Argemone,
Erythrina, Ipomoea tuberosa,
I. indica, Zinnia elegans (naturalized),
Mirabilis, Nicotiana

Hunnemannia, Foeniculum,
Bidens pilosa, Opuntia leucocarpa,
Amaranthus sp. Nicotiana,
Lantana, Tridax, Hilera gallica,
Leucaena, Cyrtosperma, Passiflora sp.
Nothocestrum latifolium,

(on left by rd.). Chenop. vavilae,

then pasture with Leucaena,
Lantana, Nicotiana, Opuntia,
with a few Erythrina.

Fouquieria below on left rd.

29.4 Opuntia very abundant on left.
one Prosopis tree. Much Lantana.

29.9 3 Cinder cones on left. with
Lantana scrub and some grass.
same on rt. below.

20.7 Patches of Erythrina below.
Another cinder cone on left
patch of Reynoldia & Erythrina

just below rd. on rt.

Then open Lantana scrub with
scattered Erythrina and
Myoporum. Canthium.

Occ. Diospyros & Hilera
and ~~the~~ Aleurites.

Argemone.

72 Patches of scrappy Lantana, ^{Dodonaea}
Erythrina, Diospyros, etc.
Mostly Lantana.

Xanthium, Abutilon molle,
Nicotiana, Solanum
sodoraecum, along rd.

Lantana above, grass below.

Very rocky. Soil gone.

Occ. Erythrina, much
Opuntia - grass with
Lantana.

33.5 Verbena common.

Have been descending for
some time.

Very rocky, little Lantana,
rather little grass.

Occ. Dodonaea & Canthium,
much Opuntia. Some Leucaena.

34.0 more grass, less Opuntia.

Argemone common.

locally much aa

34.6 Erythrina in ravine.

This aa probably esp.
by erosion.

36.7 Grass, less aa, rock on

- lower, gentler slopes, just above ocean. *Manowainia* 9.
- 36.6 dry gorge. *Euphorbia* sp. depressed, shrubby, on walls.
- 37.7 Low grassy slope. some *Pili* another, smaller gorge *Kahal* *saimehama* 9. with abundant *Euphorbia*, *Atriplex*, *Sida*. Stop. Timstones
- 37.8 Another. prob. better stop. Few here - grass, over. leave, esp. in ravines.
- 38.2 12 noon. Pebble beaches. gorge with flat rocky bottom. This *Prosopis* savanna.
- 39.4 *Prosopis* thickets on it. savanna.
- Now - bay with old landing. *Prosopis* thickets. *Ozimum* sparse.
- Prosopis*, *Leucaena* scrub with *Opuntia* and a few many *Erythrina*.
- 41.0 grassy slopes. much *Opuntia*, *Zinnia* common.
- 41.6 *Leucaena* scrub on it. it. been on both sides.
- 42.1 Guinea grass pasture + *Leucaena*, *Schinus*
- 42.6 first farm. Mouth of Kampo Gb. *Eugenia cinnam.* Church. *Theretia* thickets on left. *Pandanus* on left. Much *Leucaena*, some *Schinus*

- over. Kuluni. Kampo area. Farms. *Leucaena*.
- 44.4 Kampo school. Gorge with waterfalls on left. View of Kuluni patches on mt.
- 44.8 *Erythrina* patch on left stream with *Eugenia*, *Psidium*, etc. Then mt. *Theretia* thicket. Then low *Psidium* catt. - *Eugenia* *Schinus* beat. Kuluni in ravine. Spectacular rocky coast. Wind-sheared *Schinus*, *Euphorbia* scrub. Han - mango forest, Kuluni, bananas in gulch. *Euphorbia* + *Osteonites* on cliffs on left. Han - quava. Mango, quava, *Psidium* catt. on steep slope. see bluffs. Mango forest with *Pandanus*. *Fourea* with *Eugenia cinnam.* cliffs. Wet valley with Kuluni mango, han. Water falls. *Psidium* catt. *Coccoloba*. breadfruit. Ten grade up from this. *Canavalia microcarpa* on it.

in low-lying thickets.
Stachyarpeta urticifolia
 abundant.

Pastures.

More Pandanus spp. Mango
 thickets. Kukui in ravines.

Pastures.

More thickets. *Polypod* red
~~alternata~~.

Tuff cliffs. bare.

Gulch with scrub of
Euphorbia + *Osteococcus* on
 s. side. Pandanus + *Scaevola*
 on n. bluffs. Grass scrub
 in bottom.

Cliffs - some *Scaevola*,
 mostly bare tuff cliffs.

Shrub beach. *Canna* in
 bottom of gulch. scrub of
Cantua, *Euphorbia*, *Scutellaria*
 on sides.

Sea cliffs with *Euphorbia*,
Scaevola, Pandanus.

Gulch with low thickets.

Terminalia by small bridge.

Cliffs. Pandanus above.
 Fourcraea.

Wooded gulch with Mango
 then *Spondias*, *Cecropia*,
 Mango, Coco, etc. *Eugenia*
 common around farm.

Pastures.

Guava, mango, *Eugenia*
 forest. Wood Pasture with

thickets; mango trees
 dominate landscape.

Guava, mango, Pandanus,
 breadfruit, bananae,
 Coco.

Mango and Pandanus +
 pasture. some low mixture
 to *Pipihula* with old
 mill ruins. Terminalia
 grove on rt. Village.
 with *Aravearia* and
 many ornamentals.

Another Terminalia grove.

Grassy pasture slopes,
 on left, very green. Thicket
 on rt. and in ravines.

Terminalia and *Eugenia*
 trees along road. Milo on left.

52.2

Seven Pools. - beautiful
 cascade in gorge.

Canavalia microcarpa at
 end of bridge. Pandanus
 below - otherwise no native
 plants. *Thesperia*, *Eugenia*,
Terminalia, guava, Coco,
Cantua, *Plumeria* (in ^{cemetery} ~~past~~).

Pasture

Gulch with Pandanus, *Eug.*
kukui, *Scaevola*.

Pasture + thickets.

Gulch with Pandanus
 forest on opp. wall
 low, *kukui*, mango,
Eugenia, etc. ~~Terminalia~~

Gulch with *Eugenia* - mango forest.

Guava - bae. - *Eugenia* - mango thicket on bluffs. *Persea* sp. *Ipomoea indica*

General ~~mostly~~ mixture of the same thickets and pastures on bluffs and in small ravines to "Wailua" Gulch, where there is a beautiful waterfall in a grove of kukui and breadfruit. *Alouatta maculata* (ape), ~~and~~ torch ginger, red to in *Commersonia* slopes below falls. *Thelypteris* *parvifolia*. *Schizostachyum* clump to rt. of falls. *Ipomoea indica* festooning cliffs. *Colocasia*. *Dioscorea bulbifera* rare.

On wet rocks alga, much *Delphinella menziesii*, ~~a bit~~ some *Pilea peltoides*, a bit of *Adiantum* sp. and on drier rocks, *Polypod. thunbergii*.

By road *Zehnera pendula*, *Oxalis martiana*, *Panicum maximum*, *Euphorbia glomerata*, *Canavalia* ~~tree~~ *microcarpa* on tree. *Drymaria cordata*.

Wailua Falls

54.9

By a narrow, between 2 bridges. Breadfruit abundant.

Bridge over second stream labelled Wailua.

houses and many kinds of planted trees - Kooli Village.

mango trees. pasture.

56.5

Farm with *Melastoma* planting on left.

mulo trees a little beyond it. Coconut trees in pastures and thickets.

Small farms and dwellings. many *Terminalia*, *Citrus*, mango, Coconuts, Pandanus. *Papaya*, *Lamanea* (defoliated) *Calophyllum*, etc.

Scrub on sea bluffs.

Farms & pasture.

Wide level pasture.

59.9

Hamos Beach Rd.

Pasture invaded by guava on level ground. thickets and pasture on bare slopes.

Kukui in pasture on it. have also - round clumps.

Wooded area on it - *Melastoma*.

Casuarina planted just above beach ~~pastures~~.

Kukui along ravine to st.
Guava thickets on st.
Pasture & stock pens.
Row of ~~the~~ Araucarias and
Casuarinas leading into Hana.
Cider was on hand.
wooded with Casuarina

62.7 Hana. 2 p.m.

Crunum procerum - fine
row on st. by hotel.

Beautiful Hana Bay.
Lighthouse on point.

Old Casuarina trees.

Pastures to st. Houses
and trees, wet lowland
forest to st. Tall Araucarias.
Broadfruit very common. Bananas,
Pandanus, Eugenia, Terminalia,
guava, mango, Plathodea
Carica, Persea, etc.

65.6 Pastures & thickets.
Pandanus forest on st.

Extensive pasture, guava
brush on slopes above st.
Road is well up on slopes
good patch of Pandanus
forest down on coastal flat to st.
Wooded ravine in pasture.
Banyan trees planted along
road.

Kukui with Eugenia
malaccensis, guava, etc.

Guava - Eugenia mal.
Plathodea thickets.

69.7

Large Banyan.
Then several large
Eucalyptus robusta.

Guava forest below,
pasture, much invaded
by guava, above.

Pasture, with a few
Manihot glaziovii
Eugenia jambosa
groves in pasture.
Heterocentron roseum along
road.

71.5

Pasture gives way to thickets
and forest. Gleichenia,
much land has been cleared
for pasture, but overgrown
largely by guava, Gleichenia,
etc.

72.5

Some Lohia, Koa, many
planted trees, mostly
guava thicket.
Pastures more and more
overgrown. Gleichenia and
guava most abundant
some Lohia and pastures
on slopes.

Koa more and more
abundant, some Lohia.

Many planted trees
Melaleuca, Eucalyptus.

75.5

Pua Kaa Park.

Koa very common as far as ridge before Waiokani Falls
 Schinus very abundant
 above ~~Koala~~ Wailoa Taro
 patches. Much koa and
~~koala~~ forest on flats sea-
 ward of taro. Koa on slopes,
 also.

82.5 Beautiful view along coast
 line, then another view of Mualua

84.8 Beautiful view of Honomau
 Gulch with side ravines
 full of kukui.

86.5 Kaimahina Park
 planted Eucalyptus and
 Acacia confusa. Melaleuca
 leucodendron.

Many aroids, ginger.
 Impatiens sulcata
 collection of Cordyline term. var.

Beautiful view of Keanae
 Pen. from lookout.

Xanthosoma sp.

Dieffenbachia picta

Scindapsus aureus

Philodendron lacunus

Heliconia humilis

torch ginger

Costus sp.

Cibotium chamissoi or glaucum

87.8 Bet. Kaimahina Pohuakama
 gulches - Eugenia malaccensis
 trees along ~~rd.~~ rd. on it.
 fruit July & Aug.

000 Gulches before Peahi
 have Pandanus, kukui forest.

12.1 Prosopis forest along beach
 near Speckleville. Cane
 plantation to left of rd.

14.3 Puenene ft. 4:20 p.m.

Road in cane fields lined
 with Spathodea

Came to Puenene Mill

ft. on main st. in town,
 giant Enterolobium to st,
 Samanea to left. Cross this.

More cane for a long way.

19 Cane on left, savanna on
 rt., then on both sides.

20.9 Cane on rt. Prosopis forest
 on left - thick, to 8-10 m. tall.

21.9 rather denser Prosopis forest
 on both sides, then very
 dense. 10-12 m. tall.

22.9 Sea. ~~Prosopis~~ turn rt.

Prosopis forest on rt.
 houses along beach.

23.3 Flats of Batis maritima
 along road, bet. road and
 pond. Atriplex semibaccata
 & A. sp. also Sesuvium
 and bare salty areas.
 On other side a strip of Batis,

Kealia
 Pen

then *Prosopis* fruit.

Bet road and beach a sand
strip of ^{potholes} ~~crippled~~ ^{with *Chrysanthemum* ~~mutabilis~~ & *detans* perit.}
~~crippled~~ and
on beach ridge *Thorobolus*
virginicus & *lescurianus*.
Iporhoa *percaprae*.

24.8

Outlet.

25.8

end of Mats flats. beginning
of cane fields.

26.6

Slopes of West Maui on left
lower slopes and bluffs grassy.
Jct. Lahaina Rd. ^{Town} Keawe & *Leucaena*
on it. Then cane fields.

Gulches on left brushy,
ridges grassy & eroded into
dark red dirt.

Most of alluvial fans wooded
until just before Waihapanu,
where a large fan is being put
under cultivation. From here
on all are in cane.

Samanea trees along road on left.
from Waihapanu to Wailuku.

27.9

Wailuku. 5 P.M.

Royal Palm on left, on street entering.
(High St.)

Kanaha Pond Wild Life Sanctuary
Maui Traffic and Planning Commission
has plans to develop this, with
picnic areas, etc. (County govt.)
Robt. Ohta OHATA.

Joe Medeiros is Chairman
of Commission.

Plan A provide extensive
picnic areas on land, some
of it to be filled, in center
of pond. Parking areas
on all side. Magazine
areas to be retained in pond.

M.C. or Audubon Soc. should
look into this.

Flight Maui to Honolulu -

Lower slopes of W. side W. Maui
are in sugar, that is, the flow
slopes bet. the gulches.

Molokai - S. coast -

considerable reef development.
but with gaps at mouth of
streams. Lower half of
slopes, including all the
flow slopes are in pasture, except
brave forest on lowest part.
Upper ridges and slopes ^{forested}
and ^{stunted brush} in upper gulches.
But some of the western
ridges are terribly eroded
up to not far from tops.

and farther west the
grass goes almost to tops.
Lower slope and ravines
in open *Prosopis* forest or
savanna (upward).

Green grassy area in back
mangrove swamp

be Batis. A few bare
areas in them.

Some red silted areas
also. Dry scrubby vegetation,
probably Prosopis, grass,
and ^{red} eroded areas. Grassy
slopes being actively gullied.

Thornorn sand slugs
seems to be almost all
wooded now.

Savanna and liawe
forest on west end. Also
a depression back of
main western beach
that may be a marsh
surrounded by liawe
forest.

March 23 - Kealia Pond,
south side of Isthmus

- 41783 *Atriplex*
abundant on sand back of beach

- 84 *Atriplex*
common in edges of saline
flats around pond, in sand

anwaia, w. of Suabailua Hills,

Mar. 28 - south side of
Maui, ~~5 mi. beyond Hlupulaka~~
on dry aa lava slopes

- 85 *Sporobolus tuberosus* v. *costatus*.
common

- 86 *Diospyros ferrea* var. *pubescens* Forb.
~~occasional~~ occasional in remnant
of dry forest

Mar. 28 - ~~Maui~~ Kahaleaia Mahana gulch, Maunawainui,
south side of Maui, south

- 87 *Euphorbia*
common on cliffs of small
gorge

Mar. 28 - Wailua Falls,
2 mi. s.e. of Hana

- 88 *Artocarpus altilis* (Park.) Forb.
very common in gulches
along road.

- 89 (alga) *Oedogonium* sp. + *Cladophora* sp. + mostly *Pithophora* sp.
abundant on rocks in falls

1 m.

erect.

much branched low plant.

485 m.
~~Beach~~

flowers white.

small tree.

60 m.

prostrate ^{lactiferous} shrub.

50 m.

~~tree~~ fair sized tree.

Det W.J. Gilbert

Apr. 3 - Los Angeles - Tucson
(Constellation, left side 5:30 p.m.)

El Segundo sand dunes are completely covered by oil refinery and houses.

Palos Verdes Hills - a low density development, with areas not occupied by houses either in a golf course or very well manicured. A few scars on hill tops that look like sand diggings, and a big quarry and a nearby area graded in horrible terrace squares presumably for building.

Santa Ana Mts. have very considerable areas of chaparral intact, also a road up to a radar station on a peak near the summit. Rocky areas large.

Hills east of here dry bare, little if any chaparral.

San Jacinto Peak with no visible snow. Upper peaks and ridges very rocky, almost bare of vegetation. West slope of summit peak looks as though it had dwarfed alpine vegetation. Considerable forest in upper valleys and canyons.

In valley by Palm Springs

and Indio what appears to be a dry lake - cultivation intermittent on either side of it. Part of the bare area apparently laid out in house lots.

Is this Salton Sea - if so, it must be dry.

Mojave Valley still untouched except for road. Little San Bernardino as dry and bare as I remember them. Chocolate Mts. also, though there seems to be vegetation in the bottoms of the canyons.

Several parallel roads along L.A. aqueduct, across vast series of bare fans, coming out from a long straight mountain range front, undoubtedly a dissected fault scarp. Some sand along this, and especially a large pile of it near the eastern end of the broad valley through which the aqueduct runs.

Apr. 1. Tucson - Chicago (707 jet, left side). (Departed 10:15 a.m.)

Valley above Tucson - for some distance a series of complicated washes braided on the floor of a broad flat valley. Small check dams. Small ravines cut into desert floor.

Then a rather large wash with considerable vegetation immediately adjacent to main stream beds.

Upstream this forks into many small streams in a dendritic pattern. All this is fairly undisturbed desert.

At head the course passes over an imperceptible divide into another stream system. This river runs off to the left, with dense woods vegetation and a few green cultivated patches in bottom land - open desert otherwise. Mountains to left of this well wooded at higher altitudes.

Beyond here very sparse desert vegetation on not very rough land. Then a cultivated valley with a

small town and air strip - the cultivation all well above the town - apparently alkali flats below, with small reservoir. Wooded mountains in distance to left.

Rough desert country below. Scattered small trees on mountainous parts, sparse scrub on more level parts, more dense along watercourses.

Then another village with rather extensive cultivation. This valley leading northward with much cultivation in far distance.

Open desert country with buttes - very sparse scrub except slightly denser along ~~stream~~ water courses.

Then gray low mountains with extremely little vegetation, but this strikingly greater on north-east slopes than others.

Another, much narrower, cultivated valley - cultivation only on bottom-land. An enormous strip mine in distance toward head of this valley.

Vegetation on slopes leading down to this valley very sparse.

Country gets rougher, leading up into a wooded plateau on gentle slope eastward from an abrupt scarp which falls off abruptly to west. Eastward this slopes off into gently dissected country that is grassy except in ravines which are sparsely wooded or brushy.

Generally mountainous but not too rough, locally wooded to north.

Then a very rough mountain mass, very high, with coniferous forest with traces of snow on northeast side of crest, on course - this extensive, extending n.e. in a high, gently dissected plateau, well wooded, with, farther n.e., some areas of grass or very open or sparse forest. ~~are~~ high wooded peaks with mountain meadows near top on north side.

Generally mountainous and wooded country in this whole area except for

extensive grasslands in distance to left.

Then large grassy patches closer by where terrain is flat.

A mosaic of wood and grass on an apparently high plateau. Snow locally, this for some distance with variations.

A conspicuous low flow then, about 50 min. from Tucson, a great snow capped peak, isolated, on immediate left, Redondo Pk. A snowy range in distance. A lava mesa just east of it.

Then, at just under one hour out, the Rio Grande Valley, and a great rugged range east of it. The bottom land, intensively cult. the slopes desert, very sparsely vegetated. The Mt. range mostly wooded, with a sharp crest, snowy on east side. Extensive snowy mts. far to north.

Lower wooded mts and large plains areas along course. Some large

scale cultivated areas. Then mountains again with pine forest and many high very snowy peaks extending to north from a belt of lower wooded mts. and hills across course. This mostly sparse low wood - possibly piñon-juniper, much grass, esp. eastward where it gradually fades into desert grassland. Some incised meandering streams. Vernal pools? Typical high plains. mostly thin grass, shrubby areas locally near water courses. Mosaic with some forest to left. Snowy mts. in distance.

Detail of vegetation pattern in plains below very interesting, with relation to water courses, low erosion remnants of mesas. Would be worth examining on ground.

Rather large reservoir on immediate left.

Along river below this, extending and meandering eastward ~~or southward~~, some very severe erosion,

exposing bright red material. Course follows this river. Vast grasslands, erosion wherever there is any relief.

Then, very locally, some cultivation, but here away from river. No bottom land cultivation - no bottom lands. Cultivated areas larger eastward. Grass between them but rather sparse.

Scattered sand dunes along the course of river but a little way on other side of it. River becomes notably larger. Water a red color, sand bars pale tawny. Sand dunes also tawny. No

more cultivation after ~~start~~ beginning of sand dunes. After sand dunes area vast plains locally with many vernal pools and small ponds the latter formed by damming small water courses. Still some erosion, locally serious.

Then ~~the~~ river augmented by a large tributary from northwest. Much cultivation

in distance to north. Gully erosion locally very conspicuous, especially south of river. River

~~Crossed to north side of river, then~~
gets larger, gets closer to large cultivated area on north. Extensive plains on both sides of river. There have been no trees along this river nor along its tributaries.

Small city to south of river. Bleak! and what appears to be an oil field east of it.

Course still parallels river. Tributaries are dry and very sandy. River bed wide and braided.

Terrific gully erosion in complicated dendritic patterns on both sides, especially the south side.

Vast cultivated area not far north of river.

Crossed river at 11:50

Partly cultivated, eroded plains, some intensive cultivation to north. Becomes more spotty to northeastward. Much open thin grassland. Laid out in squares marked

by roads.

Then a red area, rather deeply gullied. Rather a lot of cultivation to north.

Many dammed up gullies forming small ponds.

11:58 crossed a broad braided river course at right angle.

No conspicuous woody vegetation. Then more dendritic gully systems cut into red plains.

These gullies beginning to have woody vegetation in them, flat between them grassy, gully slopes bright red and bare.

Scattered cultivation.

Red area very large.

Gullies now generally wooded and ~~some~~ river bottom lands cultivated.

At about 12:05 land becomes generally cultivated - some small grassland areas, but 80% of area under cultivation.

12:25 Topeka and Kansas R.

Chicago - Baltimore - (left. side 2-8)
3:39. North over lake, then east. Crossed shore where it turns north. A new area of wooded dunes - 3 ponds at north end, some

sand excavation at south end, highway passes on land side.

Country to east intensively cultivated, but many small lakes and wooded meandering stream courses. Not very green at this season.

A very few small wood lots. South west part of Lake Erie has a ~~small~~ small archipelago of islands of varied sizes, mostly largely cultivated.

Locally in n.e. Ohio an appearance (from 27000') of some snow remaining in elongate patches, as against fences, etc.

Just before landing crossed what may be a small serpentine barren, ^{open} ~~open~~ ^{glarry} land with a few small pines. On left of a paved road going northeast toward Baltimore. Not a large area. Possibly only an abandoned pasture.

April 10 - mall side of Capitol Bldg. - *Magnolia grandiflora* on the two sides of the capitol steps have become a bird rookery since the Capitol has been wired to drive the starlings and pigeons off the building. The result is a layer an inch or more thick, on the ground and on the branches, of guano. The magnolias, as well as *Ilex opaca* and *Ligustrum* ~~and~~ (Calif. privet), have become largely defoliated and seem to be in very poor condition. The remaining magnolia leaves are browned in spots where splashed with guano. Even the small twigs have an accumulation of guano. Not a plant of any sort is growing on the ground under the trees. However, even before the invasion of birds nothing much was growing there. Now, of course, there is almost no shade to have an effect.

April 16 - Balls Bluff
Flowers in bloom in
deciduous woods on slope

Saxifraga virginica

Hedyotis caerulea

Antennaria plantaginifolia

Claytonia virginiana

Amelanchier arborea (Michx.) Fern.

Dentaria laciniata

Dicentra cucullaria (L.) Bernh.

Dicentra canadensis (Goldie) ~~Walt.~~ ^{Walt.}

Viola ~~pubescens~~ ? glabra yellow

Erigeron bulbosa (Michx.) Nutt.

Jeffersonia diphylla (not flowering)

Caulophyllum thalictroides

Hydrophyllum virginicum (not fl.)

Sanguinaria canadensis (part)

Trillium sessile

~~*Platanus occidentalis*~~

Podophyllum peltatum (buds)

Erythronium americanum

Mertensia virginiana

Viola cucullata

Asimina triloba (bud)

Acer ~~saccharinum~~ (young fruit)

Lindera benzoin

Smilacina racemosa (not fl.)

~~*Nepeta*~~ *Glechoma hederacea*

Corydalis flavula (Raf.) DC.

Stellaria media

Alliaria officinalis (buds)

~~*Stachys*~~ *Lamium purpureum*

Erythronium album

Thalictrum thalictroides

Dodecatheon media L.

Luzula campestris v. *multiflora*

Sedum ternatum (not fl.)

Carex sp.

Carex sp.

Asarum canadensis (buds)

Arabis laevigata (buds)

Asplenium Trichomanes

Asplenium rhizophyllum

Asplenium platyneuron

Cystopteris fragilis

Polystichum acrostichoides

Barbarea vulgaris (buds)

Hemerocallis sp.

Danthonia spicata (not fl.)

Stellaria pubera

Ranunculus abortivus

Viola striata

Galium aparine (not fl.)

Lonicera japonica (not fl.)

Veronica hederacifolia

Poa sp. *cuspidata*?

April 23 - Great Falls, Va.

Phlox subulata in
full bloom on rocks
below falls - mostly white,
a few pale purplish.

Saxifraga virginica

Ranunculus abortivus

Society
signed

April 16 - Balls Bluff,
Potomac River east of Leesburg
in Deciduous woods on
river bluffs

41790 *Viola cucullata* Ait.

1 occasional

1 91 *Viola papilionacea* Pursh ?
common

1 92 *Veronica hederacfolia* L.
abundant

1 93 *Lamium purpureum* L.
common locally

1 94 *Poa cuspidata* Nutt. ?
common

flowers rich violet,
center dark.

flowers light violet.

prostrate; corolla bluish,
falling very easily.
erect bracteal leaves
dark purple, corolla
rose pink.

small loose tufts.

May 15 - Utrecht -

Lawns with abundant *Bellis perennis*.

Pasture with abundant *Ranunculus acris*.

Crataegus flowering.

Sorbus just past.

Curious form of *Hedysotis caerulea* in Prof. Mennege's garden. (Said also to be in Edinburgh Bot. Gard.) Is same as seen in Baarn in 1948. Certainly closer to *H. michauxii*.

May 20. rail from Leiden to Utrecht.

Polder landscape - rich green grass, cropped rather short. Land cut by ditches into long rectangular checks.

Ditches have some marsh plants - *Iris pseudacorus*, rare clumps of *Salix*. Water

surface partly covered by *Lemnaceae* and floating felt of green algae. Small carefully tended gardens near r. track. Soil almost black.

A few weeds, e.g. *Barbarea*, *Brassica*, etc. but not many. Sheep and cattle in moderate numbers.

Toward Utrecht rows of pollarded willows and poplars become common and dominate the distant landscape.

white umbellifer

Small orchard near Voorden, but country is dominantly meadow. Some hay being dried, but not much.

A little *Phragmites communis* along ditches along r.

Rather large orchard of apparently dwarf trees recently planted.

Meadows have more

Ranunculus and other conspicuous flowering plants.

More orchards. Small patches of alnus - *Salix* - *Populus* wood. Rows of pollarded trees and orchards more abundant toward Vleuten.

Gardens, cold frames and commercial greenhouse common just beyond Vleuten.

Ground has gradually become somewhat higher toward Utrecht.

May 15 - Utrecht - Arnhem - to Germany. Lv. Utrecht 9:20 a.m.

Landscape much more dominated by trees. Meadows with flowers separated by rows of trees. *Crataegus* hedges patches of wood. Beeches, firs, oaks are prominent also *Betula*. Thickets. Open pine forest with deciduous

understory. Some *Picea*. Much young forest - planted?

Pine is the most prominent larger tree. Young pine is notable, but many other young trees - *Populus tremuloides*, *Robinia*? Stands of pine generally have a broadleaf understory, but this is inversely prominent according to thickness of pine stand.

Thickets along tracks in places obscure view.

Cytisus scoparius is locally common on r.r. embankment, also *Calluna*. Mostly grass or planted rye. Mixed agriculture, mostly dairying. First low hill or knoll.

9:44

But this is isolated in generally flat country. Soil becomes gray rather than black, but this varies locally to yellowish or brownish.

9:50

Enke-Wageningen.

More low hills. Cuts with heather. Country becomes gently rolling. Patches of rather young pine forest (*P. sylvestris*). Heather along tracks in rather broad strip. Some *Cytisus*. Scattered young oaks, birches, *Populus*. Thickets and patches of small oak.

The heather quite local. Oaks and other broadleaf trees dominate landscape generally.

Hills slightly higher near Arnhem. *Robinia* abundant with oak.

Left Arnhem 10:17.

Flat country, but hills in middle distance & left and in far distance ahead. *Salix alba*, mostly pollarded, common. Meadows with abundant *Ranunculus*.

10:32

Some thickets and patches of pine forest. *Cytisus* locally common along tracks, flowering.

Mixed hedges common, esp. along r.r. *Crataegus* and various other shrubs and small trees.

10:47

Small orchards. Mainly grain fields, meadows. Ditches along tracks and roads with some water or mud, marsh plants, shrubs. *Salix*, etc.

Low flat wet land, mostly meadow.

10:52

Very slightly higher, slightly rolling, mainly grain fields. rows of trees, small orchards.

Just beyond Meekhoog some

fairly large patches of pine woods.
some lichen, birch, oak.

10:59

some small swamp forests. Still
large pine woods. Several genera-
tions of plantings. Considerable birch.
Robinia. Rolling land.

11:04

Wesel. Much industry in all directions.
Generally pasture with some
thickets and woods. Cytisus locally
abundant in waste spots and
along r. Rumex acetosella (?) also.
Woerde - grain fields, pasture,
some orchards and woodlots, mostly
oak, Tilia, etc. no pine.

near Dinslaken the soil has
a thin dark layer. below this orange.
Heavy industrial area, much smoke,
from here to Oberhausen.

Oberhausen is a huge horrible
industrial expanse.

Arr. 11:23 Oberhausen Hbf. Lv. 11:37

Low hills in distance to left.

Duisburg Hbf 11:42. Lv. 11:45

Smoky industrial area
continues. Some patches of pine wood.

Then grain fields, largely
rye and pastures. Rows of
salix along ditches. Some hedges,
Crataegus, Sambucus. Woodlots -
mixed.

Düsseldorf - Unterath -

Düsseldorf is another big horrible
industrial place, but perhaps
not so bad as Oberhausen.

Düsseldorf Hbf - ar. ^{12:00}~~11:58~~ Lv. 12:05

Nice park (?) with many
trees, ponds, etc. just out of
city on rt. Then smoky
industrial area.

12:17

Wide area of grain fields
on absolutely flat land.
A few rows of trees. Apparent
woods in distance on both sides.
Trees and hedges principally
around houses and village.

12:15

Langenfeld

12:19

another frightful industrial
area - smoke and fume
limiting vision and almost
as choking as in Carr de Pasco.

Nice gardens back of houses.

Large strip of wood on left.

Grain and potato fields.

12:23

Coln - Mulheim - more industry.

Sambucus seems to be the
dominant weed-tree in

waste spots, r.r. embankments, etc.

Platanus common street tree.

12:29

Robinia abundant, flowering.

crossed Rhine. Cologne Station - dep. 12:52

Flat intensively cult. bottom
land. Low bluffs in distance
to rt. Vegetables, potatoes, fruit trees.

1:13

Bonn

1:18

Route at foot of bluffs
starts to climb. Rhine
immediately on left.

Then for some distance
the m. is along the river bank.
The bluffs are heavily
covered by houses.

1:30 flood plain has broadened
considerably and the bluffs
are much less abrupt.

1:35 track again ^{briefly} squeezed bet.
river and bluffs. Bluffs
covered by dense mixed
oak(?) forest, rather low
and bushy but canopy
practically full.

Occasional grassy spots
invaded by bushes. Orchard
in flood plain.

1:44 plain wide, bluffs low,
mostly cleared.

1:51 plain very much wider.

1:54 Koblenz. Commonest weed tree
again *Sambucus nigra*. Crossed Moselle
Interesting castle to rt. of
station.

The Rhine, this far, seems to
carry a great amount of barge traffic
left Koblenz. Bluffs on rt. imposing.
Robinia is a common tree.

Raining rather hard.

2:09 crossed Rhine. wide here.

2:13 above Niederrhein -

High hills across on rt. a castle
on hill to left.

Then high hills to left, wooded
near tops. Flood plain intensively

gardened - mostly potatoes,
between fruit trees.

Gardens on rather steep slope
on left.

2:18 m. squeezed bet. river and
hills.

2:19 Hills on both sides partly
wooded, partly grassy,
locally cultivated.

2:21 Some terracing and walling
on other side, steep slopes
cult. Osterpaj

Most of other side, though
very steep, bare of
wood, cultivated.

Valley here is very narrow.
scarcely a flood plain.

2:23 Sides now steep.

semi-wooded. This is the
Rhine Valley as I had expected.

Visibility since Koblenz has
been ~~very~~ very bad because
of rain.

2:35 Hills or bluffs partly densely
wooded, partly open and
semi-terraced.

All this part is very narrow.
m. even tunnelled in places.

Some vineyards - small,
on narrow benches of gravel
or broken rock bet. m. & river.

2:40 Spectacular steep semi-
terraced slopes. Castle.
several photos.

2:43

Wooded bluffs again.
near Kaub?

2:46

Castle on island. photo. (bad)
Spectacular churches and
towers across river.
Lochfmausen?

Photo of castle across from
Loch.

Along here the towns are
long and narrow, at foot
of bluffs along river.

Vineyards on lower slopes.

Steeper slopes wooded.

Low wooded islands in river.

2:51

Fine ruined castle across river.

2:53

Another, above a broad bar
in river where many
people are camping.

Vineyards on terraces and
semi terraces on left side.

vines staked up on wires.

Wires running up and down slope.

2:59

Assmanshausen

Steep wooded bluffs on
w. side.

2:56

Bingen across river. photo.

Wine tower on small island (photo?)

3:00

Rudesheim. Picturesque r. station.

Vineyards on e. bank slopes,
and on lower w. bank slope,
dense woods above. Spectacular
church on top of bluff on w. side.

Turned east along Rhine.

valley here much wider,
more agricultural and
less spectacular.

3:12

River is wide. Channel
marked by levees, but
water outside levees
as well as inside.

3:14

Extensive vineyard
on gentle slopes.

3:20

Large islands in river.
Mixture of fields, orchards,
villages.

3:26

Weisbaden - probably originally
a beautiful city, but now
industrialized to ugliness.

Main Valley is broad
and rather flat. Vineyards,
orchards, pastures, grain
fields.

3:55

Kattersheim main.

Much interplanting
in all these orchards.

Strawberries abundant.

Sambucus abundant along

river.

4:07

Frankfurt am Main Hbf.

4:20

left Frankfurt. Crossed Main.
Beautiful rows of fourbarby
poplars.

4:25

Frankfurt (Main) Sud.

Intensive truck gardening in
orchards on bottom land.

4:28

Patches of open oak woods

- 4:29 Affenbach. ^{mostly sylvestris}
 4:30 fairly large pine forest on mt.
 4:33 more patches of pine
 4:35 Stennheim (Main) crossed main again.
 4:46 Patches of pine and spruce at least 2 terrace levels along main here.
 4:50 Hills in distance on both sides and ahead. Thickets and trees prominent in landscape.
 4:53 Aschaffenburg
 4:59 Hills with planted Picea forests, some pine-spruce. lower slopes and flat or rolling valley land cultivated. Forests on hills as much broadleaf as conifer.
 5:03 Hedges of Crataegus, but few.
 5:04 Hösbach
 Hills become higher and a bit more ragged in distance on both sides. wooded, very neatly.
 Woods of Picea, Tilia, Quercus, Fagus, Prunus (Carmine?), with very thin undergrowth except at edges.
 5:08 stop in woods. grain fields on lower slopes.
 Laufach Sep. 5:13
 Beautiful valley, lower slopes cultivated, upper parts of hills wooded. Grain fields,

- meadows and orchards.
 5:16 m. is in low mts. now, ~~now~~ partly wooded mostly mixed woods. long tunnel.
 5:23 Pine forests with an irregular ~~scattering~~ scattering of beech ~~etc.~~ etc. Some of it has a definite second layer.
 5:28 beautiful solid beech forest and ~~etc.~~ patches of pine conifer.
 5:30 Country wooded except flat valley bottoms and patches of slope which are pastured or cultivated.
 5:40 Valley now very much wider. Main R.
 5:49 Germünden.
 Above, the valley narrows again - wooded sides, flat bottom with meadows, along main.
 5:52 Broadens out again. Cultivated. steeper slopes bushy or wooded.
 5:55 Karlstadt (Main).
 Above this rather wide flat valley floor, medium hills, partly wooded on sides. A few trees along river.
 6:08 Wuntzburg left 6:17
 Marienburg Castle on hill off. Rolling hills covered by grain fields, some thickets. Sambucus.

6:28

Hills with open oak forest and thick understory of shrubs on it.

6:35

Generally grain fields. Unmixed forest on right. The patches of scrub in the grain fields & the hedges, seem mainly *Prunus* sp. with some other shrubs.

6:37

Extensive rolling plateau. Generally cultivated. Mostly grain. A very few small areas one or two woodlots, scarcely any hedges. Mostly vast open spaces, especially to left. Some scarps with scrub and scattered oaks.

6:41

broad low valley to left has large areas of pine forest.

6:43

Kitzingen.

6:45

Pine woods with some admixture of broadleaf trees, understory of *Robenia*, etc.

Then open fields. Then an oak forest, rather good.

Then pine & oak patches.

6:46

Rolling open country. Some patches of woods.

6:49

Some rather abrupt hills on left. Rolling open country with small trees along roads, etc. on it, extensive. Mostly grain fields.

6:51

This continues a long way but finally wooded low

~~6:58~~

ridges in distance on each side.

7:00

Ridges have come fairly close. Some fairly large areas of rather low dense forest. Some patches of pine. Then more broad open valley with wooded low ridges in distance.

7:02

extensive patches of pine forest. Rolling land. Dark chestnut red soil.

7:08

more pine, considerable areas, slight admixture of beech, cherry, birch, etc. Pines, *Quercus*. Generally open grain fields but large patches of forest. *Consp. birchen*

7:12

7:14

Patches of pine, spruce, some oak. Calluna in cuts. Mostly open grain fields on rolling land.

7:16

7:18

perhaps as much pine as grain field. considerably more pine than grain, open fields only in bottoms of shallow valleys. Some oak, birch, beech mixed with pine, also some spruce.

7:20

Flat open valley quite wide, pine on low hills on both sides. This for considerable distance.

7:25

7 north 7:25 Nürnberg.

7:25

left Nürnberg.

Valley mostly thickly settled

near Nürnberg, trees common.
Then a patchwork of pine
forest and grain fields. villages,
Cytisus abundant on cuts, in
flower.

Then the narrow flat valley
bottom is open, the gently
sloping sides wooded, mostly pine.

The pines in these planted
pine forests are very closely
spaced, even after the trees
have reached full height,
are very well self pruned.

but not large in diameter.

Beyond Mohlstetten there is
some heather. but only very
locally in openings in pine woods.
mixed with Cytisus scoparius.

8:15 still mostly pine forest,
but a mosaic with fields of
grain.

8:20 Open rolling country, only a
few patches of forest.

May 21 - From Munich south
in valley of Isar R. by auto
plain south of Munich is of
Tertiary gravels. terraces.
Terminal moraines.

Planted Picea forest with
natural reproduction of
beech.

Alpine species found here
minimally
only on peat bogs.

Climate line in north Alps.
1400-1700. Central Alps. 2400
South Alps 1900 m.)

Agriculture becomes
less to south, dairying
more - too wet to south
rainfall more than doubles.

Forest on edge of moraine

d Acer pseudoplatanus
Alnus cornuta

Sambucus

Fagus Picea planted

Tilia

10-12 sp. trees

ve. Laminium galeosiphon

a Aegopodium

Geum rivale

Anthriscus

Rubus

Colchicum autumnale

Trisetum

Paris

Urtica dioica

Ranunculus lanuginosus

Listera ovata

Urtica nemosa

Symphylum officinale

Pulmonaria

Impatiens noli-tangere

along Würm R. WÜRM

in Würmthal below Starnbergersee
in flat bottom of
wide ravine cut in
moraine.

Munich
519 m.
Bad Tölz
659 m.
Kochel See
549 m.
Walchenseel
302 m.

Low hilly land with beech forest, flat broad valley mostly in meadow. below Starnberg. Some planted Picea in beech forest. Orig. forest 90% beech. (Hueb)

Starnbergersee is in glacial valley, (much like Finger Lakes, N. Y. & but in lower country.)

Extensive meadows, with mouse-brown cattle, rich flora of flowering herbs, on rolling land.

This morainal material is chalk and dolomite in nature. Much planted Picea forest. This is between Starnberg and Walpertshausen. These moraines are of small gravel and sand.

Isar Valley Loisach R.

On river deposits an open dwarf vegetation with much heather. Pinus sylvestris very open. Juniperus communis

Viburnum lantana

Erica carnea

Sambucus

Platanthera

Globularia

about
Puppling
~ km. from
Walpertshausen
on Isar.

~~Prof~~ Puppling an
along Isar

Ligustrum vulgare

Daphne mezereum

Hedysarum comosum

Daphne cneorum (deciduous ph.)

Lathyrus pratensis

a Thesium

Carex pilulifera

Polygala chamaebuxus

Euphorbia

Psylla trilobum

Orobanch

Agrostis vulgaris

Mercurialis annua?

Polygala comosa

from
alps

Bellidistrium michaelii

Gentiana acaulis

Globularia

Primula farinosa

Ophrys muscivora

Cypripedium calceolus

Listera

Peripheral area is open Penns to 15 m. with full

shrub layer of Juniper

ground layer of Erica & moss.

Then large area varying

from open forest to savanna.

pines & mostly not more

than 30 m. and dense grass

and some heather.

Several Carex spp.

Convallaria majalis

Trorinum? humil

Pinguicula

result
of disturbance

from alps

*Dryas octopetala**Salix purpurea**Tragopogon* (dark yellow)*Galium boreale**Polygonatum officinale**Orchis militaris**Astragalus major*

from alps

*Alnus incana**Valeriana**Alectorolophus* (Rhinanthus?)*Plantago alpina*?*Tetragolobus siliculosus*Gravel terrace dominated
by *Salix*, *Alnus*.occ. *Populus tremula* no pine*Orchis militaris* common.*Orchis latifolia**Chrysanthemum leucanthemum**Thalictrum aquilegifolium**Anacam. vulgare**Patentilla silvestris*Several terrace levels,
1 m. or more apart, different
stages in dev. of pine
open forest.*Rosa alpina**Berberis vulgaris**Biscutella laevigata**Petasites nivas**Viburnum opulus*A little *Picea*, locally,
brought from alps by river.*Euphorbia*affected by *Puccinia* forms
elongate erect branches with
broader shorter more
scattered leaves.*Lymphytum tuberosum*Away from river, on
higher terrace an almost
dense pine forest to 20 m.
little undergrowth.except some *Ligustrum**Lonicera alba**Crataegus**Amelanchier vulgaris*Flat open plain bet. town
& Lorsch. Meadows - surrounded
by low hills, these densely wooded.
mostly spruce & beech.
spruce mostly planted and
reproducing~~Forest~~
up the valley *Picea*
tends to invade meadows.Meadows in beautiful
flower.

Königsdorf

Above Königsdorf on rolling to hilly land mosaic of meadow with patches of *Picea* & *Fagus* forest, some oak, esp. rows. in Munich 500-600 m. Königsdorf 900 m.

Steep mountain slopes above Biehl are mostly densely wooded with *Picea*, *Fagus*, etc. in an irregular mosaic. Snow on higher peaks. Timber line on first range 1400 m. Some clearings.

Baroque architecture very characteristic. Benediktbeuern church and enormous monastery a good example.

Photos of landscape and flowering meadows near Benediktbeuern.

- Large open marsh ^{from lower side} ~~at~~ below of Rochelsee, cut for hay, with a few scattered trees, local peat bogs.

Above Roche very abrupt limestone mountains. *Picea* and *Fagus* forests on them, very irregular mosaic. Considerable *Acer pseudoplatanus*.

Beech forest with some *Picea*, *Acer pseudoplatanus*

Polygonatum verticillatum

shrubs

Daphne mezereum

Hepatica trilobum

Maianthemum

Scilla europaea

Melica nula

Grenanthus purpureus

Fragaria vesca

Mercurialis perennis

Lychnis fischeri

Belasite

Adenostyles

Phyteuma

Cephalanthus

Neottia

Asperula odorata

Samolus montanus

Carex

Oxalis acetosella

Pillium montanum

Salvia glutinosa

Bellidifolium

Carex pilulifera

Dentaria

Dryopteris filix mas

Valeriana montana
Corallorhiza enata
Primula elatior
Aquilegia
Streptopus
Lactuca muralis
Melica nutans
Galium sylvaticum

This seems to be about the general vegetation on the dolomite slope.

Harvesting of timber is taking place selectively.

Pass and view of Walchense photos (last 4) of Walchense forest and mts. around it. Mixed beech, maple, spruce forest on steep slopes of dolomite.

Bet. Kochel and Schlehdorf extensive marsh with *Phragmites*, local areas of sedge bogs with *Carex* sp. *Eriophorum polystachyum*, etc. clumps of *Salix*. *Betula* along road embankment planted. Varying to wet meadow with *Ranunculus*, *Melandinum*, *Rhinanthus* on glacial outwash plain. (mud in lower layers, acc. Herzh.).

Beyond Schlehdorf toward Murnau, flat meadow surrounded by partly wooded hills. Glacial ponds.

Dense *Picea* forest with almost nothing beneath on low hills. Flat-bottomed valleys with ~~meadow~~ meadow vegetation - *Aspidium*, *Trollius conspicuus*. Extending up on low hills, with scattered *Quercus petraea*.

Anthriscus exceedingly abundant, *Tragopogon*, *Ranunculus*, *Chrysanthemum leucanthemum*, *Melandinum*, *Hieracium pratense*, *Galium cf. verum*, *Festuca elatior*(?), *Trifolium pratense*, etc. in great luxuriance and abundance. Thickets along streams Ohlstadt.

Mts. rise very steeply like a wall from near here. Lowest forests on this are *Picea*. Then *Fagus* with *Picea*. on tops *Picea* again.

West of Ohlstadt an ^{extensive} marshy meadow, cut for

hay. many small haystacks
also many small barns for
hay storage.

Some spots in ^{wet} meadow
have *Trollius europaeus* in
abundance. *Sanguinaria*,
Ranunculus, *Orchis latifolia*,
Primula farinosa,
Carex spp. *Equisetum*.

Polygala *Eriophorum*
clump of *Salix*.

Large areas of *Phragmites*.
where it is very wet

Mannau

n. of this rolling ^{low} hills of
fine gravel with grass,
locally cultivation, thickets
patches of *Picea* forest.

East through Eberding
the hilliness increases a bit,
somewhat more forest.

Near Leeshaupt - some birch
forest.

Sternbergersee - narrow
belt of *Phragmites* on shore.

Where not occupied by dwellings
and villages there are meadows
& and planted forest back from
west shore of lake. On slopes
there ~~are~~ are thickets and

forests of slender saplings.
Some patches of swamp
in low spots somewhat
away from the lake.

Below Sternbergersee
is also a large marshy
area of glacial outwash.

Extensive *Picea* forests
on road bet. Sternberg & Munich.
Forsternieder Park.

The general pattern of
forest distribution on the
moraine area has little to
do with soil characteristics.
Steep slopes are generally
in forest. Otherwise it may
roughly be a matter of
distance from a village.
around a village the closest
lands are likely to be
cultivated, next in meadow
or pasture, farthest away
in forest.

May 21 - Würm River just
north of Starnberg
in deciduous forest in flat
bottom of wide ravine cut in moain

41795 *Asarum*
common

96 *Asperula odorata* L.
occasional

May 21 - Puffinger Au,
Puffing, 2 km. w. of Wolfratshausen

97 *Galium boreale* L.
rare in low open *Pinus sylvestris*
forest with juniper and *Erica*
on calcareous alluvium.

May 21 - above Kochel-See
below Pass to Walchen See
in *Fagus* forest with *Picea* and
Acer, on thin soil on dolomite.

98 *Bellidiasium*
common

99 *Corallorhiza enata*
rare

41800 *Melica nutans*
common

01 *Carex pilulifera*
common

02 *Carex* ~~sp.~~
occasional

rhizome prostrate, creeping
on surface of ground, with
faint ginger odor; flowers
dull maroon within, trigonous
stems erect from
yellow prostrate rhizomes;
flowers white; "waldmeister".

erect; flowers white.

rays white.

pale green, tepals yellowish,
lip white.
glumes deep purple, lemmas
green.

May 13 - rail trip - Munich -
Hannover - Nienburg.

Left Munich 8:15 a.m.

Travelled through a
flat plain, in ~~cattle~~
meadow and cultivation,
locally wooded.

8:35

Dachau

8:37

some low hills, mostly
in grain fields, rougher
parts wooded. Of fine
alluvial material.

8:39

Still rolling hills,
some rather extensive
patches of *Picea* planta-
tion, tall and dense.

These continue, alternating
with large open areas
of grain, some meadow,
without hedges and
with trees only rarely.

Occasional villages with
trees and streams ~~with~~
lined with bushes and
trees.

8:47

Same type of landscape,
trees (*Quercus*, etc.) more
common. Some flat valley
bottoms seem marshy, or at
least somewhat wet.

Hay-making in this area
presents some difficulty
and the cut grass is
draped over frames or

stakes with cross arms
to dry. The low wet
flat meadows are quite
colorful with flowers.
The soil in these is very
black.

8:53

The amount of forest
planting is less, and
more confined to rough
places and escarpments.
The route follows a
flat valley bottom
with rolling hills on
either side. The wet
meadows have cattle
grazing them but do
not appear to be very
heavily grazed.

8:57

The amount of forest in
the distance is greater.
The patches (small) close
to the r. are of *Quercus*.

8:58

Hop fields interspersed
in grain fields on rolling
hills. Wires strung on
tall poles.

8:59

Fairly extensive area of
forest, partly *Picea*
partly low irregular oak.
Cytisus in openings and
along tracks.

9:00

More hops.

9:01

Extensive marshy plain
with some drainage ditches.

- 9:02 Small town. Populus planting,
(72 km. from Munich)
- 9:04 flat country as far as
visibility in all directions
(visibility not too good, thin
fog.) ~~to~~
- 9:05 same, with some marshes
and heathy areas.
Oberstimm.
- 9:08 otherwise mostly cultivated.
Ingolstadt. Left 9:16
Fruit trees very abundant
in suburbs. ~~to~~
- 9:18 crossed Danube. *Rambuscus*
abundant on n. embankments
and waste spots.
- 9:22 Flat cultivated plain
on left, very slightly rolling
slightly higher ground
on right. Occasional
very small thickets,
rows of trees, trees around
villages, mainly open.
no hedges. Soil very dark
brown.
- 9:28 The land is more rolling, still
open and cultivated.
- 9:31 some *Picea* plantings, admixture
of *Quercus* and other broad leaf
trees.
- 9:34 Hilliness increasing somewhat.
- 9:35 Extensive forest, mainly planted
Picea, but some birch ~~and~~ beech,
and oak. Country becomes

- quite hilly.
some beech forest.
appears to be dolomite.
Flat-bottomed small
valleys, cultivated. Hills
partly wooded, partly in
pasture, locally cultivated.
- 9:38 Occasional small cliffs.
A few pines, some oak.
beech forest more abundant.
hilliness decreases somewhat.
Proportion of forest decreases.
- 9:40 R. follows a winding valley
of a small river, between
low cliffs, a ravine cut
in a plateau.
- 9:43 Then a long tunnel and
another similar valley.
Cliffs ^{slopes} wooded with beech
with admixture of pine
spruce and oak. (Possibly
the same valley, & the n.
avoiding the more extreme
meanders by tunnels and
cuts. Cliffs are certainly
Solnhofen.
- 9:47 either dolomite or chalk.
- 9:48 some grassy slopes
with abundant pine.
Bluffs with mixed beech
and oak forest. narrow
flat bottom cultivated
and meadow. Gentler
slopes grassy, with

bushes, hedges, etc.

9:50

More and more pine, at least locally.

Some low scrub, probably after clear cutting.

9:51

Bluffs have a mixture of spruce and beech.

9:52

Valley broader, cliffs and bluffs largely give way to gentler slopes, there still partly wooded.

9:54

Treuchtlingen. left at 10:00.

Hills with forest principally of Fagus.

Then rolling locally hilly country with meadows, cultivation, patches of wood on hills, soil on flat land a dark reddish brown. Hay still being cut by scythe.

A few widely scattered trees in the broad valleys, mostly along the ~~the~~ stream in bottom.

10:13

Weisenburg

Rolling mostly open landscape.

A few thickets of Quercus, Populus etc. and patches of Picea plantation.

10:14

more hops, interspersed with grain fields.

10:17

Pine plantings.

Pleinfeld

10:19

extensive pine plantations

Soil sandy. Cytisus locally

abundant and in full bloom. Natural reproduction is mostly oak, a little Populus tremuloides and Betula.

10:27

Mühlhausen

Some open cultivated areas. ~~not~~ and meadows. Mostly pine woods.

10:24

Open land increasing.

10:25

Jeorgensmünd.

Mosaic of pine and open land.

Continues irregularly to

10:36

Schwabach

10:39

Riechelsdörfer

broad valley surrounded by pine woods.

Increasing cultivation, less woods.

10:47

Nürnberg. left. 11:00 a.m.

Sambucus nigra very common in waste places and on r. embankments. Forth.

11:05

Orchards around house.

Much residence area. Some cult. fields.

Pine forest in distance to left. also in farther distance to right. Generally rolling cultivated land, gray sandy soil. Scattered oaks or oak thickets.

11:03

Open rolling landscape, small patches of pine and oak forest. Much pine in distance.

11:11

Pine plantations on low hills. Valley bottoms in meadow and cultivation.

11:12

Some low hills also in grain.

Understory of oak in pine plantations, mostly rather sparse, except where pine is thin. Where it is very thick there is little even of herbaceous vegetation under it.

11:16

Pine over most of hilly area.

11:17

Open grain fields on rolling land to rt. pine on left.

Then a small town surrounded by cultivated fields, esp. grain, pine plantations farther away.

Salvia pratensis (?) (dark purple) and *Melandrium* (bright rose) abundant on embankments and roadsides.

11:20

Almost all in pine plantation. Most of these pines are well grown in height, but still of pole size, self pruned.

11:22

Open country around a town. Oak and *Crataegus* thickets on rough spots. Fruit trees around newstadt houses in suburbs.

11:25

Rolling open broad valley. Pine on low hills around it.

11:26

Rolling landscape with mosaic of patches of pine in grain fields and meadows. Light brown soil, apparently sandy. Meadows in low flat areas, yellow with *Ranunculus*.

11:28

Pine not common except in distance to rt. Low oak forest on low hills to left. Broad valley between with grain fields and meadows. Village. Some alfalfa.

11:30

Fruit patches on both sides mostly oak. Slight admixture of pine.

11:32

Markt Bibart. Broad valley - cult. & meadow. surrounded by oak forest on low hills.

11:35

Mosaic of oak forest and cult. grain fields.

11:36

Open rolling land. Calcareous. mostly ~~to~~ grain fields and alfalfa.

11:37

Higher hills in distance, esp. to rt. and ahead. Tobs wooded.

11:40

Iphofen. (photos). Open rolling cult. landscape. Very little wood.

11:42

Mannernheim (photos)

- 11:33 Area of mixed pine, oak, Robinia forest.
- 11:40 Town - Kitzingen
in open rolling country. crossed
long river. Apparently main? ^{diff. valley}
cult. rolling land, some
small hedges and thickets,
but few. A few scattered small
oaks. Soil light reddish
brown.
- 11:49 Area of open oak forest with
thick under brush of Corylus,
etc. Generally rolling open
landscape. Thickets more
prominent on slightly rougher
land. Then open cultivation.
- 11:51 Dettelbach
- 11:53 Patches of oak forest in open
rolling country.
- 11:55 Jct. (mixed name)
- 11:57 Oak forest on left, grain fields
on rolling land to rt.
- 11:59 Open rolling hilly country.
- 12:00 ~~small city~~ Würzburg. left. 12:23.
Vineyards on south-facing slopes
demarcated. Staked & wired.
Main Valley - rather steep
sides, cultivated, fruit
trees abundant, mostly
scattered rather than in
orchard. Vineyards on rt.
even on steeper slopes. But
not on bluffs - where rock

- is exposed. Top of ridge
on left. wooded. also that on
right a bit farther on.
- 12:35 Interesting looking low cliffs
of flat rather thinly bedded
shale & conglomerate - possibly
calcareous - pale gray.
None except for low rock
plants.
- Apparently limestone, as
there is a cement factory.
- 12:43 Vineyards poor and not less
numerous. Slopes bushy.
- 12:44 Changing to forest - mixed pine & oak
on both sides. pure oak on left.
Grain fields & meadows in bottom
of valley.
- 12:50 Jernunden. Both sides of valley
steep, wooded with oak.
Considerable barge traffic on
Main.
- Left at 1:00 p.m.
- 102 ~~for~~ left Main up small valley
between hills thickly planted
to Pines, then on rt. ^{thick} oak ~~woods~~.
forest, patches of pine. Then
same on left, then gentler
slopes with grain fields.
oak forests a ~~bit~~ little way
back on left, immediately
on rt. on steep slope.
- 106 Cultivation, with hedges
on both sides.
- 1 Tunnel

1:10

thick forest on both
side, irregularly
mixed, oak, pine, beech, spruce.
Then an area of cultivation
on gentler slopes.

Then pine forest on it
pine & beech on left, patchy.

1:14

1:17

Some patches of cult.
on it. Then open slope
on left and right.

More thick mixed forest.
Tunnel.

Mixed forest on it + left.

Steep wooded slopes.

Gentler cult. slope.

Hedges. Reddish sandstone.

1:20

Slopes cult. semiteraced
with hedges. Wooded above.

1:25

Both sides of valley
wooded. Beech with pine
then lower slopes cult.
Hedges fairly general
semiteracing.

1:28

Dryopteris filix-mas common.
Climbing on side. Village
with pine mixed cult
on other side of valley.

Valley broad, cultivated,
ridge tops only wooded.
Crataegus hedges.

1:32

Long tunnel ~~Staffordshire Tunnel~~
Staffordshire.

High rolling grain fields.

Pine woods on hill tops.
also beech + ^{spruce} - mosaic.

1:35

Fruit trees along roads.
Ramholtz Tunnel.

1:37

Soil distinctly reddish.

Proportion of forest high on
hilly ground. Mixed
deciduous. Robinia on cuts.
Some patches of spruce and
pine. Mostly oak with
admixture of other things.

1:40

Some areas of beech. Some ash.
Brandenstein Tunnel.

Beech forest on it. Open valley
on left.

1:42

Then hilly country with
beech forest. Valley grassy.
Open hills on left. some thickets
Beech wood on it. some planted
Picea. Back on limestone.

1:43

Crataegus hedges in grassy
country. Oak woodland
rough place. Scattered
oaks in fields, also
fruit trees.

1:47

Picea woods, some oak and
beech admixture, some
beech forest.

1:49

More red sandstone & shale.
Oak woods.

1:50

Rolling hilly country meadow
grain fields. patches of woods
hedges.

1:54

Frieden. In plain is an

enormous conical pile of white material, probably a mine dump. This on left.

1:57

Neuhof

Large forests in distance on both sides. Then much closer. Large patches.

Some oak. Mostly coniferous. both spruce + pine.

2:01

Flatter areas in grain and meadow. Hills in spruce forest

2:02

Flattest parts are wet meadows.

Bronsgeel.

Landscape flattens out.

2:05

Fulda. left. 2:10

Open country with scattered wooded hills. Some hedges of Prunus + Crataegus. (3 photos)

2:17

Götzenbalt (2 photos)

Many small villages in rolling plateau.

Pine plantations on surrounding low hills. also some beech and birch forests. Some mixtures.

2:24

Some spruce with a little pine. Then pine, and oak. + mixed oak + beech. all on it.

Open wide valley on left.

Woods on ridge in distance.

2:29

Wide rolling open country. a few trees and hedges very locally.

2:30

Flat narrow valley with

wooded hills, mixed pine and oak, some beech, locally planted Picea.

2:33

Forest principally beech on it. Picea on left. Then

pine and beech on it.

Open rolling grain fields on left.

2:34

Pine wood on hills to it.

2:35

Neukirchen. Open valley with meadows and grain fields. Patches of oak wood.

Salix along streams. Flat valley bottoms are flowering meadows.

2:38

Hills with oak forests, some mixture of pine.

Then another winding valley, lower or more gentle slopes in cultivation, bottoms in meadows, willows along stream ravines, some forest on hilltops.

2:42

Bad Hersfeld. Oak forest on some hills, some admixture of beech. Some other with planted pine and spruce.

2:44

Valley narrows. Hills rounded, almost entirely forested, with mixed coniferous and deciduous forest.

2:45

Mixture of wooded hills and cultivated valleys + slopes.

Wide flat valley with meadows, grain field, surrounded by wooded hills.

2:50

Bebra. left. 3:01 took left fork. toward Kassel. - no it looped back to right and crossed the other fork. Apparently we are going via Göttingen. Vast open valley around Bebra. Climbed slope above the town. Slopes are all covered with grain fields. R.R. cut wooded with Robinia, *Dryopteris filix-mas* abundant beneath, upward patches of forest become frequent, mostly planted Pines. Thickets and hedges of Crataegus, oak, Robinia, holly. Small patches of a cotton-like plant. Steep escarpments have oak woods. Patches of oak wood mixed some with pine & beech.

3:13

3:14

tunnel.

Then mosaic of grain fields and forest. This locally oak, beech, or coniferous, or mixed.

3:18

3:20

Climbing, still.

tunnel

Mixed spruce, pine, beech, oak

forest. Then cultivated hills, oak forest locally and ^{mixed thickets} on rough places.

3:23

Extensive rolling cultivated land. Pastures with scattered trees and shrubs on steeper slopes. Trees mostly pine and fruit trees.

3:25

Broad valley with gentle slopes, light pinkish red soil, semiteraced in many places. ~~Some~~

3:30

Wooded hills and steep slopes, oak and pine, separately or mixed, cult. valleys between them.

3:33

Then open rolling valleys and hills, few trees except fruit tree occasional short hedges, oak on escarpments, willow along streams in flat valley bottoms. High hills in the distance forward to the right. Hazy mts.??

3:34

3:37

Valley narrows, and steep hills and small mountain close it in, densely wooded with a patchy mosaic of broadleaf and coniferous forest.

Fairly large stream or small river meanders in bottom of valley, which

3:43 is cultivated. Robinia locally along r. Some orchards among fields. Bad-Sooden. wide flat plain in valley. Warra River.

Slopes on left abrupt, dense oak woods. On rt. gentle and cultivated in lower parts, dense forest, prob. oak, above. Occasional patches of conifers.

3:44 Valley narrows again, steeper slopes forested.

3:48 Crossed Warra.

~~Castle~~ Church on hill to ~~rt.~~ left. (Ludwigstein?)

3:49 Left Warra, into hills to rt. Hills partly cultivated, partly, esp. steeper slopes, forested.

3:51 tunnel.

Hills, densely forested with beech and pine. - oak on sunny slopes.

3:57 Eichenberg

Broad cultivated valley with villages. grain and pea fields. Some hedges (cattle pens) wooded knobs, mostly oak woods. Willows along streams.

Orchards on flat ground.

Meadows on low-lying flat ground.

4:01 Hills become lower. Less wooded.

Abernigse.

4:06

Valley widens into an extensive plain, hills in distance on either side. A city on right at base of hills and on lower slopes.

4:07

Göttingen left 4:16.

Broad flat valley, river terraces. Leine River. Valley all cultivated, mostly grain fields. Hills on both sides forested.

4:29

Broad flat valley still, densely forested ridge on both sides. Barley fields. Trees around villages, and some along roads.

4:30

Northheim. left 4:34.

Still the same broad very flat valley, intensively cultivated.

4:41

Patch of pine and of beech forest on low hill to rt. Otherwise grain fields.

4:44

Valley narrows between rounded hills, wooded in places with beech, spruce, oak, some pine. Higher hills mainly with beech forest. Hills severe chalky.

4:48

Kreienzen. left 4:51.

Flat valley with wooded ridges on either side, mostly beech. Grain fields and meadows in valley and on lower slopes.

- 5:06 Freden. Waste place with much *Sambucus nigra*.
 Valley narrows somewhat (crossed Leine R.) but bottom stays very flat. Rounded hills on sides mostly have rather abrupt, densely forested slopes. Rarely cleared and cultivated, where more gentle. Flat bottom mostly meadow. Soil a gray brown, apparently rather sandy, with rather high water table. Small towns ~~scattered~~. occasional alfeld.
- 5:06 Valley widens somewhat. Hills still densely wooded above, with lower slopes cultivated.
- 5:12 Valley much wider, some miles, bottom flat, but with a couple of river terraces.
- 5:16 Phragmites in drainage ditches.
- 5:17 Elze. left 5:19
 Relief in valley bottom somewhat greater. Flat bottom less extensive. Broad grain fields. Some ponds and marshes. Willows around these and along river.
- 5:25 A low dome-shaped wooded hill on either side. A castle,

- 5:26 Marienburg, on the river left. Nordstammen
~~Geography of area~~
 Several similar but even lower hills in distance. Otherwise the country is now a vast perfectly flat plain. Judging by the ponds, the water table can't be more than a few dm. below the surface. Some slight undulations a short distance to on either side. Grain fields, small orchards, thickets, willows along watercourses, abundant marsh plants in ditches, ponds, and along streams, rows of trees, esp. along roads, some wet meadows, but most of area intensively cultivated.
- 6:08 Fruit trees very abundant in residence areas south of Hannover.
- 6:14 Hannover. Lv. 6:08.
- 6:26 second start.
 Suburbs are in places really like an orchard with houses among the trees. A fine patch of mixed broadleaf forest, prob. a park. Then a horrible industrial area. Then gardens, small orchards, edge of town.

6:30

Housing development -
nearly banana, but with
areas set aside for gardens,
fruit trees, etc. Beyond this
residences with much
garden land.

Then open flat land
some thickets, some gardens.
Wood along watercourses.

6:34

A town, Leelze, with
more gardens and fruit
trees.

Forest across river to left.
Almost continuous gardens.
many houses.

6:36

Residences thin out some.
Patch of oak forest on it.
then on both sides.

6:38

Then open fields.
Small pine wood on it -
some oak & willow also.
Pine on left with understory
of oak.

Open fields.

6:40

Fore to it. Open fields with
rows of trees along canals.

Blue lupines along embankment.

6:42

Low sand hill with
scattered pine, then
irregular mixed forest,
mostly oak.

6:44

more patches of forest,
mostly oak, open and
irregular. Low cultivated land.

mostly open. Scattered
villages, rows of
houses.

6:46

Extensive very flat open
grain fields. Patches of
forest in distance.

Villages and farms.

6:47

Woods on left. Patches of
pine on right. Pines, young
among pine.

Mixed woods on left.

6:48

Land becomes very slightly
rolling. Scattered
patches of woods.

6:50

Flat open land, forest
visible in all directions.

6:52

Land somewhat rolling,
many patches of pine.
some oak. Scattered
halls and oak in low
flat areas.

Mixed thickets. Some
grain fields some very
young pine plantings.

Thin black soil underlain
by yellow sand.

6:55

Low mixed forest for
some distance, then
openings, more forest,
now tall oak, then
mixed with pine.

6:56

Birch forest, then forest,
various mixtures meadow.
Patchwork - cultivation, meadow, forest.

7:00

Nienburg

Tüxen's laboratory, —

They have made, in all, over 800 maps, most of which have not been published.

Always a basic map based on plant associations. Then various derived maps of water levels, of soil moisture, of forest and agricultural potential, of kinds of trees and crops that should and should not be planted, etc. These must depend on a great amount of correlation and experience.

Most spectacular thing in institute is collection of soil profiles.

Method of making them is to dig a pit, smooth off the desired profile. Then spray it with a lacquer dissolved in acetone. Allow acetone to evaporate. Then glue a cloth to this surface. Then cut away the layer of soil next to the cloth. Bring it in to lab. Lay it out on a masonite sheet, glue it down. Then shave it down to as thin as possible while still preserving the features. Dry thoroughly. Then wash well with acetone, which brings

out the color of moist profile. Frame and cover with cellulose acetate film well away from surface.

Tüxen illustrates some late Pleistocene and post-Pleistocene history with these that is most remarkable. Also some vegetation-soil relations, roles of vegetation in profile formation, also vegetation-soil-primitive man relations.

kind of lacquer and glue?

Ruth-Tempel - Werke

Hamburg - Wandsbek

Waldorferstr. 136

Plain of the Weser consists of a terrace and a flood plain. The terrace is of sand. Nat. veg. is ~~Quercetum~~ ^{Fago-} ~~Robur~~. Flood plain, of reddish loam deposited about 1000 years ago when upper valley 150 km. or so up was deforested and eroded. Natural veg. Fraxino-~~Alnetum~~. Presently cultivated completely. Characteristic landscape of hedges of Crataegus, Prunus spinosa, Sambucus, etc. and scattered large Fraxinus excelsior. Within last years these, esp. the hedges have been almost eliminated to increase land for cultivation.

red
villages
→
potatoes
rye

sugar
beet
Barley
wheat
meadows.

approaching Hamburg -
 a vast alluvial plain of Elbe
 Peaty soil - Alnetum.
 Salix alba common.

This on the outer parts
 near moraine - wetter and
 more humus.

Near river drier, less
 humus. Fraxineta - Alnetum.

Salix forest along
 river, Phragmites marsh
 Tides 1 m. or more.

The Fraxinetum slightly
 higher than Alnetum.

Beyond Hamburg - first
 the middle moraines with
 Fago-Quercetum. Then an
 older moraine landscape
 rolling, lacking forest,
 fields separated by Catalpa-
 Corylus hedges. Rotation on a 7 year
 cycle bet. grass and crops.
 Hedges cut back when crops
 are grown, allowed to grow up
 during grass period, for protection
 and to serve as fences.
 Still Fago-Quercetum.
 - also Querceto-Carpinetum

Hedges become largely
 Corylus toward Kiel. All these
 hedges have a low earth wall
 at base, deliberately built and
 repaired every 7 years.

The relief is, in general,
 inversely related to the
 age of the moraine. The
 fertility also. But much
 local variation in fertility
 esp. in young moraines.
 Differences gradually
 smoothed out.

In young moraines there
 are many ponds and bogs.
 few in old moraines, as
 they have been filled in during
 the long period of erosion
 as the terrain has been flattened.

Hedges on young moraines are
 dominantly Corylus.

Fraxinus indicates a rich soil.

In young moraines one
 sees characteristically over
 the hedges into the fields,
 because of the relief. In old
 moraines the fields are
 hidden by the hedges.

May 25 - Schleswig - Tiergarten
 A beech forest with
 admixture of Picea (planted)
 Geranium phaeum -
 Rubus spectabilis?

Some Quercus, Carpinus, Tilia

Roadside

*Geranium robertianum**Carex**Urtica dioica**Lilium platyphyllum**Vicia**Galium aparine**Paraxanthum officinale**Rumex crispus?**Melica uniflora*

In woods

*Asperula odorata**Maianthemum bipartitum**Veronica**Luzula pilosa**Athyrium filix-femina**Stellaria (large fl.)**Anemone nemorosa**Carex sylvatica**Fagus sylvatica* (incl. abundant seedling)*Fraxinus excelsa**Milium effusum*

"Forstkultur" = forstliche Bezugsgenossenschaft
 Frankfurt/Main, Bodenbohrstock, 1m lang

Dr. Siegfried Zingel, Reinbek bei
 Hamburg

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Dr. Siegfried Zingel, Reinbek bei Hamburg.
 Bundesforschungsanstalt für Forst- und Holzwirtschaft,
 Abteilung Forstschutz

2 (s) Carpinus
 2 (s) Fraxinus

Vicia sylvatica
Epilobium montanum

"Forstkultur" - forstliche Bezugsgenossenschaft
Frankfurt/Main, Bodenbohrstock, 1 m lang

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Bundesforschungsanstalt für Forst- und Holzwirtschaft,
Abteilung Forstschutz

Roadside

Geranium robertianum
Carex
Urtica dioica
Tilia platyphyllos
Vicia
Galium aparine
Tharaxacum officinale
Rumex crispus?
Melica uniflora

In woods

Asperula odorata
Maianthemum bipartitum
Veronica
Luzula pilosa
Athyrium filix-femina
Stellaria (large fl.)
Anemone nemorosa
Carex sylvatica
Fagus sylvatica (incl. abundant seedling)
Fraxinus excelsa
Milium effusum

"Forstkultur" = forstliche Bezugsgemeinschaft
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H. Lippold Zingel, Reinbek bei
 Hamburg; Bundesforschungsanstalt
 für Forst- und Holzwirtschaft,
 Abteilung Forstschutz

Soil profile taken with
 this instrument was sandy,
 light brown, somewhat
 grayish in upper few
 centimeters, not well
 differentiated into horizons.

A pit dug in a flat
 area of open beech-oak
 mixture - ^{light yellowish brown.}

(Trees almost 30 m.)

About 60-70% *Fagus*, 30-40% oak.

No shrubs, ex saplings of *Fagus*, *Alnus* (very few)
 herbs -

a Milium effusum
c Stellaria holostea
c Carex sylvatica
c Asperula odorata
c Geranium robertianum
c Circaea lutetiana?
la Oxalis acetosella
la Anemone nemorosa
l Rubus idaeus?
l Veronica montana ^{& V. chamaedrys}
c Ranunculus ficaria
~ Lamium (yellow) galeospteron
l Melica uniflora
a Festuca sylvatica
~(2) Carpinus *Vicia sylvatica*
~(2) Fraxinus *Epilobium montanum*

The shrub layer here was removed in a year when beech fruited abundantly the ground was plowed, and now there is a great crop of beech seedlings.

Soil profile

yellow brown, top few cm. darkened somewhat.

lower part mottled with gray and darker brown. (below 3-4 dm.)

somewhat sandy clay in upper few inches, stiff clay below.

a brown earth pseudogley. (mottled from high soil moisture "staunwasser" not ground water)

Another pit, in same forest 150 m. away, in a peaty area.

Upper 4 dm. a dark brown, mottled with ashy gray ^{fine} sand, mostly peat but with some fine sand. *Pseudotsuga* on surface.

Below this a fine sand with some clay, mottled red brown, yellow brown, and gray.

Sharply distinct from A horizon. Some iron concretions apparently the beginning of an *otstein* layer. or an old one broken down.

From map by ^{H.L. Heck} Prof. Rasche

The eastern half of Schleswig-Holstein seems to be young moraine, the western half older and alluvium & maritime marsh.

Division about the long axis of the isthmus.

May 26 - trip by bus - Schleswig to Flensburg & Glücksburg.

Wet marshy meadows along south shore of Fehle across from Schleswig.

Moraine - rounded hills a few m. relief. Hedges of *Corylus*, *Crataegus* and various other shrubs and trees, cut the landscape into small fields of 1 - several acres. No forest but one or two fields seen newly planted to *Picea*.

Güby = some patches of forest - *Picea*, some admixture of broadleaf trees, esp. around meadows. Only locally.

Holm.

New hedges are 1 species. Old ones, to 200 years, up to a dozen species of shrubs.

Büttsee - stop.

small lake surrounded by marsh of *Carex stricta* with fringe of *Scirpus lacustris*

May 25 - Schleswig

41803

Carex arenaria

on sand bank, edge of Schlei

— ~~is~~ forest of *Fagus* and *Quercus*
on moraine.

1 04

Veronica montana

in edge of thick

1 05

Veronica montana

in soil plowed earlier in

1 06

Veronica chamaedrys

in soil plowed earlier in

1 07

Luzula pilulifera

common in soil plowed earlier in

1 08

Stellaria holostea

very common on soil plowed earlier in

branches ascending

flowers bluish-violet

flowers bluish-violet

small tufts, culms spreading-
ascending.prostrate with ascending
branches, petals white.

on margin of water, also Phragmites,
shrubs of Salix sp. scattered
irregularly. Carex rostrata, also
found around margin of
10 m. Juncus balticus, Luzula campestris,
Anthoxanthum odoratum, Cephis?

Marsh is discontinuous
Scirpus has come in very
recently with increasing
eutrophication. Ranunculus celeratus
& swans.

12 m. Up slope very slightly or
dry meadows

Chenopodium carolinense

" praecox

Festuca ovina vulgaris

Hieracium pilosella

Ornithopus perfoliatus

Vicia angustifolia

Cerastium semidecandrum

arvense

caespitosum

Rumex acetosella

Polytrichum juniperinum

Hypochaeris glabra

Luzula campestris

anthoxanthum odoratum

Beyond here - occasional
Trissandra

Very narrow point in Schlie
Phragmites marshes, but very
small. Bluffs about 5 m. high

of sandy morainal material

Archangelica officinalis

Anthriscus silvestris

~~Sanicula palustris~~

Cirsium arvense

Triglochin maritimum

Carex otrube

gr. vulpina

Convolvulus sepium

Cochlearia officinalis

Phragmites zone

Scirpus maritimus zone

Carex otrube zone

Archangelica zone

The Anthriscus is only
shrubward, becomes dominant
above the Archangelica

Archangelica ^{arven.} ~~zone~~ is somewhat
nitrophilous

wooded

On bluff Anthriscus

Rosa sp. Alliaria, Urtica,

Artemisia, Dactylis, Ranunculus
trees & shrubs are

Fraxinus, Corylus, Populus

Crataegus, Sambucus, Quercus

Cornus, Prunus spinosa

Grassy bluff

Vicia angustifolia

Hieracium pilosella

Trifolium procumbens

Trifolium procumbens

Lasiopogon granulata

Centaurea scabiosa

Anonis rebus

Dactylis glomerata
Festucaovina
Plantago lanceolata
Arenaria serpyllifolia
Vicia lathyroides
Aira caryophylla
Pimpinella saxifraga
Hypericum perforatum
Thymus pulegioides
Myosotis siliquosa
Vicia hirsuta
Arrhenatherum elatius
 Crossed on small ferry

Kösel.

sandy moraines.
 Patch of beech woods.
 large fields.

inoo - arm of Schille

Phragmites form a
 floating mat, pulled
 loose by ice in winter.
 Cytisus scoparius common
 locally along road.

Norby - windmill much
 like those in Holland.

Riesby.

local name for hedge - knick
 because the shrubs are
 broken or knicked every
 7 years.

A small beech wood.
 several such patches

To be seen in middle distance.
 Houses brick with thatch.
 Marl pits ^{were} common.
 but now mostly filled.
~~here~~ Liesby

Patches of wood very sparsely
 scattered.

Cultivation of barley, wheat,
 sugar beets. Meadows.

Marl pits filled with
 water, surrounded by
 bushes.

Many mae are marked on
 1/25,000 maps than are now evident.
 Winneemark.

In hedges Corylus,
 Lyringia, Salix 2 spp.,
 Crataegus, Sambucus,
 Prunus spinosa, Rosa
 Euonymus, Quercus,
 Salix caprea, S. purpurea ??

Schwonsburg 15 ppt. salt or less.

Marshes of Phragmites (photos).
 ringing water.

Juncus maritimus (photos)
 with armeria. hummocky for
 grazing. Aster tripolium.

Festuca rubra, Juncus gerardii
 Plantago maritima, Plantago
 agrostis, Lyringia maritima
 form a dense sod. glauc

Armeria montana

Kappel. crossed Lichlei.

Fish Wiers in narrow part of Lichlei. Herring which are smoked here.

Patch of beech wood back of town. Mostly small fields and gardens. Fruit trees just out of town around houses.

Several patches of forest. *Melico-Fagetum*.

Cows are all dark red. Local breed.

Patches of rape in full flower. A very little rye. Mostly barley, wheat and meadow. oats.

wheat, rye, re form of barley sown in fall. oats & re form of barley in spring.

Getting

Flensburger Fjörð on it. Coasts low.

Aesculus hippocastanum is a common planted tree near houses.

Patchwork of fields and hedges on gently rolling ground. *Fraxinus* common.

Steinbergkinder
Relief very slight, but still a young moraine.
Fields rather large.

turned right ^{before} at Nübeck.

past Roikier is a patch of beech forest. *Wolsthoppel* ^{near Nübeck}
Tall dense forest, with oaks, ash, *Carpinus*.

Where cutting has been done on edges, much reproduction of beech.

There is no shrub layer in dense part of forest. Canopy almost complete, about 25 m.

Trees to 5 dm. dbh. spaced 2-5 or 6 m.

- la *Melica uniflora*
- a *Asperula odorata*
- : *Ranunculus ficaria*
- c *Impatiens noli-tangere*
- a *Anemone nemorosa*
- l *Stellaria holostea*
- c *Viola silvatica*
- c *Milium effusum*
- c *Veronica montana*
- l *Carex silvestris*
- n *Neottia nidus-avis*
- c *Geranium robertianum*
- la *Oxalis acetosella*
- l *Stellaria Mohingia trinervis*
- c *Ranunculus lanuginosa*
- o *Lanicula europea*
- a *Circaea lutetiana*
- n *Epilobium montanum*

- ~ Dryopteris filix-mas
- ~ Primula elatior
- ~ Stellaria nemorum ssp. montana
- ~ Primula acaulis
- ~ ~~Stellaria nemora~~
- ~ Stachys silvatica
- ~ Stellaria nemorum ssp. globulifera

Two associations are represented here. Melico-Fragetum and Querceto-Carpinetum

Neukirchen

No birch seen so far today
Laburnum occ. planted as ornamental.

Kalleby

Tulips still in flower.

Windmill - formerly much more numerous to grind grain.

Beyond Nibel some hedges have been replaced by fence of barbed wire.

Dollerup.

All cows are dark red.

Turned off bus. to it.

Westersholtz

Landballigan

Coastal terrace

Pebbly beach with
arenaria peptoides

Cirsium

Festuca rubra

- Taraxacum vulgare
- Atriplex latifolia
- Potentilla anserina
- Achillea millefolium
- Elymus arenarius
- Taraxacum
- Petasites

Slight beach ridge

back of it marshy meadows.

Alopecurus geniculatus

Potentilla anserina

Post^{prutenica} humilis

Triglochin maritima

Festuca rubra

Triglochin palustre

Carex otrube

Carex distans

Trifolium pratense

Glaux maritima

windrows of dried Fucus & Zostera on beach.

Near edge of woods C. fistulosa

patches of Carex panicea
with Caltha C. acutiformis

Ranunculus acris

Senecio aquatica

Anthoxanthum odoratum

Dianthus

Bromus ^{racemosus} ~~racemosus~~

Taraxacum sp.

Lycopus floriculus

myosotis ^{caespitosa}
Trifolium
pratense
repens

Eleocharis
viridula

Depression a ditch
with *Eriophorum*

Acer - *fraxinetum*
word of *Acer* ~~*pseudoplatanus*~~
fraxinus excelsa
Fagus *Alnus glutinosa*
Sambucus
Prunus spinosa

with
Equisetum pratense
Urtica dioica
Stellaria nemorum
Asperula odorata

rather steep slope *Fago-querquetum*
with *Populus tremula* (*orientalis*
Sorbus aucuparia *Fagetum*)
Quercus or *Betula*

Vaccinium myrtillus
Maianthemum
Luzula sp.
Anemone nemorosa
Deschampsia flexuosa
Trientalis
Lonicera periclymenum
Holidago virgaurea

Wet meadows are
Bromus racemosus (allium)
apparently on peat or
muck, as the ground
trembles under foot. ^{yes. fire.}
_{acc. fire.}

Many species.
Scattered alders. If these
meadows are not mown
Alnus will soon dominate.
(photos and roll)

Landballigholy
fairly level rolling moor.
Toward Glucksburg the
relief becomes greater.
Ulstrup

Glucksburg - (stop)
Harbor lined with
Phragmites.

Beech forest with
some oak, maple,
Abundant saplings of
Acer 1-2 m. forming shrub
layer. quite patchy, absent in large areas.
Herb layer of beech seedlings
1a *Anemone nemorosa*
~ *Melica uniflora*
~ *Asperula odorata*
1 *Stellaria holostea*
1 *Stellaria nemorum*
2a *Milium effusum*
2a *Mercurialis perennis*
1a *Trientalis europaea* *Asperula marginata*

Where there is a hole in canopy shrub layer is 3-4 m.

- ✓ l.d. *Luzula maxima*
- ✓ " *Melampyrum pratense*
- ✓ l.a. *Deschampsia flexuosa*
- ✓ l.a. *Sorbus aucuparia* (near edge)
- ✓ l.a. *Maianthemum bifolium*
- ✓ .c. *Trentalis europea*

association, or subassociations
and one plants marked &
rather sharply distinct.
Anemone slightly mixed
in patches of *Deschampsia*
and *Luzula*.

- ✓ l. *Lonicera periclymenum*
 - ✓ l.a. *Vaccinium myrtillus*
- Over a considerable
area *Luzula maxima*
is completely dominant
in the ~~vegetation~~ ground layer
no shrubs. Canopy somewhat
broken. A layer of 1 dm of
loose dry duff, then a
dark humus filled gray
sand.

Luzula - *Fragaria*.

Soil pit shows a
thin black layer, + 10 cm. (under the
duff root layer)
then 20-30 cm. gray sand, mottled
Then a dark brown layer
fading quickly into a mottled
yellow and gray sand.

in the dark brown layer is
some (unimportant) ^{locally} ~~at~~ ^{somewhat} hard.
This layer varies greatly
in thickness and color over
in the one pit. being from
15 cm to 50 cm.

The entire profile is
fine sand, with a few pebbles
of flint.

Beach ~~form~~ sand mixed
with shells and pebbles
much of it has no vegetation
Ficus and Ulva thrown
up in a ~~small~~ drift line.

- Locally patches of
Elymus arenarius
Arenaria peploides
Taraxacum sp.
Agropyron repens
Festuca arundinacea
Potentilla anserina
Festuca rubra
Rumex crispus
Calamagrostis epigaea

planted patches of *Rosa rugosa* - dense,
low, 3-4 dm high
locally covers beach flat
completely. Flowers very
large, a beautiful deep rose color.

Murwig
Flensburg

Leaving J.ensburg the road follows the edge of the young moraine. On the left is the hilly land of the younger moraine, on the right, and then on both sides is the flat land of the old moraine. Brown soil on ~~the~~ ^{young} moraine, violet on old moraine. Pine and spruce plantings. Mostly open fields and meadows with hedges, a few patches of woods.

Terminal moraines and very flat outwash plains from them - young moraine.

Some small lines on outwash plain.

Rye and meadows.

Some small ponds and plantings of Larix.

May 26 - Langballigholz,
3 km. e. of Glücksberg

- 41809 *Ulmus scabra*
on steep wooded slope on moraine gravel.
- 1 10 *Bromus mollis*
common in edges of wet meadow
- 2 11 *Bromus racemosus*
abundant in wet meadow
- 2 12 *Luzula maxima* (or *syriatica*)
common in acid woods on slope
- 1 13 *Equisetum hyemale*
very local in acid woods on slope
- 1 14 *Vaccinium myrtillus*
common locally in acid woods on slope
- 1 15 *Polypodium vulgare* L.
rare on sandy slope in acid woods
- 2 16 *Luzula pilosifera*
common on sandy slope in acid woods
- 1 17 *Maianthemum bifolium*
abundant locally in acid woods
- 1 18 *Luzula campestris*
common on open eroded slope
- 2 19 *Equisetum pratense*
abundant in rich woods
- 1 20 *Mohringia* *Mohringia*
local in rich woods
- 1 21 *Myosotis caeshitosa*
rare in wet meadow
- 1 22 *Salix cinerea*
common on edge of forest and wet meadow
- 1 23 *Carex distans*
common in wet meadow in dense sod
- 1 24 *Poa pratensis* var. *humilis*
abundant in dense sod in wet meadow

small tree.

dwarf shrub; fruit immature.

flowers white

flowers white.

flowers blue

shrub 3-4 m tall,
leaves bluish green.

41825 *Triglochin palustris*
occasional in wet meadow in dense sod.

2 26 *Juncus gerardi*
abundant in dense sod in wet meadow

1 27 *Alopecurus geniculata*
abundant in dense sod in wet meadow

1 28 May 26 - Glucksberg
Trientalis europaea
common in beech forest

2 29 May 26 - Horsthopfel, near
Neubirchen
in dense beech ~~sod~~ forest
Stellaria nemorum var. ~~opulenta~~ ^{montana}
local

1 30 *Carex sylvatica*
common

2 31 *Lanicaula europaea*
rare

1 32 *Ranunculus lanuginosus*
common

1 33 *Milium effusum*
common

1 34 *Anemone nemorosa*
abundant

1 35 *Viola montana*
common

1 36 *Melica uniflora*
local

2 37 *Mohringia trinervia*
local

~~st~~ rhizomes thread-like
white; flowers white.

flowers white.

flowers white.

flowers bright yellow

erect

rhizome brittle; dark brown
except white tip.

diffuse; flowers white.

May 26 - Missunde,
on Schlie Föhr

41832 *Carex otrube*

1 common in marsh on edge of Föhr

1 39 *Myosotis hispida*
occasional, local

May 26 - Bült See

in rather dry sloping meadow,
rather open

2 40 *Festuca ovina* v. *vulgaris*
abundant

1 41 *Ornithopus perpusilla*
occasional

1 42 *Aira caryophyllacea*
very common

1 43 *Aira praecox*
common in bare spaces
between tufts of other species.

2 44 *Fuzula campestris*
very common in dense sod
at foot of slope

1 45 *Ranunculus celeratus*
same - in edge of marsh

same - roadside ditch

1 46 *Saxifraga granulata*
common

flowers minute, blue.

prostrate

erect, flowers white;
bulbils ~~on~~ at base of
plant pinkish.

May 27 - bus trip Schleswig - Husum, north, back to Schleswig.

Left the terminal young moraine just west of Schleswig. On flat outwash plain birch is common, *Picea* is planted, soils are violet, as on old moraine *Populus tremula* appears. Shrub.

Hedges have no *Lyringia*, not much *Corylus*.

Landscape has become very flat.

Cultivation principally ~~the~~ rye and potatoes.

Practically no forest except in the far distance.

Hedges have no *Corylus*. Silberstedt.

Natural vegetation is Fags-Quercetum.

Silberstedt Forest. ^{rather} ^{moorland}

Fags - *Quercus* forest, much opened up and irregular. some *Carpinus*

shrub layer

Rhamnus frangula

Quercus

Salix aurum

planted *Picea*,

Rubus sp.

Herb layer: *Anthoxanthum odoratum*

... *Steridium aquilinum*

Lonicera periclymenum

Stellaria holostea

Melampyrum

Deschampsia flexuosa

Trisetalia europaea

Luzula bulbifera

Cornus suecica

Maianthemum bifolium

Vaccinium myrtillus

Dryopteris spinulosa

~~and~~ *Milium effusum*

Dryopteris "spinulosa"

Oxalis acetosella

The *Cornus suecica* forms a dense colony occupying an area a few m square. (photo)

Soil profile:

4 dm. very dark brown, peaty.

below this a dark mottled gray, yellow, dark brown, ^{red brown} down to the water table.

Evidently an old Calluna profile.

Nearby in a low wet place there is a profile of perhaps 25 cm. of blackish peaty sand and gray mottled with yellow sand and gravel beneath it. Forest here beech, ~~elm~~, alder.

shrub layer

Quercus

Fraxinus

Carpinus

Crataegus

Corylus

Herbs

Carex silvatica

Ranunculus sp.

Viola sp.

Anemone nemorosa

Geum

Carex sp.

Lanicula europaea

Mercurialis perennis

A black pond with
no aquatic veg.
nearby.

Tilia

Polypodium vulgare common
in this region on sand, on
north slopes, also on trees.

Hedges of *Prunus spinosa*,
Sambucus, *Crataegus*, *Sax.*
Sorbus aucuparia, *Alnus*, *Quercus*

Schwesing

Anthriscus common here in
old moraine, almost absent
in outwash plain.

~~H. r. r.~~

H. r. r. to n.e. of Engelsburg.

along this road *Sorbus*
suecica is the street tree.

Area of oak scrub about
3-4 m. tall, dense, on sand.
Some *Rhamnus*, *Populus*, *Crataegus*,
Lonicera ^{perj.} ~~sp.~~ *Sorbus aucuparia*,
Rhamnus. Coppiced every 5-6 years.
Fagus has been eliminated by cutting.

Herb layer *la. Convallaria majalis*

a *Anemone nemorosa*

c *Polygonatum multiflorum*

sterile grass *Holcus mollis*

c *Pteridium aquilinum*

la *Luzula*

lc *Stellaria holostea*

dc *Anthoxanthum odoratum*

l *Teucrium*

la *Maianthemum bifolium*

Open Calluna heath with
planted *Larix*, *Picea*, etc.

Some very small *Populus* trees.

Lupinus sp. *Luzula pilulifera*

Anthoxanthum *Juncus squarrosus*

Deschampsia

Soil profile in oak scrub
25-35 cm. of pale gray sand,
lower margin very irregular
(appearing scalloped).

Immediately below this several
cm. darkened, dark brown, fading
at meets a dark yellow brown
sand which becomes paler
and mottled downward
mottling is dark red-brown
to blackish. Black fine
bits, very irregular.
may be incipient ostreum.
Entire profile fine sand.

Hesum

photos north of city a large polder
enclosed by a dyke - 400 years old.
north of this very low
land, fringing the old moraine.
Gentle slope down to ~~marsh~~ beach
divided by low earth walls
with 2 low barbed wire fences
slanting in opposite directions

photos On walls are: *Carex arenaria*,
Elymus arenarius, *Festuca rubra*,
Rumex acetosella, *Cerastium* sp.,
Taraxacum, *Hieracium pilosella*,

Meadows between them
have a firm sod, with
much *Ranunculus*, locally
juncus. Much *Bellis*.

Beyond beach, low walls
of poles and wattle run out
in shallow water for reclamation.

These serve as baffles,
retarding the strong ebb
which would carry out the silt.

~~sod at edge of~~ on mud in reclamation areas

Agrostis stolonifera
Scirpus maritimus
Arter tripolium
Puccinellia
Plantago maritima
Triglochin maritima
Festuca rubra
Plantago maritima
Arundo
Lolium

Beach

Monchensya maritima
Carex arenaria
Elymus arenarius

The *Scirpus maritimus*
and *Lolium* bring about
settling and retention of silt.
Then this is shoveled up in
levees between parallel ditches.
More silt is deposited in the
ditches. The silt is stirred
up from the bottom in shallow
water by rough weather.
(Halligen Islands)

near Sudeshagen Nordstrand I.

Festuca marsh just outside the dykes

Festuca rubra
Agropyron pungens
Antennaria maritima
Puccinellia maritima
Plantago maritima
Limonium communis
Triglochin maritima
 forming a dense ^{low} sod.

On sides of ditches
Obione portulacoides
Suaeda
Aster tripolium

This is similar to what was on the land inside the dykes before they were built.

Inside dykes land is 60cm - 1m above mean h.t. Roadside ditches have some water. ~~Very~~ Very heavy soil. Potentially a *Fragminetum*. Some spontaneous *Fraxinus* saplings along the ditches. *Ulmus*, also. *Salix* spp. abn. Barley, Wheat, beets, rape, hay rich meadows, but with much *Ranunculus*, increased by grazing. Cattle and sheep both common.

Dykes covered by a low sod on inside much *Caum carvi* & *Pellis*. Two series of dykes,

the inner called "sleeping dykes" maintained in case outer are breached by waves.

Ponds represent places from which dyke material was removed.

On both sides of the dyke on which the road goes to Nordstrand is a belt of reclaimed land. still at about h.t. serving as pasture for sheep. *Pharbitis townsendii* has been planted here and has spread, proving very ~~valuable~~ valuable in speeding up reclamation.

North of this dyke is a large polder, mostly in wet meadow.

Leaving this ^{inland} ~~inland~~, ~~over~~ very flat land to Hatstett; turn north again.

Meadow land with some grain fields. Marshy ditches, with *Salix*.

Grain fields proportion increase north. Barley, so this must be reclaimed marsh, rather than moaine. Land cut by drainage ditches with considerable water. — This is a "kroog" a polder, dyked off for 400 years. Struckum.

Fields in the kroogs are separated primarily by low earth walls. Hedger on these sometimes.

Bredstedt - road crosses an area of old moraine.

Cross highest point in road Friesland. 28 m. Descend to Borgelum: and Isterdelum,

still on the moraine, but with marsh (or holder) just to left. The road now

goes along an old, 15th century dyke. Ditched meadows

and fields on ~~the~~ both sides. Black & White Holstein-Friesian cattle in abundance. No other kind.

Old houses built on mound for protection against storm tides. Were formerly on island. Now reclamation and building of large dyke now makes this unnecessary, and new houses are on level ground.

Large ditch inside dyke, from which material was taken. Road very undulating from being built on peat.

Canal turns inland. Carries water from two small rivers.

Bottschlotte see on it. turn left to main dyke again.

Much of beauty of this flat country is in the thatch-roofed Friesian Islands. (photos) Tudenstwart

Newly reclaimed area of Fahretoft.

On area exposed by digging for dyke material the old ditch system, pre 1643 exposed, filled by more recent mud. (photos)

On this bare ^{new} clay, hardened by sulfates, *Salicornia*, *Spergularia* & *Festuca rubra* are pioneers.

Outside this area is a wide belt of *Puccinellia* sod, separated from it by a ditch and low dyke.

Beyond this is a large area of *Spartina tansendii*, now mostly ^{died down and sprouting} ~~dead~~. Being drained by lines of tile packed in heather.

Beyond this is an area of dead *Salicornia* on hard clay, with abundant seedlings.

Small patches of *Fanaria* also of *Suaeda* and *Puccinellia* ^{distans} ~~maritima~~, *Atriplex* these all a dm. or so across. a few of *Spartina*, larger.

Beyond this similar area but with dead *Suaeda* as well as *Salicornia*, larger patches of some of same plants.

Suaeda seedlings very abundant. *Poa trivialis* (rare)

Farther out, just inside the main dyke, is an area lower still, with a scattering of dead *Salicornia* and a few *Salicornia* seedlings practically nothing more. and some of this area still under water.

North of *Fahrtøffer* large areas of "broog" of *Puccinellia* bog meadow, with ditches. Grazed by cattle and sheep. A fine close pine soil.

In very wet areas, solid stands of *Phragmites*.

Inland some barley fields. Large canal lined with *Phragmites*. Roadside ditches, also.

Back of *Ockholmen* Koog.

Ockholm. Cultivation and meadow.

Enormous area of flat and ditched land.

Stendebyll. Old moraine begins.

West *Bordelum*.

Turned north on highway.

View to west over *broog*, sea and the *Halligen* (Islands) on the horizon.

goeharde
Calluna heath with
Arnica (photo)

Calluna v.

Erica tetralix

Arnica

Genista pilosa

Genista anglica

Scorzonera

Potentilla ~~*truncatella*~~ *erica*

Luzula multiflora

Pedicularis

Luzula campestris

Nardus stricta

Deschampsia flexuosa

In wet places

Hartheicum

Drosera rotundifolia

Eriophorum

Myrica gale

Salix repens

Scirpus caespitosus

Mollinia

Potentilla erica

Salix cinerea?

Calluna

Carex panicea

Sphagnum

Rhynchospora

Salix aurita

Phragmites

Juncus squarrosus

Turned east
Much flat land, Calluna
heath but largely planted
to pine.

Picea plantations.

Some pastures and rye fields.
Some oak around edges
of pine and spruce plantations.
Goldelund.

Goldelund. buried

Fragment of old
series of profiles in a
sand dune. from superimposed
podzol profile.

Old dune surface
a black layer (from an
Erica^{heath}) below this a deep
white sand layer. Then
black ^{humus} fading to yellow
sand with irregular
bands of black. These quite
thick - only of humus, not of
iron. This quite thick.

The top black layer of this
buried portion is banded
with thin layers of sand -
possibly wind blown.

The *Erica* vegetation may
have been destroyed by
sheep.

Deep in the B horizon
is some iron.

Typical profile of Ericetum.

above this buried A. a yellow
B about 4 dm. thick with very
thin brown bands, darkening
upward, then about 1 dm. gray
sand, then a thin black layer.
Then a gray layer, blackish
upward. Then another
yellowish gray layer perhaps
15-20 cm. then gray for 10-15 cm.
to surface.

In second profile are
white spots. ~~probably~~
~~not~~ ^{balls of} ~~tubes~~. balls of
always associated with
presence of man.

Under a Populus-quercetum.

On way back ~~had Goldelund~~
A large peat bog being
dug and stacked up to dry
for burning as fuel.

fillerup or heeland Moor?

Another smaller one near
Sollerup has been dug up quite
a bit and *Eriophorum* has come
up in great abundance.

Generally typical level
old moraine landscape.
fields, meadows, hedges
on low walls. Rye
Jübeck

Albert Heyken

Kiel

Botanisches Institut

Hildegard Rüter

Kiel

Esmarchstr. 18

W. Lötschert

Staatsinstitut für Allgemeine Botanik

Hamburg 36

Lunginsstr. 6-8

May 27, Gosharde, about 5 km.
n.w. of Bredstedt

- 41847 *Carex panicea* ^{sand}
occasional in wet heath
- 1 48 *Salix repens*
common in rather moist ^{sand} heath
- 1 49 *Luzula multiflora* ^{sand}
occasional in dry heath
- 1 50 *Luzula campestris* ^{sand}
common in openings in dry heath
- 1 51 *Pedicularis*
occasional in moist sand heath

May 27 - newly reclaimed land
south of Fahrenstoft

- 1 52 *Cochlearia officinalis*
occasional on slopes of dyke
- 53 *Poa trivialis*
very rare on desiccating clay flat.

May 27. Engelsburg, n.e. Husum
in copse of *Quercus robur*

- 1 54 ~~Urtica~~ *Polygonatum multiflorum*?
common
- 2 55 *Luzula campestris*:
common in opening

May 27 - Silberstedt Forst,
10 km. w. of Schleswig
in open oak-beech forest

- 1 56 *Cornus suecica*
luxuriant colony in
- 1 57 *Dryopteris "spinulosa"*

fruits pink;
stems prostrate to ascending

flowers deep rose pink.

slightly fleshy; flowers white,
fruits scarcely or not compressed.
prostrate, culms spreading,
plant purplish.

rhizome white, fleshy;
flowers white with green distal parts.

stems erect, in masses;
bracts white, flowers blackish

May 28 - Schleswig - Hamburg
by car.

In Schleswig a *Crataegus* with bright rose pink fls. is a common street tree. *Tilia* is also common.

Just south of Schleswig the highway to Rendsburg passes onto the old moraine landscape - very flat, no *Corylus* in hedges. Rye is principal crop, with meadows and pastures. A mile or two to the east is the hilly front of the young moraine.

In the old moraine landscape here *Spiraea* sp. is a very important ~~part~~ component of the hedges, often the entire hedge.

North of Rendsburg is a considerable area mostly planted to *Picea* forests. Some larch and pine. (n. of Heideburg) South of this some larch and spruce planted in mixed stands.

Some damage to larch by late frosts. Unseasonal frosts are an effective factor in limiting area of beech, acc. Zantman.

North of Jevenstätt the hedges have a very mixed

composition, much *Salix*. Rather little forest. South of here, some patches of pine and of oak, but rather limited. *Quercus* - *carpinetum*, on moist soils.

Then scattered patches of pine, then more forest both pine and oak, near Brammer.

South of this podzols on slightly higher ground, violet soils, locally brownish on slopes, black in depressions. Mostly in rye, some beets, some meadows. Hedges very mixed, much oak and beech in them.

Wardorf - gardens and fruit trees around houses in suburbs.

Neumünster

Bad Bramstedt

The entire trip is through old moraine landscape.

Some forest north of Hamburg - largely oak, of various heights.

Quickborn - Friedrichsgraben. Meadowland with hedges.

Some grain fields - wheat? Then mostly cultivation.

Then a heath on top of a small rise.

May 28. Hamburg - Düsseldorf
(Caravels, left side)

Large areas in Hamburg, e. of Elbe, with fairly large lots, small houses, abundant fruit trees, gardens.

W. of Elbe land is intensively cultivated at first in long parallel strips, then in blocks. Most of the houses are lumped in villages.

Then a fair proportion of pine (?) forest (planted) in fairly large to small aggregations of blocks.

This somewhat less southward and some areas of natural oak (?) forest and heath. The pine or spruce forest patches are smaller, but fairly numerous, quite irregular in size and distribution, perhaps 10% or less of total area, increasing to 50% very locally (incl. natural forest and heath). Houses

still generally in villages rather than scattered on farms. Soil a light gray to gray-brown, sand color.

Visibility becomes zero before the N. German plain is passed.

A few minutes later, still on plain. A large patch of what may be heath, judging from color but laid out in rectangular pattern - possibly forest planting, very young in heath.

Then an abrupt change in pattern of cultivation. Patches smaller, of mostly odd but still geometrical shapes. orientation not regular any longer, but mixed up. Not much forest. Visibility poor again. Occasional glimpses show this pattern continues but becomes a bit more regular.

About half hour from starting several wooded ridges, close together transverse to course. Otherwise landscape mostly cultivated, irregular patches with hedges, some small patches of forest, probably coniferous and doubtless planted (the altitude now such that details are ~~not~~ lost.) Visibility poor again; and descent shortly begins. Landscape still mostly cultivated, patches irregular but geometrical or at least angular.

no visibility for a bit, then similar pattern, flat country, a few small bits of forest. Poor visibility again.

Outskirts of Dusseldorf - many neat housing developments and apartment developments, grassy or grain fields between them.

Flood plain of Rhine ^{each channel} is very green. Forest between east and main channels.

West of Rhine some city development. Then ~~the~~ country about $\frac{1}{3}$ to $\frac{1}{4}$ wooded. City north of small river. Forest on hills, flat tops with some cultivation. Much forest, some subdivisions. Forest obviously carefully managed. blocks clear cut, and in various stages of regrowth. Mostly coniferous but some blocks of beech and possibly oaks & larches.

Then open fields and housing developments for some distance as airport is approached, then some more forest. Then landed. 4:15.

May 28 - Dusseldorf - Paris.

Flood plains in meanders of Rhine completely cultivated in a regular rectangular pattern.

Visibility bad for 15 minutes or so. Then ok for a short distance.

From a very high altitude the country appeared to be a vast mosaic of roughly circular large areas of forest in a matrix of cultivated land and towns. Spacing fairly regular and ^{usually} about or less than diameter of the forests.

Then no visibility again.

After about 10 minutes, deeply incised very regular meanders of a river in forested country. Then generally forested country with flat cultivated valley bottoms, about 60% wooded. Changed gradually to almost completely cultivated and grazed country, only very slightly wooded along streams - gallery forest and a few tiny patches.

Pattern of cultivation rectangular but orientation varies locally.

After about 5 minutes patches of wood become frequent and a large area in middle distance. 10-20% of landscape wooded, locally much less. Fairly large patches, then

May 27 a very large patch just left of course.

Then smaller scattered patches, quite variable in size and perhaps covering 10-15% of country.

Descent to Paris started. More large patches of woods, but not more than 20% of landscape mostly much less.

Poor visibility. Then some fairly large patches of forest (but altitude much lower). 20-30% cover locally, mostly much less.

Then a large irregular forest (Fontainebleau?) also other fairly large ones, some locally fairly open. Green fields between them, also open villages.

May 30 - From Orly westward over Versailles a very considerable amount of dense forest. That around Versailles cut up by roads in a very formal and geometric pattern.

About an hour west the clouds cleared away. Ireland (?) is immediately to the right. This part is green but singularly ~~sparsely~~ uninhabited. No cities or towns are in evidence. The

as Brittany?

landscape shows a very pronounced "grain" of parallel beds or strike lines running southwest, culminating in a series of parallel rectangular peninsulas pointing southwest. Forests are not at all evident. Small mountains may be seen well inland. A few small beaches are scattered along the coast, but it is mostly lined by low sea cliffs.

Farther west the coast swings somewhat north, and there are a few tiny islands.

The upper surface of the clouds at with the sun about 20° up, ~~it~~ can be likened to a symphony in white and powder-blue.

Label
typed

41858

Virginia

June 12 - George Mason High School,
just north of Falls Church

Fagopyrum esculentum

beside road in second growth
deciduous woods.

June 13 - Great Falls

Flowering:

Lysimachia ciliata

Lonicera japonica

Cryptotaenia canadensis

Chrysopsis virginianum

Scutellaria ovata

Liparis liliifolia

Galium obtusum

Glycyrrhiza canadensis?

Circaea quadrangulata

Anemone virginica

Trifolium repens

Juncus tenuis

Lepidium virginicum

Dianthus armeria

Apocynum cannabinum

Tephrosia virginiana

Rosa carolina

Penn.

erect; flowers white.

June 24 - Powdermill Reserve

birds: Crow

Powdermill Run
Westmoreland Co.

Kentucky warbler

Cardinal

Goldfinch

Titmouse

Mourning dove

Cowbird

Robin

House wren

Yellow billed cuckoo

Black billed cuckoo

Chipping sparrow

Field sparrow

Red eyed vireo

Indigo bunting

Hairy woodpecker

Cedar waxwing

song sparrow

Northern yellow throat

chat

towhee

Golden winged warbler

Crested flycatcher

Scarlet tanager

Mixed hardwood ^{subbottom} ^{land} ^{rich herb layer}
Quercus alba
Carya cordiformis?

Acer nigrum

Nyssa sylvatica

Pinus strobus

Platanus occidentalis

Acer rubrum

Quercus rubra

Fagus grandifolia

Magnolia tomentosa

Ulmus

Liriodendron tulipifera

Juglans nigra

Old field with thickets
 of *Pinus serotina*

a *Populus angustifolia*

c *Acer rubrum*

c *Cornus florida*

o *Nyssa sylvatica*

c *Fraxinus americana*

r *Rhus typhina*

o *Acer nigrum*

c *Lolium nigra* (near stream course)

r *Lambucus canadensis*

la *Cornus ferruginea* *Tilia* *Ulmus*

Meadow parts of field

a *Chrysanthemum leucanthemum*

a *Trifolium repens*

a *Phleum*

o *Apocynum androsaemum*

a *Holcus lanatus*

c *Trifolium agrarium*?

a *Erigeron strigosus*

c *Asclepias syriaca*

c *Plantago rugelii*

c *Panicum*

la *Melilotus officinalis*

June 25 - Cranesville Swamp

Flat peaty area with
 scrub or dwarf scrub

with *Prunella*, *Hypericum*

Vaccinium, *Gaultheria*

Coptis Rubra hispida,

Solidago sp., *Symplocarpus*,

etc. growing on a mat

of *Polytrichum* and locally

Sphagnum. *Coptis*

Scattered, locally

abundant emergents

of *Nemophanthus*, *Viburnum*

cassinoides, *Populus tremuloides*

Ox. hemlock, *Pinus strobus*

Picea,

192

Labels
typed

Penn.

June 25 - Powdermill Nature
Preserve, Powdermill Run
Westmoreland Co. Penna.
Mixed deciduous forest
on flood plain.

41859

Mitchella repens
abundant

1 60

Luzula
common

June 25 - Cranesville Swamp
West. Va.

1 61

Luzula
occasional ~~as~~ in dwarf
scrub around periphery
of swamp on thin fine
sandy soil.

193

prostrate; flowers white,
purplish outside; fruit scarlet.

194

195

Kulani - if prism within
 v shots beyond Kulani,
 might make it. bad spot beyond
 dog school - if wet no good.

Hilina OK.

Rapport Beach lots

Ocean Rd. =

Can make it but Rt.
 does not want
 should do in reverse order to K. Beach lots then
 via green lakes and
 back track to Rapids.

Up to Overlook above Rapids

Beginning with #41723

Field note book #

A. R. Fenzberg

stempeln an den Unterzeichneten zu senden. Briefporto bitte beifügen.

Fortsetzung von Seite 2

an	km	ab	Strecken-Nr des Kursbuches	ab	Anschlüsse nach	an
Koblenz Hbf	(249c)	14.00	Niederlahnstein 14.08 (E 14.21 St Goarshausen 14.49)	
13.45		13.53	(248a) (263)	14.10 D 14.10	Mayen Ost 15.12 Cochem [Mos] 14.48 Trier 15.49 Luxem- bourg 17.05 Reims 20.56 Paris Est 22.53	
	63.1		(263) (249)	14.17 14.45	Hatzenport 14.56 Boppard 15.03 Bingerbrück 15.40 (D 15.48 Bad Kreuznach 16.01 Bad Münster a St 16.10 Kaisers- lautern & 17.01 Homburg [Saar] 17.34 Saarbrücken 18.04)	
			(195)	15.18	Bad Ems 15.46 Limburg [L] 16.34 & Anschluß nach Neustadt [Wstr]: an E 17.46	
		Rüdesheim [Rh]	(250)	E 15.20	Eltville 15.38	
14.51	30.2	14.52
Wiesbaden Hbf	(195b)	15.27	Niedernhausen [Ts] 15.55 (16.00 Camberg [Nass] 16.23)	
15.22		15.29	(195e) (317)	15.28 E 15.35	Bad Schwalbach 16.10 Mainz 15.44 (15.53 Rüsselsheim 16.10)	
	41.4		(2195/60) (250b)	16.00 E 16.01	Gr Gerau 16.04 Darmstadt 16.17 Schlangenbad 16.32 Frankfurt-Höchst 16.27 (16.38 Bad Soden [Ts] 16.52 und a 17.18, 17.40 Königstein [Ts] 17.52, 18.11)	
			(249a)	E 16.05	Worms 16.52 Ludwigshafen [Rh] 17.12 (D 17.24 Mannheim 17.30)
Frankfurt [M] Hbf	(196h)	16.11	a 16.20, 16.41 Bad Hom- burg 16.36, 16.42, 17.06	
16.06		16.16	(315a)	D 16.12	Mannheim 17.02 Kaiserslautern 18.00 Saarbrücken 18.48 Metz 19.50 (19.54 Bar-le-Duc 20.48 Paris Est 23.46)	
			(315)	D 16.15	Heidelberg 17.15 Karlsruhe 17.52 Baden-Baden 18.18 Offenburg 18.43 Freiburg [Brsg] 19.24 Basel SBB 20.30	
			(196)	D 16.15	Friedberg [Hess] 16.43 B Nauheim 16.51 Gießen 17.23 (17.34 Marburg [L] 18.15)	
	46.2		(315a)	E 16.17	Siegen 18.49 Gödelau-Erfelden 16.55	
			(196g) (315) (192a)	a 16.20 E X 16.21 X 16.22	Biblis 17.13 Lampertheim 17.25 c 16.41 Usingen 17.28 Δ 17.53 E 16.48 Weinhelm [Bgstr] 17.20, 17.51 E 16.35 Offenbach [M] 16.34, 16.46	
			(192)	X 16.22	Hanau 16.50, 16.59 † 16.40 Wächtersbach 17.48, 18.12 (a 17.51, 18.18 Bad Orb 18.01, 18.28)	
			(196h) (192) (196)	16.26 c 16.40 F 43 17.14 „Roland“	Kronberg [Ts] 16.54 a 16.59 Fulda 19.20 Bebra 20.45 Gießen 17.59 Kassel 19.28 Göttingen 20.21 Hannover 21.23 Δ Bad Homburg umsteigen
Aschaffenburg Hbf	(416d) (416f) (416) (416f)	b 17.04 a 17.15 E 17.23 17.57	X 17.42 Miltenberg 18.11, 18.43 Mömlingen Bf 17.55 Lohr Bf 18.00 Höchst [Odw] 19.04	
16.50	51.6	16.52				
		Gemünden [M]	(192)	17.52	Jossa 18.19 (19.45 Brückenau Bad 20.10 Wildflecken 20.42)	
17.38	37.7	17.40	(416) (418d)	E 18.16 18.26	Karlstadt [M] 18.27 Hammelburg 19.12 Bad Kissingen 19.44
Würzburg Hbf	(322)	D 18.18	Lauda 18.55 (E 19.10 Bad Mergent- heim 19.20 Crailsheim 20.37)	
18.08		18.17	(419)	E 18.24	Heilbronn 20.09 Schweinfurt 19.00 Bamberg 19.54 Lichtenfels 20.26 (21.10 Coburg 21.36)	
	102.2		(415)	E 18.24	Neuenmarkt-Wirsberg 21.22 (22.01 Bayreuth 22.32) Hof 22.32 Steinach 19.25 (19.41 Rothenburg od T 20.02)	
			(415) (416) (416)	E † 18.24 X 18.58 E 19.48	Ansbach 19.52 Treuchtlingen 20.38 Eichstätt 21.06 Ingolstadt 21.33 19.27 Kitzingen 19.25, 19.54 Neustadt [Aisch] 20.31 Fürth [Bay] 20.56	

Fortsetzung Seite 4

Fortsetzung Seite 4

Reisebuch - Deine Reisekasse

an	km	ab	Strecken-Nr des Kursbuches	ab	Anschlüsse nach	an
Nürnberg Hbf 19.27	137,2	19.42	(420)	D	19.46 Dombühl 20.53	
			(417)	E	19.50 Neumarkt [Opf] 20.18 Regensburg 21.08	
					Plattling 22.00 (22.06 Passau 22.49)	
			(414)		19.50 Erlangen 20.30 Forchheim [Opf] 20.52	
			(423)	E	19.51 Neukirchen 20.42 Weiden [Opf] 21.51	
			(417c)		19.55 Feucht 20.10	
			(413)		19.56 Schwabach 20.21 Pleinfeld 20.57	
			(413)	E	20.29 Treuchtlingen 21.20 Donauwörth 21.57	
			(423)		21.00 Amberg 22.52 (c 22.55 a 23.15	
					Schwandorf 23.45, 0.10)	
Augsburg Hbf 21.08	61,9	21.12	(421)	E	21.55 Schnabelwaid 23.04 Bayreuth 23.23	
			(411a)	X	21.20 c 22.20 Aystetten 21.55, 22.55	
			(404a)	†	21.40 c 23.10 Landsberg [Lech] 22.41, 0.22	
			(411d)	†	21.51 a 22.35 c 23.25 Schroben-	
					hausen 22.42, 23.26, 0.16	
			(410c)		21.50 Gessertshausen 22.14	
			(411a)	a	22.20 c 23.20 Weiden 23.15, 0.15	
			(410c)		22.34 Dinkelscherben 23.11	
			(405)		23.47 Buchloe 0.40	
München Hbf 21.53	153,3	22.28	(413a)		22.10 Dachau Bf 22.30	
			(401b)		22.26 Starnberg 22.56 Tutzing 23.10	
			(413)	E †	22.30, 0.10 Wolnzach Bf 23.20, 1.12	
			(428)	D	22.35 Rosenheim 23.18 Kufstein 23.44	
					Innsbruck 1.24 Bolzano/Bozen 4.43	
					Merano/Meran 5.42	
			(428)	D	22.35 Verona 6.54 Venezia SL 10.13	
			(428)	D	22.35 Verona 6.54 (7.13 Milano C 9.10)	
					Bologna C 8.46 (9.03 Rimini 10.18	
					Ancona 11.52) Firenze SMN 10.34	
					Roma T 14.40	
			(428)	D	22.42 Prien 23.45 Traunstn 0.07 Freilassg 0.33	
					Wels 2.49 Linz 3.12 Wien West 6.20	
			(410a)		22.46 Nannhofen 23.24	
			(424a)		22.52 Freising 23.35	
			(401a)		22.58 Herrsching 23.48	
			(402)	E So	23.00, 23.10 Weilheim [Obb] 23.41, 0.06	
			(402)	E So	23.00 Murnau 23.58	
			(2429/3)		23.10 Garm-Partenk 0.28 Mittenwald 0.56	
			(406a)		23.12 Bad Wiessee 0.16 Tegernsee 0.35	
Salzburg Hbf 0.12	99	0.50	(424)	E	23.20 Fürstenfeldbruck 23.43 Geltendorf 0.11	
			(427)		23.29 Landshut [Bay] 0.20	
			(2429/40)		23.35 Dorfen Bf 0.34 Mühldorf [Obb] 1.03	
			(429a)		23.35 Wolfratshausen 0.41 Kochel 1.45	
					0.05 Holzkirchen 0.55	
Badgastein 2.48	52	2.52				
Spittal-Millstät 3.45	37	3.51			6.20 Lienz 7.42	
					S Candido/Innichen 9.20	
Villach Hbf 4.22	103	4.50				
Ljubljana[Laibach] 7.48	142	8.30				
Zagreb [Agram] 10.57	144	11.12				
Beograd[Belgrad] 17.01	244	18.20				
Nis 22.02	960	22.22				
Athen OEZ 22.09						

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- 2. Aachen - Meran
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an	km	ab	Strecken-Nr des Kursbuches	ab	Anschlüsse nach	an
Den Haag SS						
	148	8.32				
Emmerich						
10.37	60,8	10.39	(235)	X 11.10, 12.06	Empel-Rees 11.30, 12.21 (12.25 Bocholt 13.15) Wesel 12.10, 12.48	
Oberhausen Hbf						
11.21		11.31	(227)	E 11.26	Essen 11.43 Bochum 11.56 Witten 12.13 Hagen 12.32 (D 12.57 Kassel 16.16)	
			(227)	E 11.26	Bochum 11.56 (E 12.01 Dortmund 12.20 — E 12.31 Hamm [W] 12.51 Soest 13.18 Paderborn 14.10)	
			(227)	E 11.26	Hagen 12.32 (D 12.57 Arnberg [W] 13.51 Bestwig 14.21 Brilon Wald 14.44 B Wildungen 16.42)	
			(236)	E 11.28	Bottrop 11.41 Dorsten 12.01 Coesfeld [W] 12.32 Rheine 13.14 Spellen [Nrh] 12.10	
			(235b)		Gelsenkirchen Zoo 12.17	
			(236a)		Duisburg-Ruhrort 12.10	
			(235b)		E-Altenessen 12.07 Gelsenkirchen 12.17	
			(227)	D 11.57	Wanne-Eickel 12.26 Herne 12.33 Dortmund 12.53 Hamm [W] 13.23 (13.54 Münster [W] 14.39 und D 15.03 Osnabrück 16.09 Bremen 17.38 Hamburg 19.07 Bielefeld 14.15 Herford 14.30 Minden [W] 14.57 Hannover 15.42 Braunschweig 16.54	
			(243a)		Moers 12.31	
			(236)		Recklinghausen 13.01	
Duisburg Hbf						
11.39	23,7	11.41	(244)	E 11.46	Krefeld 12.02 (12.45 Kleve 14.13) Viersen 12.16 M Gladbach 12.25 Lindern 12.54 Aachen 13.36 Duisburg-Wedau 12.08	
			(232a)		12.00	
			(227)	X 12.15	12.56 Kalkum 12.28, 13.08	
Düsseldorf Hbf						
11.58	40,0	12.01	(229)		Sol-Ohligs 12.36 Remscheid 13.09	
			(2245/21)	12.15	Elmpt Markt 13.58 Roermond Hbf 15.02	
			(227)		Leverkusen-Wiesdorf 12.41	
			(228)	E 12.38	Wuppertal-Elberfeld 13.14	
			(2246/3)	X 12.45	Viersen, Augustaplatz 14.00	
Köln Hbf						
12.28		12.44	(250)	E 12.36	Troisdorf 12.55 Königswinter 13.13 Linz [Rh] 13.30 Neuwied 13.51 N'lahnstein 14.19	
			(240b)	X 12.44	Bergisch Gladbach Stadtmitte 13.08	
			(240)		Overath 13.31 Gummersbach X 14.20	
			(249)		Brühl 13.06	
			(247)	D 12.50	Düren 13.14 Aachen 13.39 Liège [Lüttich] G 14.36 Bruxelles M 15.47 (D 16.00 Oostende 17.15)	
			(228)	E X 12.51	E 13.15 Opladen 13.10, 13.34	
			(251)	E 12.55	Au [Sieg] 14.05 Betzdorf [Sieg] 14.27 Siegen 14.48	
			(248)	Sa 13.01	E 13.50 Euskirchen 13.58, 14.29	
			(248)	E Sa 13.40	E 13.50 Jünkerath 15.25, 15.33 Gerolstein 15.42, 15.51	
Bonn						
13.06	59,3	13.08	(249)		Bad Godesberg 13.32 Remagen 13.48 (13.56 Bad Neuenahr 14.12) Andernach 14.16	
			(247e)	X 13.34	Rheinbach 14.06 Euskirchen 14.22	

Fortsetzung Seite 3

Fortsetzung von Seite 2

an	km	ab	Strecken-Nr des Kursbuches	ab	Anschlüsse nach	an
Koblenz Hbf						
13.45		13.53	(249c)		14.00	Niederlahnstein 14.08 (E 14.21 St Goarshausen 14.49)
			(248a)	14.10		Mayen Ost 15.12
			(263)	D 14.10		Cochem [Mos] 14.48 Trier 15.49 Luxem- bourg 17.05 Relms 20.56 Paris Est 22.53 Hatzenport 14.56
			(263)		14.17	Boppard 15.03 Bingerbrück 15.40 (D 15.48 Bad Kreuznach 16.01 Bad Münster a St 16.10 Kaisers- lautern † 17.01 Homburg [Saar] 17.34 Saarbrücken 18.04)
			(249)		14.45	Bad Ems 15.46 Limburg [L] 16.34 ‡ Anschluß nach Neustadt [Wstr]: an E 17.46
			(195)		15.18	
Rüdesheim [Rh]						
14.51	30,2	14.52	(250)	E 15.20		Eltville 15.38
Wiesbaden Hbf						
15.22		15.29	(195b)		15.27	Niedernhausen [Ts] 15.55 (16.00 Camberg [Nass] 16.23)
			(195e)		15.28	Bad Schwalbach 16.10
			(317)	E 15.35		Mainz 15.44 (15.53 Rüsselsheim 16.10) Gr Gerau 16.04 Darmstadt 16.17
			(2195/60)	16.00		Schlangenbad 16.32
			(250b)	E 16.01		Frankfurt-Höchst 16.27 (16.38 Bad Soden [Ts] 16.52 und a 17.18, 17.40 Königstein [Ts] 17.52, 18.11) Worms 16.52 Ludwigshafen [Rh] 17.12 (D 17.24 Mannheim 17.30)
			(249a)	E 16.05		
Frankfurt [M] Hbf						
16.06		16.16	(196h)		16.11	a 16.20, 16.41 Bad Hom- burg 16.36, 16.42, 17.06
			(315a)	D † 16.12		Mannheim 17.02 Kaiserslautern 18.00 Saarbrücken 18.48 Metz 19.50 († 19.54 Bar-le-Duc 20.48 Paris Est 23.46)
			(315)	D 16.15		Heidelberg 17.15 Karlsruhe 17.52 Baden-Baden 18.18 Offenburg 18.43 Freiburg [Brsg] 19.24 Basel SBB 20.30 Friedberg [Hess] 16.43 B Nauheim 16.51 Gießen 17.23 (17.34 Marburg [L] 18.15) Siegen 18.49
			(315a)	E 16.17		Goddellau-Erfelden 16.55 Biblis 17.13 Lampertheim 17.25 c 16.41 Usingen 17.28 † 17.53
			(196g)	a 16.20		E 16.48 Weinheim [Bgstr] 17.20, 17.51 E 16.35 Offenbach [M] 16.34, 16.46 Hanau 16.50, 16.59
			(315)	E X 16.21		† 16.40 Wächtersbach 17.48, 18.12 (a 17.51, 18.18 Bad Orb 18.01, 18.28)
			(192a)	X 16.22		Kronberg [Ts] 16.54 a 16.59 Fulda 19.20 Bebra 20.45
			(192)	X 16.22		Gießen 17.59 Kassel 19.28 Göttingen 20.21 Hannover 21.23 Δ Bad Homburg umsteigen
			(196)	F 43 † 17.14 „Roland“		
Aschaffenburg Hbf						
16.50	51,6	16.52	(416d)	b 17.04		X 17.42 Miltenberg 18.11, 18.43
			(416f)	a 17.15		Mömlingen Bf 17.55
			(416)	E 17.23		Loth Bf 18.00
			(416f)		17.57	Höchst [Odw] 19.04
Gemünden [M]						
17.38	37,7	17.40	(192)		17.52	Jossa 18.19 (19.45 Brückenau Bad 20.10 Wildflecken 20.42)
			(416)	E 18.16		Karlstadt [M] 18.27
			(418d)		18.26	Hammelburg 19.12 Bad Kissingen 19.44
Würzburg Hbf						
18.08		18.17	(322)	D 18.18		Lauda 18.55 (E 19.10 Bad Mergent- heim 19.20 Crailsheim 20.37) Heilbronn 20.09
			(419)	E 18.24		Schweinfurt 19.00 Bamberg 19.54 Lichtenfels 20.26 (21.10 Coburg 21.36) Neuenmarkt-Wirsberg 21.22 (22.01 Bayreuth 22.32) Hof 22.32
			(415)	E 18.24		Steinach 19.25 (19.41 Rothenbg odT 20.02) Ansbach 19.52 Treuchtlingen 20.38
			(415)	E † 18.24		Eichstätt 21.06 Ingolstadt 21.33
			(416)	X 18.58,		19.27 Kitzingen 19.25, 19.54
			(416)	E 19.48		Neustadt [Aisch] 20.31 Fürth [Bay] 20.56

Fortsetzung Seite 4

Dein Postsparbuch - Deine Reisekasse

FLORISTISCH-SOZIOLOGISCHE ARBEITSGEMEINSCHAFT

(23) Stolzenau/Weser, 9. Mai 1961
Schinnaer Landstr. 6
Fernruf 353

2. Rundschreiben

an die Teilnehmer der Pflanzensoziologen-Tagung in Schleswig.

Zu der vom 25. - 27. Mai 1961 in S c h l e s w i g stattfindenden

Pflanzensoziologen-Tagung

mit den anschließenden Exkursionen durch die verschiedenen Diluvial- und Alluvial-Landschaften Schleswigs haben sich über 100 Teilnehmer aus dem In- und Auslande gemeldet.

Die Tagung beginnt am Donnerstag d. 25. Mai 1961 um 9 Uhr c.t. in der Aula der städtischen Mittelschule (Brüno-Lorenzen-Schule) an der Allee (am Chemnitz-Bellmann-Denkmal; Parkplatz vor der Jugendherberge).

Vortragsfolge:

Dr. e.h. Willi Christiansen, Kiel: Die pflanzengeographische Sonderstellung Helgolands.

Dr. Helmut Freitag, Potsdam: Flora und Vegetation des Stechlin-Sees.

Dr. Uwe Jensen, Kiel: Ökologische Eichstufen in natürlicher oligotropher Moorvegetation und ihre Zusammenfassung zu ökologischen Stufenkomplexen. Die Ursachen der Artenarmut der ombrotrophen Moorvegetation.

Dr. Heinz-Dieter Krausch, Potsdam: Vorschläge für die Gliederung der mitteleuropäischen Sand-Trockenrasen.

cand. Friedrich-Wilhelm Röpke, Kiel: Die Buchenwaldgesellschaften Schleswigs.

Kreisbeauftragter für Naturschutz und Landschaftspflege und Bauer Hans Möller, Schwensby: Einführung in die schleswigsche Landschaft anhand farbiger Lichtbilder.

Exkursionen:

25. Mai 15 Uhr Wanderung durch den Tiergarten zum Studium verschiedener Waldgesellschaften. Treffpunkt: vor Schloß Sottorp.

20³⁰ Uhr (Mittelschule) Vortrag Prof. Dr. Ernst-Wilhelm Raabe, Kiel: Eine Einführung in die Vegetationsgrundlagen Schleswig-Holsteins.

26. Mai 8 Uhr. Treffpunkt: Schleihallenparkplatz.

Exkursion an die schleswigsche Westküste: Silberstedt, Kratt Engelsburg, Husum, Schobüll Strand, Nordstrand.

13 - 14 Uhr Mittagspause Norderhafen. Weiterfahrt durch die Köge nach Fahretoft, Fahretoft Koog, Bordelumer Heide, Jordelund. Rückkehr nach Schleswig gegen 19³⁰ Uhr.

Beisammensein der Teilnehmer im Wintergarten der Schleihalle (zwanglose Diskussionen).

27. Mai 8 Uhr ab Schleswig, Schleihallenparkplatz.

Fahrt durch die Jungmoränen-Landschaft von Schwansen und Angeln: Bültsee, Missunde, Schwonsburg, Horstkoppel, Westerholz.

13,30 - 14,20 Uhr Mittagspause.

Langballigau, Glücksburg.

Rückkehr nach Schleswig gegen 19 Uhr.

Meldung und Beitrag:

Die große Teilnehmerzahl macht die Einzahlung der Exkursionskosten (Autobus) in Höhe von 18,50 M bis zum 18. Mai 1961 auf das Postscheck-Konto Hannover Nr. 136555 der Floristisch-soziologischen Arbeitsgemeinschaft unbedingt notwendig.

Benutzung von Privatwagen ist leider ausgeschlossen.

Teilnehmer der Tagung, die nur die Vorträge, aber nicht die Autobus-Exkursionen mitmachen, zahlen nur 1,-- M Tagungsbeitrag. Die Teilnahme nur an der Autobus-Exkursion am 26. Mai kostet 9,-- M, nur am 27. Mai 8,-- M.

Mit der Beitragszahlung bitten wir zugleich angeben zu wollen, wer an dem gemeinsamen einfachen Mittagessen am 25. und am 26. Mai teilnehmen will. Die Kosten dafür sind nicht in den oben genannten Exkursionskosten enthalten.

Ein Quartier-Nachweis, vermittelt durch das Städtische Verkehrsbüro, Schleswig, Stadtweg 26, ist beigelegt (sofern Unterkunft bestellt worden ist).

Evtl. Abbestellungen von Quartieren können ohne Kosten für den Gast nur dann berücksichtigt werden, wenn sie unmittelbar an das Städtische Verkehrsbüro Schleswig gerichtet werden und dort spätestens bis zum 19. Mai eintreffen. Eine Mitteilung an unsere Arbeitsgemeinschaft, daß die Teilnahme an der Tagung nicht erfolgen kann, gilt n i c h t als Quartier-Abbestellung.

Den Teilnehmern, die mit dem Zuge fahren, wird empfohlen, sich sehr zeitig am Heimatbahnhof ein Formular für Fahrpreisermäßigung (33 1/3 %) für Lehrgangsbesucher abzuholen und das ausgefüllte Formular zum Abstempeln an den Unterzeichneten zu senden. Briefporto bitte beifügen.

Mit freundlichen Grüßen und Auf Wiedersehen in Schleswig

(Tüxen)

Anlagen:

- 1 Quartierschein
- 1 Zahlkarte

Kulani - if prism works
v spots beyond Kulani,
might make it. bad spot beyond
top school - if wet no good.

Hilina OK.

Kapoho Beach lots

Ocean Rd. -

can make it but Rt.
does not want
should do in reverse order to K. Beach to then
via green lakes and
back track to Kapoho.

Up to overlook above Kipahulu

F. R. Furbush
Field note book #
beginning with #41723