

39

RECORD

J. R. Fosberg

1 Xerox copy

pages 65 and 80

J. R. Fosberg

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Collection and Field Note Book

No. 39

(Feb. 5, 1954 - Aug. 6, 1954)

(35677 - 35991)

JAPAN

O-shima Island, Izu Island (s. of Tokyo Bay)

Japan

Trail above Nomashi

Lowlands between Motomuna and Okada

Trail above Nomashi on north slopes of volcano

Mihara Yama cone

Midway Island near Airfield. 35692-35705 ...

General vegetation

CALIFORNIA

Altamont Pass Hills, Turlock Farm, Kings

River near Hub(s. of Fresno), Santa Ynez

Mts.....

KANSAS

Lawrence University of Kansas

VIRGINIA

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Williamsburg..... 35706-35711 ...

Alexandria, s. of Shirley Hwy 35713

Fauquier County, e. of Markham

..... 35714-35718 ...

Shenandoa Nat.'l Park, Dickey Hill

..... 35719-35720 ...

Big Meadows, Franklin Cliffs, Fisher Gap

..... 35721-35736 ...

Appalachian Trail s. of Fisher Gap

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J. R. Fosberg
Collection and
Field note book
39 # 35677-35992



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1954

Japan

1

3

Feb. 5 - Oshima Island,
Izu Is. (E. of Tokyo Bay)

The island is about
7 miles long, elliptical,
with a large caldera
in the north half.
In this caldera is an
active central cone.
Lava flows of 1878, 1950 and
1951 cover much of the
caldera floor. Drifting
ash of about ^{fine} sand size
covers part of the floor
and drifts over some
of the lava flows.

The ports Okada
and Motomura are
on east and north sides
respectively, with a small
fishing village, Nomaki,
south of Motomura.

Road climbs around
the mountain slope,
zigzagging some, up to
tea-house on caldera rim.

Along this road the ~~lower~~
quest is mostly cleared.
The lower slopes are
clothed by a dense brake
of *Arundinaria* (a *hara*)
2-3 m. tall, very slender,
(about the habit of American
Arundinaria). Some of this

area is in cultivated fields, these separated by hedges of *Arundinaria*.

Above the bamboo the slopes become bushy, part of the brush being evergreen scrub-forests of *Camellia japonica* 3-5 m. tall, now in flower with pink single flowers. The trees are twisted and gnarled.

Most of the scrub is deciduous, the principal plants being species of *Alnus* (*A. firma*), *Prunus*, *Hydrangea*, and *Weigela* (*W. koraiensis*). There are scattered evergreens - *Camellia*, *Cryptomeria*, *Quercus*, *Podocarpus*, *Elaeagnus*, *Rhododendron*, *Ilex crenata*, and *Lauraceae*. This is growing on bedded black and yellow-brown ash. *Dioscorea* is common twining in scrub. The entire area has evidently been cut over repeatedly, more actively in last 2-3 years.

Deciduous patches and evergreen are rather separate below, but

with some intergradation. Upward, near caldera rim evergreen becomes more abundant till, first a mixed scrub, then an evergreen scrub become fairly general near the rim.

The floor of the caldera and the active cone have little vegetation. The 1950 and 1951 flows are bare, rough lava, with no vegetation, but with ~~some~~ ^{great areas of} wind-blown ash and cinders with scattered wind-polished pebbles and cobbles of a dense gray rock.

A kipuka of 1778 lava with depressions filled with new ash. Patches of rock between, these sandblasted. On this surfaces are patches of *Polygonum* sp. and hummocks of *Carex* sp. (perhaps also *Miscanthus sinensis*, which looks same - both are present acc. H. Hara). These plants collect ash.

The caldera rim has

1954 Japan

a mosaic of patches of mixed scrub and *Miscanthus sinensis*.

Ravens are common in the caldera.

On the outer slopes on the trail down to Nomashi are patches of small trees of *Camellia japonica* with little else, little undergrowth. These seem probably not planted but probably so favored by removal of other plants that they are now dominant.

The *Camellia* nuts are harvested for oil which is used as a hair-dressing and in cooking. This is a specialty of Oshima.

Several years ago, as Helen Foster says, sparse forest of small *Cryptomeria* was common on these outer slopes. Now the trees have mostly been removed. There was a shrub layer between the trees. This is now dominant except where it has been clean cut for charcoal.

Oshima

Here it is coming back vigorously.

Feb. 6 - Trail above Nomashi
Arundinaria only at low altitudes.

Hedera sp. common along trail at top of cliff. Woods of *Camellia*, *Cryptomeria*, *Pittosporum*, *Podocarpus*, *Lithocarpus*?, *Pinus*.

Camellia forest of small trees, 5-6 m tall, 10-12 cm diam, smooth, bark gray brown; canopy not dense but practically complete. Little undergrowth except second story of small shrubs - *Ligustrum*, tree seedlings 0.5-0.8 m tall, *Ribes*, *Hydrangea japonica*?, *Corylus*?, and a dense ground cover of *Carex*, *Ardisia*, *Athyrium*, some broad-leaved herbs, *Botrychium* rare.

In ravines more ferns, especially a large *Dryopteris*, other plants except *Carex* less common. *Carex* in flower. *Hedera* common but not forming a great part of ground cover.

The upper band of evergreen scrub around the caldera rim is definitely discontinuous here, interrupted by lobes of deciduous scrub.

Feb. 6 - Caldera floor

The surface of the 1778 lava flow is as described on p. 3, with *Polygonum*, *Carex* and possibly sterile *Miscanthus*. Depressions filled with wind-blown ash, for $\frac{3}{4}$ the way n.e. from the cone to the rim of the caldera.

Then a few very depressed bushes of *Alnus firma*, a few bushes of *Ilex crenata* and a few tufts of fertile *Miscanthus sinensis* appear on hummocks and ridges in the pahoehoe lava. The flats are covered by drifted ash with small scab-like lava protrusions.

Clumps of scrub, principally *Alnus* and *Ilex* become more abundant and larger nearer the rim of the caldera. Here appear dunes of sand-like ash

held by bushes, and ^{ash ridges} parallel to rim.

~~Rims~~ There are in places densely covered by scrub. The slopes of the rim, also, are covered by scrub except where they are of loose drifted ash, blown against the lower part of the cliff.

Feb. 6 - Lowlands bet.

Motomura and Okada. A flat of gray ash soil. Mostly cultivated, cut into a checkerboard pattern of fields separated by hedges of *Arundinaria* and rows of trees - *Pinus cryptomeria*, and some deciduous trees.

Lower slopes and bluffs above Okada Harbor are covered by a mixture of *Arundinaria*, deciduous shrubs, a few evergreen shrubs, *Camellia* and a few conifers.

Feb. 5 - trail above
Nomashie on north
slopes of volcano
in mixed scrub

35677 ~~Cinnamomum~~ Neolitsea sinica (Bl.)
Windy
common

7 78 ~~Cinnamomum~~ Neolitsea sinica
common

3 79 Gleichenia japonica
occasional on steep banks

in predominantly evergreen
scrub

3 80 Rhododendron
occasional

3 81 ~~Fraxinus~~ Weigela kotoensis
common

7 82 Alnus firma
commonest shrub locally

3 83 dominant
Camellia japonica
locally dominant

4 84 Clacagnus
occasional

Feb. 6 - same

1 85 Ardisia humilis
common ground cover

1 86 Botrychium
rare in Camellia forest on ridge

3 87 Eurya japonica
common in mixed scrub.

300 m. (est.)

shrub leaves white
beneath. "kusadami"
leaves white
"kusadami"

2 m. tall

1 m. tall

3 m. tall

cf. flowers
"tubaki" oil
from seeds used
dressing and
one of local specialties
erect shrub.

"gumi"

300 m. depressed shrub; fruit
scarlet.

300 m.

400 m. bush 2 m. tall, buds black.

Oshima

Obada (N)

Motomura (W.)

~~Mabushi~~

nomasui (W)

Mihara Yama
(volcano)

1954

Japan

Feb. 5 - Trail above
Nomasaki on north
slopes of volcano.
in mixed scrub

35677 ~~Cinnamomum~~ Neolitsea sericea (Bl.)
Widy.
common

7 78 ~~Cinnamomum~~ Neolitsea sericea
common

7 79 Gleichenia japonica
occasional on steep banks

in predominantly evergreen
scrub

3 80 Rhododendron
occasional

7 81 ~~Fraxinus~~ Weigela koraiensis
common

7 82 Alnus firma
commonest shrub locally

3 83 dominant
Camellia japonica
locally dominant

4 84 Clatagnus
occasional

Feb. 6 - same

1 85 Ardisia humilis
common ground cover

1 86 Botrychium
rare in Camellia forest on ridge

3 87 Eurya japonica
common in mixed scrub.

300 m. (est.)

shrub, leaves white
beneath. "kusadami"
shrub, leaves white
beneath. "kusadami"
"sajido"

300 m. (est.)

shrub 2 m. tall
"tsuriji"

shrub 2 m. tall

shrub 2-3 m. tall
"yasha"

small tree, flowers
crimson. "~~Tubaki~~" oil
pressed from seeds used
for hair-dressing and
- looking. One of local specialties.
semi-scandent shrub.
"gumi"

300 m. depressed shrub; fruit
scarlet.

300 m.

400 m. bush 2 m. tall, buds black.

1954 Japan

Feb. 3 - Mihara Yama cont.
 on an base of 1700 lava
 flow, quartzes covered by
 loose volcanic ash.

25688

89

90

91

Hyak. 2-shima 2.

550m.

Feb. 13 - near airport,
soil sand soil.

35692

on flat open ground

93 *Morua*

one plant seen in scrub.

94 *Schinus molle*
on bush in scrub.

95 *Digitaria*

rare in open weedy
ground.

96 *Verbena encensis*

locally abundant
in open weedy ground

97 *Portulaca oleraceae* L.
uncommon around
buildings.

98 *Lolium rigidum* L.

occasional along roads

99 *Lobularia maritima*

abundant in open ground

35700 *Pluchea odorata*

common around air strip
and buildings

01 *Coryza bora-boraensis*

abundant in open ground

02 *Bidens pilosa*

common in weedy ground

03 *Medicago lupulina* L.

planted as lawn mowing

04 *Malvastrum coromandelianum*

around buildings 2"

05 *Graphalium purpuraceum*

rare around buildings.

shrub 1.5 m tall, almost
leafless
— taste, very chlorotic.

aromatic, rays
yellow.

flowers white

flowers white, very
— fragrant.

~~up to 2 m tall~~
shrub 2 m tall

up to 1.5 m tall.

flowers yellow

(L.) Fairer

2"

The general vegetation is a scrub of *Scaevola*, *Scaevola* and *Scaevola* on sand. The ground is understorey in places to an *Acacia* forest of *Acacia*. The openings are covered by *Stenotaphrum*, *Lobularia*, *Verbena* etc.

Flora observed.

- a *Casuarina equisetifolia*
- z *Scaevola frutescens*
- la *Verberina encelioides*
- la *Stenotaphrum secundatum*
- la *Cynodon dactylon*
- lc *Euphorbia heterophylla*
- a *Cyperus alternifolius*
- n *Ricinus communis*
- Eriosema sp. (cult.)*
- Musa sp. (cult.)*
- Coccoloba uvifera*
- Terminalia catappa*
- la *Conyza bonariensis*
- c *Pluchea odorata*
- la *Lobularia maritima*
- la *Medicago lupulina (cult. etc.)*
- Euphorbia hirta*
- Eleusine indica*
- lc *Louchus olivaceus*
- Chloris inflata*
- Vitex trifolia*
- Cenchrus echinatus*

- Portulaca oleracea*
- Verberina diffusa*
- Agrostis amabilis*
- o *Lobularia nigra*
- *Digitaria*
- *Morus*
- n *Heliconia tenebrifolia*
- n *Messerschmidia argentea*
- o *Ordeus pilosa*
- lc *Malvastrum coromandelianum*
- *Graptophyllum pumpanum*

1954

California

Feb. 22 Altamont Peak
Hills badly overgrazed,
green but grass very
short, large areas
eaten clean.

Feb. 21-23 - Juniper
Farm - Marion has
plowed up the 4000
acres of the farm, which
has for 3 years been
in pasture. Badly
infested with weevils
grass (*Cynodon dactylon*)
Will raise this up as
burn it. Then sow
the piece and plow it
again. Will plant
watermelons.

The check of alfalfa
just east of this, now
being pastured, seems
to be largely burned a
grass. Marion thinks
alfalfa will be sown
for another year.

Feb. 23 - Kings River
near Hub (S. of Fresno)
River bed sandy, dry
except for large pools.
Salix sp. common along
bank, heavily infested
with *Phoradendron*.

On flat ground nearby
in small spots not
cultivated *Capsella*
bursa-pastoris, *Amsinckia*
sp. and *Plagiobothrys* sp.
are in flower.

Feb. 25 - Santa Ynez Mts.
grade back of Santa
Barbara to La Cumbre
at about 2500' *Ceanothus*
megacarpus, in full
bloom is dominant
in chaparral, with
adenostomum fasciculatum
etc. Higher up this
disappears, is replaced
by *C. crassifolia* and
the chaparral becomes
more mixed. At
La Cumbre, 4000', the
chaparral is made up
of *Arctostaphylos*,
Lithocarpus, *Quercus*
much *Adenostomum*, etc.
A few pines here, some
planted, *P. coulteri*
native but scarce.
Along this crest
the ordinary coastal
woodland trees, such
as *Arbutus*, seem to
be dwarfed.

Aristida sp.

A part of this flat
covered by older woods
of *Quercus* and *Alnus*
with undergrowth
of *Corylus* and *Symphoricarpos*.
The prairie fields
are being invaded by
Malva *sp.*, *Trifolium*
lanceolatum, *Ulmus*
Rhus *Symphoricarpos*
etc.

1950 Virginia

Fairfax Co.

March 25 - Annandale

near Columbia Pike

Annandale

Stand of *Pinus virginiana*
 averaging 4-5 m. about
 20-25 m. tall, cover not
 very dense. Several
 stems of *Cornus florida*
Fagus grandifolia, etc.

Ground layer -

- c *Mitella repens*
- c *Vaccinium vacillans*
- l *Chimaphila maculata*
- o *Smilax glauca*
- o *Goodenia pubescens*
- o *Rubus cuneifolius*
- l *Antennaria plantaginifolia*
- r-o *Polytrichum acrostichoides*
- r-l *Lycopodium complanatum*
- scattered mats of *Polytrichum commune*

April 24 - Williamsburg
 Deciduous woods with
 some pine (L. laeda); open
 beneath with few shrubs,
 rich herbaceous layer
 with abundant
Polystichum acrostichoides.
 Many other species.

- 3570 *Abolonia virginica*
 small colony on
 road embankment.
- 10 08 *Stewartia ovata* (Cav.) Reuth.
 common on edges of
 bluffs along river.
- 10 07 *Valerianella radiata* (L.) Nees
 occasional on road embankment
- 10 09 *Colkwitzia amabilis* Gaertn.
~~from~~ cultivated in greenhouse

- April 25 south of Williamsburg
 10 *Camelina*
 weed in cultivated field.

April 25 - north shore of
 Chickahominy River just
 above confluence with James River

- 10 11 *Krigia*
 weed in open ground
- Apr. 27 Williamsburg
 12 *Emilia*
 cultivated in greenhouse.

leaves purplish green,
 flowers white.

shrub 2 m tall.

flowers white.

leaves fairly firm,
 flowers exceeding
 involucre, whitish with
 deep pink tips.

erect; flowers pale yellow.

flowers orange-yellow;
 leaves pale green, glaucous.

No.

det. F. R. Fosberg

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 Deciduous woods with
 some pine (*P. taeda*); open
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 involucre, whitish with
 deep pink tips.

erect; flowers pale yellow.

flowers orange-yellow;
 leaves pale green, glaucous.

no checked

26

1954 Virginia

labels by JH
24

May 23 - south of Lincolnton
Highway east of Lincolnton, N.C.

Old field with *Solidago*
Rubus, *Fragaria*, grasses, etc.

35713

Oenothera perennis -
small colony

41

Alexandria

27

flowers with calyx
carmine-maroon; petals
bright yellow, tips of
inflorescence pendent.

28

1954

Virginia

June 2 - 4 miles east of
Markham
weedy road cut

- 63714 *Papaver dubium* L.
common along road
- 15 *Plantago aristata* Michx.
common
- 16 *Verbena simplex* Schrad.
common
- 17 *Cyperus*
rare
- 18 *Bromus*
abundant

The poppy is common
for about 15 miles east
of Markham, and
rarely for a mile or
two west of it.

From well east of
Markham to ~~the~~
Front Royal the *Platanus*
occidentalis seems to
be seriously defoliated
only the youngest tips
being still green.

Fauquier Co.

29

erect, flowers scarlet,
stamens black.

erect, flowers blue-lavender.

~~at~~ panicles drooping.

722-10-111
30

1954

Virginia

35719
11

June 12 - Dickey Hill

Papaver dubium L.

rare along weedy roadside

5-120

June 12 - Jeremy Run

Galium mollugo L.

common along open roadside, banks and cuts

Isatis tinctoria common the length of the Northern section, only occasional or local in Central section. apparently two crops - about equal numbers in almost ripe fruit and in flower, none seen intermediate

Shenandoah Nat. Park 31

~~petals~~ petals scarlet, stamens black.

procumbent, many long stems from root crown, forming patches 1-2 m. across.

Robinia becoming more and more abundant along roadside.

not checked
32
labels typed
5/21

1994 Virginia

June 2 - Big Meadows
meadow with abundant
bushes and small trees.

55721 Lycopodium tristachyum
occasional small colonies
5 122 Rhododendron roseum (Vaucl.) Rehd.
single plant in

5 123 Viburnum acerifolium L.
occasional in

5 124 Potentilla simplex
local in low shaded
spots in

5 125 Fragaria virginiana L.
abundant in

11 126 Oenothera fruticosa L. (var. linearis?)
common locally on ^{open} slopes in

Vaccinium stamineum very
common in meadow and
in full bloom.

Kalmia latifolia common
in woods and less so in
meadow, some bushes only
in bud, others in almost
full flower.

Shenandoah Nat. Park 33

rhizome buried except
at tips
- shrub 1.5 m. tall,
flowers rose-purple
with red tube, deliciously
fragrant (like ~~strawberry~~
pinkies).
- shrub 1.3 m. tall; flowers
white, pinkish or purplish

ing, arching,
yellow
argentea
in open,
shade;
icy, ashen
its
it yellow,
day.

adows to
the slopes
a young
ula populifolia
is the gap

is a fine grove of hemlock
with a thick layer of
needles and twigs with
little herbaceous growth.
In ant-hills, large ones several
feet across, Poa compressa comes in first.

PLANTS OF VIRGINIA

SHENANDOAH NATIONAL PARK

BLUE RIDGE MOUNTAINS

Loc. BIG MEADOWS

(4 mi. s. e. of Marksville,)

MADISON Co.

Habitat extensive meadow,
with scattered bushes and trees

Date / /19

Coll. F. R. Fosberg

Alt. m.

No.

Det.

Remarks

labels by flk
HK

June 12 - Big Meadows
meadow with abundant
bushes and small trees

55721 *Lycopodium tristachyum*
occasional small colonies
5 122 *Rhododendron roseum* (Loisel.) Rehd.
single plant in

6 123 *Viburnum acerifolium* L.
occasional in

6 124 *Potentilla simplex*
local in low shaded
spots in

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in woods and less so in
meadow, some bushes only
in bud, others in almost
full flower.

rhizome buried except
- at top
- shrub 1.5 m. tall,
flowers rose-purple
with red tube, deliciously
fragrant (like ~~strawberry~~
pinkies).
- shrub 1.3 m. tall; flowers
white, pinkish or purplish
- without.
- stems ascending, arching,
petals bright yellow
- slightly emarginate.
- small plants in open,
larger ones in shade;
fruit ^{broadly ovoid} red, juicy, achenes
- sunken in pits
flowers bright yellow,
open during day.

From Big Meadows to
Fisher Gap the slopes
are covered by a young
growth of *Betula populifolia*.
Just before Fisher Gap
is a fine grove of hemlock
with a thick layer of
needles and twigs with
little herbaceous growth.
In ant-hills, large ones several
feet across, *Poa compressa* common in fruit.

34
label 11/11

1954 Virginia

June 13 - Franklin Cliffs
dry rocks and weedy
places.

- 35777 *Lepidium campestre* (L.) R. Br.
rare, weedy ~~plac~~ parking overlook
- 4 31 28 *Bromus testorum* L.
locally common in weedy
spot around parking
overlook
- 4 129 *Bromus ~~trialis~~ japonicus* Thunb.
locally common in
weedy places around parking
overlook
- 1 1 30 *Silene caroliniana* var.
penaylvania (Mx.) Ten.
in shaded rock crevices
- 3 31 31 *Rumex crispus* L.
steep weedy rocky road
embankment

June 13 - Fisher Gap
grassy roadside

- 3 31 32 *Poa*
dominant near road
- 5 41 33 ~~*Sorghastrum nutans*~~ (L.) Nash
abundant locally along
~~the~~ Skyline Drive
- 3 31 34 *Festuca*
common
- 2 31 35 *Dactylis glomerata* L.
occasional
- 2 41 36 *Festuca*
common

erect, petals white.

erect, spikelets drooping,
purple h.

(Hort.) Ten. erect; spikelets green,
only slightly compressed.

flower pale pink.

erect, leaves strongly
crisp.

caespitose

⁷⁴⁰ *Calamagrostis*
caespitose, erect.

caespitose

erect.

erect.

June 13 - Appalachian trail
south of Fisher Gap,
wooded west slopes

35737 *Dryopteris disjuncta*
2 34 very rocky ground in
deciduous forest.

1 138 *Orobanchis uniflora*
rare, edge of trail.

2 139 *Pyrospodium complanatum*
sporings on thin
wooded slope

6 140 *Viola canadensis* L.
abundant in Tunga grove
in deep shade.

plant bronzy white,
flowers lavender
with lower side of tube yellow.
prostrate, rhizome
not deeply buried.

erect, flowers
white tinged with
purple, becoming
purple ~~in~~ in age.

June 26 - The area around Montreal is intensively cultivated, with rather little woods of any kind. The feature most impressive is the greenness. This is such as to indicate a very wet climate, at least at this season.

England (from air)

June 27 - The coast of Cornwall, from the air, seems not to have any chalk cliffs. What rocks there are are dark, and the sand is brown. The country is intensively cultivated with the fields separated by hedgerows of bushes and low trees with fairly numerous taller trees scattered along them.

The fields are largely green, but a green showing the ground through it in many cases. Many fields plowed.

June 27 - Normandy is intensively cultivated, with but a few small patches of woods. The fields are small and separated by hedgerows in which tall trees are not so conspicuous as those in Cornwall. The fields are in about the same condition of greenness and cultivation as in Cornwall. Trees are planted sparsely in many of the fields but not as closely as in an ordinary orchard. Cultivation between them.

Nearer to Paris, to n.w. of Paris, the hedges disappear. The fields are separable principally by the pattern of cultivation, stages of development of crops, and different crops (grain, beets, mustard, etc.). Fields larger. Houses almost entirely grouped in villages. Patches of forest larger and more numerous, becoming ~~more~~ denser nearer Paris.

July 4 - Forêt de Fontainebleau -

Near Roche Eponge, 1-1.5 km. n.e. of Fontainebleau

Pine forest on sandstone hills, rather open with some heather on sandstone outcrops.

Soil sandy but with a definite peaty layer.

3 35741

Amelanchier vulgaris Moench

In crevices on sandstone boulders.

42

Erica cinerea L.

Abundant ^{relatively} in open rocky places.

Hill tops with outcroppings of sandstone weathered with angles weathered off into rounded shapes with soil between them of white sand covered with brown moss mixed with sand. Mossy carpet where not too much trampled, patches of heather general with scattered shrubs of *Juniper*, young *Quercus robur*, *Castanea*, etc. some tufts of *Deschampsia flexuosa*; the rocks with abundant foliose lichens & hypnoid mosses, some tufted grimmoid mosses, the whole covered by an open woodland of several species of pine and *Quercus robur* with scattered chestnuts.

Flat sandstone uplands with abundant outcroppings have some *Pteridium aquilinum*, *Lonicera* sp., scattered young birches, some other grasses, *Crataegus* and other shrubs and with the heather largely *Calluna* - *Polypodium vulgare* on the rocks with *Thuidium* and other mosses.

2

43

Polypodium vulgare L.

Common locally on mossy sandstone boulders.

Slender straggling shrub, 1-2 m. long, ripe fruit dark blue.
Low shrub, 2-4 dm. tall, flowers magenta.

Rhizome bitter.

- 35744 2 *Tilia sylvestris* Desff.
On sandstone outcropping
- 3 1 45 *Ruscus aculeatus* L.
Open beech and pine forest on sandy soil
Isolated plant in shade
- 2 2 46 ~~Broom~~ *Brachypodium pinnatum* Beauv.
Erect small loose clumps. Occasional Moench.
- 1 1 47 *Vincetoxicum officinale* Moench.
Rare in open place
- 2 2 48
Common in open place.
- 2 2 49 *Melica nutans* L.
occasional in open place
- 1 1 50 *Ilex aquifolium* L.
Rare in patch of pine
- 3 3 51 *Melampyrum pratense* L.
In open oak forest, common.
n.n.e. of
3 km ~~from~~ Fontainebleau, s. of Tour
Oenecourt
- 2 2 52 *Galium sylvestris* Poll.
Roadside banks in mixed pine-oak forest.
- 1 1 53 *Coronilla varia* L.
Roadside banks in mixed pine-oak forest
- 1 1 54 *Tenacium chamaedrys* L.
Roadside banks in mixed pine-oak forest
- 2 2 55 *Neottia nidus-avis* Rich.
In pine young beech forest

Tree 10 m. tall.

Dwarf shrub 3 dm. tall, several stems
- from underground base.

Erect; flowers pale greenish-yellow.

Erect, tufted.

Dense tufts.

Small tree 3 m tall, fruit immature.

Flowers yellow, lip brighter yellow.

Flowers white

Flowers purple-pink

Flowers rose-pink

Plants brownish.

July 9 - 2-4 km. n. of
Fontainebleau, vicinity
of le Gros Fontaineau natural
history reserve, in the
Bois de Fontainebleau.

A low plateau of fine
gray to gray-brown calcareous
soil, with a very few
scattered limestone rocks,
surrounded by escarpments,
low on the south side, higher
on the north, rimmed
by sandstone boulders
and outcroppings. General
level of the plateau 141-144 m.,
height of scarp 40-50 m.,
but not very abrupt.

The plateau surface
covered by a fine forest
of oak and beech, mixed,
trees up to 20 or more m.
tall, and with trees up
to well over 1 m. diam. The
proportions of oak and
beech vary locally from
almost all one to almost
all of the other. This forest
is generally rather open
beneath, but with
uneven undergrowth
of *Ilex aquifolium* and
beech ~~saplings~~ saplings,
1-2(-3) m. high, forming
low thickets, alternating

with patches of *Ruscus*,
patches of bracken, ^{of *Rubus*} and
a more or less connected
matrix of grass of
several kinds, especially
what appears to be a
Festuca and of *Hedera helix*,
which also tends to climb
the trees. *Juniperus* is very
occasional, also *Corbus latifolia*.

On the escarpments most
of the oak drops out
immediately, and locally
heather appears. The general
vegetation on the escarpment
is beech forest with some
pine, some birch (*Betula*), and
undergrowth of *Ilex* and
Pteridium and some *Juniperus*
and *Corbus latifolia*.

Pinus sylvestris tends to
invade openings, or rather,
Betula occupies them first
and *Pinus* invades shortly
thereafter. The pine is removed
in the reserve, as it is an
introduced species. *Pteridium*
is in large patches, either
in the open or in the shade,
seemingly irrespective
of the kind of soil. ~~As~~
~~sandy areas~~

July 9 - Fontainebleau Forest
between Vallee de La Folle
and Barbizon - general
information furnished
by forestry engineer in
charge of area, M. Duron.

On sandy areas the
succession is generally
Betula (open) → *Pinus sylvestris*
→ *Fagus sylvatica* (with
some *Quercus pubescens*).
The beech is especially
favoured on bare sandstone.
Pinus laricina is often
grafted on *P. sylvestris*
stock, forming a large
tree but not regenerating
from seed here. Seeds are
produced but no seedlings,
(whether from lack of
germination or lack of
survival not clear),
failure suggested to be due
to highly siliceous soil.

Pine was introduced
here in 1780. It presents
a great fire hazard (fires
started principally by careless
tourists) and much of the
pine forest has been replaced
by beech and oak in the
last 100 years.

Of the oaks, *Q. robur* is
principal species on
calcareous soils. *Q. robur*
and *Q. petraea* are grown
on siliceous soils and
from a forestry standpoint
are considered, with their
hybrids, as identical.

These forests, except
in the natural history
and artistic reserves,
are very carefully managed.
The cycle of management
in oak forests is now
180 years and is to be
increased to at least 200
years, the trees reaching
55-60 cm. diam. In the
beech forest it is 120 years
with the trees reaching
45-50 cm. diam. For pine
it is 100 years, with the
trees reaching 45 cm. diam.
This is considered too long
and will be reduced to 90 or
even 80 years, which is
more normal for pine.
Beech is actually planted
under pine when latter is
30-40 years old.

A large open area present for some distance along road is ascribed to large fires set by the Germans in 1945. Large parts of this are covered by a scrub of *Cytisus scoparius* and oak and beech seedlings, with scattered small birch trees and a few small oaks. The pine will grow up fastest and form a forest. On better soils this will be replaced by hardwoods, but on very rocky sandstone terrain pine will be continued.

In 1720 there is said to have been an immense fire, set by people smoking out bees to get honey. The area has been repeatedly

July 9 - Mare aux Couleuvres,
Forêt de Fontainebleau, about 5 km.
n.w. of Fontainebleau

irregular surface of exposed sandstone with little soil, vegetation irregularly open.

35756

Quercus pubescens
locally common

burned over since, especially in 1945

The area around Mare aux Couleuvres is an irregular surface of sandstone with soil only in the depressions, which frequently have no outlets and are flooded after rains and water stands till it dries up. There is a general cover of *Erica cinerea* and *Calluna vulgaris* except on bare tops of rocks and in desiccated pools. Small birches dominate the landscape, with some small *Quercus pubescens*, *Sedum album*, *Sedum* sp. (yellow fl.) *Hypericum perforatum* and many other species, some of them rare and local in this region, are found here. *Pteridium* is abundant, *Populus tremula* locally common. Most of larger *Betula* have bases of trunks rough, thus probably belonging to *B. verrucosa* series.

small tree about 8 m. tall.

- 95757 *Quercus pubescens*
locally common
- 58 *Agrostis alba* L. ?
common in desiccating pools.
- 59 *Hypericum humifusum* L.
common in desiccating pools
- 60 *Fumana vulgaris* Spach.
- 61 *Cornus sanguinea* L.
rare
- 62 *Ranunculus flammula* var. ?
local in desiccating pools

small tree about 8 m. tall,
10-12 cm. diam. acorns
from ground beneath.

fruit red.

flowers yellow.
shrub 1 m. tall, ~~sp~~ cymes
reddish, fruit green.
decumbent, flowers
bright yellow.

July 12 - along Rt. Nat. 7
n.w. of Fontainebleau Forest

This area has large
grain fields - wheat
oats, barley, rape (?) -
varying from almost
ripe to actually being
harvested.

July 12 - between Fontainebleau
and Montargis along
Rt. Nat. 7.

Generally small fields,
and patches of woods;
rows of trees, esp. *Populus*.
thickets of *Crataegus*,
Ligustrum, *Robinia* (young),
etc. some hedge rows.

Viscum album seen
parasitizing *Populus*
and *Robinia*.

Miscellaneous cult-
ivation - grain, alfalfa,
beets, potatoes, vegetables,
even maize, on rolling
ground of chalk with
chert or flint nodules.
Fruit trees are scattered
in some fields.

Some west-facing chalk
slopes covered by close
scrub of *Juniperus*

communis. Some pine
and oaks also on chalk.
Slopes of these west
slopes are grassy.

Robinia tends to
line roads.

A few very small
vineyards here.

July 14 Fontainebleau
weedy ground

35763 *Galium sylvestre* Poll.
shaded spots

64 *Senecio jacobaea*^a L.
common in sunny places

65 *Erigeron annuus*
abundant in sun and shade

July 14 1 km. n.e. Fontainebleau
in Forêt de Fontainebleau 100-140 m. (map)
roadside in rather
open mixed forest of oak and pine.

66 *Teucrium scordonia* L.
common generally

67 *Carex glauca* Mur.?
local

68 *Quercus* ~~robur~~ *robur* L.
very common

69 *Myrsotis* ~~sp~~ *silvatica* Hoffm.
rare, between sandstone
rocks

70 *Euonymus europaeus* L.
rare in undergrowth

71 *Clematis vitalba* L.
occasional

72 *Rubus saxatilis* L.
common in open woods
on flat rocky ground.

procumbent; flowers
- white.
erect from ~~erect~~ slender
subterranean rhizomes,
stems and under sides
of leaves purplish; flowers
- deep yellow.
erect, rays white to
pale lavender, disk greenish yellow.

flowers pale ~~to~~ yellowish
- odor strong. rhizome buried.
- loose colony, rhizome
- buried. fruits dull yellowish.
tree about 20 cm. diam.,
- 10 m. tall.
flowers pale blue

vine, extensively
climbing in trees; flowers
- cream-white.
forming low tangles up
to 7-8 dm. tall; flowers
pale pink.

Above the city to the north east, between some ~~east~~ Roche Epange and Croix de Calvaine, the sandstone plateau is covered by a rather open and rather low forest of oak and pine, with some ~~sub~~ shrubs, patches of heather, large fine sandstone boulders, and locally a thick layer of peat on the ground. All oaks examined seemed closest to *Q. robur* L. (*Q. ped.*) but are probably hybrids with *Q. petraea*, as they have rather short peduncles. Leaf form is variable. The leaves are badly eaten by caterpillars which roll leaves up into a tube about the size of a cigaret in which they live. Ants pasture very large dark brown aphids on the twigs.

Locally large patches of *Pteridium* cover the ground under the oaks and pines.

July 17 - Bet. Nemours and Souppes sur Loing
General landscape is dominated by trees in rows and patches, ^{steeper} slopes wooded, poplars on flats, fruit trees around houses.

More or less the same bet. Souppes and Montargis. Robinia very common along the roads, in edges of woods, etc.

South of Montargis the landscape becomes more open, dominated by grain, beet, alfalfa fields, etc., more level or gently rolling. Farther on, near Nogent sur Vernisson, trees become dominant again. Two methods of forest management to be seen here - clear cutting and leaving seed trees some yards apart.

South of Nogent heather and birch appear for a short distance. Said to extend commonly as far west as Orleans. Castanea is common here, flowering very heavily, a few dead trees seen, perhaps first inroads of blight.

Just north of Briare is a large forest, mostly rather open. South of Briare vineyards become common, also some poppy fields ~~light orange~~ flowered raised for oil.

The Loire River, between Briare and Nevers, is broad and has a conspicuously braided channel full of sand bars and flats, running through a broad flood plain with the higher land at its sides dissected into low rolling hills. The part of the flood plain nearest the river, especially on the west side, is occupied by a low irregular very thick brushy forest, principally of Salix and Populus, the latter making emergent trees from the general low story of willows and young populus. Sand bars of different ages are covered by brush of different sizes. Those nearest the main channel are mostly bare.

The rest of the flood plain is a mixture of cultivated land and marsh with scattered trees,

mostly Populus. Viscum very noticeable on the Populus.

The fields in this plain and on the low hills on the east side are separated by hedgerows in which a Prunus is common, also various trees. Roads lined by rows of Platanus, Populus etc. Fields very colorful with Papaver, Hypericum, Centaurea, cornilla, Ononis, etc. Vineyards very common on low hills at edge of flood plain. A special dry white wine made at Bouilly. The braided bed of the river very wide at La Charité appearing as much as 1 km.

Above this, in the vicinity of Trosanges, and south in valley of R. Allier, to St. Pierre there are grain fields, pastures and some woodlots. The fields are separated by hedgerows. Much hay produced here.

South of St. Pierre is more or less the same the terrain gently rolling. Approaching Moulins hedges become a little less common.

July 18 - Between Moulins and Chatel de Nevre hedges are really the rule. Mostly of Crataegus. South of Chatel de N. they

1954 France

become scarce. Vineyards
are abundant.

July 12 - Clermont-Ferrand.
Puy de Dome is a volcanic
remnant or cone 1465 m. high.
It is mainly of a light
gray rather hard rock, said to
be extruded; at least no signs
of a crater at top, though
other cones in neighborhood
have well-marked craters.

On gentler slopes just
below steep part of mountain
there is a thin vegetation of
grasses, Lotus, Galium verum,
etc. with shrubs and
patches of Cytisus, Calluna,
etc. In places Cytisus is almost
continuous. Small forests of
Betula, a few Quercus. Small
plantation of young Pinus
sylvestris and Picea on east
side at perhaps 690 m. In
openings Calluna, Digitalis
purpurea, Pteridium, Achillea,
Achillea, Galium mollugo,
Rubus, Centaurea, etc.

Pteridium is dominant over large areas.
At about 1050 m. ^{and above} Corylus is
locally dominant in
openings and in spruce forests,
here only near opening, and road.
Scabiosa, Brachypodium,

Puy de Dome

Valeriana seen along road
at 1100 m. and up to
1200 or 1250 m. ~~in~~
south side is a well
developed spruce forest
with ~~at~~ some Betula
at 1160 m. some Fagus. In
openings Myosotis, Anemone,
Epilobium, Trifolium pratense,
T. repens. In the well-grown
spruce forest, about 1160 m. there
is only a poorly developed
herbaceous layer - some Galium,
Geranium robertianum, etc.
Mostly a moss covers only
ground. At upper altitudes
around toward west side this
forest is partly dead - from exposure
to wind? It is lacking on west
and north sides. Above it and on
sides where it is lacking is ~~generally~~
a meadow, colorful with flowers -
Cytisus, Galium, Alchemilla, Stellaria, Viola,
Achillea, Vicia, Polygonum bistortum, Phytolacca,
Geranium, Silene, Ranunculus, etc. On
west slope this is invaded by a
broad-leaved forb (lvs. white beneath)
forming scattered shrubs (m. tall).
On rock outcrops a mat
of Cytisus and Calluna
covers the peaty ground
between the rocks.

L

July 8 - south of Clermont
 Ferrand, over the forest
 ridge there is some open
 forest, then open country
 on a gritty soil either of
 decomposed granite or a
 lapillate volcanic material.
 Here are grasses, cytisus,
 a few small junipers,
 small patches of heather,
 scattered pines and
 birches. South of this
 are meadows, hedges, patches
 of thicket, birch woods,
 coniferous woods, etc.

On lava flow, called
 Cheire d'Aydat, there ~~is~~ are
 Calluna, various grasses,
 Silene, Dianthus and various
 other flowering herbs, *Paronychia*,
~~scattered~~ cytisus, *Genista*
alata, scattered junipers,
Corylus, planted pines
 and pines. This flow
 is said to be upper quaternary.
 This flow dams the Veyre R.
 forming Lake d'Aydat.

South of the lake on the
 slopes are fir forests, then an
 irregular rolling upland
 with meadows, patches
 of cytisus, ~~head~~ hedgerows
 with *Sambucus* conspicuously
 in flower - these hedgerows

mostly just pieces,
 not enclosing anything.
 The meadows have
 many flowers out now.
 They are both mowed
 and pastured; some
 grain is grown, not yet
 nearly mature; some
 coniferous plantations; both
 sheep and cattle are pastured
 here. This surface
 seems largely made up
 of old basalt flows (tertiary,
 miocene?). Where a
 broken off section of one
 of these shows it is
 conspicuously columnar
 but the columns are badly
 shattered. This is true across
 the valley from Murols, where
 such a section was examined
 and rock asplenium collected.

To the south some snow
 patches still persist
 on the mountain slopes.

At Murols there is pine
 forest and beech forest in
 the canyon. The pines are,
 some of them, very short needled
 may be *P. cembra*. Up the canyon
 of the *Course de Chambon* from
 Murols is Lac Chambon (377m).
 Here is a locality for beds
 of "cinerite" and "diatomite" (see p. 80)

July 13 - La Cassiere, 11 km.
s.s.e. Clermont-Ferrand.

35773 *Rhinanthus hirsutus* Lam. ^{in allecto, albellus, bellus}
slipping meadow
very common

1 74 *Luzula*

1 75 *Brija media* L.
occasional

2 76 *Scabiosa*
common

2 77 *Genista alata*
common

2 78 *argophyt.*
common

2 79 *Campanula*
occasional

2 80 *Myosotis*
occasional

July 13 - Cheire d'Aydat,
13 km. s.w. of Clermont-Ferrand
on rough lava-flow
with pines, ^{junipers} and other
~~conifers~~ conifers.

1 81 *Veronica officinalis* L.
occasional

2 82 *Helianthemum*
common

2 83 *Jasione*
occasional

1 84 *Asperula cynanchica* L.
common

1 85 *Melampyrum*

825 m.

corollas bright yellow,
bracts pale green.

flowers bright ^{red} purple

flowers bright yellow.

flowers white.

flowers violet-blue

fls. deep lavender.

flowers bright yellow.

blue-lavender

flowers pinkish

bracts maroon, flowers
~~red~~ red with yellow lip.

- 35786 *Dianthus*
occasional
- 2 87 *Galium*
common
- 1 88 *Paronychia*
occasional
- 1 89 *Cystopteris fragilis*
uncommon
- 1 90 *Campanula*
occasional
- 1 91 *Valeriana officinalis* v.
common
- 1 92 *Filene*
occasional

July 18 - north of Murole
22 km. s.s.w. - crevices - found
in crevices of old
shattered basalt flow

- 2 93 *Asplenium trichomanes* L.
common
- 2 94 *Asplenium germanicum* Weins.
common
- 2 95 *Asplenium ruta-muraria* L.
common
- 1 96 *Gnaphalium*
occasional
- 2 97 *Helleborus foetidus* L.
common at foot of cliffs

- flowers ~~deep red~~
- bright crimson - pink
flowers white
- flowers whitish.
- flowers ~~testish~~
- violet-blue
flowers pinkish white
- fls. white.

900 m

erect.

1954

France

July 19 - Bessolles

meadow low on basaltic soil

35798 Viola

very common

~~99 Viola~~

occasional

1 99 Viola

occasional

35800 Malva

common

same

on steep road cut

1 01 Digitalis lutea

common

July 19 - east side of Lac Pavin

2 02 Ordis

scattered in woods and meadows, uncommon

2 03 Arnica

occasional in meadow, with some heather

1 04 Galium

in meadow with heather

1 05 Neottia nidus-avis

rare in mixed woods, mainly beech.

3 06 Anemone

common in sloping meadow

1000 m. ±

flowers very dark purple with yellow spot on lower petal.

- flowers dark purple with lower petal pale, marked with dark.

- flowers rose-purple.

flowers pale yellow.

1275 m.

root - fleshy; petals greenish, sepals white, spur green.

flowers orange-yellow.

flowers white.

flowers dull light brown.

flowers whitish, marked inside with green, outside with purple.

- 35807 *Ranunculus*
common in meadow
- 08 *Vaccinium myrtillus*
common in meadows
with heather (also in
forest)

29

July 19 - slopes of Puy de Montchal
above Lac Pavin.

- 09 ~~*Aspidistra*~~ *Ajuga genevensis*!
common in *Picea* forest
- 10 *Anemone*
occasional in *Picea* forest
- 11 *Maianthemum bifolium* (L.) Schum.
common in dense ^{*Picea*} forest
- 12 *Lamium galiiobdolon*
occasional in forest

July 19 - west side of
Lac Pavin
in beech forest

- 13 *Dryopteris pteris*
on rocks above trail
- 14 *Dryopteris linneana*
common on steep slopes
and rocky places.
- 15 *Geranium*
common on steep slopes
- 16 *Lychnis floz-fovis*
common along trail
- 17 *Luzula*
common on steep rocky slopes
- 18 *Epilobium montanum*
common along trail

flowers deep yellow

low patches; fruits
immature.

flowers blue

flowers clear white.

flowers white.

flowers yellow,
~~the~~ lower lip marked
with red-brown.

1200-1220 m.

rhizome shallowly buried
creeping, fronds light green.

flowers deep magenta

flowers crimson

small tufts

flowers rose.

- 35819 *Lysimachia nemorosum*
common along trail
- 20 *Phyteuma spicatum* L.
common on lower slopes
above lake

see 35824 at 74

July 19 - top of Puy de Montchal,
south of Lac Pavin,
open heath with *Juniperus*,
Vaccinium and *Calluna*

- 21 *Polygonatum verticillatum*
common locally
- 22 *Vaccinium uliginosum*
common locally
- 1 23 *Stellaria palustris*
occasional
- 1 24 *Paris quadrifolia*
rare along trail
- 2 25 *Galium*
common

July 19 - just below Lac Pavin
~~road~~ ^{open} inverted ravine
road bank

- 1 26 *Linaria striatula*
road bank
- 1 27 *Orchis conopsea* L.
rare in moist spot
- 1 28 *Orchis maculata* (?)
occasional, moist spots

prostrate, flowers
yellow
- root thickened, sap
milky; flowers white.

1411 m.

erect, ~~roots~~ rhizome
deeply buried among
- roots of shrubs.
forming ^{low} patches; leaves
- bluish green.
flowers white

roots ^{and rhizome} yellow; flowers
white.

1190 m.

flowers mauve with
darker stripes, palate
- yellow.
flowers crimson

leaves spotted with
bronze; flowers lavender
with deep purple spots.

July 19 - bog, km. n.e.
of Lac Chauvet
open bog with deep
peat, ~~standing~~ ^{moving} water
in lowest spots

- 35029 *Polygala*
slope above wet part of bog
- 2 30 *Polygonum bistortum*
common in wet peat
- 3 31 ~~*Eriophorum*~~ *Eriophorum*
common in wet peat
- 2 32 *Salix laricina?*
occasional in wet place
- 2 33 *Potentilla (complanata) palustris*
colony in flowing water
- 2 34 *Carex?*
common
- 3 35 *Galium constrictum*
common

wooded bog

- 1 36 *Orchis maculata*
common in open places
- 1 37 *Galium*
com. in open places
- 1 38 *Polygala amara?*
rare on peaty slope above
bog.
- 3 39 *Euphrasia*
local on peaty slope
above bog
- 3 40 ~~in wet peat~~ *Pedicularis*
in wet peat

flowers bright deep purple.

erect, flowers pink

shrub 1 m. tall.

flowers maroon

densely caespitose

flowers white.

leaves spotted with brown,
flowers lavender, marked with purple.
- flowers white.

flowers blue

flowers white, red
with black inside; palata
- yellow.
- flowers crimson.

July 19 - valley between
Roches Trillieres and Roche de la Vierge
above Rochefort-Montagne

33941

Pyrola media

steep bank above road

42

Cuzcuba

steep bank above road

43

Stellaria

rare on roadside bank

44

*Polygala*roadside bank, broken
rocks.

July 19 - Zannat Dept. Allier

45

Onobrychis vicifolia Scop.
cultivated for forage

July 20 - Forêt de Bagnolet

46

Galium palustre L.
roadside ditch

north end of Forêt de Bagnolet

47

Centaurium

rare in edge of marsh

flowers light green;
flowers white, not
- second.

caespitose, flowers
- white.

flowers white.

flowers bright blue.

flowers rose-purple

flowers bright pink.

of dated as at the base of the lower pliocene. The diatomite, especially, contains impressions of leaves and fruits, of which some were collected. *Fagus* is most common. The

outcrop has been almost completely destroyed to make a parking lot. (for references to this see Boulay, Bull. Soc. Geol. Fr. 21: 97, 1893; Boulay,

Flora pliocene du Mt. Dore, 1-116, Paris; de la Vaux, R., + Marty, P.

Nouvelles recherches sur la flore fossile des environs de Varennes (Puy de Dôme), Rev.

Gen. Bot. 32: 289, 1920; Jung, J., Geologie de l'Auvergne, 1-372, Paris, 1946 - here, p. 200, mentions

40 sp. plants and 50 insects, from which the beds are dated as base of lower pliocene above the La Barboule level, same level as the pumiceous alluvium of Fenestre. Very detailed geological map of region in 1/80,000 geological map of France (Clermont (166) and Brioude (175) sheets).

(Material sent to Washington via diplomatic pouch, courtesy of office of agr. att. at Paris Embassy, Dr. Hermann.)

Region between La Chambon and Bessalles - slopes wooded, valley flats cultivated. *Sambucus* very common and conspicuous in flower. Woods are mainly pine, some *Fraxinus excelsa*.

The pines may be *P. sylvestris*, though the leaves vary much in length and some may be *P. combris*, etc.

Uplands around Bessalles are of same shattered basalt as on other side of mounds. Pastured, some areas covered by *Pteridium* and *Cytisus*.

Fraxinus is common in hedgerows. More or less the same to Besse en Chaudesne.

(1050 m. Besse) Here there is a biological laboratory headed by M. Olivier - part of Université de Clermont.

The whole region is an exceedingly intricate complex of extrusives - basalt flows, basaltic tuffs, andesites, of Miocene to late quaternary age, lying on a basement of older crystalline rocks.

There is a flora -

Herbaud-Joseph

Flora d'Auvergne, ed. 9
1-638, Paris, Tours, Clermont-Ferrand,

1915.

Southwest of Besse, along the Couze de Pavin is pasture with patches of beech forest in U shaped valleys with rounded hills.

Lac Pavin is a beautiful little crater lake, 90 m. deep, water deep green, surrounded by steep crater wall wooded by forest of *Fagus*, with on n.e. side, at least, some *Salix* and some conifers, esp. pine. Sparse herbaceous undergrowth on ~~the~~ slopes where forest is thick, more varied and luxuriant where there are rocky places or openings.

Outer slope is pasture with prostrate *Juniperus* and many flowers. *Calluna* comes in in overgrazed spots, apparently.

On south side of lake, on slopes of Puy de Montchal, is spruce (*Picea*) forest of trees about 30 m. tall, trees about 3-4 ~~dm~~ dm. diam. 3-5 m. apart, lichen-covered, incompletely self-pruned - the branches dead and broken but still persistent. There is a thin herbaceous ground cover of scattered *Maidantheum*

Trifolium and *Pisacium* sp. with a carpet of mosses.

Puy de Montchal itself, 1411 m. high, is a rounded peak mostly covered by spruce and beech forest, some larch, fir, etc.

mixed in, the openings either meadows with flowers and grass or heaths with prostrate *Juniperus*, *Vaccinium*, *Calluna*, *Rubus*, and many flowering herbs.

e.g. *Potentilla tormentilla*
Galium

Gentiana lutea

Narcissus

Lactuca (?) (blue)

Rumex

Polygonatum verticillatum

several umbellifers, etc.

The peak itself is covered on top by such a heath.

The heath is thick. ^{of the lake}

On the west side the beech forest is magnificent with large trees, many ferns and shade-loving herbs, etc.

1197 m.

bet. Lac Pavin and Lac Chauvet are rolling high meadows boggy in places, with compact patches and clumps of beech forest, low patches of juniper - and Corylus. *Gemista alata* abundant in meadows. *Erigeron* forming white patches in low spots, *Gentiana lutea* conspicuous with deep yellow flowers forms large colonies.

Bogs near Lac Chauvet with deep peat, *Calluna* abundant, sedge incl. *Erigeron*. Some peat has been dug out locally. Standing and gently running water in lowest places.

West of Lake Chauvet the rolling meadowland is extremely rich in flowers. Basalt outcrops have *Pteridium*, broom, etc. Knobs of columnar basalt, patches of woods and brush esp. along streams, some scattered trees.

Above Labouaboule and to Mont Dore are rather extensive spruce forests

with patches of meadow. North of Mont Dore are fir forests. Beyond this are three large rocks of columnar Trachyte-phonolite, columns slender, surrounded by beech forest. Valley bet. Roche Trilliere and Roche Sanaoie is glaciated. From there through Rochefort-Montagne the road rapidly descends out of the high plateau.

In the valley are meadows and broken patches of beech woods.

July 20 Forêt de Bagnol
n. of Moulins

Parts examined are
young forest

One place mainly
oak, some beech, trees
5-10 cm thick, perhaps
10 m tall, 1-2 m apart.

There are ~~also~~ a few
Populus tremula.

Thin undergrowth of
tree seedlings ~~are~~ here
and there, local thickets
of a *Rubus* with narrow
~~leaves~~ prickles, not dense, though.

Patches of *Pteridium*,
spots of *Polytrichum*
and other mosses.

Tufts of sterile *Deschampsia*,
a little *Hedera*, *Convallaria*
common locally, scattered
Viola mercurialis,

Lonicera. Mainly a
layer of dry leaves.

Some fleshy fungi,
mostly *Lactaria*.

Another place -
forest about same size,
predominantly beech.

More *Hedera* but otherwise
much less herbaceous
ground cover. Very little
Deschampsia, some
Polytrichum.

North of this forest
is a marshy
area ~~to~~ along a
small streamlet.
Some *Sphagnum*.
Badly grazed. *Samolus*
regalis fairly common.
Rubus thicket, very
hard to penetrate.
Possible to walk in
marsh now, as
there has been dry
weather for a time.
Very little standing
water.

July 25 - out of Paris to south - generally partly wooded, especially on slopes, partly cultivated. To north and south of Thionville and Mondeville are vast open fields, mostly of grain being harvested. Some sugar beets.

A very few rows of trees and patches of woods.

At Angerville trees become somewhat more evident but still the landscape is one of open wheat fields. Some alfalfa and beets.

More common toward Tournay and southward, but still dominantly grain fields.

Around Chevilly the landscape becomes largely wooded but the woods are rather scrubby - young second growth with scattered seed trees. Still some large open fields ground level. At

Laran are plantations of *Pinus sylvestris*. Little or no wheat here to Orleans. Openings pastured, a weed, or orchards.

edges of forest
of Orleans

Just S. of Orleans the first few vineyard. Miscellaneous cultivation and some woods. Roadside and banks and waste spot covered by young Robinia, forming thickets. South a little way forest becomes more general, some heather. Mostly oak, but birch common. Forest mostly scrubby, patches of *Cytisus* and of pines common. Some ponds, some areas of open fields. Southward some patches of very good looking forest. also much that is mixed and irregular. Soil light gray. Pines more and more abundant, also birches and heather. Ponds and marshes more common, with *Nymphaea* and *Typha*, *Scirpus lacustris*. Large patches of *Pteridium*, esp around Vouzon. South of this, *Castanea* appears in considerable numbers. South of this broken woods but S. S. lined with thickets of Robinia. to Lamotte-Beuvron and southward. More pine

birch and heather. Pale gray soil continues. Nouen ~~et~~ le Fuselier - fields separated by hedgerows and woodlots. Pines, oaks, birch, etc. Some rows of poplar, very noticeably infected with Viscum. Birch seems generally an early stage. Pines where dominant have open heather beneath them. Some open heaths. Large uneven stands of birch esp. near Lalbis. Some birch wood piled up to fact. More or less similar landscape southward, heather more abundant, to Thiellay. South of here somewhat more cultivation. Fields separated by hedgerows.

Forêt de Vierzon - tall oaks, some areas of scrubby birch woods.

South of Vierzon considerable cultivation, fields sometimes separated by hedgerows, some forest. Generally much more fertile appearance. Some vineyards. Willows prominent, also poplars in flat bottom-land landscape of the valley

of Larmon R. Much cultivation here. S. of Reuilly willows and poplars very abundant for a considerable distance, esp. along the river. Both are hosts to Viscum. Some marshy land and low pasture, cultivation fields separated by hedgerows with lines of willows or poplars. Willows mostly pollarded, light silvery green. Plantations of poplars very common near St. Leger. Orchards common around Issoudun. South of Issoudun the r. leaves the bottom-land and crosses a slightly higher gently rolling calcareous plain, mostly covered by open grain fields, rather few trees, some fallow land. Soil reddish brown, full of pebbles.

Around Neuvy-Pailloux. hedge-rows and patches of woods become more common. Mixed oak etc. Some open large oak with thick growth of *Populus tremula* between.

ward Chateauroux patches of wood and brushy wet low spots become more common.

S. of Chateauroux mostly cultivated, largely grain but some vineyard, beet, alfalfa, etc. a few hedgerows, small orchards, rows of trees, but mostly open.

Then some patches of woods. Then broken wood, fields, hedgerows, etc. Then

mostly woods. Then fields with hedgerows.

Then open grain fields on gray soil, sometimes with occasional patches of woods.

All of this part rolling land. Proportion of forest varies. Occ. ravines and scarps. These brushy.

Southward the land becomes rougher, to Chabenet.

South along the valley of the Creuse - valley bottom flat, with small fields, rows of trees, etc. Side hilly, with vineyards, small fields, hedgerows, patches of brush and woods. Southward rolling land, grain fields

pastures, hedgerows.

Some vineyards, patches of woods, mostly of young second-growth with scattered seed trees.

Near Equezon is a large patch of woods.

From Argenton through Equezon and south to St. Sebastien the rr. climbs a considerable grade.

The plateau around St. Sebastien is in pasture and misc. cultivation, fields separated by hedgerows and rows of trees. Soil gray-brownish. 1-2 oaks and other decid. kinds, incl. considerable chestnut.

Grade down through La Fontenaine and beyond still fields, hedges, patches of wood. Greener here than farther north. (Photos both north and south of La Fontenaine, hedge, etc.) Landscape more and more dominated by trees. Fields 1-3 acres.

Country gets more hilly S. of St. Pierre with woods largely made up of chestnut, Ravine of La Gasterne

very attractive, with young birch woods on s. side, heather on north.

South of this mixed-cultivation with small fields, hedges, large areas of forest. Country quite hilly - hills 600-680 m.

Woods have fair % of chestnut - heavily blooming and just past blooming.

Higher hills are wooded around ~~Amboise~~ St. Julienne, dominantly chestnut. South of these hills are wooded, rolling

ground cultivated to Rapeseed and beyond. S. of here

not so hilly but still much of the land is wooded esp. with chestnut, much of which is coppiced - probably for bark. Valley around

Amboise mostly cultivated but many patches and rows of trees. South of

there, more low wooded hills.

South of Limoge - Vallee de Vienne rolling hills, mostly cult. with rows and patches of trees.

Trees along river. Some steep slopes, ^{a bluff} covered by heather.

Hedgerows between fields, fruit trees around houses.

As everywhere, Robinia on r.r. cuts and banks, but here rather locally.

Trees largely oak and chestnuts.

Near Beynac some fair sized areas of forest. South of this *Pteridium* common in partly wooded slopes.

Oaks in this region frequently have a tall straight trunk and small umbrella-shaped crown, and all along the trunk a bushy cylinder of shorter branches. Probably the result of removal of lateral branches after tree has reached full height.

R.R. climbs out of valley onto a rather rolling plateau. Largely cultivated. Fair sized fields separated by hedgerows with trees (mostly oaks) grain and alfalfa.

Vic. of Nexon.

South of Nexon some patches of wood, largely chestnut. Patchwork of fields separated by hedgerows with patches. Some patches of Ulex, Erica, Cytisus, esp. on steep cuts and hill tops. Near Lafarge some patches of chestnut coppice on low hills. Pteridium abundant in waste places, road cuts, etc. Some patches of fairly good forest, mostly chestnut, s. of La Farge. Except for areas of wood, same pattern of cultivation and hedges continues southward, but chestnut coppice areas are more abundant. Land becomes less hilly and more rolling toward Bussiers-galant. South of this a mixture of chestnut coppice and mixed cultivation, with chestnut predominating, less so toward La Coquille. S. of La Coquille Ailanthus altissima is established along the r.r. for about 100 m. S. of here a few dead chestnut trees. Little or no coppice, some areas of heath, brown birch

etc. gorse, aspen, etc. n. of Navaleux large open areas of bracken, gorse, heather just s. of it. ~~S. of it~~ Interspersed with this area of cultivation and of scrubby forest. extends to tunnel. South of tunnel land seems much more fertile and more thoroughly cultivated. Little forest, no heath, to Thiviers. No Ailanthus just s. of Thiviers. South of this largely cult. but some thin forest mostly oak with chestnut and oak undergrowth. This with patches of gorse, becomes more or less dominant southward, ~~then~~ some cult. esp. vineyards, maize, pasture ~~to~~ toward Nequander. S. of here, walnut trees common, some vineyards, pine forests on hills or knolls. Some heaths. Then much scrubby forest of oak and chestnut with scattered taller pines. Some good pine forest, but always with under-

story of hardwood. Near Ligeux some fairly good oak-chestnut forests. Still some pine. Walnuts around village. Misc. cult. esp. maize + pasture. Willows and poplars in flat valley in pasture.

N. of this some vineyards, grain fields, patches of pine woods. Misc. cult. Same flat valley with pastures, willows + poplars.

Phragmites in wet places. South of this, near Agonac, some rather open country pasture and grain, with some walnut trees around fields, etc. Pulp wood produced in this general area. Same flat valley with willow + poplar to south side. Misc. cult., vineyards, scattered walnuts, patches of woods, pine or oak or mixed.

In this general area much rye, grain, alfalfa, some beets, potatoes + Helianthus tuberosa. Mustard, more pasture. Some heath on slopes. Some slopes with junipers, near Chateau-l'Evêque. Much pulp wood here

becomes more hilly and more wooded to south, pine and hardwoods.

Some eroded slopes. Valley bottom flat, cult.

Same general pattern + Périgueux. East of Périgueux hills are wooded, some s. slopes open with small junipers. Woods are pine being replaced by hardwood, or ~~juniper~~ rather scrubby hardwood. Flat valley bottoms and gentler slopes cultivated. Some fields separated by hedgerows, others not. N. of Niversac. East of this the hills become ~~lower~~ lower and with more open meadows though still generally wooded. Woods denser on north facing slopes. Much pasture in valley bottoms and/or lower slopes.

Beyard has an extensive fire scar a year or two old in which sparse scrub appears to have been burned. Pteridium now dominant between the old sticks.

Pteridium generally common here in unused open land, except on calcareous slopes dominated by open junipers and grass. *Pteridium* is ground cover in scrub or very young forest, and in open forest generally. Heather very local.

Toward Les Eyzies the hills became lower and partly open, partly wooded. Many calcareous slopes with scattered junipers. Woods here scrubby mixed hardwood with scattered pines and patches of pine. Cliffs and rock outcrops more common.

are persistent from cultivation are common here, esp. *Ficus carica*.

The valley floor has the usual poplar and willows, many elms, and some *Acer negundo*. Cultivated fields. River lined with willow and poplar. Great masses of *Potamogeton* and *Ranunculus aquatilis* in river. The latter making masses of white bloom.

July 25 - Les Eyzies

Flat green river valley cut in flat beds of limestone which form cliffs ^{on both sides} with broad dry ledges. The cliffs and ledges are either bare or covered by a xerophytic vegetation of *Quercus ilex*, several other species or forms of *Quercus*, *Pinus* sp. (? needles), *Sedum*, *Prunus*, *Hedera*, *Viburnum lantana*, *Platanus*, *Acer monspessulanum*, *Cornus sanguinea*, many small labiates and other herbs, esp. umbellifers and legumes, several *Campanulas* and other *Campanulaceae*.

In crevices in cliffs esp. where overhanging and shaded, *Adiantum* is very common. In grottoes it is abundant.

On the cliffs *Hedera helix* forms great masses clinging very closely to the rock, lower stems many cm. thick. An *Orobanchae* is common, possibly parasitic on the *Hedera*. Quite a few plants that

July 25 - Les Eyzies
dry limestone ledges
on cliff, in scrub vegetation

- 3 35848 *Quercus ilex*
 7 49 *Quercus ilex*
 3 50 *Quercus ilex*
 2 51 *Quercus*
 2 52 *Quercus*
 2 53 *Quercus*
 2 54 *Teucrium*
 local, in full sun
 2 55 *Parietaria*
 very common in crevices
 1 56 *Teucrium*
 occasional in full sun, crevices
 2 57 *Helianthemum*
 rare, in full sun, crevices
 2 58 *Asperula*
 common
 3 59 *Teucrium*
 local in full sun, crevices.
 3 60 *Adiantum*
 abundant on shaded cliffs
 and in small grottoes
 2 61 *Saxifraga?*
 occasional in shaded rocks
 in

July 26 - same

- 2 62 *Acer monspessulanum*
 common in thickets on ledges.
 1 (63 *Quercus ilex*
 2 64 *Quercus ilex*
 common in thickets on ledges

- shrub 2.5 m. tall, gray.
 - tree 6 m. tall.
 - shrub 2.5 m tall.
 - small tree 4 m. tall.
 - small tree 4 m. tall
 - shrub 2.5 m. tall.
 - flowers whitish; plant
 pleasantly aromatic.
 - stems procumbent to
 weakly ascending.
 - flowers rose purple.

- from root crown;
 flowers white.
 - flowers dull yellow.
 fronds hanging.

leaves delicate, light green,
 flowers white.

- small crooked tree, 4 m. tall.
 - small tree, gray-green.

- 35865 *Quercus*
 2 common in thickets on
 dry ledges
- 1 66 *act.*
 rare in thicket on dry ledge.
- 2 67 *Orobanché*
 common (possibly parasitic
 on roots of *Hedera*) at base of cliffs
- 1 68 *Equisetum*
 common at bases of cliffs
- 2 69 *Potamogeton*
 July 26 - Vézère River at Les Eyzies
 abundant in slowly running
 water several ft. deep.
- 3 70 *Ranunculus aquaticus*
 abundant in slowly
 running water several ft. deep.

small tree, more
 finely lobed leaves from
 sprouts on trunk.

flowers tan to purplish.

erect, forming large
 colonies, up to 1 m. tall.

leaves floating.

leaves submerged,
 flowers on pedicels
 several cm. above surface,
 white.

July 26 R. Vezere below
 Les Eyzies - steep
 limestone slopes at foot
 of cliffs on s.w. side -
 scrub-forest of
 Quercus ilex. Slopes
 on other side low forest
 of deciduous oaks, etc.
 Valley bottom with
 cult. fields, walnut
 trees, rows of willow
 and populus - 2 sp.

Much Helianthus locally.

At Le Bugue the valley bottom
 is much wider. Some
 vineyards, misc. cult.

Hills on both sides rather
 bare except for juniper scrub.

Below this, lower slopes
 of hills cultivated, upper
 slopes wooded, mainly pine.

Valley floor very flat.

Then Vezere joins Dordogne.
 Hills here, at Le Buisson, are
 more gently rounded, partly
 cultivated to tops, some woods
 up this valley. This almost
 entirely misc. cult., some
 trees mostly in rows except
 for belt of river forest
 of Salix, Ulmus, Populus,
 Quercus, Fraxinus, etc.
 and some small poplar
 plantations.

grain, maize, tobacco,
 beets, alfalfa, a few grapes,
 some Helianthus tuberosus are
 principal crops noticed.

Same to Piorac en Perigord.
 After this the r.r. leaves
 the valley and ~~it~~ climbs
 up a small south tribu-
 tary where there are on the
 n.e. side, again some
 dry rock slopes with
 junipers, on s.w. side
 woods of pine and hardwood.
 Around Belver cultivation
 and pasture goes almost ^{or quite} to
 tops of hills. Valley bottom
 narrow, cultivated. Hills
 above this gentle but
 rather high. Up the valley
 toward Le Got the
 valley becomes more
 wooded, principally
 with pine and an
 understory of oaks, the
 oak dominant where
 pine has been removed,
 absent where pine is too
 thick. Occasional chestnut
 and other broad-leaf trees.
 Robinia abundant along
 r.r. Juniper in thin
 places in pine on s.w.
 slopes.

Descending valley of la Semance from Le got pattern of cultivation, pastures, and patches of woods, oak or pine with oak understory. Willow along the ditch or rivulet in valley bottom. Hills rather gently rolling. Some hedgerows of Crataegus, etc. Thus to Villefranche du Perigord, where woods have become dominant. Below here hills largely wooded, flat valley bottom cult. with rows of poplars. Some bare limestone cliffs and steep bushy limestone slopes. Below Sauveterre la Semance the valley opens out somewhat and the hills become lower-cult. part way up, scrub or woods on slopes and tops. Misc. cult. a few patches of poplar, some hedges in valley bottom. At St. Front it narrows again and hills are bushy to base. Some forest of oak. Some rather bare steep slopes, badly eroded. At Cuzorn there are cliffs along the valley bottom, but hills are otherwise gentle. Generally

somewhat open and scrubby, some juniper. Some wooded with pine. Some slopes cultivated. Below this the valley widens out and there are flat or gently rolling cultivated plains 1-2 km. wide. Gentle wooded slopes to the sides. Some vineyards, some hedgerows, some pasture, some rows of poplars, misc. cult., narrow strips of mixed wood along stream. Below Monsempron-Libos the valley (Lot V.) is much wider - flat. Misc. cult. Vineyard, orchard, tobacco, grain, maize, vegetables, pastures. Narrow riverbank forest, some and some patches of poplar. Lower down are limestone bluffs along river, apparently sides of low flat topped erosion remnants. Tops of hills along valley wooded, slopes cult. and pasture. Around Penne the country becomes broken

and hilly. Gentler slopes cultivated or pastured, some vineyards. Steeper slopes and knobs wooded except some rock slopes and cliffs which are bare or brushy. Grain, alfalfa, vineyards, pastures, some hedgerows in flat bottoms. Climbing up a winding valley ~~toward~~ ^{de la Ferté} toward Hautefage. Auradon this pattern ~~remains~~ continues with grain and pasture becoming dominant. Thickets of Robinia along r.r. Knobby country. More patches of woods, mostly oak or oak & elm toward head of valley. Long tunnel. After Larroque hills with patches of woods and pasture, some cultivation - vineyards, potatoes, beans, grain, etc. ~~increasing~~ downward. Some limestone slopes with sparse juniper. Hills become gentler, more rolling, tops tend to be wooded. Low hedgerows, more downward. Valley widens and hills become lower toward the Garonne.

Valley bottom in misc. cult. hill slopes mostly pastured.

At Agen are white cliffs, probably limestone. Houses built into excavations in them.

Garonne Valley has very broad flood plain with patchwork of misc. cult., grain, ~~or~~ maize, vineyards, vegetables of various sorts, alfalfa, pastures, with some hedgerows and rows of poplar and willows. A few small patches of poplars. Along the banks of the Garonne are thickets of willow and rows of poplars. Orchards and rows of fruit trees in fields of other things. Apricots and peaches. Some small patches of mixed poplar, willow and other broad-leaved trees.

The small size of the plots, mostly an acre or two or less is striking. Trees are an important part of the landscape, even where the entire countryside is cultivated.

Up river from Valence more
 or less same pattern. River
 valley very broad here.
 Some other trees besides
 poplars along road, e.g.
 Platanus, oak, elm, lindens.
 Canals lined by trees, also.
 Slopes n. of valley
 wooded along Tarn R.
 Then cult. with vineyards
 at Moissac. Patches of
 young Populus forest in low
 spots along R. Tarn. Willow
 belt rather narrow.

Above the Tarn, the
 Garonne V. is so wide
 that the hills on the side
 are not visible from the
 train. Castelsarrasin.
 Miscellaneous cultivation,
 trees prominent in landscape.

France
1954

July 27 - south from Toulouse
the valley of the Garonne
is largely in grain (already
harvested) and some alfalfa
and vineyards - very flat
country, rows of trees and
a few wood-lots, but becoming
less for a few km. Then
more with some patches.
A low but sharp escarpment
on east side. Trees esp.
along watercourses and
on escarpment, also around
houses. Escarpment becomes
higher, more broken, more
wooded, landscape on
plate below more character-
ized by trees southward
until just before Foncages
the landscape is quite
green in spite of brown
stubble fields. Vineyards
more abundant about
Foncages - no, 75% or more
of cover here. Here the
escarpment is less
sharp and less wooded.

Near Carbonne an
escarpment to the west
becomes visible. Vineyards
less abundant, alfalfa
and maize more so, some
grain fewer trees, some
hedgerows but not many.

Then rather open
flat land, large
fields and large vineyards
southward again,
more trees and more
vineyards, some solid
patches of Robinia and
of Cytinus. A few hedges
and many rows of trees.

Hills in distance on
both sides partly wooded,
partly cult. and meadow.
S. from Cazères, more
less the same pattern
less vineyards. Grain
being harvested!

At Martres-Tolosane
the flat valley floor
narrows rapidly,
rather high wooded
hills approaching on
both sides. Woods mostly
hardwood, dense but
appearing rather scrubby.

Crossing the Garonne
s. of Bourdeaux - narrow
belts of willow on both
sides.

Follow east of the small
range called Plantaurel -
Petites Pyrenées - scrubby
and rocky with cliffs
and steep slopes. Valley
here very green with

pastures, abundant trees, hedgerows, mixed cult. - grain, maize, potatoes. Large areas separated by hedgerows, these areas divided into many small patches of different crops.

Sabarthe - Gard.
southward same pattern high wooded hills to east, low ridge to west. hedgerows more abundant, with trees.

RR skirts base of w. ridge which is wooded with small pastures dominant in some areas. Mixed broadleaf woods, some very fine old trees locally.

Toward St. Gaudens hills are cultivated. Across valley are high densely wooded hills, foothills of Pyrenees.

After St. Gaudens the valley abruptly widens - is green with broad meadows and pastures, some grain fields, few trees, some very low hedgerows. a little cultivation of maize, beets, potatoes, etc. Vineyard locally around villages.

Foothills of Pyrenees rise very abruptly from flat valley floor.

Further on less pasture, more diversified cultivation.

Foothills thickly wooded, but showing evidence of vertical strips of different management stages - done in narrow vertical bands which seem to be clear cut.

Montrejean - Gourdain - Polignan - 420 m.

From here, still following the Garonne, but climbing, between brushy ~~hills~~ or wooded hills. The higher Pyrenees visible above the hills, to the south (n. goes west from Montrejean).

Along n. or slope n. of Garonne v. thickets of Robinia, patches of cultivation. Valley very green, cultivated fields, patches of wood, hedgerows, rows of trees. Trees dominate landscape. Grain fields are yellow. Trees mainly ~~oak~~ oak + chestnut, even on valley floor here, though willows + poplars ~~not~~

not absent.

Then n. emerges onto a broad open plain, a vast alluvial fan with patches of trees, pastures and cultivation some hedgerows.

610 m. Lannemezan - The Plateau de Lannemezan is the great alluvial fan which is crossed by r.r. east to west.

Rows and patches of woods, pastures, cult. fields, areas of scrub, and broom. Then vast open areas, mostly in pasture, only a few very stunted trees - to Capvern

From here descends the slope of fan which is dissected. Steeper slopes wooded, gentler ones pastured, more level places grain fields. Fields and pastures separated by hedgerows. Some vineyards. Some fine patches of oak woods.

Dissection becomes deeper as n. goes down a rather steep grade.

Lower down extensive slopes covered by scrub and bracken

Then, flat bottoms of ravines widen out and cultivation becomes more general, with grain, vineyards, maize, potatoes, etc. Poplars and willows appear, esp. along streams. Grain being harvested or ready to harvest.

To Tournay - here flat valley bottoms are 1 km. or more wide - cult. with ~~but~~ some rows of trees and hedgerows. Tarbes - 720 m.

July 28 Tarbes - Amprevielle flat valley bottom, misc. cult. many trees.

Valley of Adour R. - misc. cult. some vineyards, rows of trees, fruit trees around villages; mostly grain and maize, some potatoes, a little alfalfa, beets, etc. Small patches, carefully tended. Center of valley with few houses or trees, both more numerous to both sides.

Near Vielle - Adour the valley starts to narrow rapidly. The hills on both sides are partly ~~or~~ wooded, partly cult. partly pastured.

Maize mostly planted in rows, but ~~many~~ ^{many} patches seen below Indigam planted in hills with beans in each hill.

Some patches of chestnuts on hills, but mostly mixed thickets, Alnus, Robinia, Betula, Fraxinus, Quercus, etc.

July 29

auto

Bagnères de Bigorre - in valley of Adour R. surrounded by luxuriant cultivation and the ornamental vegetation in the town is luxuriant and varied. The east slope of the valley above the town is very steep, rocks, with cover of low scrub. The w. side is more gently sloping and is partly cultivated, partly wooded, but mostly hay meadows.

Well above the town, at 1000 m. or more, the walls of the valley tend to be covered by a dense forest of beech. Wherever this is bounded by meadows the transition

is very abrupt. The effect is of dense masses of dull dark green against the bright green meadow. Upward this cover becomes almost continuous.

At perhaps 1500 m. the beech becomes mixed with fir and spruce, these becoming dominant. This belt is perhaps 200 m. wide and the trees are conspicuously lichen-covered, indicating at least a high incidence of fog at this level. Dr. Roche (Road) confirms this, saying that clouds are commonly encountered at these altitudes. Usnea is especially conspicuous hanging from the limbs of the conifers.

Above the spruce-fir forest there is meadow with a dense turf of many species. This is prominent around La Mongie, at the base of the Pic du Midi "Teleferique" or cable-way. Above this on rocky crests and outcrops are scattered dwarf pines (*P. uncinata*) up to about 2300 m.

July 28 - Pic du Midi de Bigorre - trip by overhead cable from 1740 m. at La Mongie to summit.

This series of canyons, cliffs and slopes is extremely rugged, with rock outcrops and talus in great expanses. The rock is a folded series of beds of limestone and schist. The folding is intense with the "wave-length" of the folds varying from several cm. to 100 m. or more. Some shattering, shearing and ^{minor} faulting also.

Talus is generally grassy except where rather coarse, where it has a low discontinuous scrub of *Rhododendron* perhaps several dm. tall, low rounded flattish clumps. *Rhododendron* also covers some rocky outcrops.

Everywhere there is the close pattern of sheep grazing paths - there might be taken for the result of intensive frost action and solifluction, were it not for the presence of numerous sheep even in seemingly inaccessible places on tiny

sites of talus.

The only woody plants seen larger than the *Rhododendron* were a scattering of small pines (*Pinus uncinata*) along the sharp rocky crest on which the "Midway" station of the cableway is situated. These are stunted trees only a very few m. tall and, though they form a conspicuous strip along this crest at about 2300 m. are so scattered as not to form any sort of forest.

The Pic proper is a very precipitous spur of rock 2857 m. high (lat. $42^{\circ} 56' 12''$ N, long. $0^{\circ} 8' 32''$ E), mostly mesozoic calcareous rock, bluish and massive interbedded with shists, severely folded.

Annual precipitation about 2.20 m., average of 4 m. snow in winter; snow storms have been recorded every month (e.g. possibly July), severe ones until May and sometimes again in September, but generally good weather till

La Taoulat

sometimes in November. Severe and frequent electric storms especially in May & June.

Although the talus of the middle slopes and even the rock outcrops, are covered by a rather continuous turf or heath, near the top there are principally isolated clumps, tufts and cushions on the talus on ledges and in crevices. In a few gently sloping grassy spots the vegetation is more or less continuous, but only very locally. All species seen except

~~are~~ ^{are} low, depressed or compact in habit. Most ~~are~~ either densely pubescent or fleshy.

In the schistose areas the flora ~~is~~ is more restricted than on the calcareous ones, but most of the species from the schist are also to be found on the calcareous soil. This is probably because of the small area and close proximity of one to the other and the movement of soil from one

to the other.

The sheep even climb to the top of the mountain, where they are quite a nuisance, destroying the plants in the small alpine garden maintained by the botany dept. of the University of Toulouse, in connection with the observatory.

In this garden they are attempting to bring together the high altitude plants of the Pyrenees and even some from the alps. Also they are trying out some from much lower altitudes to determine their tolerance. M. Drossant, the gardener in charge, says that this site is rather too high to provide ideal conditions for most alpine plants. Has some difficulty with some of them. They are also carrying on some biological and pharmaceutical studies, but on a very minor scale. An installation of a tiny biochemical laboratory

July 28 La Mongie, Pic du
Midi de Bigorre
green meadows,
closely grazed, on slopes.

35871

Galium

very common, especially
around rock outcrops

2

72 Trifolium

common, especially
around rock outcrops.

2

73 Jasione

common

1

74 Viola

common on slopes
near buildings where
grazing is less severe.

July 28 Pic du Midi de
Bigorre, near summit
shattered limestone rock.

1

75 Oxytropis

common on ^{rock} debris

2

76 Veronica nummularifolia

occasional on patches
of ^{rock} debris.

1

77 Arenaria

~~common~~ common in
crevices and on ^{rock} debris.

2

78 Gentiana verna

occasional on ^{rock} debris

2

79 Androsace

occasional on ^{rock} debris

1

80 Iberis

occasional on ^{rock} debris.

1760 m.

flowers white

flowers rose-purple.

flowers purplish-blue.

flowers violet

2850 m.

flowers deep purple.

flowers blue-violet

flowers white.

caespitose in small loose
tufts; flowers intense blue.
- ~~flowers~~ caespitose, flowers
pinkish white.
- flowers lavender; leaves
sub-fleshy.

- 35881 *Geum montanum*
 2 common locally on ^{rock} debris
 2 82 common locally in crevices
 1 83 *Potentilla rupestris*
 common on rock debris.
 2 84 *Myosotis*
 occasional on rock debris
 1 85 *Lotus*
 occasional on rock debris
 2 86 *Festuca*
 occasional on rock debris.
 1 87 common on rock debris
 2 88 *Oxytropis*
 occasional on rock debris
 2 89 *Pedicularis*
 occasional on rock debris.
 2 90 *Statice* (Armenia)
 occasional on rock debris
 1 91 *Carlina*
 rare on rock debris.
 2 92 *Poa*
 common locally on
 fine rock debris.
 1 93 *Halis*
 very local on fine rock debris
 1 94 *Halis reticulata*
 very local on fine rock debris.
 2 95 *Taraxacum*
 occasional on rock debris.

- small tufts; flowers
 bright yellow.
 - caespitose.
 flowers bright yellow.
 caespitose in small tufts;
 flowers light blue.
 prostrate, caespitose, forming
 small mats; flowers
 deep yellow, with orange
 red over occasional (perhaps
 old ones?).
 - forming dense prickly
 mats.
 - caespitose; flowers
 deep rose-purple.
 - caespitose; flowers pale
 yellow.
 - flowers ~~deep~~ maroon-purple.
 - caespitose; flowers rose pink.
 heads purple.
 prostrate; leaves smooth,
 light green.
 - prostrate, leaves very
 rugose.
 - heads bright yellow.

- July 29 - same - siliceous
schistose rocks.
- 35896 *Poa*
1 common on fine rock debris.
- 1 97 *Draba*
occasional in crevices
- 2 98 *Oxyria digynia*
occasional in sheltered
spots on fine rock debris.
- 1 99
occasional on steep rock
slopes, in crevices.
- 35900 *Hutchinsonia*
1 common in crevice and along
- 1 01 *Cerastium*
occasional in crevices
- 2 02 *Chrysanthemum*
common on rock debris
- 1 03 *Erigeron*
rare in rock crevices
- 1 04 *Globularia*
rare in rock crevices
- 1 05 *Papaver*
rare in ^{rock} debris
- 2 06 *Galium pyrenaicum*
common in ^{rock} debris and crevices
- 2 07 *Thymus*
common on rock debris
- 2 08
common on rock debris
and in crevices.
- 1 09 *Artemisia*
rare in rock crevices
- 1 10 *Linaria*
rare on rock debris.

- flowers yellow.
- scapes erect; flowers
dark red.
- caespitose; heads bright
yellow.
- caespitose; flowers white.
- flowers white.
- rays white, disk yellow.
- rays lavender.
- flowers blue-lavender.
- flowers light yellow;
foliage glaucous.
- forming dense mats;
flowers cream-~~ish~~ yellow.
- prostrate; flowers
bright purple.
- flowers white (with #35911, 35912)
(to pp. 144-145)

July 14 - Toulouse toward
Carcassonne

Almost flat valley of R. d'Herz
mostly cultivated,
some pasture. very few
patches of woods, some
rows of trees, a few hedgerows
some vineyards but not
many, grain, maize,
alfalfa, etc.

The low hills on the
sides of the valley also
show about the same
pattern. Almost no woods.

A few sizeable patches
of forest on the south side
and in the valley floor below
Villeneuve de Lant.

Many more trees in vicinity
of the town than away from
it (usual condition).

Rows of poplars and Platanus
very common ~~at~~ south end
of her. Valley ravine
narrows rapidly.

Very narrow bands of thick
woods along river banks.
Willows common. To the

east the hills become
less cultivated and more
pastured, with patches
of scrub and broom.

Some bad erosion scars
on the hills.

Pass imperceptibly over
the divide bet. ~~Atlantic~~
Atlantic and Mediterranean
drainages, into the
valley of R. Fresquel.

Just before Castelnaudary,
first ^{rows of} cypresses appear.
Planted for wind-breaks.

Rows of willows and
poplars common. Valley
intensively cultivated.
Hills to south appear rather
bare and drab from a distance.
Planted conifers very
common e. of Castelnaudary.
Some Mous.

To north, in distance the
low massif of Montagne Noire,
partly wooded.

This valley looks distinctly
drier than that of d'Herz.
Grain is practically all
harvested already. A few
patches of young oak woods
w. of Bram.

Toward Carcassonne vineyards
become more common. Rows
of trees conspicuous, esp. along
canal. Marshy spots
common along rd. Few
planted conifers east of Bram.
Vineyards become dominant
feature of landscape toward
Carcassonne.

S. of Carcassonne the level or rolling land is all in vineyards mostly, not trained on rows.

Limestone hills are mostly scrub-covered but partly wooded. First *Spartium junceum* noticed just s. of C.

Juniper and small pines abundant on hills. The hills and scarps badly over-grazed and eroded. Much bare rock exposed.

Hills more common southward. Grazed. Some olive trees. General color of landscape drab, gray-green or gray-brown, except for bright green vineyards in flat valley bottoms. Spots of dark green on hills are low dense bushes. Patches of pines planted on some small hills. Cypress hedges fairly common, esp. in vicinity of towns, as *Lezignan (Aude)*.

At S.-A. the valley has become quite wide again. Mostly in vineyards. A few very low hills are pastured and have some planted pines. Some fruit trees scattered in vineyards.

Hills at sides of valley very sparsely tree-covered, brush between, badly grazed. Largest part of ground is scrub-covered.

Rd. follows a small valley into the hills. Occasional places planted to pine. Mostly low scrub and pasture. Much bare light gray rock exposed. Olive trees still rare but becoming more common near Narbonne.

Beyond Narbonne valley is wide and flat, almost entirely in vineyards, but many with fruit trees thickly scattered in them. Hedgerows and rows of poplars, willows, *Platanus* very common, esp. along the abundant ditches.

Populus alba common. Low spots frequent along r. with reeds, tamarisk, grass.

After a few km. most of trees disappear. Then vineyards become less frequent (but still the greater part of land) and misc. cult. esp. grain become more common. Proportion of vineyards varies locally.

Hills at sides of valley low grasses with bushes, overgrazed. Arab. A few plants *crifera* on tops.

Near Colmbien valley becomes very wide again, mostly in vineyard.

To Meybes. - beyond on cut banks and eroded places a large quarry bush like *Atriplex*. Rolling country, in vineyards. A few scattered pine and olive trees, rows of plane trees along canal and main road, some cypress wind-breaks. All the cypresses in the region seem to have spire-like form.

A few small patches of heather and scattered small trees, some low hills partly wooded with scrubby oaks (!).

Then, most of irregularity in ground disappears. Great areas of vineyard with scattered trees and rows of trees.

Just past Argde is a small extinct volcanic cone. Then salt flats partly mowed, partly cult. farther

in salt marsh and succulent veg.

Large lake with salt pans inland from sea. Low area around lake with halophytic veg. Area of very low dunes lining sea is cult. - vineyards and asparagus, protected by rows of reeds. Outside this, slightly higher dunes with bushes.

At Sete-Villa a rocky hill, covered by pines on landward side, by city on seaward side. The lake extends to behind this hill, which is in the edge of the city. This lake is mouth of canal which extends from beyond Agen.

Between Sete and Montpellier are a series of lagoons with a broad strip of salt marsh surrounding them and a strip of dunes between this and the sea. Back of the salt marsh is solid vineyard. Salt marsh has areas of reeds, of *salicornia*, and of marsh grass.

East of Montpellier are vineyards on flat and rolling ground with a few scattered trees, a few rows of trees. On some small hills are patches of woods, mostly pine.

A few small woodlots of pine farther east. Rows of trees mostly *Platanus*. Some small olive groves.

On north side, away from m. are some small brush-covered hills.

Almost all cultivated ground is vineyard. Soil red.

Olive groves become more and more abundant. Hedges of *Arundo donax* occasional.

The low bushy hills extend eastward for some distance, becoming more and more covered by olive groves. Vineyards still occupy flat ground.

Some forests and scrub of *Quercus ilex* farther east. More grain and other cultivation than vineyards toward Nîmes.

Hills east of Nîmes covered by scrub "garrigue". Valley with meadow, grain

fields, vineyards, etc. Some fruit trees scattered in vineyards, olives also.

Some small woodlots of young pine, some fallow land, eastward.

Dry hills, some with low scrub "garrigue", some of it burned over. Some with olive groves.

Olive trees mostly 2-4 m. tall, rather flat-topped.

Some rather bad erosion in these hills. Some hills really wooded near Rhone. Willow-poplar forest along Rhone and on islands in it, at Tarascon.

East of the town are marshes and low cultivated ground, gardens, etc. orchards, some vineyards, reed hedges (*Arundo*) Rows of cypresses for wind-breaks. Thickets of willow and *Populus alba* in low place.

To northeast ~~the~~ limestone hills covered by gray-green scrub and scrub-forest. Some bare scarps exposed.

Some fair sized rice fields in flat land. Grain, vineyards and meadows on very slightly higher ground.

Fields separated by hedges in some ~~places~~ cases. These grain eastward rather extensive tracts of willow and poplar, there along river at Arles.

S. of Arles fields have low levees around them, probably used at times for rice. extensive meadows many trees - rows of willows, planes, poplars, etc. A few vineyards here. Area very green - apparently some irrigation through ditches might be for drainage, as there are large areas of marsh. *Phragmites communis* is dominant over large part of it.

East of this are large stretches of weedy flat uncultivated land, very rocky alluvium. Woods and scrub in distance. Soil bright rusty red.

Rather barren southern slope of Alps in distance to north.

Then cultivated ground with thick willow hedgerows, some open uncultivated land, grassy

with or without scattered trees. This ~~alluvium~~ ^{area} called "da éran". *Spartium* common. Much open scrub. Some land cultivated by piling up rocks and removing them. Some ponds. Willows a very conspicuous feature of the landscape. Again vast open sparsely grassy plain - some attempt being made to pile up the rocks but certainly not a very encouraging task as the ground is largely made up of rocks.

Salon.

Some dissected hilly country before Marseille. flat places cult., rougher ones weedy, or with scrub and patches of woods.

Around lake a considerable surface of bare rock with a sparse low scrub.

Then cultivated ground with closely spaced rows of cypresses for wind breaks.

East of Marseilles are rather rugged hills ~~with~~ of limestone with many cliffs. They are covered by a rather sparse and scrubby pine forest with an understory of scrub. Lower slopes near sea terraced and cultivated, vineyards and olives.

La Chiotat

Pines and olives mixed near sea, pine woods inland.

Eastward hills become lower, gently sloping. Large areas scrub-covered, some pine forests, some olive groves esp. near sea. General color a dark dull green. Then rather rugged again.

At St. Cyr is a large flat valley, mostly in vineyards and olive groves, also rows of olive trees between the vineyards.

Eastward the hills are rather rugged, partly wooded, partly scrubby vineyards and orchards, olives, etc. locally. Eastward more scrub, "garrigue", dark green, with *Pinus* low, bushes 1.5-2 m. tall,

touching or not. At least some pines generally, but much scrub. Lower slopes often terraced.

Ollioules

flat land in vineyards and flower cultivation. Many olives. Surrounding hills very rocky and rather barren. Rows of *Cupressus* common. Some pine woods on low hills. Similar to Toulons.

July 28 - Pic du Midi (ctd.)

- 359 11 *Linaria*
common on rock debris.
- 12 *Linaria*
occasional on rock debris.
- 2 13 *Potentilla nivea*
common in rock crevices.
- 2 14 *Arenaria*
common in rock crevices.
- 2 15 *Arenaria*
common in rock crevices and on ledges.
- 1 16 *Silene acaulis*
common in rock crevices and on ledges.
- 1 17 *Hutchinsonia*
common on ledges and crevices.
- 2 18 *Petrocalis*
common on ledges, and in crevices, and in rock debris.
- 1 19 *Eryssimum*
rare in rock crevices.

July 30 - Antibes

- 1 20 *Gelidium*
common in crevices just below low tide level.
- 2 21 *Limnium*
rocks just above high tide
- 2 22 *Rubia*
common, characteristic of *Quercus ilex*

- flowers blue-violet, palate whitish, & the common form here (with #35910, 35912)
- flowers blue-violet, palate orange (with #35910, 35911)
- caespitose; fls. cream color.
- prostrate; flowers white.
- forming a dense mat; flowers pale green.
- forming cushions; flowers pink.
- flowers white.
- flowers deep lavender.
- flowers bright yellow.
- deep red
- calyx lavender with white tips, corolla blue.
- scrambling in low bushes, fruit black & fleshy when ripe.

July 30 ~~to~~ Cap d'Antibes
 walk with Guinocet
 - small patch of
 maquis - a thick
 scrub 2-3 m. tall, with:
Cistus monspeliensis
Myrtus communis
Pistacia lentiscus
Rhamnus alaternus
Rubus sp.
Spartium junceum
Calycotome spinosa
Taraxacum

On the hill around the
 lighthouse some remnants
 of *Quercus ilex* - *Q. pubescens*
 forest, but with *Olea*
 abundant. *Pinus halepensis*
 forest below on flatter
 portions.

The general relationships
 here, according to Guinocet,
 are that the *Quercus ilex* -
Q. pubescens forest was the
 original cover on calcareous
 rocks. When this is cleared
 it tends to be replaced by
 maquis. This is readily
 replaced by *Pinus halepensis*
 which is, in turn, gradually
 replaced by *Quercus ilex* if
 not burned over. This
 pattern general on calcareous

rocks east to Var R.
 and below 300-400 m,
 above which *Quercus pubescens*
 is thought to have been
 dominant in the original
 cover. East of Var R. along
 the coast was a strip
 of *Ceratonia* - *Olea* forest.

On the crystalline rocks
 the original cover was
 thought to be *Quercus*
ilex - *Q. suber* forest,
 with *Pinus* secondary.

Above this, *Quercus ilex* -
Q. pubescens forest.

Mediterranean species
 observed:

Centaurea peniculata
Asperula cynanchoides
Euphorbia spinosa
Camphorosma sp.
Tunica saxatilis.

Garrigue vs. Maquis - acc. Guinocet
 Distinction physiognomic -
 garrigue is low, sparse,
 ground visible between
 bushes, mostly on calcareous
 soils. Maquis 2-3 m.
 tall, dense. Chaparral-like.

July 31 - Esterel, ^{near Grataadis,} about 3 km
inland from Agay, on que R.

Quercus suber - Pinus pinaster
woodland - trees separ-
ated, with garrigue
beneath them of, ~~in~~ in addition
to young pines and oaks,

Cistus monspeliensis

Cistus salvifolius

Daphne genkya L.

Pistacia lentiscus

Lonicera sp.

Asparagus acutifolius

Phillyrea angustifolia

Pteridium aquilinum

July 31 - near Grataadis,
about 3 km. inland from
Agay on que River, Esterel
Quercus suber - Pinus
pinaster woodland.

35923 *Origanum vulgare*
1 ~~at~~ roadside

2 24 *Quercus suber*
dominant tree in

July 31 - Col Belle Barbe
on que River, Esterel

Quercus suber woodland
with some pine, garrigue undergrowth

1 25 *Linum gallicum*
weedy openings

2 26 *Centaurea paniculata* var. *esterensis*
common in weedy openings

In habit *Quercus suber*
looks much like *Q. wislizenii*
or *Q. chrysolepis*, or when
large, *Q. agrifolia*, of S.W. U.S.

The pines tend to invade
after fires, but are
regarded as a normal
part of vegetation.

35 m.

strongly aromatic herb;
- calyx purple, corolla pinkish.
tree 6 m tall, 20 cm. diam;
bark harvested for cork.

44 m.

flowers bright yellow.

erect, biennial; flowers
rose-pink.

July 31 - Que R. between
Col Belle Marbe and Mal Infernet,
Esterel

in cork-oak woodland
with garrigue undergrowth

- 35927 *Cistus salvifolia*
3 codominant species in garrigue
- 3 28 *Cistus monspeliensis*
codominant species in garrigue
- 3 29 *Arbutus unedo*
occasional in garrigue
- 1 30 *Fumana*
occasional
- 2 31 *Lavendula stoechas*
common
- 1 32 *Myrtus communis*
common
- 2 33 *Rhus cotinus*
rare
- 2 34 *Daphne genkwa* L.
common
- 1 35 *Molinia caerulea*
very local, in small seep
of water

This country is generally
covered by a sparse, uneven
stand of *Pinus pinaster* and
considerable *Quercus suber*.
Beneath this is a garrigue
(maquis if tall and dense)
of such plants as *Lavendula*

45 -
60 m.

shrub 0.7 m. tall.

shrub 0.7 m. tall.

shrub 1.5 m tall; fruit
immature, pendent.

shrub 0.5 m. tall.

— strongly aromatic.

shrub 1-1.5 m. tall.

— aromatic when broken; flowers
white.

shrub 1.5 m. tall.

shrub 0.8 m. tall; ~~flowers~~

— principally branched
at base; flowers whitish.

— fruit 1.3 m. tall.

Phillyrea angustifolia
stoechas, *Helichrysum stoechas*,
Helianthemum tuberosum,
Erica arborea, *E. scoparia*,
Calluna vulgaris, *Arbutus*
unedo, *Juniperus oxycedrus*,
Myrtus communis, *Stihelina*
dubia, *Globularia* sp., *Drachidium*

^{Fumana spp.}
 pentaphyllum, Calycotome
 spinosa, Rhamnus alater-
 nus, Daphne genkwa, Rhus
 cotinus, Arnelanchies sp.,
 Pistacia terebinthus,
 P. lentiscus, and Rubus
 tomentosus (perhaps only in
 disturbed places.)

After fires the pines
 may appear at the
 same time as the scrub
 and may, locally,
 form an almost complete
 cover 1-2 m. tall. However,
 there are few really closed
 stands of mature pines.

July 31 - ^{Hills above} ~~Les~~ Trayas, on
 seaward side of l'Estérel,
 Alpes Maritimes

almost closed scrub
 or "garrigue" on ^{dry} rocky slopes.

- 35936 Pinus
 1 common throughout region
 2 37 Calluna vulgaris
 occasional in
 2 38 Erica arborea
 common in
 1 39 Asplenium adiantum-nigrum
 occasional in rock crevices
 1 40 Galium rubrum
 occasional at base of rocks

In a wet seepy spot
 are Molinia caerulea,
 Asmundia regalis and
 Alnus glutinosa.

There are great knobs of
 red porphyry with enormous
 talus slopes, but, acc.
 M. Guinochet, no special
 flora on the talus.

The pines here are
 generally small
 trees, not more than
 10 or 15 m. tall, 20-25 cm.
 or less thick. Here all
 are Pinus pinaster (P. maritima)

The garrigue on its seaward
 slopes is like that inland but
 has Rosmarinus ^{and Vituvium tinus} added in signi-
 ficant amounts, and oaks are princi-
 pally in the canyons. Scrub 1-1.5 m. tall,
 tree 10 m. tall, 15 cm. thick.

shrub 1 m. tall, flowers
 pale purplish pink, shiny.
 shrub 1.3 m. tall.

erect, many stems from base.

- 35941 ~~Herb~~ *Lavendula stoechas*
very common in
2 42 *Erica scoparia*
occasional in
3 43 *Quercus ilex*
common in ravines
2 44 *Juniperus oxycedrus*
occasional

July 31 - 3 km. n.w. of
Antibes

garrigue burned over
2 years ago, bushes
far apart.

- 2 45 *Prunella hyssopifolia*
occasional
1 46 *Linum strictum*
rare
1 47 *Andropogon ischaemum*
rare
1 48 *Dianthus*
occasional
1 49 *Lithospermum*
common
2 50 *Fumana*
common
2 52 *Cistus albidus*
common
1 53 *Picris*
rare
1 54 *Lavendula*
rare
1 55 *Euphorbia*

- shrub 0.5 m. tall,
aromatic.
shrub 1.5 m. tall
tree 5 m. tall
tree 4 m. tall, broadly
spine-like habit,
fruit not quite mature.

flowers crimson

plants dry.

flowers bright yellow.

low shrub

erect, flowers yellow

erect, flowers blue

stem red, flowers green.

- 35956 Teucrium
local
- 57 Thesium
rare
- 58
common
- 59 Inula
common
- 60 Asperula cynanchoides
common
- 61
occasional
- 62 Galium
occasional
- 63 Campanula
occasional

This rather extensive burned area has scattered low shrubs, mainly Pistacia lentiscus, Daphne gnidium, a few small Erica, a few small oaks. These probably mostly come from root crowns not killed by the fire.

Many annuals and herbaceous perennials

57a Carex

- prostrate, aromatic
- flowers whitish.
flowers white
- flowers blue
- involucre pearly.
flowers bright yellow.
- flowers pinkish white
- flowers purplish blue

July 31 - 2.5 km. s. of
Valbonne, 10 km. w.n.w. of
Antibes

pine forest with sparse
under-story of oaks;
flat ground.

- 35964 *Centaurium*
occasional along path
- 65 *Linum*
occasional
- 66 *Quercus pubescens*
common
- 67 *Linaria*

This forest has
a rich ground flora
and considerable Pteridium.
The trees are 10-15 m. tall,
~~to~~ up to 25 cm. diam.
mixture of *P. pinaster* & *P. halepensis*

In this region the pines
are mostly cut for
pulp-wood and not
allowed to reach much
over 10 m. tall and 10-15 cm.
diam.

flowers yellow.

shrub 2 m. tall.

3 km. e. of Valbonne is
a dense maquis of
Calycotome spinosa
Cistus monspeliensis
Cistus alba
Phillyrea angustifolia,
Myrtus communis,
Pistacia lentiscus
Quercus ilex
a little *Q. pubescens*.

this scrub is 2-3 m. tall,
and is in a sparse
~~to~~ stand of
Pinus halepensis 10-15
m. tall, 10-20 cm. diam.

July 7 - near Biot
7 km. n. of Antibes
wasteland of a
volcanic conglomerate
of a basic character,
with very sparse shrub
vegetation, many annuals.

35968

grass

2 69

Diplazium serotinum

rare

1 70

Juncus pygmaeus

common in ^{small} desiccated
pools on rock surface.

1 71

Crucianella

rare among rocks

1 72

Sedum rubens

common among rocks

1 73

Asplenium trichomanes

occasional in shaded
rock crevices.

1 74

common in rock crevices

1 75

Polypodium serratum

occasional in rock crevices

1 76

Gymnogramme

occasional in rock crevices

2 77

Ceterach officinarum L.

common in rock crevices

1 78

Paronychia

rare in ~~rock crevices~~
small desiccating pools

2 79

Helaginella

common on shaded rock
faces and ledges

30

Plantago

desiccating rock pools

sheet
of area [80] x .76 au
10,000

IGN

Les Alpes

40-70

4 Trayas Var

50-100

Cannes

XXXVI-44

50,000

dried completely at this
season.

dried completely at this
season.

curled up in dry weather.

completely dry at this
season.

prostrate, closely adherent
to rock, mostly completely
dry at this season.

completely dry at this season.

sheet

page

8a

7b au

10.000

IGN

les Alpes

40-70

le Trayas Van

50-100

Cannes

XXXVI-44

50,00

July 7 - near Biot
7 km. n. of Antibes
wasteland of a
volcanic conglomerate
of a basic character,
with very sparse shrub
vegetation, many annuals.

- 35968 grass
- 2 69 *Diplazium serotinum*
rare
- 1 70⁶⁹ *Juncus pygmaeus*
common in ^{small} desiccated
pools on rock surface.
- 1 71 *Crucianella*
rare among rocks
- 1 72 *Sedum rubens*
common among rocks
- 1 73 *Asplenium trichomanes*
occasional in shaded
rock crevices.
- 1 74
common in rock crevices
- 1 75 *Polypodium serratum*
occasional in rock crevice
- 1 76 *Gymnogramme*
occasional in rock crevices
- 2 77 *Ceterach officinarum* L.
common in rock crevices
- 1 78 *Paronychia*
rare in ~~rock crevices~~
small desiccating pools
- 2 79 *Helaginella*
common on shaded rocks
faces and ledges
- 30 *Plantago* desiccating rock pools

10-10 m. sp.

stiff.

dried completely at this season.

dried completely at this season.

dried completely at this season.

dried completely at this season.

dried completely at this
season.

dried completely at this
season.

curled up in dry weather.

completely dry at this
season.

prostrate, closely adherent
to rock, mostly completely

dry at this season.

completely dry at this season.

July 31 - Biot. exposure
of basic volcanic
conglomerate with
labradrite. Soil pH
tested by Guinochet is 9.0.
Mass of boulders
up to several dm. diameter
in a consolidated but
rather crumbly matrix.

This formation covers
about 30 sq. km. (or 30 km. sq.?)
and has very little
soil. Its vegetation presents
the aspect of a desert.

The vegetation is sparse,
only $\frac{1}{4}$ to $\frac{1}{2}$ of the ground
is actually covered by
the woody vegetation. This
is a very sparse scrub
with *Cistus monspeliensis*
the most abundant
species, up to 1 m. tall,
with some *Lavendula*
stoechas, and with
scattered *Pinus halepensis*.
The vegetative period
is from December to April,
during which time
water actually runs
over the ground and
stands in shallow
pools. Ephemeral
annuals are present
in large numbers

and with mosses
cover much of the bare
ground and the beds
of the desiccating pools.
An *Isotria* is found in
the desiccating pools.

These observations
were made on a moderate
west slope, over which
an old Roman road went
whose wheel-tracks are
still apparent, in places
10-20 dm. deep. In these
wheel tracks are tiny
annuals and dormant
perennials, incl. the
Isotria, *Plantago pusilla*,
and *Juncus pygmaea*.

~~The ravines are~~
The east slopes, and
especially the ravines,
have more trees in
them. On the rocky
walls of the ravines
are several xerophytic
ferns, ~~an annual~~
including *Ceterach*, an
annual *Sedum* of which
only the hard dry inflorescence
remains, *Umbilicus*
pandulinus, of which
only the dry fruiting spikes
remain, *Selaginella*,
etc.

Aug. 1 - hills e. of Nice
are pine-covered.

Beyond Nice is Cap
Ferrat, generally pine
covered but mostly
occupied by houses, etc.

East of Beaulieu ^{on the}
are high bluffs and
cliffs of light gray
rocks, prob. limestone,
the tops of the bluffs
with scattered pine,
the cliffs with almost
no vegetation. At the
base little wild vegetation,
but semi-wild, are
numerous *Agave americana*,
many of them flowering,
also a very large *Opuntia*
prob. *Opuntia*, and
cultivated plants of a
generally subtropical
character (*Bougainvillea*,
Nerium, *Phoenix canariensis*,
etc.) which contrast strongly
with the pines which
are most abundant
and, with *Olea*, form the
tree background.

Drive through Monaco
and Monte Carlo. Many
Ficus carica, *Cupressus*
sempervirens, etc. Some
Eucalyptus, *Acacia* spp.,

Quercus ilex, *Arundo*, etc.
Pines seem to be mostly
P. halepensis.

East of here, at Cap Martin,
some semi-wild thickets
with oaks, etc. some
pine. *Schinus molle*.

Menton - mts. behind
it are wooded below,
very sparsely vegetated
above.

Lowlands rather
green and luxuriant
with *Ficus*, *Olea*, *Phoenix*
canariensis, *Schinus*,
Arundo, *Araucaria excelsa*,
Cupressus, and gardens
of all sorts. *Citrus*, *Eriobotrya*,
Platanus, *Bougainvillea*,
Washingtonia, *Cratogeomys*,
Acacia spp. *Magnolia*
grandiflora, *Arceuthobium*,
various other palms, etc.

Dry aspect continues to
Genoa, with in places
more or less trees on the
high slope.

From Genoa east along
the coast the cultivated,
and semi-wild vegetation
is much more luxuriant,
with many pines, esp.
P. pinea, *Cupressus*, *Fraxinus*
and many other trees,

of Aug. 1 - Dry looking hills, almost completely terraced, partly with olive groves, vineyards, etc. bet. Pontieri and Ventimiglia. Cliffs and high bluffs above V. olive groves in parts not too steep. Stony river-flats with pioneer vegetation.

Eastward, coastal slopes are terraced and have rows of grape vines and some fig trees, but prevailing tone of landscape is determined by olive trees. Some pines but even these have a gray tone.

Lowest few yards above water, where not cultivated, have aqave, and much *Arundo donax*, as well as *Atriplex halimus* and many other halophytes. Where there are shrubs they are low, compact, and rounded, due probably to spray shearing. Some attempt to plant pines here behind shelters. The most common cultivation is carnation-culture, at least w. of S. Lorenzo Cipressa.

Railroad is only a few feet above sea-level.

East of Imperia & Ventimiglia the terracing of the hills become less marked. Olives still dominate the lower slopes.

Near Andora the hills are ^{even} more rocky and are covered by a rather sparse scrub down to a rather low level.

Here the r.r. leaves the sea for a very short distance.

Eastward at least the lower slopes of the hills are ~~less~~ terraced and cultivated. Locally there are wide flat valley mouths, intensively inhabited and cultivated.

Seldom is there a square meter of ground flat enough to cultivate that is not cultivated.

The coastal strip, seaward of the r.r., if more than a few yards wide, is mostly occupied by houses and gardens, many fruit trees, oranges, peaches, figs, etc. For considerable distances, where the land is very

low and would be covered by storm waves, there is a substantial concrete wall 1.5 m. high at the top of the beach and the several yards of flat ground behind it is in gardens.

Olive groves on most lower slopes except where too rocky.

Same pattern generally eastward. Pines become fewer. ~~Near Genoa~~ ^{inward from} the higher and rockier parts of the coastal mountains are entirely bushy. Lower, among the olive groves, are occasional small groups of umbrella shaped Pinus pines. On bluffs above sea are patches of Erica scrub - bushes not touching.

Around Savona the higher hills are wooded with pine.

Dry aspect continues to Genoa, with, in places, more or less trees on the high slopes.

From Genoa east along the coast the cultivated and semi-wild vegetation is much more luxuriant

with, among the dominant olives, many pines, esp. P. pinea, cypress, palms, and many other trees, even Robinia. The low strip along the coast is almost entirely villas, etc. to Uscita. Olive groves ~~reach~~ reach half-way or more to the tops of the hills surrounding Uscita. Above them are pine woods.

East of this around ~~Rapallo~~ ^{Rapallo} the same pattern continues, with in places olives to the tops of the hills, locally pines down fairly low.

Same pattern continues ~~southward~~ ~~east~~ ~~along~~ ^{southeastward} along the coast, with pines in steep places coming even down to the sea-cliffs. Levanto. Much terracing, with terrace surfaces at about a 30-45° slope.

Left sea at La Spezia

Hills inland wooded, lower slopes with olive groves. Mountains in distance very rugged, upper parts bare and rocky.

Vegetation in thickly settled valley luxuriant - olives, fruit trees, almonds, grapes, poplars.

Woods in patches on lower slopes of hills are deciduous. Pines no longer important in valley around Carrara. Upper slopes densely wooded.

Broad flat valley, mostly intensively cultivated with a close mixture of gardens, rows of grapes and fruit trees. Occasional fields. Many of grapes on high wires. Olives abundant. Densely populated. Some of lower slopes of hills grazed, but mostly covered by olives.

Mountain slopes above Carrara - Avenza sparsely bushy but badly scarred by marble quarries and their debris cones.

RR several km. from sea on flat plain. Higher mountain tops bare.

Beyond Massa hills are covered by pine forests except for cleared and terraced parts.

Then in lowlands *Populus alba* and *Salix* begin to dominate landscape. Grape vines on trellises. Then the poplar changes to a green one. Lower slopes with olive groves.

Trees - fruit, willow, poplar, olive completely dominate landscape on all of this coastal plain. Somewhat more open toward Viareggio, but only locally.

South of here vineyards become more important on flat land. Then a large forest of *Pinus pinea* presenting a very odd appearance with flat crowns, scattered under story of oaks, and ground layer of heather and *Pteridium*, density of this layer varying considerably.

Then some open fields and meadows with a few long rows of trees.

Then the fields become more subdivided and lined with rows of willows and a single row of grapes around each field.

Then more open country but with cultivation in rather small plots separated by ditches but now hedges and trees only along roads.

Pisa. Area generally more cultivation, small plots separated by rows of tall vines. Hills to north densely wooded.

Same pattern eastward
Rolling hills along south
side of valley are cultivated
but steeper slopes are
either in small woods or
terraced.

Aug. 5 - Florence to Milan

Flat valley with
mostly olive groves and
vineyards, some misc.
cult. Grapes trellised
up on high wires or
even climbing in trees.

On east a high range
of hills or mts. olive groves
running up on lower gentler
slopes, green scrub or scrub
forest with uneven stand
of pine ^{or other conifer} on slopes above, with
some patches of sparse
scrub. High ~~summits~~
summits with sparse
scrub or grassy. Very rocky.
Prato. Some citrus and
figs with olives, grain
between. R.R. lined with
Robinia thickets, some dillanthes.
Beyond Prato m. enters
smaller side valley
between similar rocky
hills with scattered pine
or Cupressus.

Vaiano. Above this,
flat narrow valley
bottom has olives + grapes,
a few other fruit trees, some
poplars + willows and
grunds along stream.
Pine forests, and some
broad-leaf forest - oak and
chestnut on slopes. In
places terraces and olive
groves run far up hills.
Robinia thickets along
roads and railroad.

After a series of
long tunnels, it merges into
a valley with rather
gently sloping sides,
the greater part of
which, on s. side, are
cultivated. Some woods
on steeper or higher points,
seems to be mainly
meadows, some vineyards.

Then enters a part of
valley with steep
sandstone sides,
these wooded except for
small patches of
cultivation. Woods scrubby.
Montyuno-Vado.

More tunnels. Then a
broader valley with
gentle open cultivated
slopes on both sides.

Mostly grain fields and meadow. Flat valley bottom with fruit trees, ~~of~~ grapes, alfalfa. Rows of poplar. Some vineyards on lower slopes. Miss. cult. between rows of grapes and trees on valley floor. Apparently no olive trees. Approaching Bologna.

Bologna is in flat country surrounded by very low hills. Fruit trees abundant.

North of Bologna is a broad flat plain, all under intensive cultivation. Small fields of alfalfa, maize, separated by rows of trees - elm & poplar, mostly with grapes climbing in them. Willows along ditches and in wet places. A few cypress hedges. Fruit trees locally. Locally, also, the rows of trees are absent. Appearance is of larger open fields, but cult. is still in small patches.

Some vineyards, some tomatoes, beets, millet? ^{requiem} Other vegetables in addition to dominant alfalfa and maize. Small orchards. Where grapes are not with trees, they are up on ~~wires~~ wires 1.9 - 2 m. tall. Much bare plowed ground.

Landscape is tree-dominated but actually mostly open ground. Modena.

This pattern ~~is~~ does not vary much for a long distance except for one or two broad flat stony river-beds with little or no water. Irregular strips of bushy willows along banks.

Much of this land is irrigated by pump-driven water from wells.

Locally tomatoes and maize are grown together. Seems to have an inhibiting effect on the maize, as the plants are relatively small.

Parma. Riverbed dry, weedy. Stretches of Robinia along r. generally, but not everywhere!

near Fidenza the general aspect becomes somewhat more open, with larger fields, not so often separated by rows of trees and grapes, but some hedgerows, more rows of cherry or peach trees, some fair sized tracts with no trees. Trees do not completely dominate landscape.

Misc. cult. tomatoes, maize, tobacco, alfalfa, etc. irrigated from wells. Almost no grapes.

Riverbeds dry.

Cadeo. More poplars.

few grapes.

Piacenza. Large river with broad bed and considerable water. Willows along banks but not many.

Large fields and groups of fields separated by rows of poplars. Some fruit trees. Misc. cult. alfalfa, maize, few grapes. Some small patches of poplars. Some willows.

Mulberries for silkworms.

Poplars dominate landscape.

Secugnago. Lodi.

Irrigation from canals, all way to Milan. Country gets more open approaching Milan.

Milan northward - flat land - misc. cult. maize and alfalfa principally. Dense population. Some fruit trees. Some poplars. Robinia abundant along r. and roadsides.

Cannago L.

flat valley with meadows, low wooded escarpments on sides, cut in flat country. Woods on walls entirely of Robinia thicket.

This ravine winds into somewhat rougher country. Robinia thickets up to 10 m. tall. Approaches foot of Alps - must be cut in a great alluvial fan.

Albate-Camerlata - almost at foot of mts.

Mts. wooded but with much terracing even on very steep high slope. Robinia very abundant around Como, Ailanthus also.

Lake Como surrounded by steep mountains with woods, but with scattered houses clear to tops. A hamlet from Como up to a thickly built up hill-top above.

Chiasco - surrounded
by woods hills,
with a few scattered
houses and clearings.
Flat valley bottom with
misc. cult. scattered
groups of poplar and
willows. Woods on
hills deciduous. Those
on low hills largely
Robinia thicket, more
mixed upward.

Talus at base of
high cliffs sparsely
wooded. Cliffs with
much bare white rock.
Upper part of valley
mostly in meadow,
some cult. Irrigated

Lake Lugano surrounded
by steep densely wooded
slopes. Narrow flat
land on n.e. side with
meadow and houses. Very
little on other side.

Maroggia - Melano.

Dense deciduous woods
on all steep slopes. Seem
to be largely chestnut.

Lugano.

Vineyards on lower slope
on east side of valley
above lake, valley of R. ~~Fino~~
Upper and steep lower slopes

densely wooded - mostly
broad-leaf trees, some conifers
on and around summits.
Valley winds between
steep slopes, quite narrow,
a few meadows in bottom,
small vineyards ~~at foot~~
on slopes. ~~some~~
thicket, ~~is~~ along rr.
mostly Robinia.

On the high slopes, where
there is a bit of moderate
slope there is a clearing
usually with a house.
Vineyards still on
lowest slopes near
Riviera Bionico

Tunnel to Lago Maggiore
broad plain above the
lake all in green farms,
mostly meadow, ~~rather~~
few trees, scattered houses.

Steep slope round
this valley mostly wooded,
Castanea and Robinia, but
any possibly cultivable
slope cleared. Lowest ones
in grapes.

This plain winds for
some distance to Cubiasco.
Grapes up on high vines,
1-2 m. or even more. Same to
Bellinzona. Here valley
narrows. Slopes are

rocky and wooded, still with chestnuts and other broadleaf trees. Grapes and meadows in valley bottom. High summits very steep and bare. General slope here 45° or more, some of them steeper at bottom.

Above this, below Isoetes pines appear both on valley floor and on summits.

Valley walls get steeper and much rockier, enormous bluffs and cliffs, woods scrubby and sparse, thick ^{scrub} on talus.

Biasea. Great cliffs on east side. Still grapes, on trellises, in valley bottom, otherwise meadows. Snow patches visible on high peaks.

Above this valley becomes a tremendous gorge a few hundred m. wide, with towering peaks and cliffs with hanging valleys on both sides. Sloping places scrub-covered with scattered trees, cliffs bare or nearly so. High slopes covered by coniferous forest, prob. spruce. Around Giornico the valley

bottom, a bit wider, is covered by vineyards, entirely on trellises. Slopes above here with beech, ~~and~~ birch, and spruce(?) woods.

Lavaggio. Conifers and birches except on talus at bottom which has a broad leaf scrub. Valley bottom with willow-birch thickets and meadows.

Magnificent Picea on bluffs, also Larix.

Soon they clothe everything except cliffs and valley floor. Some ~~best~~ admixture of birch.

Then no significant meadow area in valley floor. Gorge very narrow.

Rodi-Fiesso. - valley slightly wider, meadow runs up slope a little. One side has spruce forest, showing conspicuous avalanche scars. Other side some spruce, large areas of pure birch, some high meadows.

Ambripiotta
Some Sorbus in lower forests.

Valley widens out and meadows become more extensive both in valley bottom and on slopes. High peaks around are bare rock with patches of snow. Ariolo. Wide valley surrounded by very sharp high peaks.

St. Gothard Tunnel 12 minutes ±, to Goerchenen. Here, high practically bare rock cliffs. Some patches of spruce forest. Snow patches everywhere. Glacier at head of valley. Lower talus cleared, higher with spruce forest. Highest slopes in meadow and low scrub. Peaks above this bare rock.

Avalanche scars are sharp clear stripes running down through spruce, grassy or with very low scrub. Steep mountain torrents in vertical ravines with debris cones at bottom. Debris grass covered.

Aug. 7 - Fribourg - Geneva
Predominantly hay meadows with some grain fields. Many patches of forest, this either beech, spruce, or mixed beech, fir and spruce in varying proportions. Fruit trees around houses. Alnus and Salix along streams. Some Robinia along rr. but not much. A few birches along fences and in the occasional hedgerows.

Some vegetable gardens. Agriculture generally in small plots. Alfalfa common, some Onobrychis.

Gently hilly country. Perhaps 5% in woods. Everything except the grain is very green. Grain is being harvested.

Romont.

Some oaks in hedgerows, and in edges of forest patches. Vauderens - edge of a lower level of rolling country with the Jura in the distance. This level must be at least 10-15% wooded, or even more. Spruce predominates. Otherwise same general pattern.

The beeches here seem to have abnormally small leaves in the upper parts of their crowns, normal in lower parts. This observed more or less throughout trip.

Palersieux. Near here some Abies and some Pine observed in forest - mostly on steep slopes and ravine sides. Also some *Arbutus aucuparia*.

Quite a few walnut trees scattered around in fields, and esp. in hedge-rows, near Puidoux and Lake Geneva.

Lower slopes above Lake Geneva are in vineyards - the vines mostly staked but not on wires. Some orchards. Thickets in ravines.

Lausanne.

Hilly ^{or rolling} country, partly vineyard, partly misc cult. partly woods, extends some distance back from lake. Lonay. Thickly populated. Gardens of all sorts. Fruit trees. Ornamental Orchards.

Toward Geneva this rolling country narrows and becomes much flatter. The hills back of it are mostly wooded except the lower slopes. The flats are mostly cult. with few hedges, no hedgerows, few orchards, many vineyards and grain fields. Fewer patches of woods.

Widens again. Jura in distance. Densely wooded.

Nyon.

Woods here have few conifers. Mostly beech. Some oak. A few spruce + pine.

Houses become more numerous again.

Versois.

Thickets and rows of trees, as well as orchards numerous. Trees dominate landscape. Robins abundant.

Aug

July 5 - Engstlensee, Canton Bern
meadow with scattered trees

1850 m.

35931

Pinus cembra

tree 10 m. tall.

1 ~~8~~

scattered trees, with Larix
said to be remnants of former forest.

1 37

Pinus cembra

tree 14 m. tall. staminate
cones bright red.

same

Aug. between

July 6 - Engstlensee and
Jochpass, Canton Bern
meadow patches on rocky banks

2000 m.

1 83

Primula

flowers crimson

rare

1 84

Tofieldia

flowers greenish; leaves
in one plane.

occasional

1 85

Soldanella

flowers rose-purple

locally common

July 6 - Engstlensee, Canton Bern

86

Tofieldia

common in

Aug. July 6 Tannenalp, Canton Unterwalden

1980 m.

turfy slope, common

1 86

Tofieldia

leaves in one plane, buds only.

Aug. east of

July 6 Melchsee, Unterwalden
boggy place in grazed meadow.

1990 m.

1 87

Plantago alpina

said to be good cattle food.

common

1 88

Lycopodium selago

1 89

Lycopodium selaginella

creeping, spikes erect.

1 90

Nardus strictus

unpalatable to cattle

common locally

1 91

Trichophora?

tufted

common

Aug.

July 6 - Engstlensee, Canton Bern
 35992
 1
Asplenium viride
 occasional in rock crevices

Aug.

July 6 - Valleys of Melchaa and Melchtal above Larnen - meadows with patches of woods, the steeper slopes almost completely wooded, with beech-fir woods - mostly *Fagus* with some *Abies* and *Picea*. This is the basic vegetation type at lower altitudes in this part of the country. Above this, from perhaps 1000 to 1300 m. or a little higher, is *Picea* forest, and above it was formerly *Pinus cembra-larix* forest, now mostly replaced by meadow or pasture. Above this, perhaps above 2000 m., alpine meadow.

In the higher parts of the *Fagus-Abies* belt *Acer pseudo-platanus* and *Picea abies* are common, as well as *Fraxinus*.

The meadows that now occupy the place of the former *Pinus cembra-larix* belt have a mixture of the plants that grew under these trees with those of the

racialis of pond green.

meadows above. The former existence of the *Pinus* and *Larix* is determined by the persistence of herbaceous species characteristic of their ground layer, and of scattered remnants of this forest. These meadows have been heavily grazed for a long time and have assumed a low compact turf-like character, the vegetation not usually more than 10 cm. tall.

This is the common type around the Melchsee at about 1900 m. on calcareous rock. This limestone shows conspicuous lapies or erosion channels, which shelter many interesting plants. This area is completely bare of trees and all shrubs except prostrate ones such as *Salix retusa*, *Juncus communis* and *Rhododendron hirsutum*. There are many herbs characteristic of the "tall meadow" and ~~also~~

1954 Switzerland

some from above timberline.

The annual precipitation here is about 2000 mm.

This type of meadow continues through the Tannenalb and around Tannensee. Around both Melchsee and Tannsee are zoned marshes and boggy ground. In low spots in the valley are boggy or marshy spots with some species different from those of the ~~dry~~ drier meadows. Locally, also, are areas of *Nardus strictus* which is stiff and harsh and which is so disliked by the cattle that when they accidentally bite off a tuft of it they spit it out. Dry tufts of *Nardus* are common in places. It seems that both *Nardus* and a big yellow *Ranunculus* have been greatly favored by grazing.

Over the line in Bern Canton there is a steep slope which has been protected from grazing. It has "tall meadow" vegetation up to 3-4 dm. tall, or more, with many showy flowers,

Unterwalden and Bern cantons.

such as *Rhinanthus*, *Dianthus*, *Anthriscus*, *Lotus*, *Delphinium*, etc. Very rich in herbaceous species. Here are patches of *Picea* and occasional trees of *Pinus cembra*.

Around Engstlensee is a grazed meadow with commonly scattered *Picea*, individuals and patches, with some *Pinus cembra* and *larix*. The general background here is grass with many herbs, and with shrubs such as *Rhododendron*, *Daphne mezereum*, *Vaccinium myrtillus*, *V. uliginosum*, and *Calluna*. This extends up to Jochpass, but the trees drop out not far above the lake.

On the north slope of Jochpass are rocky hills covered by meadows with *Ranunculus*, *Myosotis*, *Chrysanthemum*, *Lirium olivaceum*, *Gentiana verna*, *Dryas octopetala*, *Athyrium*, etc. with patches of *Vaccinium heath* ~~low~~ patches.

On the slope across the valley of Engelberg timber line is clearly visible at perhaps 2000 m. well below the scree slopes and cliffs. Below it is steep meadow with patches of spruce.

These mountains are all limestone.



