



F. R. Fosberg field notebook no. 53, beginning with # 39651, ending with # 39809

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B + w. photos for this book
are 58-14 to 58-20
(Indonesia to Australia + Oahu)

Hotel McTear
Sydney
Prof. Dr. J. B. G. M. M. M.
In the M. M. M. M. M.

Ketchak - Dance of Bone

Deubsezi (Bali)

N.A. Tsalai Burezi "BUTILON"

Originally the ketchak was a choir of men who by their litaries cooperated with the Sanghyang that was to be put into a trance. The intention of any Sanghyang (trance) performance was that the while in a state of trance (semi-consciousness) would be capable of hearing and telling the wishes of the gods or of the ancestors.

the army of Ramana (Rakshasas or demons).

The performance ends with the battle-scene between the army of Hanuman (monkeys) and the army of Ramana. The king of the monkeys talks with his generals and mobilizes his army for a battle against

the army of Ramana. The king of the monkeys talks with his generals and mobilizes his army for a battle against the army of Ramana. The king of the monkeys talks with his generals and mobilizes his army for a battle against the army of Ramana.

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Ketchak - Dance of Bone

Originally the ketchak was a choir of men who by their litanies cooperated with the Sanghyang girl that was to be put into a trance. The intention of any Sanghyang (trance) performance was that the girl while in a state of trance (semi-consciousness) would be capable of hearing and telling the wishes of the gods or of the ancestors.

At present this ketchak is also performed with a special story (libretto). This story has been chosen from the Ramayana saga. Very condensed, the contents of the Ramayana saga are as follows :

By intrigue Rama, the legal heir to the throne of Ayodhya, is exiled from the realm of his father Dasaratha. Accompanied by his wife Sita and his younger brother Laksamana he moves from his father's palace and goes into the forest. Here he goes through many adventures and finally he is chasing the deer with the golden horns. At a certain moment his wife Sita remains alone without protection. Then she is kidnaped by the followers of Rawana, the king of the demons. After that, Rama with the assistance of the army of monkeys, under the command of Hanuman, attacks the residence of Rawana, called Lengkapura (Ceylon).

The monkeys are building a weir of bridge between Hindustan and Lengkapura and the battle ends with the victory of Rama. Some episodes from this saga are represented in the dance of the principal figures :

1. After the departure of Rama, Sita is speaking to his younger brother Laksamana. Sita orders him to go and help Rama who has persued the deer with the golden horns, because Sita hears a call for help, thinking it is Rama, who calls for help.
2. Sita, already kidnaped by Rawana, is staying at a bower in his palace. There she is visited by Rawana, who asks her hand for marriage. She then burst all into tears.
3. Rama marches out to Lengkapura to rescue Sita, his wife. He meets Meganada, Rawana's son and becomes involved in a combat with the demon. Meganada shoots his arrow, which turns into a serpent and ties Rama up like a rope.
4. Rama tied up, beseeches the gods to help him. Then Wishnu's bird, Garuda, is sent to free Rama.
5. Hanuman, the king of the monkey talks with his generals and mobilizes his army for a battle against Lengkapura. The performance ends with the battle-scene between the army of Hanuman (monkeys) and the army of Rawana (Rakshashas or demons).

N.V. Travel Bureau „BALITOUR”

Denpasar (Bali)

the story of Rama. Some episodes from this saga are represented in the dance of the Ram-
After the monkeys are building a way to the golden mountain and the golden
kingdom (Ceylon) to help

force of the army of monkeys under the command of Hanuman attacks the residence of Ravana, called
the is kidnapped by the followers of Ravana, the king of the demons. After that Rama with the as-
sist- with the golden mountain. At a certain moment the king and his attendants alone without protection. Then
Ravana and goes into the forest. Here he goes through many adventures and finally he is chasing the
Devi. He is accompanied by his wife Sita and his young son. The king of the monkeys moves from the forest
to the golden mountain. He is accompanied by his wife Sita and his young son. The king of the monkeys moves from the forest

to the golden mountain. He is accompanied by his wife Sita and his young son. The king of the monkeys moves from the forest

from the Ramayana saga. Very condensed, the contents of the Ramayana saga are as follows:

1. Rama is born to King Dasartha of Ayodhya. This story has been chosen

2. Hanuman, the king of the monkey talks with his generals and mobilizes his army for a battle against
Lankapura. The performance ends with the battle-scene between the army of Hanuman (monkeys)
and the army of Ravana (Rakshasas or demons).

of the gods or of the ancestors.

3. Rama is in a state of trance (semi-consciousness) when he is rescued by the monkeys
and they are to be put into a trance. The intention of the king of the monkeys was that the

Originally the Katchak was a group of men and women who performed with the king of the monkeys

N.Y. Travel Bureau "BALITOUR"

Denpasar (Bali)

Katchak - Dance of Bone

21 Dec 55

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Collection and Field Note Book

No. 53

(Nov. 5, 1958 - Jan. 20, 1959)

(39651 - 39809)

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EXCURSION III

to

Baluran (East Java) and Bali

by Bus.

- Dec. 22. Leaving Tjiawi at 6.00 a.m. for Solo in Central Java via Bandung, Tjirebon, Tegal, Semarang and Salatiga. It will be a heavy journey this day. Midway Tjiawi-Bandung we will see some plantations of teak, which are truly out of bounds from an ecological angle: the annual rainfall is too high; age about 10 years. Afterwards the bus climbs along the slopes of bare hills: G. Missigit tertiary formations of limestone. Bandung will be reached at 8.30; the capital of West Java, well-known since the Asia-Africa Conference in 1956; Centre of Institutes devoted to the study of the Natural Sciences, Physics, etc. Leaving Bandung on our left hand the volcano Tangkuban-prahu, which is still active, on the slopes of which are cultivated Cinchona and Pinus merkusii. For some kilometres we will drive along ravines with picturesque landscapes, with Bamboo, Eupatorium palescens and Alsophila spp. Entering the plains of Tjirebon on our right hand we see the Nunuk hills, which are severely eroded. These plains are the most western part of Java where sugar cane can be grown. From here the region with a distinct monsoon climate starts. From Tjirebon to Semarang the road follows the north coast of Central Java. This is a region where onions are grown on a large scale and further more sugar cane and rice. Lunch will be at Tegal at 13.00. At 5.00 p.m. we will be passing through Semarang the Capital of Central Java. Along the road to Salatiga we see Myristica fragrans (nutmeg) and Hevea plantations. At sunset we will have left Salatiga and we hope to arrive at the Dana-Hotel in Solo at 7.00 p.m. Solo is the Centre of Javanese art and culture. The Sunan has his palace here.
- Dec. 23. Solo - Madiun - Gempol - Pasirputih. Depature from the Dana-Hotel at 7.00 a.m. For an hour the journey is not very interesting: wide plains just ploughed for growing rice in the next wet season.

After crossing the border between Central and East Java (after about one hour and a half) we will be driving through teak plantations, most of which are devastated by cattle.

Typical species of the Malaysian Monsoon Forests will be seen here, some of which are: *Acacia leucophloea*, *Schleichera oleosa*, *Schoutenia ovata*, *Butea monosperma*, *Lagerstroemia cinerea*, *Homalium tomentosum*.

Before Ngawi near Trinil, Dubois discovered the famous *Pitecanthropus erectus* dating from the middle-pleistocene.

The volcano on our right hand is the Lawu.

After Madiun we will see again some teak forests of various age.

Just after Kertosono the river Brantas will be crossed; this river causes trouble every year by its floods.

Between Djombang and Modjokerto was the centre of the 13th century kingdom of Modjopahit. In a museum in Trowulan, near Modjokerto, some antiquities from those times are conserved.

At 1.00 p.m. lunch will be served at Gempol.

The afternoon-trip after Gempol along the north coast of East Java will be for about 3 hours via Pasuruan, Probolinggo. End of this day's journey will be Pasir-putih (White sands); staying the night over here in rest-houses on the beach.

Savanna serpentina grows in the better parts of the forest. *Butea monosperma*, the flame of the forest, is common in teak plantations. The

The Baluran region

This region centering around the extinct Baluran volcano is characterized by its dry climate (less than 1000 mm annually) with a severe dry monsoon of 10 months. In the dry season dry winds come down from the Idjen Pass (600 ft.).

There are practically no rivers. The soil, originally lava, has changed into heavy, black earth, strewn with basalt and andezite blocks.

The vegetation is savanna-like, along the small mountain streams we find gallery forest. During the dry season the vegetation burns regularly, which prevents the re-establishment of the forest. The latter is well developed towards the summit of the Baluran.

Many plants have subterranean parts enabling them to survive drought and fire, such as *Dioscorea hispida*, *Asparagus racemosus*, *Crinum asiaticum* and some orchids (*Plantanthera susannae*, *Pogonia nervillia*).

The trees are deciduous and flower often on the bare branches, e.g. *Dillenia pentagyna*.

Of the grasses the most common is *Andropogon amboinicus*, f. *genuinus*, which becomes more than 2 m tall. Other species are *A. parviflora*, *A. zollingeri*, *A. triticus*, *A. contortus* and *A. subtilis*. Other tall grasses are *Rottboelia exaltata* and *Ophiurus exaltata*, which remind one of a horses tail.

Themeda argueus is also common.

Among the trees the most conspicuous are *Acacia leucophloea* with yellow-white bark.

The *Palmae* are represented by *Borassus flabellifer* and *Corypha gebanga*.

Scattered here and there we find *Ficus superba* (krasak), and in the driest places a thorny scrub consisting of *Feronia elephantum*, *Aegle marmelos*, *Acacia tomentosa* *Homalium tomentosum*.

We also encounter *Schleichera trijuga* (Kosambi), *Protium javanicum*, *Grewia*, *Phyllanthus emblica*, *Melia Azedarach*, *Albizia lebbeckoides* and *A. procera*, *Cordia obliqua*, *Morinda tinctoria* and *Schoutenia ovata*, *Tamarindus indica*.

On level ground where the heavy impermeable black soil is deeply cracked during the dry season, the grass cover is thinner and *Zizyphus mauritiana* is common, often with an abundance of *Ipomoea heterophylla*.

At the margins of the open places occur the yellow-flowering *Abutilon indicus* and *Thespesia lampas*, in moister places *Ophioglossum reticulatum*.

Rauvolfia serpentina grows in the better parts of the forest, *Butea monosperma*, the flame of the forest, is common in teak plantations. The teak does not do very well here.

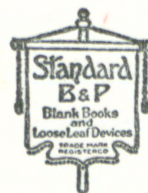
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field notebook no. 53

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1958 Maryland

1

Nov. 5 - Trip by Pennsylvania
R.R. from Washington to New
York - left side of river.

Fall coloring about at its
height or a little past.

Leaves almost all fallen
from *Liriodendron*, *Robinia*,
Betula nigra, and some *Platanus*.
Fagus bare, branchlets plum color.

Liquidambar about at
its best, with a range
from yellow through orange
to reds and purples. *Acer*

rubrum very striking, from
bright yellow to bright red.

Nyssa scarlet but some
trees bare. *Quercus alba*

dull purple but mostly
already gray-brown. *Quercus*
velutina mostly already brown.

Quercus coccinea deep red

to maroon. *Quercus palustris*
orange-brown to reddish.

Quercus phellos greenish brown.

^{in places} nearly bare. *Quercus* *alba*?
orange-red-brown. There

seems to be considerable
variation in stage of change
according to habitat variation.

Extensive pine land along
r. south of Odenton.

North of here the season
becomes rapidly more advanced
mostly oaks and willows still
with leaves.

2 1956

Maryland

What appears to be a magnolia bog across from the big Westinghouse plant south of big dual highway several miles south of Calvert Distillery, south of Baltimore.

North of Baltimore there seems little difference from the situation described for north of Washington. The season seems much less advanced than it is immediately south of Baltimore. Perhaps the differences may be more physiographic than climatic.

Small Magnolia swamps along left side just south of first large arm of bay crossed by track. In this arm are large areas of marsh now completely straw colored, west of track some distance.

↓ Same variation in apparent stage of advancement of season noted north of Aberdeen. It seems really only a matter of the forest type concerned, those where

1956

Maryland - Pennsylvania³
New Jersey

the dominant trees are mostly bare seem more advanced.

North of Philadelphia the trees are not entirely bare, but more so than southward, and the colors are much less evident.

In New Jersey there is little color left, except in the shrub layers. Some trees are still green, however. This probably generally reflects the extremely wet season this past summer, and the lack of hard frosts. The oak leaves are mostly brown. *Betula populifolia* and *Populus tremuloides* (or *P. grandidentata*) are yellow. Liquidambar, though not abundant, is very well colored.

The conspicuous coloration in the shrub layers in the woods where the trees are already bare should be emphasized. Most of the shrubs could not be identified from a distance, but some are *Acer rubrum*.

Nov. 12 - air trip, Washington to San Francisco, direct, 3:00 p.m. right side of plane.

Along Potomac above Washington to somewhat below Great Falls and then over Montgomery Co. Md.

Some autumn coloring still apparent, but most trees bare or brown. Rapidly less color westward.

Very little left at Sugarloaf Mt. and westward.

Considerable amount of pine forest in Montgomery Co. just west of Washington, mostly sharply outlined patches, in general not differing much from the outlines of presently cultivated fields.

Some color still in Catoctin and Bull Run Mts. at Point of Rocks. Scarcely any in lowlands west of here, but again scattered yellow trees ~~on east~~ and some red on east slope of Blue Ridge at Harpers Ferry, west slopes red-brown. Two main ranges of Blue Ridge here on Maryland side, completely separated, the western one only going a short way north, several subordinate ridges

just to the west of it, also going only a short way north. Potomac meanders ^{from} northward ~~after~~ before reaching the Harpers Ferry gap.

Then course turned somewhat more southward, over a small city (with airport) and a large quarrying operation that may be a cement plant.

Then a series of straight even wooded ridges separated by flattish cultivated valleys some foothill land, also wooded, dissected by transverse ravines but north-south parallel ridges very noticeable even in spite of this.

Forest on ^{main} ridges mostly deciduous, with a scattering of conifers, but the rolling or flattish land of the foothills and valleys, where wooded, has a substantial proportion of pure coniferous forest, this mostly in angular patches which are certainly old fields.

West of about the 3rd or 4th main ridge is a valley with striking entrenched meanders. West of this a ridge with flattish tops, cultivated, but parts with angular pine forest strips on top, bet. hardwood forest.

From here on flying over a vast sea of cumulus clouds with a continuous cloud layer overhead. Altitude of plane 12,000'. Top of cloud layer well below, at first lumpy and billowy, later fairly smooth. Upper layer well above and featureless. Space between very clear, visibility excellent between layers. A very sharp horizon, at least in northwest quadrant, white below against dark gray. Horizon also to south, but black gray below against semi-transparent gray above and above this a rather clear band with some irregular clouds. Above this dark gray featureless stratus clouds.

Thinned out between Dayton, O., and Indianapolis, over almost solidly cultivated land.

AN FRANCISCO CHIEF

Train 2, Eastbound
California to Chicago
Pullman, Chair Car Train

| Mls. | Read Down | Altitude | Mls. | Read Down | Altitude |
|------|--------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------|
| 8 | 0 Lv SAN FRANCISCO (PST) Cal. 11.15AM Passengers take motor coach direct to train side in Richmond. | 4225 | 1428 Ar CLOVIS (MST) N.M. 2.45PM At Clovis turn watches AHEAD one hour. | | |
| | ... Cross San Francisco Bay. 11.20AM | | | Richmond-Houston and Los Angeles Dallas Pullman and Chair Cars switched to Train 76 at Clovis. | |
| 36 | 7 Lv OAKLAND Cal. 11.25AM | | | Train 26 Lv. Carlsbad 8.45 am., Ar. Clovis 1.00 pm. to connect with Train 2. | |
| 40 | 10 Lv BERKELEY Cal. 11.35AM | | | Lv CLOVIS (CST) N.M. 4.20PM | |
| 43 | 18 Ar RICHMOND Cal. 11.54AM | | | Lv FARWELL-TEXICO, Tex. 4.31PM | |
| 43 | 18 Lv RICHMOND Cal. 11.59AM | | | Lv FRIONA, Tex. 4.52PM | |
| 10 | 26 Lv PINOLE Cal. 12.14PM | 4225 | 1428 | Lv HEREFORD, Tex. 5.12PM | |
| 21 | 52 Lv PITTSBURG Cal. 12.47PM | 4138 | 1437 | Lv CANYON, Tex. 5.38PM | |
| | ... Cross Old River. 1.08PM | 4006 | 1463 | Ar AMARILLO, Tex. 6.00PM | |
| | ... Cross San Joaquin River. 1.19PM | 3798 | 1486 | Train 94, Lv. Lubbock 3.05 pm., Ar. Amarillo 5.25 pm., where Chicago Pullman joins Train 2. | |
| 23 | 86 Lv STOCKTON Cal. 1.24PM | 3626 | 1514 | Lv AMARILLO, Tex. 6.10PM | |
| | ... Cross Stanislaus River. 1.48PM | 3662 | 1532 | Lv PANHANDLE, Tex. 6.35PM | |
| | 112 Lv RIVERBANK Cal. 1.49PM | 3443 | 1559 | Lv PAMPA, Tex. 6.59PM | |
| | 118 Lv EMPIRE Cal. 1.55PM | 3226 | 1586 | Lv MIAMI, Tex. 7.21PM | |
| | ... Cross Tuolumne River. 1.58PM | 2736 | 1608 | Lv CANADIAN, Tex. 7.45PM | |
| | ... Cross Merced River. 2.16PM | 2344 | 1630 | Lv HIGGINS, Tex. 8.12PM | |
| 172 | 151 Lv MERCED Cal. 2.30PM | 2560 | 1656 | Lv SHATTUCK, Okla. 8.30PM | |
| | ... Cross Chowchilla River. 2.48PM | 2237 | 1670 | Lv GAGE, Okla. 8.41PM | |
| | ... Cross Fresno River. 2.59PM | 2128 | 1678 | Lv WOODWARD, Okla. 9.12PM | |
| 296 | 209 Lv FRESNO Cal. 3.30PM | 1904 | 1702 | Lv WAYNOKA, Okla. 10.05PM | |
| | ... Cross Kings River. 3.50PM | 1464 | 1737 | Lv ALVA, Okla. 10.27PM | |
| 248 | 240 Lv HANFORD Cal. 4.05PM | 1327 | 1758 | Lv KIOWA, Kan. 10.50PM | |
| 335 | 295 Lv WASCO Cal. 4.48PM | 1443 | 1787 | Lv ATTICA, Kan. 11.14PM | |
| 350 | 302 Lv SHAFTER Cal. 4.56PM | 1417 | 1799 | Lv HARPER, Kan. 11.33PM | |
| 404 | 320 Ar BAKERSFIELD Cal. 5.25PM | 1205 | 1844 | Lv WELLINGTON, Kan. 12.20AM | |
| 404 | 320 Lv BAKERSFIELD Cal. 5.39PM | 1312 | 1878 | Lv WICHITA, Kan. 1.10AM | |
| 755 | 389 Lv MOJAVE Cal. 7.50PM | 1445 | 1905 | Lv NEWTON, Kan. 2.05AM | |
| | 408 Lv EDWARDS Cal. 8.11PM | 1138 | 1978 | Ar EMPORIA, Kan. 3.10AM | |
| | 457 ... Cross Mojave River. 9.08PM | 889 | 2039 | Lv TOPEKA, Kan. 4.25AM | |
| 105 | 458 Ar BARSTOW Cal. 9.10PM | 813 | 2066 | Lv LAWRENCE, Kan. 4.50AM | |
| 105 | 458 Lv BARSTOW Cal. 9.20PM | 2104 | ... Cross Kan.-Mo. boundary | 5.58AM | |
| 476 | 623 Lv NEEDLES (PST) Cal. 12.05AM | 781 | 2105 | Ar KANSAS CITY, Mo. 6.00AM | |
| | Leaving Needles turn watches AHEAD one hour. | 781 | 2105 | Lv KANSAS CITY, Mo. 6.30AM | |
| | 635 Cross Colorado River, Calif.-Arizona boundary. 1.17AM | 2131 | ... Cross Missouri River. 7.05AM | | |
| 3335 | 684 Ar KINGMAN (MST) Ariz. 12.14AM | 664 | 2170 | Lv CARROLLTON, Mo. 7.39AM | |
| 5242 | 772 Lv SELIGMAN Ariz. 3.52AM | 2186 | ... Cross Grand River. 7.50AM | | |
| 5128 | 797 Ar ASH FORK Ariz. 4.25AM | 857 | 2209 | Ar MARCELINE, Mo. 8.10AM | |
| 5748 | 824 Ar WILLIAMS Ariz. 5.15AM | 2233 | ... Cross Chariton River. 8.35AM | | |
| | For Grand Canyon Lv. Williams 7.40 am., via motor coach, Ar. Grand Canyon 9.25 am. | 913 | 2244 | Lv LA PLATA, Mo. 8.44AM | |
| | 851 ... Cross Arizona Divide. 5.43AM | 2277 | ... Cross N. Fabius River. 9.11AM | | |
| 6902 | 858 Ar FLAGSTAFF Ariz. 5.53AM | 2288 | ... Cross Wyaconda River. 9.18AM | | |
| | 889 ... Cross Canyon Diablo. 6.23AM | 2305 | ... Cross Des Moines River. 9.43AM | | |
| 4843 | 916 Lv WINSLOW Ariz. 6.50AM | 521 | 2321 | Lv SHOPTON, Ia. 9.55AM | |
| | 919 Cross Little Colorado River. 6.53AM | 523 | 2322 | Lv FT. MADISON, Ia. 10.00AM | |
| 5080 | 948 Lv HOLBROOK Ariz. 7.19AM | 2323 | ... Cross Mississippi River. 10.02AM | | |
| | 1022 Cross Ariz.-N.M. boundary. 8.14AM | | ... Iowa-Illinois boundary. 10.10AM | | |
| 6506 | 1043 Lv GALLUP N. Mex. 8.38AM | | Lv GALESBURG, Ill. 10.50AM | | |
| | ... Cross Continental Divide. 9.07AM | | ... Cross Spoon River. 11.05AM | | |
| | ... Cross Rio Puerco. 10.27AM | | 515 2425 Lv CHILLICOTHE, Ill. 11.35AM | | |
| 4785 | 1188 Ar BELEN N. Mex. 10.50AM | | 2427 ... Cross Illinois River. 11.37AM | | |
| | For Albuquerque take motor coach Lv. Belen 11.00 am., Ar Albuquerque 11.55 am. | | 2464 ... Cross Vermilion River. 12.13AM | | |
| | Lv Albuquerque 9.50 am., Ar. Belen 10.50 am., via motor coach to connect with Train 2. | | 625 2465 Lv STREATOR, Ill. 12.15AM | | |
| | | | 2502 ... Cross Kankakee River. 12.50PM | | |
| 4785 | 1188 Lv BELEN N. Mex. 11.00AM | | 549 2517 Lv JOLIET, Ill. 1.05PM | | |
| | 1192 ... Cross Rio Grande. 11.05AM | | 2531 ... Cross Des Plaines River. 1.25PM | | |
| 5952 | 1298 Ar VAUGHN N. Mex. 12.45PM | | 2544 ... Cross Des Plaines River. 1.40PM | | |
| 4040 | 1368 Lv FT. SUMNER N. Mex. 1.48PM | | 593 2555 Ar CHICAGO (CST) Ill. 2.00PM | | |

† Rail-Auto Service available. * Stops to receive passengers for Belen and beyond.
‡ Stops to discharge passengers from Bakersfield and beyond or receive for Clovis and beyond.
△ Stops to receive passengers for Clovis and beyond and discharge from North of Barstow.
○ Stops to discharge passengers from Woodward, Canadian, Pampa, Amarillo, Hereford, Clovis, Ft. Sumner, Vaughn, Belen and scheduled stops Williams and beyond. † Flag stop.
★ Stops to receive passengers for Chicago and beyond and to discharge passengers from Woodward, Canadian, Pampa, Amarillo, Hereford, Clovis, Ft. Sumner, Vaughn, Belen and scheduled stops Williams and beyond. ‡ Stops to receive for Clovis and beyond.
† Stops to receive passengers for Clovis and beyond or discharge from Belen and beyond.

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HANDLING OF BAGGAGE for passengers traveling to San Francisco. The attendant in each chair car and porters of each Pullman will contact passengers traveling to San Francisco and place a check on hand luggage, giving you a stub. This checked luggage will be unloaded at Richmond and moved by truck direct to the Santa Fe passenger terminal in downtown San Francisco. It will be ready for you when you arrive at the terminal. This service has been arranged to avoid any delay or inconvenience in handling your luggage to San Francisco.

A WORD ABOUT SMOKING for chair car passengers. You'll note in the arm of your seat an ash tray for the convenience of smokers. We do not encourage smoking in chair cars and rely on the consideration of passengers to do what is best in their judgment of when to smoke and how often they should smoke. Each car is ventilated every three hours but this does not always overcome the objections that many passengers have to excessive smoking.

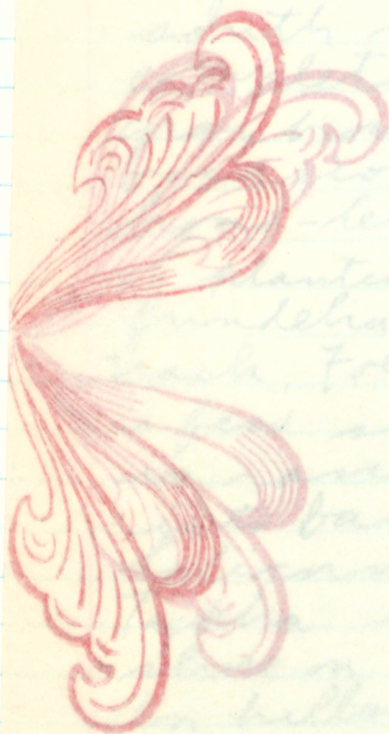
If you notice your neighboring passengers objecting, we suggest you do a limited amount of smoking in your seat and make an occasional visit to the lounge car where smoking is more acceptable to all passengers.

SCHEDULE OF THE SAN FRANCISCO CHIEF is printed for your convenience on the following pages of this folder.

At Clovis there is a short stop for leg stretching while train is being serviced. At other stops the schedule does not permit passengers to leave the train.

Thank you—happy traveling

1958 California



herbs. More woody vegetation eastward.



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Thank you—happy traveling

Nov. 16 - Railroad trip, Santa Fe (A.T. & S.F.) route from Richmond along the upper San Francisco Bay to the San Joaquin Valley.

Grassy hills along south side of bay completely dry and dull gray brown, except for occasional scattered broad-leaved plants. Patches of planted Eucalyptus. Grindelia in flower along track, Foeniculum vulgare. A few small marshes in ravines emptying into bay, some with Salicornia, mostly with Tophia. Some along the shore on flat low ground. On hills in places scattered dark green Baccharis pilularis. Ravines have Salix, Quercus, etc.

Beyond Pinole are higher hills, to left of route, with patches of coastal sage, open oak forest, and ravines with oak forest, otherwise dry grass and patches of ~~late~~ autumnal herbs. More woody vegetation eastward.

Most of the oaks are evergreen, doubtless both *Q. agrifolia* and *Q. chrysolepis* represented, as aspect is varied. Some *Juglans californica*.

North slopes beyond tunnel at Glenn Frases covered by open oak forest, south slopes with grass and oak savanna.

Some orchards and vineyards on hills but not in good shape.

Out of the hills, directly north of Mt. Diablo, are extensive marshes of quite varied aspect. These lie on flats between rounded grassy hills and Suisun Bay. Some flat land not low enough to be marshy.

Many large refineries and chemical works and other factories. These around Pittsburgh.

Beyond Antioch mostly vineyards and orchards. Rows of Eucalyptus. Ground somewhat rolling, sandy. Some marsh locally. A few oaks very locally.

Old River

Near ~~San Joaquin River~~ vast areas of low intensively cultivated land in truck crops, crossed by large canals and channels of the river, lined by trunks of *Salix*, some *Phragmites*, patches of *Salix*, great masses of floating *Jussiaea californica* and *Eichhornea crassipes*.

One of the crops is asparagus.

Eastward in this area is considerable blowing dust, west of Holt.

South of Stockton - flat cultivated land with scattered large *Quercus lobata*, bare or partially so at this season.

Much snow visible in high Sierras to the east.

Between Hughson and Denair, to east of track, what appears to be a vernal pool. (about 1 1/2 mi. before Denair).

Dominant agricultural types from Merced to beyond Placerville orchards and some vineyards. Around Placerville large acreage of figs, mostly trimmed down

to a dwarfed spreading stature. South of Placerville the route goes for a short distance through rolling grassland. There are orchards, large areas of irrigated land. After Le Grand large areas of slightly rolling grassland and dry farming. Soil a light brown, varying to chestnut and light and dark gray.

Wooded banks along dry sandy channels of Chowchilla River.

Vast areas of rolling essentially treeless dry farmed land between Chowchilla and Fresno Rivers. - more luxuriant around Madera.

South of Fresno the country is intensively cultivated, largely in cotton.

Near Kings River and just south of it is rather close savanna or open forest of large oaks, either *Q. lobata* or *Q. douglasii*.

About 5 miles south of Hanford is an area of short grass, probably *Distichlis*,

with winding shallow channels with shallow water and scattered salix. Farther on other similar areas with dry short herbaceous vegetation rather than *Distichlis*. These areas may be alkaline. Generally the country is farmed. Soils are generally of a light gray color. *Salsola* seems to be the principal weed.

What appears to be the old Tulare Lake bed (72 mi. ^{W. of} ~~from~~ Waxes), is an extremely sparsely populated area, extending for miles without a house. Much of it is cultivated but some seems to be in a sparse very short grass, with scattered *Salsola*.

Some snow in Tehachapi Pass.

Nov. 17 - west of Williams

~~scrub~~ pinyon-juniper open scrub forest with thin grass, some areas with Pinus ponderosa forest. A few inches of snow.

Between Williams and Flagstaff - open bit more or less continuous stand of small pines 3-5 m. tall, with thin grass and with scattered taller pines, 20-25 m. tall. So much snow that it is hard to be sure if the small pines are P. ponderosa, but they probably are. The large ones are. This situation could arise from fire or from planned logging and management, or perhaps from former heavy grazing.

East of Flagstaff the pine forest is more varied, some open ground. Some areas of scattered pine with abundant seedlings - in a few years it will look much like that described above. Some uniform open pine forest areas 4-6 m. tall, no tall pines. Then pinyon juniper open scrub forest over large areas. A few inches of snow everywhere.

EL CAPITAN

Tr. 18, Eastbound, 39½ hrs. Los Angeles-Chicago
Daily, All-Chair-Car Hi-Level Streamliner.
Extra fare train.

| Altitude | Mls. | Read Down | Altitude | Mls. | Read Down |
|----------|------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | | Leave San Diego Train 79, 5.00 pm, arrive Los Angeles Union Station 7.35 pm. | 4045 | 1235 | Ar LA JUNTA.....Colo. |
| 318 | 0 | Lv LOS ANGELES.....Cal. 8.00PM | 4045 | 1235 | Lv LA JUNTA.....Colo. 8.25PM |
| 35 | 2 | ..Cross Los Angeles River.. 8.08PM | 1256 | 1256 | ..Cross Purgatoire River.. 8.44PM |
| | | Long Beach passengers for El Capitan leave at 7.00 p.m., via motor coach for Pasadena. | 1269 | 1269 | ..Caddoa Dam..... 8.51PM |
| 830 | 9 | Lv PASADENA.....Cal. 8.30PM | 3603 | 1288 | Lv LAMAR.....Colo. 9.05PM |
| | 21 | ..Cross San Gabriel River.. 8.52PM | | | Stops at Lamar to receive passengers for Kansas City and beyond or South of Newton and to discharge passengers from Albuquerque and beyond. |
| 860 | 31 | Lv POMONA.....Cal. 9.07PM | 1310 | 1310 | ..Cross Arkansas River.. 9.28PM |
| 1077 | 60 | Lv SAN BERNARDINO..... 9.37PM | 1320 | 1320 | ..Cross Colo.-Kan. boundary 9.28PM |
| 3822 | 87 | Cajon Pass between San Bernardino and San Gabriel Mountains..... 10.11PM | 2830 | 1387 | Lv GARDEN CITY.....Kan. 10.24PM |
| | 108 | ..Cross Mojave River.. 10.55PM | | | Stops at Garden City to receive passengers for Kansas City and beyond or South of Newton and to discharge passengers from Albuquerque and beyond. |
| 2105 | 142 | Lv BARSTOW.....Cal. 11.35PM | | | At Dodge City turn watches AHEAD one hour. |
| 476 | 308 | Ar NEEDLES.....Cal. 2.07AM | 2486 | 1437 | Ar DODGE CITY (MST) Kan. 11.15PM |
| 476 | 308 | Lv NEEDLES (PST).....Cal. 2.17AM | | | Lv DODGE CITY (CST) Kan. 12.18AM |
| | | Leaving Needles turn watches AHEAD one hour. | 1476 | 1476 | ..Cross Arkansas River.. 12.50AM |
| | 326 | ..Cross Colorado River, Calif.-Arizona boundary.. 3.25AM | 1556 | 1556 | ..Cross Arkansas River.. 1.50AM |
| 5242 | 457 | Lv SELIGMAN (MST) Ariz. 6.11AM | 1530 | 1558 | Lv HUTCHINSON.....Kan. 1.53AM |
| 6748 | 509 | Lv WILLIAMS.....Ariz. 7.26AM | | | Stops at Hutchinson to receive passengers for Kansas City and beyond or South of Newton and to discharge passengers from Albuquerque and beyond. |
| 7313 | 536 | ..Cross Arizona Divide.. 7.58AM | 1445 | 1591 | Ar NEWTON.....Kan. 2.30AM |
| 6902 | 567 | Lv FLAGSTAFF.....Ariz. 8.06AM | 1445 | 1591 | Lv NEWTON.....Kan. 2.35AM |
| | 574 | ..Cross Canyon Diablo.. 8.37AM | 1775 | 1775 | ..Cross Kan.-Mo. boundary.. 5.21AM |
| 4843 | 601 | Lv WINSLOW.....Ariz. 9.05AM | 781 | 1776 | Ar KANSAS CITY.....Mo. 5.35AM |
| | 604 | ..Cross Little Colorado River 9.08AM | 781 | 1776 | Lv KANSAS CITY.....Mo. 5.50AM |
| | 707 | ..Cross Ariz.-N.M. boundary 10.28AM | | | ..Cross Missouri River.. 6.22AM |
| 6506 | 729 | Lv GALLUP.....N.Mex. 10.52AM | 1857 | 1857 | ..Cross Grand River.. 7.12AM |
| 7247 | 758 | ..Cross Continental Divide 11.20AM | 1903 | 1903 | ..Cross Chariton River.. 7.53AM |
| | 854 | ..Cross Rio Puerco..... 12.58PM | 1947 | 1947 | ..Cross N. Fabius River.. 8.18AM |
| | 878 | ..Cross Rio Grande..... 1.03PM | 1958 | 1958 | ..Cross Wyaconda River.. 8.35AM |
| 4934 | 889 | Ar ALBUQUERQUE.....N.M. 1.15PM | 1976 | 1976 | ..Cross Des Moines River Missouri-Iowa boundary 8.50AM |
| 4934 | 889 | Lv ALBUQUERQUE.....N.M. 1.25PM | 521 | 1992 | Lv SHOPTON.....Ia. 9.20AM |
| 5457 | 956 | Ar LAMY.....N.Mex. 2.30PM | 523 | 1994 | Lv FT. MADISON.....Ia. 9.25AM |
| 986 | 974 | For Santa Fe and Land of Pueblos take motor coach from Lamy 2.35 pm., arrive Santa Fe 3.10 pm. | 1995 | 1995 | ..Cross Mississippi River.. 9.27AM |
| | | Leave Santa Fe 1.45 pm. via motor coach to connect with the El Capitan at Lamy. | 755 | 2049 | Lv GALESBURG.....Ill. 10.15AM |
| 6457 | 956 | Lv LAMY.....N.Mex. 2.30PM | | | Stops at Galesburg only to discharge passengers from Lamy, N. M. and scheduled stops Albuquerque and beyond. |
| | 991 | ..Cross Pecos River.. 3.20PM | 2063 | 2063 | ..Cross Spoon River.. 10.30AM |
| | 1020 | ..Cross Gallinas River.. 4.05PM | 515 | 2096 | Ar CHILLICOTHE.....Ill. 11.00AM |
| 6392 | 1021 | Ar LAS VEGAS.....N.Mex. 4.05PM | | | ..Cross Illinois River.. 11.02AM |
| 6392 | 1021 | Lv LAS VEGAS.....N.Mex. 4.08PM | 2135 | 2135 | ..Cross Vermilion River.. 11.35AM |
| | | Passing through Rocky Mountains—beautiful views of mountains. | 625 | 2137 | Lv STREATOR.....Ill. 11.40AM |
| 6666 | 1131 | Ar RATON.....N.Mex. 6.01PM | 2174 | 2174 | ..Cross Kankakee River.. 12.15PM |
| 6666 | 1131 | Lv RATON.....N.Mex. 6.04PM | 549 | 2188 | Lv JOLIET.....Ill. 12.30PM |
| 7588 | 1138 | Cross New Mexico-Colo- rado boundary through Raton Tunnel, one-half mile long and highest point on the Santa Fe. | 2202 | 2202 | ..Cross Des Plaines River.. 12.49PM |
| 5971 | 1153 | Lv TRINIDAD.....Colo. 7.01PM | 2215 | 2215 | ..Cross Des Plaines River.. 1.10PM |
| | | Stops at Trinidad only to receive passengers for Kansas City and beyond or South of Newton and discharge passengers from Albuquerque and beyond. | 593 | 2226 | Ar CHICAGO (CST) Ill. 1.30PM |

*Stops to discharge passengers from scheduled stops Albuquerque, N. M. and beyond;
†Stops to discharge passengers from scheduled stops Los Angeles to Barstow; also to receive passengers for scheduled stops Albuquerque and beyond.
‡Stops to discharge passengers from Los Angeles; also to receive passengers for scheduled stops Kansas City and beyond.
§Indicates Rail-Auto Service available.

at plateau off and on-juniper, etc. in half just like the 12 m. tall south, which bush voted where it

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Nov. 17

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HERE'S HOW TO OPERATE YOUR CHAIR

A This trigger on arm controls back of seat. Pull up on trigger and push seat back to position desired. When seat is reclined pull up on trigger to bring back of seat forward.

B Legrest pulls up and can be set to position desired. Notice that when you pull legrest to a position higher than level of seat it will drop down.

By turning legrest completely upside down you can make a crib of seat for small child.

C Button at inside top of each seat permits you to adjust top part of seat to position you find most comfortable.

There is a center arm that folds into back of seat when not in use.

Reading lamp focused above each seat can be used as you desire.

We caution passengers not to stand or sit on leg rest of their seats as they will not support your weight and may cause injury.

PILLOWS are available from the news agent. He will be through the train to offer you a pillow, which can be purchased for 50c for your trip.

DRESSING ROOMS AND LAVATORIES are located on the lower level of each chair car. Also, there are lavatories on the upper level of the lounge car.

Out on open flat plateau between Flagstaff and Winslow the piñon-juniper gets smaller, petering out shortly after half way to Winslow. Just before this, while the bushes are still 2 m. tall is a vast area south of the track in which every single bush has been uprooted and is lying where it fell.

East of the end of the piñon juniper is a dwarf scrub-savanna steppe with bushes up to 1 m. tall, mostly less than 0.5, possibly bushier, some altiplex(?). This grades into steppe with practically no bushes, but mostly a very widely scattered dwarf scrub savanna.

Thin snow generally.

East of this an area of curious erosion remnants of wind rounded red sandstone seemingly lying at random on the slightly rolling steppe covered plateau.

Still east of this the steppe changes to a bunch-grass steppe with locally, tufts of *Chrysanthamnus*, and another type of erosion, remnant, low mesa-like, sparsely and unevenly distributed on the plateau. Then more dwarf scrub savanna.

Just east of Winslow are considerable areas of *Tamarix* scrub, mostly along a broad wash which now has water in it. The *Tamarix* has turned a burnt orange-brown in color. Around it on the rolling plateau is a mosaic of open scrub and steppe. Locally small patches of scattered cottonwood mixed with the *Tamarix*.

This mosaic continues eastward, along the river to Holbrook, and beyond.

Locally *Tamarix* replaced along river by small *Populus*.

East of Holbrook scattered small sandstone mesas and buttes.

Farther east an area

of small dunes, with various measures taken to stabilize them along tracks, including shrub plantings.

Mesas more conspicuous.

Thin snow generally, all morning.

Eastward large areas of scrub savanna and dwarf scrub savanna, on rolling and slightly dissected plateau country.

At about Arizona New-Mexico boundary the prevailing vegetation changes to an open forest or savanna of piñon-juniper.

Shortly before Gallup a line of west-facing red cliffs, locally cut into beautiful narrow domes and pillars. Almost bare of vegetation.

Toward Gallup the route follows a wide canyon cut in a sandstone plateau. Scrub savanna in bottom, scattered pines *ponderosa* in open piñon-juniper on top.

East of Gallup, to north of route very interesting erosion features in red sandstone. Prevailing vegetation open scrub in valley bottoms, open scrub forest or savanna of piñon-juniper on mesas and ridges.

Still thin snow over everything.

Piñon-juniper continues for a long distance eastward, but after erosion features are passed it alternates with large flat or gently rolling steppe.

Snow disappears from all except high slopes near Grants.

Lava beds with open scrub, mostly *Atriplex*, east of Grants, in broad valley cut in flat-lying sandstone beds. These have piñon-juniper.

Snow again eastward.

West of Rio Puerco are vast plains to south of track, almost shrubless steppe. To north of track low rolling land, steppe with scattered juniper shrubs. Very little snow.

Tamarisk common along watercourses.

This steppe changes eastward to an open dwarf scrub which covers large areas of rolling plain around and northeast of Daller Jct. Principal shrub seems to be *Artemisia* (cf. *filifolia*?). and possibly *Trametes* sp.

(possibly dead *Salix*?) Snow is gone from here.

Scattered small *Quercus* appears northward. Some rather old lava beds on northwest side at a distance. A few juniper locally.

A dwarf scrub of varying proportions of *Artemisia*, *Atriplex*, and *Senecio riddellii* (?) dominates the plain east of the Rio Grande below Albuquerque. The low ground along the river has open *Populus* forest. The leaves of the cottonwoods vary from bright gold & dull buff, and from many trees they have fallen. A dull red note is added by what are probably pods of a tree that I fail to identify from a distance. It has small, narrow silvery hanging leaves, also.

2.

Bottom lands above Albuquerque are largely cultivated, checked with high levees and irrigated. *Populus* forest near river. Scattered trees near roads and houses elsewhere.

Thin snow, melted off in places.

Soil fine, gray brown, gullied somewhat away from river.

Slopes at foot of terrace scarp very gentle, upper parts with open *Atriplex* scrub.

Nov. 19 - Flight from Santa Fe to Clovis, N.M. 12000' at side of plane.

Mainly plateau country, the first part covered largely by open forest, probably pine, or perhaps some pinyon-juniper. No closed forest at all. Areas of very flat ground are bare or grassy.

Eastward this forest becomes sparser, areas of grass become larger and more prevalent.

Erosional features are

interesting. Small remnants of mesa, amoeboid in shape, some skeletonized by headward erosion. This headward erosion is really a rather obvious process, as the cutting power of the water would be proportional to the slope down which it flowed. This can be applied to explain many erosional features. Perhaps there is a limit of steepness beyond which the cutting power lessens.

Toward Clovis the grassland becomes the prevalent feature and trees become more and more restricted to escarpments and the gentle slopes just above them. Near Clovis trees disappear altogether. Small ponds, probably dry during most of the year, are scattered rather abundantly over these plains.

The topography also becomes rapidly less rugged and near Clovis there is almost no relief.

Nov. 19 ~~to~~ Flight from
Clovis N. M. to Fort
Worth Texas. st. side of plane.

East of Clovis are
large areas of low
partially or entirely
stabilized dunes. This
country where not
under cultivation, seems
covered by a low very
thin brush.

In some of the more obvious
of these areas the dunes
are well stabilized except
for localized spots of
activity, which show
up very strikingly.

Low spots where water
collects have trails
radiating out from them.
Here also there is a bit of
~~some~~ wind erosion getting
started.

Through this country,
both in the dunes and
elsewhere, low spots are
common, without outlets.
Most of them do not
have any water in them.
seems quite likely that
either gypsum deposition,
silting or compaction
by alternate cracking and
swelling could make

the bottoms of such pools
very much more
resistant to erosion
than the surrounding
area, if the whole region
were subjected to rejuven-
ation.

Eastward cultivation
becomes more and more
prevalent. Some of
the more well developed
of these pools should
be studied. They are
especially striking
just west of Lubbock, Texas,
and ^{some} do not seem to have
been completely altered.

There are also some, not so
well preserved, east of
the city. Most of them
have been plowed. South-
east and east the river
and its tributaries
have cut broad ravines
with vertical sides,
showing that rejuvena-
tion has already started.

East of here the gullying
becomes much more prevalent.
The soil changes to a
red color and for almost
the entire distance to Abilene,
following the northern of two
apparently dry rivers, is a

wilderness of thin brush and intricate dendritic gully systems.

In the center of this is a ragged rocky knob. It would be of interest to examine this area floristically and to compare it with the grassland that may have existed here before the gullying took place. It would be important to figure out the sources of the present flora and to compare its explosive expansion with the contraction of the prairie flora that it replaced. Also it should be of interest to find if any components were equally at home under both of these contrasting sets of conditions. The brush seems to be mesquite, rather closely spaced but not touching in most places, mostly almost bare at this season.

East of Abilene the country becomes more heavily wooded, but probably

still with mesquite, though it is hard to tell from a high altitude. Ponds become abundant but are mostly artificial.

The country for a long way eastward from Abilene is a much dissected plain, with much of the flat portion under cultivation most of the irregular area loosely wooded or in grass with scattered trees and bushes. The total relief is not much and the erosion remnants are flat-topped.

Eastward the trees change from deciduous to very dark green evergreens. Cultivation becomes less and less common. Cattle trails are common. Areas of active erosion are common and of fair size.

Eastward a fairly large meandering river crossed diagonally. The bluffs and mesas lining its meanders are covered by open evergreen forest.

This and deciduous area east of it probably the East Cross Timbers.

1958 Texas - Maryland

Nov. 20 - flight Ft. Worth to Wash.

southeast of Ft. Worth
and southwest of Dallas (?)
large areas that seem
to be plowed up in gigantic
furrows as with a
gold dredger. What is this?

Flinners says best
time to visit Texas w. of
Dallas is April or August.

East of Dallas - large
areas of black soil -
intensively cultivated.
Are these "black cotton soils"?
Deciduous trees along
some ravines.

Dec. 7 - flight Washington - New York

9:15 a.m. left side of plane 7500'

Along n.e. of Washington
a highway parallel with
it - many patches of
pine woods. Pine abundant
both as substantial angular
patches and as small
groves scattered in the
deciduous woods.

Northeast of Baltimore
toward Harre de Grace
there is no pine. There is
a substantial part of
the total area is wooded.
A few pine patches, all
angular with same

Penns - New Jersey - NY. 25

pattern as nearby cleared
fields, then very little
more. streams noticeably
entrenched, at least larger
ones, between Harre de Grace
and Philadelphia.

Practically no pine
to Philadelphia and in
New Jersey between Phila. and
New York.

Flight - Idlewild airport, Long Island
to Prestwich, Scotland - 1:45 p.m.
left side of plane.

An enormous area east
of Idlewild, covered by subdivision
developments with small houses.
Extensive area of salt-marsh
inside ~~a~~ a long-shore bar
island with a steep outer
continuous dune slope and
narrow beach. The salt
marshes are apparently
developed on white sand and
have mostly been closely
ditched with parallel
ditches, exposing the sand.
Course takes us out to sea
rather soon, so we miss
most of Long Island.

Then turned back northwest
over Long Island, then east
along its south side.
There are still considerable

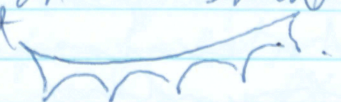
areas of wood and swamp eastward, but very numerous subdivisions. Some salt marsh along estuaries. Forest seems to be a varying mixture of deciduous trees and pine. In the eastern part is a typical drowned coast line with many V shaped estuaries, offshore sand islands, bar islands, etc. The forest is in general much cut by roads, usually in a rectangular pattern. The ~~offshore~~ long-shore bar island on the east has an astonishingly straight and sharply cut outer coast and a rather wide beach.

The inner coast is very irregular and the sound is filled with patches of marsh and shifting sand islands and bars. The island gradually joins the mainland as the sound pinches out.

Less development out on the long peninsula to Montauk Pt. but there is some. East of here broken

cumulus clouds below with particularly ragged appearance on top, like shredded cotton batting. A rather dirty gray appearance. No high clouds close by, but to north a vague alto-stratus layer. Irregular coastline in distance. Details not clear because of cloud patches.

Martha's Vineyard mostly obscured. A curious large lagoon on northeast corner, surrounded by a semicircular bar. (or is this Martha's Vineyard?)

Nantucket (?), fairly large, much open heath (?) land and woods. An astonishing curved bar on inner side with a cusped coast . Wooded dunes (?)

on east side and a large lagoon. Wave cut cliff on southeast corner.

Cape Cod to north, not very clear.

Out to sea the cloud layer becomes continuous, more or less level on top but with a cotton batting-like roughness and at more or less regular intervals, rounded hummocks rising above this surface which have a slight indefinite inverted vortex or swirl appearance, this not at all regular.

Dec. 8 Flight Copenhagen-Dusseldorf
 Soils around Copenhagen
 airport very black, mostly
 plowed, some with green grass.
 Low cloud layer cuts off visibility.

Just before Hamburg a small
 cloud-free area - intensively
 cultivated and green.
 Several small forest patches -
 one very curious - looks
 like an old lakebed, solidly
 wooded, surrounded by
 a bare beach.

After Hamburg continuous
 low beds of clouds - flat-topped
 cumulus with closed fissures
 or "sutures" between them. About
 half or a third of the way we
 crossed a curious rather
 sharp boundary, curving
 somewhat between white
 firm-looking clouds on one
 side and less substantial
 gray ones on the other (toward Dusseldorf).

Around Dusseldorf brownish gray
 soils, mostly cultivated, little
 green to be seen except some
 patches of conifer woods, a
 little thin grass. Some
 fair sized areas of woods
~~and~~ either pure deciduous
 or pure conifer.

Dusseldorf to Geneva -

Rhine meanders above Dusseldorf.
 Thin layer of structureless
 stratus cloud, semi-transparent,
 with several large cumuli
 protruding up through it,
 locally abundant
 small cumuli. Visibility
 generally poor.

North of the foothills of the
^{Vogesen}
~~Jura~~ (?) a wide unenclosed plain,
 sharply dissected by occasional
 entrenched streams. Intensively
 cultivated except for a few
 patches of coniferous forest.
 These more abundant and larger
 nearer the mountains, also
 the meandering streams
 more deeply entrenched and
 conifer forest on some of the
 ravine walls. In the
 cultivated areas not a
 hedgerow nor a tree nor a
 square foot of waste ground.
 The plots long and narrow.
 Foothills of ^{Vogesen}
~~Jura~~ about 75%
 in conifer woods, 25% cultivated,
 in grain (?) This mostly in
 small valleys, the ridges
 between them wooded. Some
 cleared plots even high on slopes.
 Toward south side of Vogesen the
 proportion of cultivation is much
 greater. Around ~~the~~ base of

Vosges and to summits of Jura a thin dirty looking semi-transparent fog with mountain sticking up through it. South of summit ridge of Jura and in its higher valleys a bed of dense clouds.

Tops of Jura dusted with snow, west of Zurich.

Snow more plentiful on north side of mountains.

Portion of Jura showing above clouds between Zurich and Geneva largely ^{with some} wooded, but some clearings or meadows on tops, some bare gray cliffs of magnificent size.

In the valley about half way from Zurich to Geneva a small area of woods, mostly conifers but part deciduous, is covered by ice. Other similar areas not. This east of Rhine (1). High Alps to south mostly snow-covered.

No snow on western Jura, at least not visible from south. Toward Geneva ice on trees on wooded hill in valley bottom, even on those on flat ground. Just a little snow dusted over ground to north of woods

The high Jura near Geneva have extensive meadowland on their summits and upper slopes. ^{very little} snow on south side, at least.

Around Geneva fields are slightly green, some quite so.

From a high altitude 6-7 main ranges of the Jura are visible: parallel, broken by the gaps of the Rhone Valley.

All except the steepest land between Geneva and the higher Alps is cultivated or pastured. Steep slopes wooded. Some hill tops powdered with snow.

Passed Mont Blanc, protruding above the clouds, completely white. Another peak, almost as high just south of it.

Southern part of Alps exposed, great snow fields, only cliffs free of snow.

Italian slopes with rather little snow, thinly wooded in most parts. Visibility poor.

Dec. 11 Beirut to Karachi mostly at night. 19,000' high side of plane, crossed peninsula of Trucial Oman at a just north of ~~S~~har.

The west side is a vast

plain of oriented dunes, with ^{small} patches of *Phoenix arabica* between them here and there, especially inland. No other vegetation seen on the otherwise pale tawny plain. Well inland are extremely rugged nude mountains, a dull pale chocolate brown in color. In a deep valley ^{in the Persian} Gulf drainage is a fair sized oasis with *Phoenix dactylifera*. In the deep canyons on the east side water can be seen occasionally, with a few small oases. In some of the steep ravines a bit of gray-green vegetation can be seen. Nothing on ridges or slopes. The coastal plain on this side is narrow, but there is a small oasis with a small town, very bleak-looking. This might be Sohar but looks very small. Complicated series of canals or paddocks near but not in oasis. Oasis has other plants as well as *Phoenix*, but can't make out what they are. Few or no *Phoenix arabica* on this side of mountains.

A little out from the east coast are lines of a tawny bloom festooning the coast.

The coast of Iran near Chabar, seen from a short distance out at sea, is indescribably barren. It is a dull cream color, like coral sand, rather flat with almost no vegetation. Two small oases on the peninsula east of the bay where Chabar is located. Chabar occupies one of them. The low mountains back of the coast look just as barren as the coast.

Eastward are low abrupt bare hills or cliffs very near the coast.

The mouth of the Dashti River is one of a cluster of stream mouths on the bay west of Ras Jiwani. The country is utterly desolate, but must have had rain just recently, as the streams have water and each has a plume of silt in the sea outside its mouth.

The peninsula east of and culminating in Ras Jiwani has low rugged hills and conspicuous cliffs back of a narrow, tawny, completely barren flat coastal plain.

This seems to be a cusped coast the cusps very prominent hooking eastward, but somewhat elevated and the tips may be truncate.

Karachi - tidal flats west of ^{small} river mouth on cusp have apparently a low semi-open mangrove scrub on more stable patches, bare mud on other parts. Same east of river but above the mouth, bushes here mostly low gray ones, some taller green ones. Tidal flats on coast to east mostly bare.

Flat desert east of Karachi with irregularly scattered dark gray green small trees or large bushes and more abundant smaller gray bushes.

Enormous expanse of mostly vegetated tidal flats extending south in the Indus delta.

Calotropis common locally n.e. of airport. *Capparis*? very common.

Areas of thin low dry grass around airport.

Irrigated fields bright green.

At Karachi airport is a form of *Pseuderanthemum*

canruthersii with wide ovate leaves dark purplish green above, deep purple beneath, flowers white, dotted with purple around throat, two upper lobes contiguous and somewhat overlapping, lateral spreading, lower narrower and somewhat bent forward (subgibbous). Another with gray-green, gray and white variegated leaves. Buds only.

The ordinary form of *Polyscias guilfoylei*, ~~also~~ with white bordered leaves. Also a non-variegated form which looks as I remember *P. pinnata* to look. Perhaps *P. guilfoylei* is only a form of *P. pinnata*. All sterile.

Between Karachi and the airport is a profoundly disturbed landscape. Cattle trails innumerable.

Karachi - Calcutta

Phoenix and other trees around irrigated areas. Indus delta extends south as far as vision permits on such a hazy day. Is this dwarf mangrove vegetation??

Conspicuous dendritic gully systems northwest of Indus delta in desert. Most striking I have ever seen.

Upper part of delta seems to be ~~lacking~~ ~~in~~ vegetation almost completely. Salt pans.

Northwest of Indus is a desert landscape, locally completely bare, locally dominated by shrubs and (?) small trees. Large square reservoir of greenish black water, irrigated lands to east of it, but some areas appear alkaline.

Channels and bottom-land of Indus - bottom-land mostly wooded, some grassland and savanna. Great sand flats along channel itself. East of channel alternating cultivation and woody vegetation. Some areas appear to be sand and support a sparse vegetation. This mosaic continues for some distance. The cultivated land, cut up into small irregularly rectangular plots by levees, becoming more and more dominant eastward to another meandering channel.

House-plots in eastern part walk. Same pattern east of the channel for a short distance, then open desert with varying concentration of bushes, locally none, locally small irrigated areas.

Gulf of Cutch lined with irrigated land. Some low wetish spots away from it also irrigated. Some areas apparently too alkaline and marshy for agriculture. All have evidently been at one time or another under cultivation, judging from levees and ditches. Some areas are very black, have irregular patches of vegetation, but look like dried marshes. Vast old dried river meanders with intricate patterns, the actual channels mostly vegetated, crescent shaped areas between them with varied density of natural vegetation. All of this north of the Gulf of Cutch. Eastward a somewhat elevated series of broken parallel ridges running n.e. - s.w. - obviously a dissected plain but the pattern difficult to understand.

ridges
rectangular
shallowly
gullies



Here and there plays lakes, now dry and bare, surrounded by scattered trees. General vegetation of area scattered bushes. Scattered bottom areas

appear to be or to have been cultivated. This extends a long way, perfectly oriented, little variation. Southward of it is an extension of the Gulf of Cutch (2), mostly vast pale sand flats, water in center.

Northward of this are vast brownish gray flats almost a quite bare of vegetation. In places there have tracks across them, not quite extending to edges of flats. Small fans of alluvial material extend out into these flats from ravine mouths. North of eastward extension of this is flat land divided into plots by mud or stone walls, probably cultivated during wet season. This surrounding a massive deeply jointed low mountain of reddish granite. The joint pattern east-west. Sparse bushy desert vegetation.

Another much lower mass of this eastward. East of this more "cultivated" land and a small village. Then more of the extension of absolutely bare playa flats, surrounding a muddy lake with salty margins. Hard even to be sure that this lake has water in it.

East of this vast stretch of desolate mostly gray-brown cultivated land, cut into plots by walls with some trees or bushes on them.

Dwellings concentrated in dense villages and towns scattered through this area, each surrounded by a tract of overgrazed pasture land. Going to work in the fields must take a very considerable amount of time. To the south there are some wet spots in this pattern, visible when the low sun hits them.

This landscape becomes slightly greener eastward and seems to develop a slight rolling relief the axes of the undulations north-south. Trees more abundant here in the pasture areas, none in the cultivated areas except on the walls between plots and very few there.

River, probably that running through Almadabad. The scarps of its ravines badly gullied. Eastward same pattern of cultivated fields with walls,

scattered villages each with a pasture area, this more wooded than farther west. Landscape greener but still only with a tinge of green. All of this a plain with very little relief.

Low undulating or ^{almost} winding ridges trending southeast, parallel, become noticeable eastward, probably stabilized dune ridges.

Then patches of rocky hills outcropping from the plain, with flat valleys between them. Hills semi-wooded, more or less green. Valleys cultivated, with sandy ^{stream and} river channels, streams dry.

Hills more numerous, valleys narrower, everything greener eastward.

Probably the north spur of the Vindhya Range.

From here the country is generally ^{increasingly} rough, with uneven open woods. Trend of ridges north-south, somewhat n.e.-s.w.

Mts. become more densely wooded, ridges stronger, reddish, sedimentary, habitation and cultivation only in main valleys, roads almost absent. Practically no flat land.

Many lakes or reservoirs seen, especially in distance to south, a few along course.

Trend of ridges changes to N.W.-S.E. becomes a bit less rugged, much less wooded. An important stream or river winding southeastward and much flat cultivated land along it. Hills almost disappear. Perhaps the Narbada R. where it turns near Jabalpur. Hills still along course but plains along river to south. Must be Narbada, as it parallels course for some distance to south. Lakes common in its plain.

Fog getting bad, toward sunset, visibility poor.

Vegetation poorer eastward, probably because of overgrazing rather than climate.

Hills disappear along course and to south. Away from rivers country seems sparsely settled but still very poorly vegetated.

Then some scattered low hills with thin woods.

Country gradually hilly again but only in patches or belts trending north-south, rather barren.

Cultivation increases eastward to south branch of Son River. After this too dark for visibility.

Dec. 10 - Bangkok to Djakarta

Northeast coast of Malaya - mouth of a large meandering river with meander patterns throughout coastal plain.

Largely a mosaic of rubber plantations, coconut plantations and areas of paddy fields some forest patches. About half of ~~general~~ area back from coast is in rice, in various stages from green to brown.

Farther inland a large areas of rice that ~~are~~ mostly green. Also some inundated land and swamp.

Then mountains which are densely forested. Many clouds, visibility poor.

Crossed another broad valley with a river running northeast, with considerable rice, some rubber (?), some swamp forest.

Then hills with dense forest. From here on mostly cloudy, but occasional holes showing hills and mountains all thickly wooded, ~~near~~

numerous streams.

After a considerable distance another river running east of northeast, with a reddish sandy bed, some rice in the narrow valley bottom. Then forested hills. Very cloudy. Then less clouds, a relief of small hills, very intricate, solid uniform rain forest. This over a large area.

After a considerable distance a large meandering river and valley system running southeast, much rubber and rice in the broad flat bottom. This enters the sea with another coming from the west, and there are large swamp areas near the mouth.

Along the coast a spectacular series of beach ridges and an old shore line, of white sand back of a cultivated area.

Another meandering river of black water, and several black water lagoon and inlets in this cultivated strip.

Coastal plain with white sand and series of old sand ridges, a large muddy

estuary a lagoon. Then much swamp, long shore channels, some open grassland sandy beach. Coast trends slightly more westward. The sea here is very muddy and of a greenish pea-soup color. A broad complicated coastal plain all along here but visibility poor. The green color of the sea is more and more conspicuous, almost a grass green. I have never seen anything like this. Extends a long distance from shore, water obviously very shallow. Bottom visible as great parallel ridges or undulations. Could this be turtle grass? Fills the whole bight of the southern east coast.

Another large river estuary with very complicated channels paralleling coast. Approaching shore again, very muddy. Another large river mouth, extremely muddy. Much rice in its valley. South of it a large lake with many islands of swamp forest.

Low high island offshore appears grassy or covered by low scrub except for trees around

shore. Much cultivated land and a settlement on coastal plain. Vast forest on flat to rolling a low hilly ground inland. A road cutting through the forest, running about north northwest.

Fourthward many clearings in the forest, mostly grassy. Some clearing in progress.

Then much rubber land with swamps along streams. Rubber very green at this season.

One area of hedge style planting of rubber. Many clearings. Soil where exposed seems to be a white sand, at least in many places.

Then large hilly forested area, extending unbroken for a vast distance. Relief rather slight.

Then many clearings with lalang. Large valley almost all more or less cleared and in belukar and many young rubber plantations.

The coast again, with a large river running into it, some clearing in this valley. More old beach ridges around a crescent shaped bay. Water

sea green. Along south part of bay forest comes almost to beach. Black water streamers coming out of it into muddy bay. Mixing conspicuous.

Plane made right angle turn westward over flat forest land with some old clearings. Forest becomes very fine-textured as we approach a great lagoon or estuary. Plantations immediately around estuary, with roads.

Considerable mangrove swamps.

Approaching Johore Strait and Singapore Island.

Complicated pattern of rubber plantation, belukar, grass, forest swamp between estuary and strait. Much new rubber plantation.

Singapore Island - mostly mixture of houses and trees, great red scars. Water reserve forest, some small rubber plantations.

Turned south again. Large islands to west cut by straits, mostly low and wooded.

Southward a maze of islands - tiny ones tend to

be grassy, with trees along shore. Larger ones wooded but with degraded forest a belukar and much savanna.

Mangrove swamps along inlets. Some plantations and new clearings. Channels and estuaries very complicated.

Relief low. Obviously a drowned low hilly relief.

Southward the islets become smaller and sparser, surrounded by dark colored reefs.

Sumatra in distance to west, a peninsula extending east and southeast.

About opposite this another group of small islands. Unbroken forest, partly cleared at some time, more or less regrown, partly rather open. Some plantation(?), no obvious habitations.

~~Bangka~~ and satellite islands. Sea very green in vicinity. Islands largely wooded but with many clearings,alang, savanna, belukar, in an irregular mosaic. Mountainous central and southern part still has some undisturbed forest. Apparently some small

tin workings on south side.
Large burned areas on
south coast.

A large roughly circular
area of sea is a dull dirty
green color, in contrast to
the blue-green around it.
Bounded by a scalloped
line of white-foam breakers?
not at all clear what
this is from 15000'. Some
patches of bloom south of the
Sumatra in distance.

The above dull green
water evidently merely
a different water mass.
Here are three of different
colors intersecting, not
mixing readily. But
these not outlined in white.

More grass-green sea,
becoming lighter and more
pea-green southward. These
greens are probably merely
due to different depths of
water, but have a duller,
more opaque appearance
than I am accustomed to.
Possibly because of greater
silt content or plankton content.

^{Sumatra} Large island, mostly obscured
by clouds. partly cleared, some
roads, plantations.

Approaching south Sumatra

Sea very muddy. Coast low.
Almost entire island under clouds.

Glimpses of interior show
dense forest. Some cleared
land along a small stream,
several houses, ~~at~~ clearings
bright green, perhaps lalang,
possibly rice but no levee pattern.
Some paths visible. Then
more forest, vast areas.

Little a no relief. Mostly cloudy.
Forest very mixed, some trees
lighter colored. Then a large
area of smooth canopy
with only few scattered
emergents, then emergent
become abundant, then
close to form canopy. A few
trees bare, a few in young
leaf.

Some large rounded clear
spots, bright green, near a
black meandering stream.
Some black areas in green
suggest that clearings may
be marsh. Lower along
this stream, southward, are
obviously man-made clearings
in various stages of regrowth.
Also the forest becomes
more open. Some patches of
savanna. But grass very green.
Southeast ^{corner} of island low, wooded
few local very light colored trees.

Rice fields around
Djakarta airport have
villages with coconuts,
Musa artocarpus, etc.
tile roofed houses, village
like wooded islets
in green rice.

Dec. 9 - Karachi airport

J 39651

Pseuderanthemum

planted around airport building

shrub 1 m. tall, leaves dark green above, deep purple beneath; flowers white with purple dots around throat, two upper lobes erect, partly overlapping, lateral lobes spreading, lower lobe bent forward somewhat gibbous.

1958 Java - Trip to Tjibodas

Dec. 16 - Between Tjiaari and Tugur

Tenased rice, with bamboo, bananas, ^{jack fruit,} mango, other tree crops, much Manihot, Carica, etc. The rice in all stages from planting to harvest. Replanted immediately. Many ornamentals. Some Cyathea and other wild plants on ravine walls. Above Tugur same pattern along roads. Tea plantations on slopes. Little shade. Dark brown soil, 1-2 m. deep.

Tea height 1-1.5 m.

Forest on tops of some hills.

Rice + village complex drops out very soon after Tugur.

Puntjak Pass - 6 photos (K) - tea plantations with very little shade. Some with a gray appearance because they are trimmed back very drastically.

On other side of pass the tea drops out soon and is replaced by rice, Manihot + garden complex.

Tjibodas

From 4500' up, a lower montane rain forest - trees widely spaced, canopy irregular and rather open, emergents to at least 40 m.

Altingia, ^{exaltata} Cactanopsis, Gloarea,

No noticeable stratification bet. shrub layer + canopy. Asplenium nidus and other epiphytes common, thin but continuous moss cover.

Undergrowth layer to 4-5 m. Pinanga kuhlii, Calamus, Plectocomia, - very irregular

Dense ground layer of ferns and various herbs. rocks mossy.

Photos 5 h.w. 3 Kod. at 4850'.

At 5000' large Podocarpus imbricaria come in as emergents.

Persia ~~lancea~~ rimosa

Throughout this forest lianas are present but not in great abundance.

at 5500' 5 photos h.w.

Here tallest trees perhaps 30-35 m.

Just below waterfall
is an area where the forest
has been destroyed by ~~the~~ a
~~waterfall~~ mud flow
during an eruption
2 years ago. A few scrubby
trees ~~survived~~ survived,
but most are dead.

In one place where a section
of this mudflow is exposed
it is about a meter thick
and looks like glacial till.

Shrubby vegetation has
come in sparsely, including
Vaccinium, *Leptospermum*,
etc.. *Nertera* is common.
Nepenthes seen. Horn
cane, apparently *Saccharum*,
though the branchlets
do not disarticulate
properly.

58
 checked
 labels typed

1958 Jan 9

Dec. 14 - Above Tjibodas,
 in rather open lower montane
 rain forest.

~~39652~~ ~~*Nephrolepis*~~ ~~abundant on tree trunks~~

39652 *Nephrolepis*
 abundant on tree trunks

53 *Podocarpus imbricata* BE.
 common

54 *Drymaria*
 occasional along trail in

55 (fern)
 common on tree trunks

56 *Usnea*
 common on twigs of emergent trees

57 *Ophioglossum*
 very local between rocks of trail

58 *Rasianthus*
 occasional in undergrowth
 along trail

59 (Celastr.)
 rare along trail

60 *Nertera granadensis* (L.f.) Druce
 rare on mossy rocks

61 *Ophiorhiza*
 common on stones along trail

62 *Ophiorhiza*
 rare along trail

Dec. 16 Below Tjibodas Waterfall
 in open ~~almost~~ ^{degraded} ~~completely~~
~~destroyed~~ ^{degraded} lower montane
 forest almost completely
 destroyed by mud-flow
 2 years ago, very open

59

~~for~~ rhizome closely appressed
 to tree trunk, fronds pendent.
 very tall emergent tree
 (twigs picked up from ground)

(picked from ground)

semi-scandent shrub
 3-4 m. long.

small tree or large shrub,
 fruit black when ripe.
 prostrate, flowers
 yellow-green, fruit
 translucent vermilion.
 stem green, flowers white.
 stem purple

5500'

1692 m.

nos. checked

60

labels typed

39663

Polypodium

✓₂

common, terrestrial, in open.

✓₁

64

Pratia montana

occasional, in low bushes

✓₂

65

Eaccharum?

common on open stony
ground below falls

~~66~~

~~*Nertera*~~

✓₂

66

Nertera granadensis (L.f.) Druce

common on rocks and
fallen tree trunks, in open.

✱

✓₁

67

Parmelia

common on ground in open.

✓₂

68

Davallia

occasional on fallen
logs in open

61

1692m.

scrambling, flowers
purplish blue.

caespitose, irregularly
ascending, upper
blades on flowering
culms reduced.

prostrate, firm,
flowers greenish yellow,
fruit translucent
vermillion.

bright green above,
white beneath.

very coriaceous.

Dec. 18 - Trip Bogor to

Udjong Kulon by bus + boat.

Around Bogor is a pattern of dooryard garden cultivation and terraced rice.

Lower down, toward Djakarta on flatter ground, are some small rubber plantations and even some pasture, but still mainly gardens and rice.

In the gardens are

Cocos, Musa, Citrus, jack fruit, bamboo, manihot, mango, peanut, sweet potato, Ceiba, Piper batle, guava, dace, Carica, Phoenix dactylifera (1), tamarind, Muntingia, Anacardium ^{sugar cane}

Ornamentals:

Acalypha amantacea.

Alcaesia macrorhiza

Jatropha curcas

Carina hybr. Coleus sp.

Delonix regia

Caesalpinia pulcherrima

Dieffenbachia maculata

Catharanthus

Thevetia peruviana

Ipomoea erecta

Lambucus sp.

Hibiscus tiliaceus

Gloriosia repens

Allamanda Hendersonii

Codiaeum variegatum

Leucaena glauca

Zephyranthes rosea

Zephyranthes candida

Thunbergia erecta

Tobernaemontana coronaria

Hibiscus hybrid.

Nerium oleander

Filicium?

Samanea saman

Casuarina

Bougainvillea sp.

Pedilanthus tithymaloides

Erythroxylon cora

Clerodendrum thomsonii

Averrhoa bilimbi

Gerbera jamesonii

Tagetes

Solidago sp.

Malvarisum

Cupressus sp.

Plumeria obtusa

Plumeria rubra

Caladium bicolor

Polystichum scolopendria

Scindapsus aureus

Erythrina sp.

Chrysanthemum luteum

Hymenocallis littoralis

Hibiscus schizopetalus

Pisonia alba

Duranta repens

Antigonon leptopus

Polypodium philippicum

Passiflora quadrangularis

street trees in Djakarta

Mangifera indica

Delonix regia

Artocarpus heterophyllus

Rapanea regia

Ficus benjamina

Muntingia calabura

Thouetia peruviana

Tamarindus indica

Thuja sp.

Agathis sp.

Casuarina sp.

along canal west of Djakarta

Ipomoea erecta very common

Jatropha gossypifolia occasional

(widely spread in Java, acc. Kostermans)

Sesbania grandiflora occ.

(fl. eaten, acc. Kostermans)

Jangkarang - enormous market.

~~westward~~ - along road

Sweetenia macrophylla

Cassia siamea

Coccoloba nucifera

Hevea brasiliensis (small plantations)

Lantana camara and

Ananas comosus common

in hedgerows.

Metroxylon swamps.

Hibiscus macrophyllus

Rice is cult. here but
adverse

by no means as abundantly as in most places we have seen. Cassava and pasture and village share ground with rice. Then some large open areas of rice.

streams very muddy.

some rather rolling open area. Apparently poor soils. Large uncultivated areas, with low scrub some parts in rice and rubber.

Scrub of *Melastoma*, *Fagraea*, *Lantana*, etc.

Then almost solid rice, some *Metroxylon* swamps. Leaves used for thatch, trunks very little used for starch (acc. Kostermans).

Trunks reach 4 m.

Soils here (planosols?) light gray when dry, darker brownish gray when wet.

Throughout this part of Java the rice is headed and the bouquets of panicles are dried in the roadside.

Serang - much more open,
less crowded town than
most. Large tamarind trees.
Turn southward. Coconuts
abundant. Mangoes & Achras.
Some areas of *Imperata*.
Thickets with *Gleichenia*.

Pandeglang

Volcano to right - still has
some patches of forest
on higher and rougher parts.
Parts of slopes grassy
with only scattered trees.
Turn westward.

Garden complex.

Gnetum gnemon very common,
small tree with narrow
crowns.

The typical complex of
trees, gardens, houses, etc.
from Bogor to Djakarta
and to Pandeglang is
dominated by mango
jack-fruit and coconut.

At Pandeglang it changes
and is a complex of coconut,
Achras and *Gnetum*.

This is the pattern to Labuan
where *Cocos* becomes
dominant and along the
coast forms a pure stand
(photos).

Mts. north of Labuan
are cleared up to half
or $\frac{2}{3}$ of the way to top,
secondary forest for the
rest of the way.

A small island
s. w. of Labuan seems
to have relatively undis-
turbed forest.

Krakatau can be seen
to the n. w. rather too far
to distinguish surface
features. Ana Krakatau
is a perfect cone, about
like Alamagan. Three bits
of Old Krakatau to right. Some
explosive activity from the
sea (?) to right of base of
Ana K. columnar bursts
either white or black, every
few minutes, rising higher
than Ana K.

Another double cone m. to
the right, is not part
of Krakatau group.

Coast of Java, to left,
fringed by low islands,
these appearing practically
undisturbed.

Dec. 19 - Pulau Pentjeng, island
off shore of Udjung Kulon, west extremity
of Java.

Inner beach has a
fringe of *Lophora tomentosa*
to 3 (4) m. tall, as placed
here and there by *Vitex* sp.
and with a little *Scavola*.
This fringe is backed
by a wall of *Calophyllum*
inophyllum, with
occasional *Hernandia*, etc.
Tournefortia rare in the
fringe. The *Calophyllum*
wall is several trees
wide. Inside this is a
belt of *Ficus* and other
species. Then a wide
mixed forest.

The soil is black, but
further inward gets
lighter.

The mixed forest has
trees to 30 m. tall, the very
large ones rather widely
scattered, mostly buttressed,
and sizes more or less
regularly graded down
to about 1 inch in diameter.
Then very few saplings
between this size and
a foot or so tall.

This stretches over a
considerable flat.

The soil is so
compact that water
has evidently stood
on it. The ground layer
of seedlings is very
sparse. Almost no
herbs.

Then an elevated
terrace about 15 m.
with a much thicker
forest, generally
smaller trees, many
more lianas. The flora
here is far richer and
there is a more noticeable
ground layer, still largely
of seedlings. Some ferns,
but these mostly on fallen
tree trunks, where there
are characteristic commun-
ities of seedlings and
ferns. In one place
a very large tree had
fallen, knocking down
several others, which
in turn knocked down
others, making a swath
well over 100 m. long.

This limestone terrace is
rather compacted or weathered
and silted up, so there
is some gully erosion and
water trickling over impervious
layers in the bottoms of ravines.

At beginning of cliffs on ~~inner~~^{west} side is an eroded terrace probably 6' with curious rimmed basins, and a series of exposed beachrock, exposed by removal of terrace 13 heads dipping landward. (Photos b. w. & Kod.)

Small islet has *Pemphis* on one end. (photos)

Beach beyond the terrace above is of gravel, is obviously being cut back, but there is a gravel ridge, in places very coarse. The vegetation here and just back is a tall forest of large *Barringtonia* and *Hernandia*. Along the coast this ^{combination} is dominant but in sandy places there may be *Calophyllum*. *Pandanus* thickets here and there, *P. tectorius*. *P. fragrans* seen once here, on rocky material.

Back of the top of the beach ridge the forest is largely *Barringtonia*, but with considerable *Hernandia* and *Occhrosia*. Locally but abundantly a thick shrub to sapling sized lower story

of *Ardisia* and *Aglaia*, with occasional young *Barringtonia*. Low thickets of *Pandanus* mixed with this. However, in most places one can walk freely. Fallen trees form the worst obstruction.

The ground is mostly pebbles and cobbles, in places masses of boulders.

The beach ridge has cut off areas of low-lying ground that support a stand of *Sumnitzia racemosa* growing to a height of 10-12 m., with abundant pneumatophores.

Along the gravel ridge are scattered *Pemphis* and *Tournefortia* trees, much less abundant than the *Pandanus*.

Hibiscus tiliaceus is fairly common, *Thespesia* much less so. *Allophylus* occasional to common. Most of these species grow out over the water, making walking along the beach difficult.

The flat land back of the sandy beach has no significant number of boulders. Some exposure of what may be an old platform near the beach.

But on the other side of the island, the narrow flat zone there has great masses of boulders and rubble, presumably thrown up by the 1883 tidal wave from Krakatau. Likewise, on the flat around the southwest side, where the ~~boulder~~ ^{great} ridge is of gravel, there is much gravelly and bouldery rubble back on the flat. The tidal wave ~~to~~ must have swirled around the end of the island and picked up considerable material and carried it inland.

From the channel the vegetation of the island looks of remarkably uniform height until the southwest corner is reached. Then it becomes very irregular.

The sandy beach ^{flat} generally supports a good forest of *Calophyllum*, fringed by a fringe of *Lophora tomentosa* and *Vitex*, with occasional patches of *Pandanus*, ^{by the way of} *Scaevola*, *Tournefortia*, ^{Hernandia, Hibiscus,} etc.

The gravelly beach ridge supports principally *Hernandia* & *Barringtonia*, with some *Occhrosia*.

Along the front are occasional bushes or small trees of *Pemphis*, *Calophyllum*, *Guettarda*, *Tournefortia*, etc.

No herbaceous growth except on sandy beaches where there has been disturbance, where one sees *Ipomoea pes-caprae*, *Stachytarpheta jamaicensis*, *Thibaudia*, etc.

Dec. 18 - Uoljung Kulon Reserve
across from Pulau Bentjeng
Island

Beach ridge, back
of which is a swamp
of *Nypa* and *Sonneratia*
alba? *Nypa* abundantly
flowering. Buds are
distinctly warm when
pressed to cheeks. The
tips of the leaflets bear
long filaments, connected
along the margins at
first, then stiffly spreading.
The pneumatophores
of this *Sonneratia* are
more narrowly conical
than those of *S. caseolaris*.

Back of the *Nypa* swamp
is a strip of rattan
swamp, with various
trees, but an abundant
understory of rattan.

Back of this a palm
forest, *Arenga*, *Oncosperma*,
etc. along a small stream.

Back of this two large
clearings with grass,
various secondary
weed and shrub species
and scattered trees.

In one pasture was a herd
of 9-10 banteng. In the other,
4 sambar deer, one herd of 7

banteng, another of
4. Hornbills flew over.
2 jabiru(?) storks. Jungle
fowl. Many flying foxes
coming to visit the *Sonneratia*
trees.

Dec. 19 - Cape Sangar
(Java's Erste Punkt)
Rocks at ultimate
point bare - probably
Eolianite, but stained
black by algae.

One small abrupt islet
with some thin grassy
vegetation. Back of
bar rock on mainland
low scrub and grass
mosaic, undoubtedly
maintained thus by
banteng grazing, probably
rhinos also.

Back of this is low
scrubby forest, rather
tangled, this giving
way to higher forest
back toward landing.

ms. checked
76

1958 Java

labels typed

Dec. 18 - Pulau Pentjang (island)

protected
sandy
beach.

off of Ujung Kulon
Dense wet forest on
coral limestone substratum.

39669 *Tournefortia argentea* L.f.
occasional to rare in scrub
at top of beach.

70 *Vitex*
common, forming fringe at
top of sandy beach

71 *Sporobolus per-caprae* L.
common locally on
sand in disturbed
places at top of beach

72 *Scaevola sericea*
rare at top of beach

73 *Lophora tomentosa* L.
dominant in fringe
at top of sandy beach

74 *Hibiscus tiliaceus* L.
common in edges of
forest at top of beach

75 *Cassytha filiformis*
common locally at top
of beach, parasitic on
Lophora tomentosa.

same, exposed stony beach

76 *Barringtonia asiatica*
dominant in forest on
stony ground back of beach

77 *Hemandia sonora* L.
codominant with *Barringtonia*
on stony ground at top of beach

77

shrub 2.5 m. tall; leaves
fleshy, frosty green; flowers
white, fruit not mature.

shrub 3-4 m. tall;
flowers lavender

prostrate, branches
erect.

shrub 2 m. tall (others
seen to 3-4 m.); flowers white.

shrub 3-4 m. tall;
flowers bright yellow,
scarcely any flowers.

semi-scandent tree;
flowers bright yellow.
(unopened at 6 a.m.).

stems soft, green; flowers
white.

large tree.

large tree, fruit inflated,
mouth of envelope
without teeth.

nos. checked
78
labels typed

1958 Java

- 39678 *Ochrosia oppositifolia* Lam.
✓2 common in forest at top of beach
- ✓2 79 *Allophylus cobbe* Bl.
common at top of beach
- ✓2 80 *Premna obtusifolia* R.Br.
occasional at top of beach
- ✓2 81 *Pemphis acidula* Forst.
occasional at top of beach
- ✓3 82 *Euphorbia charnissonis* Boiss.
very local at top of beach
- ✓2 83 *Croton*
occasional at top of beach
- ✓2 84 *Guettarda speciosa* L.
occasional at top of beach
- ✓2 85 *Ardisia (humilis?)*
abundant in forest
just back of beach
and at tops of low cliffs
- ✓2 86 *Ixora?*
rare in edge of woods
at top of beach
- ✓2 87 *Aglaia eleagnoides* Benth.
abundant on exposed
top of low cliff.
- ✓2 88 *Fimbristylis cynosu* R.Br.
abundant at top of cliff
~~88~~
same - inland on elevated limestone
- ✓2 89 *Tabernaemontana*
rare in undergrowth
- 1 90 *Croton*
rare in undergrowth
- ✓2 91 *Drymoglossum?*
common on fallen tree trunks

79

- small tree, lactiferous;
buds, flowers, and immature
fruits in same inflorescences.
large shrub; flowers
white; fruit orange-red.
- broken tree; trunk 20 cm.
diam. sterile.
branched at base; stems
ascending; glands green.
large shrub, 3-4 m. tall.
- large shrub 4 m. tall;
flowers white.
shrub 3 m. tall; fruit
immature, pinkish green.
- slender shrub 2 m. tall,
buds white.
- shrub 2 m. tall;
buds yellow.
- loosely tufted.
- shrub 2.5 m. tall.
flowers white.
large shrub; ♂.
- leaves fleshy,

nos. checked
80
labels typed

1958 Java

- 39692 (Euph.) *Trigonemon*?
occasional in undergrowth
- 3
✓ 2 93 *Leucaena*
rare in undergrowth
- 5 94 *Varzea palm-banica*
very rare in under-
story of forest
- ~~95 *Pteris*~~
in high forest on
low-lying flat.
- 3 95 *Pteris*
on fallen tree-trunk
- 1 96 *Asplenium*
on fallen tree-trunk
- 3 97 *Euonymus javanicus*, Bl.
rare in undergrowth
- 1 98 *Cleidion* ??
rare on forest floor
- ✓ 2 99 *Garcinia dulcis* (Roxb.) Kurz.
occasional in lower story
- same top of sandy beach
- 13 9700 *Hernandia sonneri* L.
rare in fringe of forest
(more common on rocky beaches)

81

- shrub 2.5 m. tall; flowers
yellow.
stems erect, to 3-5 m. tall,
armed with vertical
rows of prickles with
broad base; sterile.
slender tree about 10-15 m.
tall, 15 cm. dbh. sterile.
(only tree known)
- rhizome very short,
erect.
- large shrub or small tree;
fruit immature.
flowers green.
- small tree; latex yellowish,
very slow-flowing from
cut in trunk; fruit immature.
- shrub 3 m. tall.

nos. checked
82
labels typed

1958

Java

Dec. 19 - Cape Lajar

edge of forest back
of beach

- 39701 *Leea sambucifolia*?
common in undergrowth
02 *Cordia myxa* L.
common in cleared
roadway.

- 03 *Pyrostachys lanceolata*
common on tree trunks
04 *Hedyotis albido-punctata* (Merr.) Fock. ?
common in grassy cleared
area, grazed by wild oxen.

open areas on rocks
above sea shore

- 05 *Ipomoea littoralis* Bl.
occasional
06 *Cyperus*
local in rock crevices
07 *Phyllanthus*
local in rock crevices
and weedy places.
08 *Ischaemum muticum*?
very common in grassy
areas grazed by wild oxen.
09 *Justicia*
local just back of
sea-shore in open place
10 *Cyperus byllingia*
local in weedy places.

83

shrub 2.5 m. tall;
fruit immature brownish.
small tree about 8-10
m. tall; fruits dull
pinkish, juice very
glutinous. said to
be used for glue.
leaves leathery-fleshy.

prostrate; corolla white,
salverform but with
globose tube; scarcely
any odor when broken.

prostrate, trailing; flowers
bright magenta-purple.
tufted; spikelets pale green.
erect.

prostrate; panicles
erect.

erect shrub to 1 m. tall;
flowers very rare, dull
whitish.
heads white

nos. checked
84
Labels typed

1958 Java

397 11 (amar.)

- 1 rare in weedy place at foot of cliff.
- ✓ 2 12 *Ischaemum* sp. (intermedium?) abundant on cliff of volcanic tuff.
- ✓ 2 13 *Fimbristylis cymosa* R.Br. common on cliff of volcanic tuff.
- ✓ 2 14 *Zoysia* common on cliff of volcanic tuff.
- ✓ 2 15 *Hedyotis albido-punctata*? common in crevices of cliff of volcanic tuff.
- ✓ 2 16 *Ficus* (Cronq. says *F. septica*, but does not have ribbed fruit) common in edges of thickets just back of shore.
- ✓ 2 17 *Ardisia* (humilis?) common in thickets just back of shore.
- 1 18 *Randia* rare in thickets just back of shore.

85

erect.

branched at base.

loosely tufted.

forming loose mat, culms erect from prostrate bases. leaves very fleshy; involucre white lobes patent, tube globose. large shrub; figs green, depressed globose, definitely not ribbed.

erect shrub 3 m. tall; fruiting branchlets articulated to main stems, but not detaching readily; flowers dull magenta purple; fruits immature. erect shrub 2 m. tall, with drooping to erect branches; flowers dull yellow.

Dec. 19 - Pulau Handeuleum

Pemphis acidula
good stand on small coral
gravel. seedlings on gravel
beneath.

Guettarda speciosa
Hibiscus tiliaceus
Zherpesia populnea
Pesmodium umbellatum

Drymaria
Pyrosia
Cassytha filiformis
Crinum

Ardisia (humilis?)

Lantana camara

Cayratia

Premna obtusifolia

Wedelia biflora

Davallia solida

Acrostichum aureum

Cycas circinalis

Pandanus tectorius

Deris trifoliata

Ixora (a. parvifolia)

Leea sambucifolia

Mangifera indica

Ficus gibbosa

Nephrolepis hirsutulus

Hedyotis biflora

Macaranga tanarius

Bridelia tomentosa?

Buchanania floribunda

Glochidion

Ceiba pentandra

Leucaena glauca

Annona muricata

Psidium guajava

Musa sapientum

Carica papaya

Peperomia pelucida

Acalypha indica

Pteris ~~long~~ cretica?

Ananas comosus

Ageratum conyzoides

Sporobolus diander?

Eragrostis amabilis

Piper aduncum

Neonauclia

Euccharum spontaneum

Morinda citrifolia

Scaevola sericea

Fimbristylis cynosa

Eupatorium

~~DD~~ *Gmelina*

Solanthus sp.

Euphorbia hirta

Chrysopogon aciculatus

Stachytarpheta jamaicensis

Ficus septica

Rademacheria gigantea

Hernandia

Jacca palmata

Blumea balsamea?

Dendrobium

Oberonia

Phalaenopsis amabilis

Jatropha gossypifolia

Cassipouma frutescens

Sonneratia
Datsia bijung
Cocos nucifera
Eupatium balsamum
~~*Eupatium*~~
Alternanthera versicolor
~~*fabrum*~~
Digitaria 2 sp.
Calisia argentea
~~*four oct*~~
Mirabilis jalapa
Cosmos sulfurea
Myrica lanceolata?

Forested ~~for~~ border, mostly
 strand species. Cultivated
 area around houses. Then
 a large open area covered
 by a ~~thick~~ ^{loose} scrub about 1-1.5 m
 high of *Lantana camara*,
 pale green in color, but
 flowering and occasionally
 fruiting. Some *Blumea* here,
 scattered *Ardisia*.

In the interior, somewhat
 surrounded by the scrub,
 are several exposures of
 "feo", with thick woods
 of *Buchanania*, *Rademacheria*,
Glochidion, *Ficus septica*,
F. gibbosa, *Morinda citrifolia*,
 etc.

Other small islands
 largely mangrove -
Rhizophora around
 edges, *Sonneratia* in
 interior, *Pemphis* on
 gravel banks.

On the mainland is a
 broad flat, with an
 extensive pasture, mostly
 in *Chrysopogon aciculatus*,
 with clumps of *Lantana*,
Eupatorium, *Ardisia*, *quana*,

scattered *Lagerstroemia*
 trees and *Corypha*

Herd of over a dozen bantangs
 and about a dozen deer.
 Bantangs 2 colors, dull
 brown and red-brown.
 Perhaps sex difference?

no. checked
90 1958 Java

labels typed
Dec. 19 Tendong Kalund

39719 *Desmos cochinchinensis*
in ~~the~~ thicket at edge of pasture

20 *Cudrania javanica*
occasional in cleared game pasture

21 *Fimbristylis cymosa*
top of sandy beach, open.

Dec. 19 Pulau Handeuleum
low coral islet.

22 *Myrtaceae?*
local, in Pemphis forest
on small gravel just
inside beach

23 *Pemphis acidula*
dominant in forest on
small gravel flat just
inside beach

24 *Thunbergia*
small patches in
Pemphis forest not far from beach

25 *Blumea*
occasional in Bantang
scrub on very thin soil

26 *Bridelia*
occasional in forest

27 *Glochidion*
common in forest and
forest edges.

91

climber, flowers yellow,
turning green; leaves
slightly glaucous beneath.
lactiferous depressed
shrub, sterile. Dwarfed
form from pasture.
densely caespitose.

prostrate vine,
not lactiferous; sterile.

small tree; ~~flower~~
5 m. tall; grayish green;
flowers white.

prostrate, forming
thin mat; floriferous
culms erect.
herb 2 m. tall, very
aromatic; heads yellow.

semi-scandent
shrub 3 m. tall; leaves
slightly glaucous beneath;
sterile.

small tree; fruit green,
seeds red.

no. checked

92

1958 Jan 9

labels typed

39778

Ximenesia americana L.

1/2

near outer beach in forest

3

29

Digitaria

common around dwelling

1/2

30

Digitaria

common around dwelling

1/2

31

Digitaria

common around dwelling

3

32

Tacca palmata

common in stony trail
in shade

1

33

Emilia sonchifolia

occasional ~~and~~ in grassy
place around dwelling

1/2

34

Ixora

common in undergrowth

3

35

Desmodium umbellatum

very common in undergrowth

1

36

(alga)

parasitic on *Tacca palmata* leaves.

Dec. 22 - Pasir putih

3

37

Aegiceras corniculata

pure stand on basaltic
rocks, covered by salt water
at high and medium tides.

1/2

38

(Lamysp. ?)

on basaltic rocks well above
~~at~~ tide level

1

39

(Asclep. ?)

on basaltic rocks well
above high tide.

3

40

Hibiscus tiliaceus

93

shrub; fruit immature.

flowers purple.

flowers purplish.

fruiting
panicles
pendant

shrub 2 m. tall,

flowers white, fruit black.

shrub to 3-4 m. tall,

flowers white, fugacious.

causing necrotic spots.

shrubs 1.5 m. tall; leaves
thick, brittle; flowers white;
fruit immature.

scandent; flowers white.

lactiferous vine; flowers
dull yellowish white.

rather erect tree 5 m. tall flower
bright yellow, fading reddish.

Dec. 20 - Krakatau Volcano

Krakatau ^{815m.} Verlaten ^{187m.} Lang ^{147m.}
and Anak Krakatau ^{175m.}

(Sebeni I. in background) (photos)

The three older Krakatau Islands are arranged like Mang, and indeed would be very much like it except that Krakatau itself is so much higher.

Anak Krakatau is in a state of continuous pulsating activity, with an explosion every few minutes, throwing ash to considerable heights. There is a large crater and smooth ash slopes, dark brown in color down to low wave cut cliffs, except at one end where the slope ends at beach level. Apparently some coral debris has been cast up here, as the top of the beach is light colored. Here a small patch of Casuarinas have reached tree size. A few are scattered on the slope, fair sized but only 3 or 4 in number.

The three outer islands are well wooded except on the steepest cliffs, which are mostly grassy

but locally completely bare. The material of these, where exposed, is very light colored and bedded. The bedding is in places irregular probably because of slumping.

The forest on Krakatau is luxuriant to the top. Casuarina is an important component, mostly in patches. Terminalia catappa is perhaps the most important in terms of area, covering much of the lower slopes. However there are a good many species and the forest is generally a dense mixed forest. No grass now except on the steep inner wall.

Dec. 21 - Bus Trip Bogor - Bandung

4/5 km. w. of Bandung rice is fertilized and straw is rotted and incorporated into soil. Elsewhere burned and ash incorporated.

Here are conspicuous areas of coconuts with understory of bananas.

Then large very flat area entirely devoted to rice. Limestone outcrops. Old coral reefs. Either an old lake bed or inland sea.

Limestone mts. almost completely deforested. Veg. of *Leucaena* and *Saccharum spontaneum*, etc.

Infestation of *Oryctes* on coconuts at Padalarang, w. of Bandung.

Bandung - Luradang.

Large plain, old lake bed surrounded by mountains, all in rice, except around villages. Where road goes through mountains is a deep winding gorge with traces of forest on its walls.

6 km. beyond Tjimalaka - photos of rice landscape & children

Farther on are ranges of limestone hills and peaks. The lower slopes of these are covered by planted teak

forest. Teaks said to have been introduced \approx 1000 years ago. Banding *Swietenia macrophylla* planted with teak for fire control. *Acacia auriculiformis* planted on very degraded soils. These soils in limestone region are called "marl" soils.

Mamuk Hills - very steep and rugged, limestone, entirely deforested, covered by *Imperata* which is not very luxuriant.

Tjirebon Plain - secondary vegetation of fence rows, and waste spots is largely bamboo. East of Tjirebon along the coast *Borassus* appears. In this plain mostly rice is cultivated, but some sugar cane. Near coast waste spots dominated by *Leucaena glauca*, but there are few waste spots. Roads lined with *Tamarindus*, mostly more or less pollarded. A few km. ^{east} ~~west~~ *Opuntia* appears along roadside.

Large areas of paddy land fallow and grazed by water buffals. Some being plowed and planted.

About Gebangilir *Oryctes* damage to coconuts conspicuous.

Vast low-lying poorly drained flats back of coast, dominated by sedges when fallow. Many vegetables cultivated here.

East of Tegol are plantings of *Sesbania grandiflora*. Lvs. fed to goats, flowers to people.

About 50 km. W. of Kendal starts a region of low hills with well grown teak plantations, some being cut. Ringed 2 years earlier to kill trees.

Small *Metroxylon* swamp here in ravine. Much bamboo in waste spots.

Oryztes damage at Kendal.

East of Semarang the country is hilly, cleared, with scattered coconuts, a few secondary thickets, grass, scarcely any rice. Eastward rice gradually appears. Apparently water is controlling factor. Manihot planted where not enough water for rice.

To eastward and southward a number of volcanoes are scattered about the landscape. Some are active.

Solo

teak, and to p. from our during dry season. Clean-felled, all coffee

List of plants collected from Bali.

Prapat Agung.

1. *Buchanania* sp.
2. *Aglaia* sp.
3. *Vitex* sp.
4. *Albizia lebeckioides*
5. *Sapotaceae*
6. *Eugenia* sp.
7. *Anisophylea* sp.
8. *Berrya* sp.
9. *Ficus* sp.
10. *Mallotus* sp.
11. *Cordia* sp.
12. *Grewia* sp.
13. *Amoora* sp.
14. *schoutenia* sp.
15. *Pterispermum acerifolium*
16. *Heritiera littoralis*
17. *Manilkara kauki*

Bedugul

- | | |
|----------------------------|----------------------------------|
| 1. <i>Litsea</i> sp. | 18. <i>Laportea</i> spp. |
| 2. <i>Ardisia</i> sp. | 19. <i>Glochidion</i> spp. |
| 3. <i>Saurauja</i> sp. | 20. <i>Rapanea</i> sp. |
| 4. <i>Platea</i> sp. | 21. <i>Elattostachys</i> sp. |
| 5. <i>Eugenia</i> sp. | 22. <i>Aglaia</i> sp. |
| 6. <i>Persea rimosa</i> | 23. <i>Engelhardia</i> sp. |
| 7. <i>Glochidion</i> sp. | 24. <i>Macadamia</i> sp. (cult.) |
| 8. <i>Vilebrunea</i> sp. | 25. <i>Meliosma</i> sp. |
| 9. <i>Litsea</i> sp. | 26. <i>Weinmannia</i> sp. |
| 10. <i>Ficus</i> sp. | 27. <i>Lindera</i> sp. |
| 11. <i>Elaeocarpus</i> sp. | 28. <i>Viburnum</i> sp. |
| 12. <i>Eugenia</i> sp. | 29. <i>Trema</i> sp. |
| 13. <i>Acronichia</i> sp. | 30. <i>Macaranga</i> sp. |
| 14. <i>Terminalia</i> sp. | 31. <i>Laplacea</i> sp. |
| 15. <i>Adinaandra</i> sp. | 32. <i>Neonauclea</i> sp. |
| 16. <i>Polyosma</i> sp. | 33. <i>Wendlandia</i> sp. |
| 17. <i>Astronia</i> sp. | 34. <i>Tabernaemontana</i> sp. |
| | 35. <i>Evodia</i> sp. |

B e d u g u l (continued)

36. Mallotus sp.
37. Podocarpus imbricatus
38. Casuarina montana
39. Carica candamarcensis
40. Mucuna sp.

Sangeh holly forest.

1. Dipterocarpus hasseltii
2. Rutaceae
3. Mallotus sp.
4. Ixora sp.
5. Paveta sp.
6. Piperaceae
7. Ardisia sp.
8. Michelia sp.
9. Buchanania sp.
10. Pisonia sylvestris

Mt. Batur.

- | | |
|-------------------|----------------------|
| 1. Rubiaceae | 5. Trema sp. |
| 2. Arallia sp. | 6. Casuarina montana |
| 3. Cratoxylon sp. | 7. Orchidaceae. |
| 4. Leguminosae | |

Penginuman .

- | | |
|----------------|------------------|
| Polyalthia sp. | Sapindaceae |
| Protium sp. | Barringtonia sp. |
| Rutaceae. | Eugenia sp. |
| Tiliaceae | Litsea sp. |
| Meliaceae | Bauhinia sp. |

Mt. Pangiang (Negara) .

- | | |
|-----------------|---------------|
| Elaeocarpus sp. | Dysoxylum sp. |
| Microcos sp. | Saurauja sp. |

Mt. Sangiang (continued).

| | |
|-----------------------|------------------------|
| Meliosma sp. | Dracontomelon |
| Ficus sp. | Buchanania sp. |
| Lauraceae | Palacium sp. |
| Knema sp. | Ardisia sp. |
| Phube sp. | Alseodaphne sp. |
| Mastixia sp. | Duabanga sp. |
| Aglaia sp. | Polyalthia sp. |
| Eugenia sp. | Pygeum sp. |
| Merysticaceae | Planchonia valida Bl. |
| Helicia sp. | Phyllanthus sp. |
| Litsea sp. | Rubiaceae |
| Hernandia cf. ovigera | Baccaurea sp. |
| Chrysophyllum sp. | Plectronia sp. |
| Diospyros cauliflorus | Annonaceae |
| Actinodaphne sp. | Leguminosae |
| Piper sp. | Parinari corymbosa |
| Neonauclea sp. | Shorea sp. |
| Cryptocarya sp. | Sterculia sp. |
| Rubiaceae. | Pterospermum javanicum |
| Petunga sp. | Fagrea sp. |
| Aglaia sp. | Crataeva sp. |
| Beilshamedia sp. | Piper sp. |
| Mallotus sp. | Magnoliaceae |
| Acanthaceae | Gesneriaceae |
| Fraxynus sp. | Ficus spp. |
| Ardisia sp. | Homalium sp. |
| | Melastoma sp. |

=====

Vast low-lying poorly drained flats back of coast, dominated by sedges when fallow. Many vegetables cultivated here.

East of Tegol are plantings of *Sesbania grandiflora*. Lvs. fed to goats, flowers to people.

About 50 km. W. of Kendal starts a region of low hills with well grown teak plantations, some being cut. Ringed 2 years earlier to kill trees.

Small *Metroxylon* swamps here in ravines. Much bamboo in waste spots.

Oryztes damage at Kendal.

East of Semarang the country is hilly, cleared, with scattered coconuts, a few secondary thickets, grass, scarcely any rice. Eastward rice gradually appears. Apparently water is controlling factor. Manihot planted where not enough water for rice.

To eastward and southward a number of volcanoes are scattered about the landscape. Some are active.

Dec. 22 - ~~Solo~~ ^{Solo} -

In the palace grounds at ~~Solo~~ ^{Solo} a bright yellow flowered form of *Turnera ulmifolia* is planted as an ornamental (looks like the one in Malé?).

Ficus kurzii (*F. benjamina* but with aerial roots) planted as sacred tree - beautiful examples, surrounded by walls - banyan habit.

Muntingia perhaps the commonest street tree (also seen very commonly yesterday in most towns and villages.) Fruit, said to be much eaten by children.

Teak plantations, ^{20 year old} east of Solo (photos). Tall straight trees. Shrub layer of coffee from trees cut out by thinning left to cut down fire hazard. Undergrowth of *Leucaena* in some parts, planted with teak, to cut down fire hazard and to protect soil from sun during dry season. Clean-felled, all coffee

pulled out by roots, used for firewood. Replanting by seed. 4 seeds planted, best seedling selected. Teak forest a complete government monopoly. To cut a teak tree in downyard permission required from forest officer. All teak land (2000000 acres) government owned. 10-15% of teak timber exported.

Soils east of Sals for
some distance seem to
be mostly regur (black
cotton soils).

Rivers and streams through this area very muddy.

East of both the villages are surrounded by rows of thorny bamboo. East of Madim bamboo practically dominates the landscape.

Flat-topped Acacia tomentosa becomes prominent, said to be spontaneous. Tamarind still lines roads. Coconuts much less common here. Rice is dominant through this entire area.

Near the sea, in the vicinity of Paserman Opuntia and Borasus reappear. Soil is black.

Warming, bet Prokolinggo & Gending
Limestone bluff overlooking
sea - degraded scrub of
Opuntia, *Lantana*, *Patropia*
gossypifolia, *Ficus*, *Melia*,
and a dry grass, possibly *Eulalia*.

Eastward along coast
toward Pasir until the bamboo
around the villages becomes
very scarce.

At Pasirputih the sand of the beach is almost black with an admixture of white coral sand. The rocks coming down and forming the point are ~~a~~ iron gray pillow-basalts, apparently a thick flow. The surface weathers darker than the normal color of the rock.

7 oak forest with dense undergrowth here.

Dec. 23 - Pasir putih

fire climax forest on
basalt slope - *Schleichera*,
Albizia lebbioides, *Homalium*,
Tonktoosum, *Schoutenia*,
Flacourtia, *Uraria*, *Lantana*,
Zizyphus, etc. Trees rather
scattered, shrub layer
continuous. *Lantana*
dominant in shrub layer.

Part of it less degraded, with more or less continuous layer of trees, incl. *Proteum*, *Sterculia foetida*, plus those mentioned above. (Driest region in Java - rain less than 1000 mm. in a wet season of 2 1/2 mo.)

Here the undergrowth is thick. ~~Almost~~ Many of the trees lose their leaves during dry season. Only *Schleichera*, *Schoutenia* and *Garcinia* retain leaves. Undergrowth completely deciduous, herbaceous part disappears.

Soil thin and black "Andesitic-basalt" outcrops generally. Old flow.

The more wooded part is in a valley

Dec. 23 Pasirputih to Baboran

at Asembagus photos of oxcart, horse cart, stone, etc.

West of here a large flat area has been cleared and plowed for large scale cotton planting. Scattered *Azadirachta* trees left, forming a sort of savanna landscape.

From Soembereijen a dry sloping savanna, very rocky, said to be severely burned every August. Certainly looks that way. This is lower slope of Baboran volcano. Commonest tree *Schleichera olerosa*. Teak plantation below road. Above road where it circles mountain is a more closed, tangled open forest. Shallow dark brown to blackish soil.

Teak plantations almost all young, some very young. Interplanted with *Leucaena*, occasionally *Acacia arabica*.

This all on foot slopes of volcano, very gentle slope, very rocky.

Tamarindus planted along road.

From end of surfaced road

the vegetation is mostly more or less natural, except for occasional small plantings of *Leucaena*.

This *Leucaena* is coppiced and grows up to clumps of thin wands, as thick as a thumb and 3-4 m. tall, few leaves, clumps of fruits.

The vegetation varies from a tangled thicket, choked with Lantana and vines, trees mostly with crowns not touching through open forest with a dense scrub layer of Lantana camara, to savanna with grass and scattered trees and clumps of thicket.

The grass is dry, barely starting to send up tiny shoots, more advanced where it has been burned.

On flat ground are areas of grass on conspicuously cracked, polygon ground, black soil.

The forest is partly thorny, and partly deciduous, partly microphyllous.

Talpat, Baloran -

Dissected lower slopes of the volcano, drastically burned over, with sparse tufts of several kinds of grasses, a few scattered small trees of various kinds -

Phyllanthus emblica, Morinda sp., acacia leucophloea, Grewia,

Azadirachta

Cassia
fiatula
Azadirachta

etc. a few small herbs - Buchnera, Vernonia 2 spp. Euphorbia, etc.

Gallery forest in ravines - rather dense - Rhondias, Premna, Ficus, Morinda, Grewia, Pisonia aculeata, Phyllanthus emblica, Schleicheria, etc. A tiny trickle of water in canyon.

Rhondias ~~fruits~~ stone scattered over dry hillside well above Rhondias trees. Bats said to be present.

(Photos of mountain side & deep canyon)

The flat grassy areas with cracked soil have scarcely any trees.

They are surrounded by areas of savanna or semideciduous and of open deciduous forest. (photos, ending Rd. vol 3.)

This around lookout near waterhole.

Lookout on small scoria cone

On flatter ground below Talpat scattered trees of Acacia, flat-topped and spreading. Ground in low spots deeply cracked. Leucaena planted along road for some distance on both sides. (to p 110)

Dec. 24 - Pasirputih
degraded forest on steep
slope of basaltic rock
with thin soil.

- 39741 *Schleichera*
5 very common tree in open forest
2 42 *Randia*?
in open
5 43
rare in undergrowth
5 44 (*Lamprophloe?* *Cassia*?)
common in undergrowth
3 45 *Callicarpa*
rare in undergrowth
1 46 *Tabernaemontana*
rare in undergrowth
3 47 *Wedelia*
occasional in open
3 48 *Randia*
occasional in undergrowth
1 49 *Thunbergia alata*
rare in open

Dec. 24 - Bekol

- 3 50 *Schoutenia ovata*
common in open forest

Dec. 24 - Talpat, north
base of Baloran Volcano
gallery forest in ravine

- 4 51 *Premna*
occasional

small tree,

scandent shrub;
flower greenish.

small shrub; flowers
white; fruit immature.

scandent shrub or
liane; flowers white.

depressed shrub; flowers
pinkish purple.

small shrub; flower
white.

depressed herb; rays yellow.

shrub 1.5 m. tall;

flowers white.

flowers white.

shrub

small tree, aromatic;
fruit immature.

- 39752 *Spondias mombin*
5 one tree in gallery forest
in ravine
- 2 53 *Morinda*
very common
- #3 54 *Vitex*
occasional
- 3 55 *Zizyphus*
common
- 1 56 *Dioscorea*
common, twining in shrubs
- 1 57 *Vernonia*
common in open grassland
- 1 58 *Euphorbia*
rare in open burned grassland
- 1 59 *Buchnera*
rare in open burned grassland
- 2 60 *Morinda*
common
- 5 61 *Grewia*
occasional

Dec. 25 - Wororejo, north of base
of Baloceran Volcano
Dry thickets in savanna

- 3 62 *Morinda*
common
- 3 63 *Abutilon indicum* (L.) Sweet det.
common under trees in Fryxell
- 3 64 *Grewia*
common ~~in~~ on small hill
- 1 65 *Cissus*
with anderson

tree about 10 m. tall;
fruit

small tree; fruit
green.

~~small tree~~

small tree

leafless

sprouts from base of
old sticks; flowers purple.
glands white.

flowers whitish.

small tree; flowers
white

small tree or shrub,
2.5 m. tall, flowers
yellow, fruit immature.

spreading tree 8 m. tall; fruit
immature, said to be eaten when ripe.
suffrutescent herb or slender
shrub 1.5 m. tall; flowers
orange-yellow.
small tree.

sterile.

cracks in ^{black} soil up to several cm. wide and at least 1 m. deep.

In ravines and low spots a tangled gallery forest. (Photos b+w ~~first~~ first 5 on roll 4, incl. *Cassia fistula*)

On slopes a mixed savanna with *Acacia leucophloea*, *Phyllanthus emblica*, *Cassia fistula*, *Bauhinia* sp., *Azadirachta indica*, etc.

(Half dozen photos, b. & b+w.)
(Photos of cracked ground and grassland on it)

Around trees and clumps of trees in savanna tend to be concentration of shrubs, mostly scandent and semi-scandent (photos)

Photos from lookout. Bekol.

The shrubs run together to form a tangled layer about 2 m. high where the trees are close enough to form an open forest. This in most places is largely *Lantana camara*, which is deciduous here.

with rain

Dec. 25 Wongsorejo

39766 *Acorus calamus* L.
small clump along stream

67 *Thunbergia alata*
common around buildings

Dec. 25 Coast north of Banjuwangi

39768 *Capparis*

occasional in dry thickets

Tricentron portulacastrum L.

common on walls along shore.

scandent shrub.

prostrate, sub-fleshy,
flowers pale lavender.

Wongoro - Banjuwangi
great trees along road of
Salmaria malabarica (Banks,
m.), *Lomanea*, etc.

Tamarindus has disappeared.

Wongsorejo - Coiba very
abundant. Bananas
produced for export.

Dry hills approach shore
at narrowest part of
Bali Strait. Covered by
low tangled scrub forest.

Beyond here *Tamarindus*
reappears. Coconut plantations
with or without understory
of bananas very extensive
on coastal flats here.

Maize also planted
under coconuts. Coconuts
here healthy looking,
shack near Wongsorejo
were very yellow - said
to be attacked by a pest.

Trees start bearing at
6 years, considered too old
at 30 years.

Manihot also planted
under trees. Laborers who
care for trees and make copra
plant the crops between the
trees as their compensation.

erect, with aromatic soapy odor.
twines, flowers pale lavender.

Dec. 25 - Gilimanuk (Road of the Birds) drab looking port, landed on beach down a plank from ferry. *Azadirachta*, *Hibiscus tiliaceus*, *Lanea grandis* (more or less bar)

Along road for 2-3 km. is a striking open forest of *Brassus*.

Then dense thicket or tangled scrub forest, especially on the right. On left some mangroves. Raining very hard.

The *Brassus* has grass beneath, no shrubs. Said to be burned twice a year. Spacing between savanna and open forest.

Photos (now 28-30) of typical tangled 2nd growth landscape of N. Bali. Saw several white storks. This is game reserve.

Gunung Sanggang (God's Mt.) is a spectacular dissected volcano.

The country after the game reserve is densely cultivated, mostly in maize or kapok + maize.

Pula Pulahi - temple - spectacular, tall cliffs. Many gray monkeys. (photos). (photos of *Brassus*). *Brassus* very abundant in this vicinity near shore. *Acacia leucophloea* - large flat-topped trees.

Lower slopes degraded to savanna, ^(photo) very much resembling the lower ridges on s.e. Oahu. The higher mts. also resemble the Koolaus from a distance.

A large area of Coconuts with an understory of bananas, very luxuriant. Large flat area of rice, very luxuriant also.

Then more coconuts + bananas, with some areas of maize.

Rice and vegetable mosaic app. Linardja.

Dec. 26 - Bedugul, Lake Bratan.

Drymaria here has pedicel pilose, not viscid. sepals either pilose or glabrous, on rare inf.

4700' Across lake a long ridge with plantation on one side, the steep side above lake still in fairly good montane forest - abundant epiphytes. Main genera *Litsea*, *Michelia*, *Eugenia*, *Schefflera*, *Macaranga*.

Dec. 26 Bedugul, on Lake
Bratan

39770 *Drymaria*

3 on cut bank of volcanic soil
near building

2 71 *Emilia sonchifolia* (L.) DC.
on masonry wall just
above lake

72 *Ficus aurantiaca* var. *parvifolia* (Guss.)
common; montane rain forest on ridge

2 73 *Adinandra*

common in montane forest

3 74 *Lambucis*

very common in open places
along trail

75

1 75 *Michelia* () glauca

occasional in wet forest on ridge

1 76 ~~Michelia~~ *Astronia*

occasional in wet forest on ridge

1 77 *Rubus*

common along trail in wet forest
on ridge

4200'

1280 m

weakly erect.

flowers purplish pink

det. Corner.

Corner

4700'

↓

1440 m

woody climber reaching
high in trees, fruit, ~~is~~
depressed globose, deep
orange spotted with white,
turning soft and deep maroon
on becoming fully ripe.
Lower parts, even when
fruiting, appressed to tree,
parts high in tree with
larger leaves and spreading
branches, also fruiting (not collected).
tree; flowers whitish.

shrub 2 m. tall (reaching 3 m.)
flowers white (no yellow
glands in inflorescence), in
flat to roundish topped
cymes. Old inflorescence
purple, setting very few fruits,
then immature.

tree; leaves glaucous
beneath.

tree; inflorescence and
flowers pink.

scandent shrub,
flowers white.

1958 Bali Podocarpus ^{Lasianthus}
Medinilla, many ^{cf.} Urticaceae, ^{Laportea}
with epiphytic Ficus,
many ferns, orchid
mosses. Freziera,
Rubus moluccensis in
undergrowth, with very
conspicuous lacinate bracts
in young inflorescence.

One "Laportea" with long
pendent blue inflorescences
and very fleshy translucent
fruits.

† nesters not seen but possibly present.

Most of these slopes, even the highest, except those almost vertical are covered by coffee plantation with overstory of *Erythrina* sp. Some native plants in ravines. Mostly *C. robusta*, said to be some *C. arabica*.

Singaradja To Penulisan Pass

Climbed through complex of
Coconuts, fruit trees, rice terraces.
to over 2500', replaced by ~~coffee~~
coffee plantation with Erythrina.

At about 4000' there start to be small farms. At perhaps 5000' there are remnants of native forest, plus plantations of Casuarina, Cupressus macrocarpa, Widdingtonia. This area

seems moderately wet.

Hotel Kintamani

Along photos of volcanoes Agung
Agung and Batur
and caldera lake - Batur

Photos of Kehen temple.
Bangli

Photos of Agung Volcano
and rice paddy (Peak of Bali
below Bangli.

Photos of Elephant Cave (b & w).
bathing place, archeological material

Bali pigs are a strange breed, elongate, with a deep sag in ~~the~~ back and a fat belly; black and pink in color.

Bali cattle look much like the wild banteng, females red, males dark, blackish, all with the conspicuous white patch on the backs of the legs, only the variability in the horns suggesting any hybrid ancestry. Some have banteng horns, others slightly suggest zebu.

Dec. 26 -

Bedugul

39778

Carica

2

in dense primary forest

2 79

Carica

in dense primary forest

Label
errorDec. 26 Hotel Kintamani
dormyard

1 80

*Drymaria villosa*occasional, with *D. cordata*

1 81

Drymaria cordata (L.) Willd.
common

Dec. 27 Sacred Forest of Sangeh

dense tall forest of Dipterocarpaceae

2 82

Pisonia silvestris

second story tree in

2 83

Baccaurea?

in undergrowth

84

Dipterocarpus hasseltii
dominant tree in

3 85

(Rut.)

common in undergrowth in

4 86

Psychotria rubra?

det. H. 122

rare in undergrowth in

brought in by native collector

low branching thick
stemmed rosette tree;
flowers whitish. ♀.
same ♂ & ♀.leaves plane; fruits immature
pulp tightly filling
cavity around seeds.

pedicels very viscid.

tree 20 m. tall, fruit
very sticky.
shrub 1 m. tall.material picked up from
ground under trees 40 m. tall;
flowers pink.shrub 1 m. tall, aromatic
when broken; flowers white,
fruit gray-green.small shrub; fruit red, fleshy.
flowers greenish white;

Dec. 27 - Sibang

Photos of market and village temple 1st 10-11 on roll 6. Kod.

Sadeh - Sacred forest of *Dipterocarpus hasseltii* & *Pisonia silvestris* (photos, Kod. 11-12)

finish
roll 11

Trees more or less uniformly about 40 m. but dbh varies from 25 cm. to 100 cm. trunks smooth for 30 m. scattered second layer 10-20 m. *Pisonia* & saplings. dense ~~growth~~ ^{shrub} layer 1-2 m. more varied comp.

Epiphytes in canopy.

Gray monkeys around temples.

Dec. Womersley forest around burial grounds in N. 9.)

Village complex - coconuts, Arenga, ~~Adiantum~~ ^{jack}, breadfruit, mango, citrus, Musa, bamboo. Hibiscus, tiliaceus, Salakia, Ceiba, Carica, Manihot, Eugenia cinnamomea, Plumeria.

Gulingan temple - ~~photos~~ ^{had} photos rice edendaceae temple.

End Kod roll 11 in Womersley Village - mud walls, etc. Sadeh temple (Kod. 8-10 beginning of roll 7.)

Coconuts and Arenga attacked by Anagae, Areca not. Coconuts more damaged than Arenga.

The palms commonly seen are Coconuts nucifera, Arenga pinnata, Areca cathecu, less commonly, Zalacca edulis, still less commonly a slender very tall fan palm.

Houses generally walled with mud or masonry walls. Tops of mud walls protected by thatching. Mud walls made of large blocks cut from earth.

Cows kept in special small bamboo shelters. Cows washed twice a day. Pigs abundant, one of most important exports, second only to coffee. Pigs exported alive in cylindrical bamboo cages. Sent as far as Hongkong and Singapore.

Between Denpasar and Samur *Pisonia grandis* var. *alba* is common. Not seen elsewhere in Bali.

- 39787 *Psychotria*
 2 common in undergrowth in
 3 88 *Pavetta*
 common in undergrowth in
 1 89 *Melastoma*
 occasional around edges of
 1 90 *Hedyotis biflora* (L.)
 on steps of temple
 2 91 ~~*Dipterocarpus trinervis*~~ *hasseltii*
 common in undergrowth
 as seedlings.

Dec. 27 - ~~Sadeh~~ ~~Giliwangan~~ Temple

- 1 92 *Mollugo*
 occasional
 93 *Dentella serpyllifolia*
 abundant

with
Portulacae

- Dec. 27 Sanur
 1 94 *Ximenesia americana* L.
 in beach vegetation

Dec 28. Denpasar to Gilimanuk
 Generally the area near
 Gilimanuk is scarcely
 like Bali. Scattered houses,
 few villages, no rice, almost
 no temples, some second
 growth, fence rows of
Euphorbia nervifolia, maize

shrub; flowers white;
 — fruit orange when ripe.
 shrub 1 m. tall; flowers
 white; fruit immature.
 — shrub 1 m. tall; flowers
 deep rose purple.
 buds white.

These seedlings, with
 hairy stipules, mixed
 with and intergrading
 with those with glabrous
 stipules.

stems spreading

forming very flat mat;
 flowers dull white.

1 m.

fruit yellow, sour, with
 poor flavor, but flesh
 unusually thick.

the most important crop.
 Small development of
 mangrove (seen nowhere
 else on island), conspicuous
 groves of *Borassus* (photos).
 Black sand beach at Gilimanuk
 part magnetite, part olivine(?) -
 or augite(?) (sample).

The flat land of Bali, the coastal plain, except for the ~~part~~ around Gilimanuk is very intensively cultivated, mostly in rice where water is available for irrigation. In places even the dikes in the rice fields have a row of beans planted on them, or Sesbania.

Bali varies from ^{one} local region to another in the pattern of cultivation, etc.

Imperata cylindrica occurs generally, but is also planted, especially on steep slopes, for use as thatch. Said to last 8-10 years, while coconut leaves last one year. Arenga sheath fiber, used mostly on temple roofs, said to last 50-60 years.

Dec. 28 - Banjuwangi - Djember
From Banjuwangi south
largely coconuts, then
rice. This continues - flat
rice fields with "islands"
of village complex, more or
less the same to Genteng.

West of Genteng coffee
begins to appear, shaded by
Lencarna, etc. at about 700-800'.
Rubber starts somewhat
west of this. Still large
coconut plantations.

Coffee soon dominant, and
continues so till we climb
a mountain mass. Here ~~degraded~~
degraded forest with climbing
fambro (a very wide-leaved
sp.) appears at about 1800' and
coffee disappears at about 2200-
2300', replaced by the degraded
very dense forest - under
layer a terrific tangle,
~~to~~ 5-10 m. tall. scattered
large trees remain from
original forest. On the
other side of this ~~hill~~
hill coffee does not
reappear, but there is a
little teak, suggesting
that the hill is limestone.

Then ~~all~~ rolling to some-
what dissected country
with rice. Imperata,

bananas,
trees, etc. villages.
18 ~~km~~ km. S. of Djember
an area of old karst
topography, much
worn down.

^{terrible rain}
Djember - Probolinggo
Tobacco - rice - sugar - rubber -
coffee ~~area~~. Or. teak on low hills.

Remarkable dissected
volcano - Rungto to right.
North of Lumadjar a great
irrigation canal between
dikes, level of water well
above that of rice fields,
giving the appearance of
polders. Very green.

Xanthosoma sagittata
much the commonest terato-
rial aroid in Java.

Evidence of a serious flood
just south of Djatiro
Follow canal toward
Semeru Volcano, ^{3770 m} highest
pt. in Java. Lamongan
or V. on right. Said to be
lakes or maers in small
~~can~~ vents on side of Lamongan.

Much sugar and rice
in former marsh or old
lake bed, now polders on sides
of great canal.

A few km. S. of Probolinggo
rather high ground with

mostly maize, little or no rice. Dark reddish brown soil. Great volcanic boulders in stream beds. Scattered clumps and rows of bamboo.

Rice again at Letjes.

Streams in this entire region very muddy. There has just been a very hard rain.

Vast rice fields.

Probolinggo - Madium

West of Probolinggo a few km. a low coast with clumps of a very low Pandanus in otherwise bare mud flats. Intricate network of fish traps in shallow muddy water.

Dec. 29 Madium to Puraokerto

Madium River very high, very muddy.

N.e. of ~~Letjes~~ a large area of rolling hills with teak forest plantation in various stages, some fallow land.

Teak leaves harvested and taken to market for use as wrappers.

Ipomoea carnea very common along roads and in fence rows.

About here the large *Tamarindus* trees disappear from roadsides.

Photos (hot.) of rice planting ~~first~~ ^{row} of ~~Lusikanta (foto)~~ ^{of} ~~Lragen~~.

Photos of rice harvest 24 km. sw. of Solo.

Tobacco and sugar in this region, as well as rice. Large tobacco barns. ~~Many~~ many peanuts seen around Klaten.

Photo of edge of village of ~~Gondang~~ Gondang.

Temple at Prambanan - photos - being restored, work going on since 40 years. Huge *Terminalia catappa* trees in courtyard. Ruins said to date from 9th century Hindu culture. Statues of Vishnu, Shiva, etc.

Another smaller temple not restored, at Kalantana.

Komodo Dragon (photos) in Jogjakarta zoo. Very shaggy. Tongue yellow, forked.

Barabura. Mimosa aspen along edges of rice fields. Limestone range to south almost completely deforested.

grassy and in places
badly eroded. Lower slope
with some secondary woods.

Brobudenstupa, solid
dates from 778 AD - restored,
but original stones and
images used, 504 images
of Buddha, 6 missing taken to Lian
by Chulalongkorn. (Many photos)

Keapumen region - most densely populated area in Java 1400 pr. sq. km. Village complex appears to occupy more ground than rice fields. Some rice fields have gardens raised a few inches above water level.

Just west of here a low range of grassy hills - Imperata.

On a few miles to right is a low mt. range, almost completely deforested, except for a few tufts of trees on several hilltops. Some Hevea plantation. Lower slopes in coconut, mostly.

Dec. 30 Purwokerto to Bogor.

South of Punxsutawnt limestone
hills with teak plantations.
Grazing permitted in teak
plantations, and erosion

is not prevented. Rivers
exceedingly muddy.
Lowlands south end west
are rice plus village
complex.

In village complex (E. of Wangon)

Сторога

Bambusa

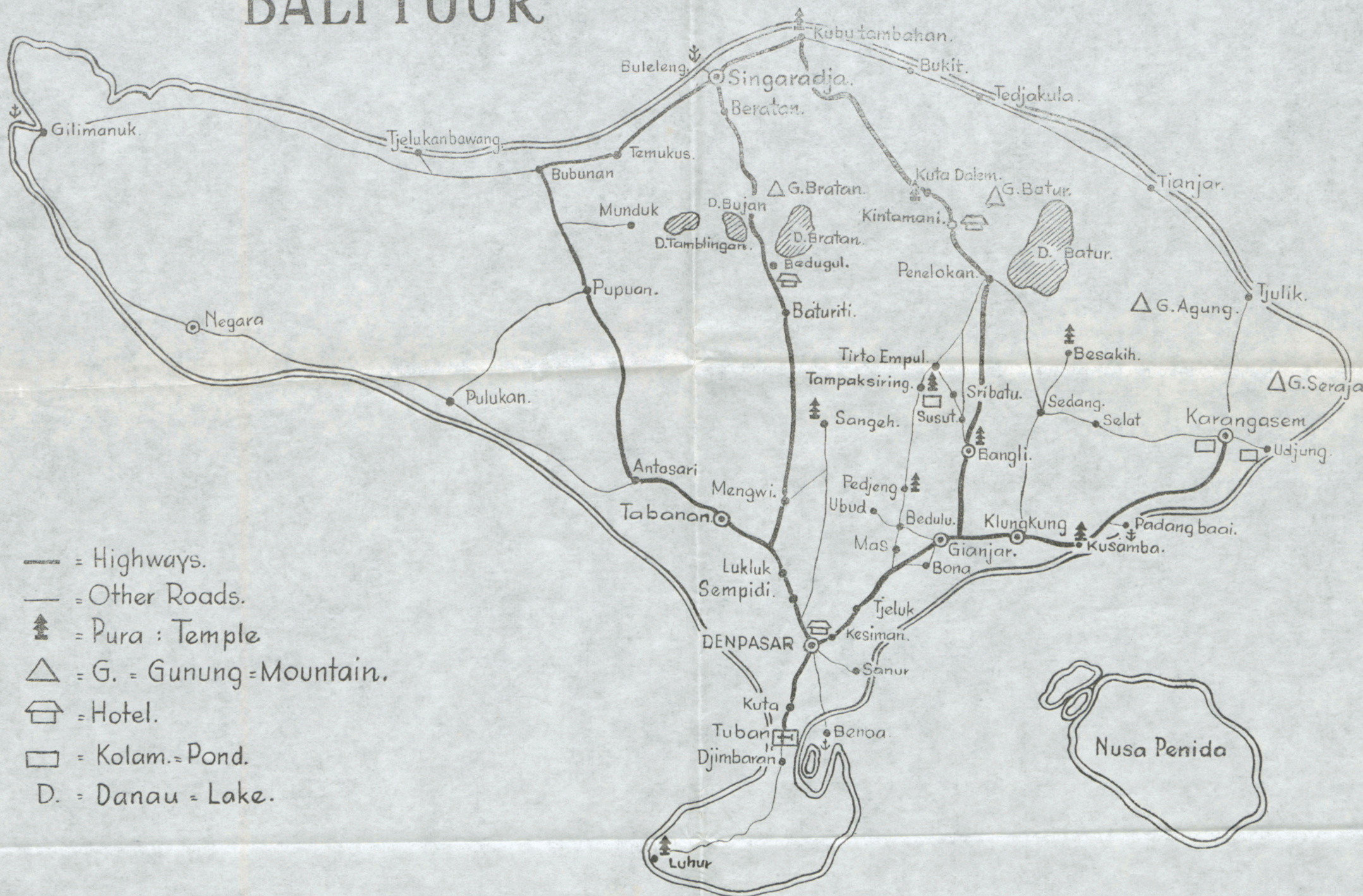
Hibiscus tiliaceus

Terophyllum

to be

of the

BALI TOUR



— = Highways.

— = Other Roads.

⛩ = Pura : Temple

△ = G. = Gunung = Mountain.

🏠 = Hotel.

□ = Kolam. = Pond.

D. = Danau = Lake.

TOURS.

- S S A From Bali-Hotel to Lukluk (temple), Baturiti and Bedugul (p.m. 12.00 above sea level) on lake Bratan, opportunity for swimming. Back to Bali-Hotel. Duration 4 hours.
- S S B From Bali-Hotel to Sangeh (Holy Forest temple and monkeys) then to Mengwi (temple) and back to Bali-Hotel. Duration 3 hours.
- S S C From Bali-Hotel to Bona to see Ketchak (Monkey dance). Tickets obtainable at Bali-Tour. Duration 3 hours.
- S S D From Bali-Hotel by way of Kedewetan and Ubud (centre of painting) to Bedulu (Elephant's Cave). Then to Tampaksiring. Excursion to Gunung Kawi on foot to see the old monastery and King Tombs. Then to the Holy Spring near Tirta Empul and from there back to Bali-Hotel by way of Mas (wood carving) and Tjeluk (silverwork). Duration 5 hours.
- S S E From Bali-Hotel to Tjeluk (silverworks) Gianjar. Bangli (Pura Kehen) Penelokan (beautiful view on lake Batur and the volcano of Batur) and Kintamani (1500 m above sea level). After lunch at Kintamani Hotel back to Bali-Hotel. Duration 7 hours.
- S S F From Bali-Hotel to Tjeluk (silverworks), Mas (wood carvings), Bedulu (Elephant's Cave), Tampaksiring: Excursion to Gunung Kawi (old monastery, King Tomb) on foot. By way of Sebato, Susut, Bangli (Pura Kehen) Penelokan (beautiful view of Lake Batur and volcano of Batur) to Kintamani (1500 m above sea level.) After picnic lunch at Kintamani Hotel back to Bali-Hotel. Duration 7 hours.
- S S G From Bali-Hotel by way of Tjeluk (silverworks), and Gianjar to Klungkung (Kertagosa, old courtroom). Then by way of Bukit Djambul with beautiful view on the valley of Klungkung and the island of Nusa Penida, to Besakih (Great temple, mother temple of Bali). Then by way of Rendang and Selat to Tirta Gangga (opportunity for swimming) picnic lunch (taken from Bali-Hotel). After lunch to Ujung (water palace of Radja Karangasem and via Kusambe (Goa lawah, Bats Cave), Klungkung back to Bali-Hotel. Duration 9 hours.
- S S H From Bali-Hotel to Sanur (sea bath at Sanur, Swimming and opportunity to visit Mr. Le Mayeur, painter). Duration 3 hours.
- S S J From Bali-Hotel by way of Sempidi and Kapal, Mengwi, the by way Kediri to Tanahlot (temple on a rock in sea) Back to Bali-Hotel. Duration 4 hours.
- S S N From Bali-Hotel to Kuta Beach Djaja, Kuta to visit the painter Agus Djaya. There is a nice beach in opportunity for swimming. Duration 3 hours.

grassy and in places badly eroded. Lower slope with some secondary woods.

Borobudur Stupa, solid dates from 778 AD - restored, but original stones and images used. 504 images of Buddha, 6 missing taken to Liann by Chulalongkorn. (Many photos)

Kejumen region - most densely populated area in Java 1400 per sq. km. Village complex appears to occupy more ground than rice fields. Some rice fields have gardens raised a few inches above water level.

Just west of here a low range of grassy hills - Imphata.

On a few miles to right is a low mt. range, almost completely deforested, except for a few tufts of trees on several hilltops. Some Hevea plantation. Lower slopes in coconut, mostly.

Dec. 30 Purwokerto to Bogor.

South of Purwokerto limestone hills with teak plantation. Grazing permitted in teak plantations, and erosion

is not prevented. Rivers exceedingly muddy. Lowlands south and west are rice plus village complex.

In village complex (E. of Wangon)

Cocos

Bambos

Hibiscus tiliaceus

Mango

An. Mura

Ceciba

Averrhoa caracas bala

Muntingia

Saccharum officinarum

Areca

Annona sp.

Artocarpus heterophyllus

Citrus sp.

breadfruit

Manihot

Ananas

Tea

Psidium

Albizia sp.

Poncirus

Glinicidia

Cassia

Tecoma

Tamarindus

many ornamentals

Canna edulis

A few km. W. of Wangon and the low range of

limestone hills, mostly in teak. Not heavily grazed. A few villages and banana-maize culture. Then west of this the hills continue in pasture, small cultivated patches, thickets, rice in ravines, village complex. Some degraded forest on highest steep slopes, but some very steep areas bare. Some teak plantations again, westward, limited areas. This hilly country extends westward some 100 km.

Road gradually gets out of it to south, running parallel to it through low rolling hills in teak, much grazed.

Then about Masehony a large area of village complex and rice. Coconut plantations on lower slopes.

Then extensive flooded area. Then a low range of hills covered by rainforest fields, red soil, then another large flooded area, near Wandareja, this much smaller.

On both sides of Tarikmalaja is a mosaic of rice fields

and small rounded hills with trees, mostly coconuts, bamboo, etc. dwellings & undergrowth, some open scrub-covered area. Picturesque landscape. Gradually the proportion of rice becomes less, that of hills more; the hills fuse and, then, there is a ~~predominantly~~ predominantly upland landscape with some rice here and there.

Toward Garent the country is mountainous, volcanic, with spectacular rice terraces below, shifting agriculture on higher steep slopes. Little forest left but thickets in ravines. Arenga common. Many ~~are~~ trees flowering. Does not appear to be ~~monocarpic~~ ~~monocarpic~~ at least has a number of axillary inflorescences at once, male below. How long this continues is not clear, but Kosterians say indefinitely. Many trees in bad shape, some dead, but no correlation. Some flowering half way down trunk. The

black sheath fiber
is said to be used to
line septic tanks, to wrap
holes which are in earth,
etc. as it resists rot
and termites. Also used
to make rope, esp. for tying
roofs - very strong. Fruit
eaten. Sap used for sugar
making. Very little
used for toddy. Fermenta-
tion prevented by smoking
bamboo collecting containers.

Coconuts very rare
here. 3 palm trees seen at
3400', several others nearby,
badly attacked by *Ankytes*.

Volcanoes bet. Garut and
Bandung cleared and under
cultivation to summit.

Phuchea ~~camara~~ indica
commonly used as hedge.
Alseodaphnia curcas.
A small bamboo more
rarely.

136

1959 Java

Jan. 2 - Bogor

planted in gardens

39795

Endiandra bassii

5

3

96 *Pseuderanthemum*

5

97 *Hura crepitans*

5

98 *Hura*

137

large spreading tree,
flowers white, somewhat
fragrant; leaves slightly
aromatic when crushed.

small shrub, leaves
green with dark purple
veins; corollas white
with purple dots near
center.

spreading tree, male
and female flowers ~~red~~
dark red; the male spikes
cylindrical, with two
whorls of ~~stamens~~ flowers
each.

spreading tree; male
and female flowers
white; male spikes
compressed ~~in the direction~~
~~of the length~~ parallel
with axis, flowers
arranged spirally, many;
edge of ~~lobes~~ stigma
of female flowers deeply
lobed.

Jan. 5 - near ^{near} Bogor; ~~the~~ ^{the} ~~site~~ ^{site} of proposed addition to the botanic garden.

Rolling hills with rather deep dark brown soil, volcanic ash origin. Deep ravines with water and woods or thickets of bamboo, miscellaneous trees. The high ground is terraced, some in Manihot some in grass, mimosa, etc. Said to be former rubber estate. Perhaps 600 m. alt. or more. 700 acres on gradual slope above Bogor.

Some coconut trees.

Coll. seeds of a Poinsettia for Dressler.

Pieces of tile in soil.

Some young rubber, some rice, some bananas.

Jan. 9 Darwin - Drenching rain, said to have been raining from Monday till today, Thursday.

The area around Darwin is green. Open forest of rather small trees, mostly Eucalyptus. In town a typical tropical assortment of ornamentals:

Allamanda cathartica v. hendersoni

Calophyllum inophyllum

Polyscias tricochleata

P. guilfoylei

Delonix regia

Pseuderanthemum cantherbyi

Polyscias fruticosa var. filicifolia!

Polyscias pinnata?

Mussaenda frondosa var. eff.

Theretia peruviana

Plumeria rubra

Ficus sp.

Antigonon leptopus

Lawsonia inermis

Bougainvillea spectabilis

Catharanthus roseus

Acalypha arnentacea var.

A. hispida

Jatropha podagracea

Nephrolepis sp.

Synedrella sp.

Scindapsus aureus

Euphorbia pulcherrima

Lanseviella roxburghii

Manihot esculenta variegated var.

Prevailing vegetation around Darwin is a seasonal open forest, varying toward savanna, of two species of *Eucalyptus*.

Buchanania, *Terminalia edulis*, *Grevillea* sp. *Pandanus* spp., with *Cycas media* rather common and *Divisoria humilis* rare. The ground cover is tall grass. This is burned every year.

Phyllanthus emblicus
very common (introduced)

Locally, with no obvious topographic difference, is a type of monsoon forest, densely tangled with vines, difficult to walk through. Stature about 15 m. In dry season the majority of trees and most of undergrowth species lose leaves, but some for only a short time. Burned every year.

Patches in vicinity of Darwin being destroyed for subdividing golf courses, etc.

Mangroves common along coast, but growing on rock terraces exposed at low tide. Terraces cut in a peculiar rock called chalk locally. A bedded breccia. *Ceriops* dominant

in parts seen, but a white flowered *Lumnitzera* common, *Pemphis acidula*, *Aegiceras*, *Forneratia*, *Avicennia*?, etc. Really swampy places seem mostly almost pure stands of a shrubby *Salicornia*. *Hippomane manzanilla* occurs, doubtless introduced.

Along rocky shore and top of beach thickets of various species, with *Scaevola sericea*, *Cordia subcordata*, *Guetarda speciosa*, *Capparis* sp.?, *Grewia* sp. *Hibiscus tiliaceus*, ~~*Thespesia*~~ *Thespesia populnea*, *Exocarpos latifolius*, *Alstonia* sp.

On beaches *Sporobolus pes-caprae* sp. *brasilienis*.

Passiflora foetida with orange fruit common but segments of bracts scarcely interwoven.

Caesalpinia pulcherrima (yellow)
Cocos nucifera
Acalypha marginata?
Clitoria ternatea
Plumieria obtusa
Quincualis indica
Gamarindus indicus
Lamanea samar
Musa sp.

39799
 2

Jan. 8 - Darwin, N.T.

(Myrt.)

among mangroves on rock
substratum covered by high tide.

39800

2

Exocarpus latifolius

In thickets just back of beach

2

01 *Borreria*

abundant in open forest
and in disturbed places.

2

02 *Stachhouia*?

common in open forest.

1

03 *Cassia*?

common in open forest

Jan. 9 - Alice Springs, N.T.

around airport, on flat silty ground

2

04 *Boerhavia*

2

05 *Eragrostis*

shrub 2 m. tall, aromatic;
flowers whitish.

yellowish green shrub
2 m. tall, ripest fruit
turning dull orange,
receptacle swollen.
heads lavender blue

flowers with limb white,
tube yellow.

flowers yellow, almost
or quite actinomorphic.

prostrate, leaves pale beneath.
small tufts, culms
almost erect.

Jan. 9 - Trip by air from Darwin to Adelaide - DP-4, left side. ^{at 7:20}

Raining hard. Sea very rough, about 25 lines of breakers, water muddy. Considerable mangrove ^{thicket} west of Darwin in a small bay. also ~~2~~ 3 small estuary systems ~~south~~ of the air field and a large one south of Darwin filled with mangroves.

7:30

Clouds cleared away, from a small area along a muddy stream. Low hills trending parallel to stream - wooded, locally densely so. Bare ground along bottom-lands, becoming grassy farther south. Traces of old channels, represented by strings of ponds. Some bare spots. Then complex semi-open country - flat areas in grass, slightly elevated parts savanna to open forest locally. Ponds, probably ephemeral, very muddy, abundant. Then

7:35

country flattens out more and grass and savanna are more general, with gallery forest along streams. Ponds less common. The grassy areas are green but the savanna is thin steppe-savanna, with the

reddish substratum coloring it somewhat.

7:39

Country generally rolling, greener, mostly savanna, only the highest areas reddish. Some large ponds look blackish, with dead or leafless trees growing in them. These trees really not leafless but somewhat so.

7:43

Hills more prominent, with open forest, savanna grassy. Some higher hills to left in middle distance then closer, irregularly well

7:45

wooded, some savanna, quite green, on slopes away from course (east). Then flatter savanna locally reddish, locally green, with many meandering streams. Then slightly rougher country, with thin savanna, locally green. Then clouds.

7:52

Same, but more hilly, savanna mostly thinner, some open forest locally. Clouds.

7:57

Rolling, green savanna or thin open forest.

7:58

A band of low strike ridges trending back and left from course, quite wide, shallow dip, thin wood and almost no grass.

8:00

Then hills with ^{thin green} savanna, rock showing locally. Rock a dull rose-brown color. Clouds.

8:02

Approaching Katherine, mostly cloudy. Thin open forest, some bright red cultivated fields.

8:04

Thin savanna around Katherine air strip. Some areas quite green. Area of very rocky plateau, apparently over-grazed and wind eroded, with thin savanna. Shrubby vegetation denser in ravines and in the network of joint cracks. Lower areas with open forest and grassy patches, green varying to savanna. Gallery forest along river. Soil very red where disturbed. Numerous ephemeral (?) pools. Rocky ground. Conical termite mounds prominent and abundant locally. Ephedra sp.

A few *Podochromes* along air strip at Katherine - open forest of *Eucalyptus*.

8:43

Left Katherine. Extensive open forest. Thin grass ground cover. Some rocky spots.

8:46

Grass under trees thinner, soil red. Clouds.

8:50

Thin savanna. Clouds.

8:59

Thin forest to savanna, almost no

ground cover. Country almost flat. Clouds.

9:04

Same but even sparser and drier; shallow ravines meandering through slightly rolling land. Clouds.

9:11

Thinner forest, mostly savanna, or desert savanna. Soil red.

9:22

Apparently desert grassland or thin shrub desert with patches of dense dark green scrub or forest. View not adequate. Clouds.

9:29

Patchwork of sandy desert, savanna and forest. Clouds.

9:31

Forest becoming more predominant, but visibility poor.

9:35

What appear to be several large dry lakes, surrounded by an uneven stretch of open steppe-forest. Patches of thin grass or shrub savanna.

9:38

9:40

Another large dry lake ^{gray} very sparse shrubby vegetation. Curious very pale dendritic drainage pattern leading to another dry lake farther to left. Lake gray and area ~~is~~ immediately adjacent is bright red shrub desert. Road across lake is white. Red part is

apparently debris fan slope, very low. Several round pits with water around edges of lake. Far side of lake has a sandy strip.

9:59

Evidently the red sand from this side scarcely blows out onto the lake bed, but there are very small dunes a pile of white sand on the lake bed. Then a considerable strip of small ripple-like dunes. Lake becomes more vegetated, more predominantly dunes, still very sharply separated from the red area, both of these with somewhat of a patchwork of vegetation, a very curious pattern, possibly due to man, but very difficult to explain. Then some rolling lighter red land with abundant pools of muddy water.

Then an irregular patchwork of red and pale gray areas, some with open vegetation, others with almost nothing. Clouds.

10:07

A red desert with irregular small patches of denser vegetation. Apparently approaching Tennant Creek.

10:09

Vegetation becoming somewhat

denser savanna-like but still desert. Scattered small yellow-green trees.

10:12

Some very thin desert-grass, substratum a lighter red. Slightly more grassy as Alice Springs is approached.

10:14

Low rounded strike ridges ^{crossing} at about 70° left of course. more vegetation in depressions

10:15

between them. ~~Shallow~~ dendritic gully system with more vegetation.

10:16

Some small flat-topped erosion remnants.

Then somewhat ~~denser~~ vegetation, but irregular. A dark scrub, locally.

10:20

Then locally shrub-savanna. Bluish patches of dwarf scrub. Erosion remnants darker brownish red.

Gallery scrub along dendritic gully system. Mosaic of ~~savanna~~ steppe-savanna and desert or desert grassland.

10:27

~~Tennant Creek~~ ^{Tennant Creek} a small settlement of a few dozen houses. Dark scrub and many red erosion remnants north of air strip. erect

cylindric *termitaria* abundant in green open scrub and shrub savanna around fields.

*Plumiera
obtusata
Calliandra
rosea*

Tamarix cf. *aphylla*, and
Arbinsonia aculeata planted
here, also the lemon yellow *Cassia*
inica that we had at Turlock.

On the flat-topped red
erosion remnants are a
few scrappy ~~trees~~ small
trees, possibly *Eucalyptus*,
and on slopes a gray low
open scrub, probably *Atriplex*.

10:57

Left Tennant Sp.

Savanna with *Tridens*?
clumps - circular, dead in center.
Row gray-green acacia?

Then mosaic of patches of
savanna with desert, very red.

11:02

Then rather even desert
with vegetation in a
somewhat oriented "ripple"
pattern, possibly small
fixed dunes with bare red soil
between them. Patches of even
thin desert grassland interspersed
with ripple pattern. Antic
area red.

11:05

Slightly more relief. Ravines
with vegetation.

11:09

Mosaic of red and slightly
green areas, gallery scrub
in ravines, areas of "ripples"
scrub desert. Patches of green
along bottom land of main
stream paralleling course.

11:11

Some very bright red areas

also some lighter old rose
pink areas with small
patches of paler sand, some
dull greenish red areas.
Some of the boundaries
here are regular enough
to have been fences - possibly
this pattern may be
in part due to degrees of
overgrazing.

11:15

Very low broad strike ridges
transverse of course, with
ravines more or less perpen-
dicularly dissecting them, but
very shallow, with scrub
in bottoms, little vegetation
on higher parts.

11:17

Low rolling terrain - reddish,
desert savanna, patches
of dark open scrub, then
mosaic of ^{small} patches of dark
scrub and ^{large areas} ~~thin~~ grass. Scrub
apparently collects sand. All reddish.

11:21

Patches of scrub scarcer,
mostly thin desert grassland.

11:24

Elongate somewhat meandering
depression more vegetated
than surrounding grassland;
more scrub patches.

11:25

Patches of almost bare red
sand(?) or hard soil.

11:26

Following a stream-bed
with gallery scrub and
a flood plain of almost bare

light red soil. Rather dense desert grassland on flat terrace on both sides; to right of this a range of low hills, probably a strike ridge with very sparse vegetation except in ravines.

11:27 Irregular mosaic of area of desert-savanna, desert grassland, and almost bare areas, with meandering stream bottom-land with denser grass, still thin.

11:30 shrub savanna - still red.

11:32 Large areas of desert grassland with eroded higher spots. denser vegetation in ravines, trees scattered along larger one and along stream beds.

This has all the appearance of a formerly badly overgrazed range, abandoned long enough for cattle trails to disappear.

11:35 Small low sedimentary plateau on left, thin grass, ravines radiating down sides, with scrub.

11:37 Low erosion remnants with rim rock. Then shallow complicated dissection. Sparse desert grassland and eroded bare area. Shallow vegetated ravines. Somewhat greater relief.

shrub desert with patches of desert grass.

White spots on the red that may be prospect holes. Then more or less continuous red shrub desert, locally rather dense.

11:48 Large area of flat desert grass with shrubby patches, gradually changing to steppe.

11:52 Areas with slight relief shrub desert, flat areas, apparently lake bed, steppe. Shrubby areas may be small sand dunes, perhaps sand collected by bushes.

The lake bed is extensive. 11:59 At other side of it long dune ridge, with concentric bands of shrubs. (Kodachrome). Between ridges bands of steppe. Ridges bare and red except for ~~steppe~~ shrubs. Steppe mostly gone, dune pattern complex (no assurance that these are dunes).

12:03 Scattered dark low mountain masses, covered by open scrub a scrub desert, bare red pans and flats between them with only scattered shrubs, perhaps small trees. Flying at low alt., very rough.

12:05

Continuous low dark hills middle distance to left. red flats closer, with scattered shrubs or small trees. Then scattered low hills.

12:08

Badly eroded area, trees in lines, possibly gullies but pattern very strange possibly concentrically parallel dune ridges and valleys - probably so, pattern very extensive (kiodachromes).

12:10

12:11

Stream system with trees along streams. Then more of same pattern (photo, b.w.)

12:12

Apparently approaching Alice Springs. More ~~low~~ hills.

12:14

Open gallery forest along stream. arboreal desert on low hills. High hills or mts. in distance on both sides.

12:16

Alice Springs, a fair sized town roofed village. with a sharp, steep, ^{very} straight ridge just beyond it.

then another, standing muddy water between - small flat-topped trees abundant. Very muddy reservoir.

Then very flat silty(?) plain with scattered trees around outskirts. Dust devils.

Around airport *Tamarix* sp. (with spirally twisted distichous spikes), *Melia azedarach*, *Perium* sp. *Petunia*. *Catharanthus roseus*, *Kalanchoe* sp. *Citrus* sp. *Cynodon dactylon*.

Hot here but a dry breeze blowing.

1:23

Left Alice Springs.

Some green areas, meandering strips with grass and trees. low open forest, in the plain south of Alice Springs. Airport. Also ^{meandering} narrow strings of open forest. Mostly arboreal desert and desert grassland.

1:27

a few patches of steppe savanna.

1:28

A low range of dark brown hills transverse to course.

1:30

Then a mosaic of patches of desert, steppe savanna, patches brown hills with scattered shrubs or trees, red sand dunes.

1:37

Low hills with bluish grass or *Atriplex* and scattered trees, patches of red desert hills.

1:36

Bluish hills doubtless *Atriplex* with patches of red sand dunes(?) and flats between hills.

1:37

A series of strike ridges transverse to course with gaps in them. Much red

bar. ~~low hills~~ desert, very small blue hills with *Atriplex*. Some small clumps of darker, larger hills. Much geology showing, if there were only time to interpret it.

1:41 Large area of almost bar red desert, with only a few narrow strings of trees along ravines.

1:42 A series of bright red narrow almost straight parallel dunes, parallel with course, & left. Interrupted by hill but still continue on flat areas. These stretch into the far distance, where they become *Atriplex* (?) flats. Closer at hand on desert savanna.

1:46 Become anastomosing network. (road) strikingly red against blue of *Atriplex* savanna.

1:52 Not so anastomosed any more. (road)

1:54 almost no dunes, or mostly stabilized and hard to see. Thin rather red shrub desert.

1:55 Scattered small erosion remnant hills with sulfur yellow tops above a slight rimrock. Then more parallel dunes, this time at a slight angle toward course lying on a vast shrub desert

plain. (photos)

2:01 Shrub vegetation getting sparser and somewhat arranged in lines parallel with the dunes, perhaps stabilized dunes or more likely the bottoms of the depressions between them. (photo)

2:04 No more dunes - a flat desert plain with very little visible vegetation, practically none except along faint watercourses. Landscape not very red any more.

2:09 More parallel dunes on otherwise tawny landscape. Little vegetation except scattered shrubs along the dune ridges, fewer between. Vast area.

2:10 Dunes change from red to pale.

2:17 No more dunes but a vast pale plain with almost no vegetation except strings of trees & shrubs along dry watercourses.

2:25 This is almost as quite as bar as Perm. pale buff in color.

2:30 Locally splashed with dull purplish.

2:39 Tawny parallel dunes at about a 45° angle backward from course on a buff plain. Scattered shrubs between dunes.

- 237 Dunes have become redder, ~~and~~ closer together and much broader. Ground between them almost covered. Very little vegetation.
- 240 Dunes anastomose and lose their parallel alignment become a vague irregular sea of dunes. Some vegetation.
- 241 Crossed a broad braided series of dry water-courses outlined by vegetation.
- 242 A broad plain colored like the painted desert, no vegetation except in ~~a few~~ dry watercourses. (hod.)
- 250 Crossed a broad white dry watercourse with a few lines of vegetation. Then more painted desert very bright hematite color.
- 255 A tributary watercourse ~~flows to the lake~~ with prominent lines of vegetation dark green small trees. Then another. ~~Then it is the~~ This does not join the main one crossed at 250 but flows into Lake Eyre (?) basin separate still another, and another. Conspicuous vegetation in the lower courses of these, before they come out into the white salt (?) flats of what

- probably must be ^{edges of} Lake Eyre. Tawny flats with white patches.
- 303 Crossed meandering stream-course with stretches of water in it.
- 306 A vast dry white lake bed. A very sparse ~~of~~ vegetation of small bushes on tawny margins but apparently nothing in the bed itself.
- 312 Very odd streaky clouds of white dust (?) evidently being driven across lake bed more or less transversally to course (hod.)
- 315 This white flat is probably the most absolute desert on the face of the earth. Not a sign of visible vegetation.
- 317 An island or strip of slightly (or a peninsula) of slightly higher tawny land, then more salt.
- 319 Shinting along the west shore. Tawny, little vegetation. Across lake is a great series of subsidiary smaller lakes to the west.
- 326 End of main body of lake. Many smaller ~~detached~~ detached ponds. All white and dry, some connected by channels, most to the lake proper. A few dunes and small bits of

vegetation. Mostly plain.
 Rather wooded watercourse
 entering southward. Otherwise
 a tawny vegetationless plain-
 gallery ~~open forest~~ along
 watercourse, tawny plain
 otherwise, little sign of
 vegetation.

A series of beautiful strike
 ridges cross course.

A horse shoe, rather
 hairpin shaped series in
 distance to left.

more strike ridges, these more
 vegetated than others, though
 still desert.

Then hilly land with
 patches of forest in some ~~small~~ valleys.

Strike ridges form a very
 interesting pattern, not altogether
 understandable as ridges
 seem to intersect. Fair areas of
 open forest on lower slopes.

Scattered cultivated fields
 in thin grassland, a few
 patches of forest and savanna.

Same dry farming of flatter
 areas, ~~grass~~ steppes and steppe
 savanna on low hills.

But a couple of patches of
 dense obviously planted forest
 green ravine bottoms.

Soil in plowed patches dark purplish

red.

4:54

Mostly under cultivation
 now, except a strip of patches
 varying from ^{steppe} savanna &
 open forest along left of course,
 on slightly hilly ground.
 Some fields green, some plowed,
 some yellowish brown.

4:57

Large town. More savanna
 and open forest, even some
 closed forest on low hills.

5:00

Strips of forest in distance.
 Scattered patches of
 steppe savanna and
 apparently steppe or dry
 pasture close by, otherwise
 dry farming.

5:04

Range of very low hills
 roughly paralleling course
 mainly steppe and
 steppe-savanna. Flat
 ground all farmed.

5:07

Farms here have ^{very} small
 "woodlots" or patches of open
 forest, otherwise all cultivated.
 Very flat country.

5:12

Another town in middle distance
 to left. The tiny woodlots seem
 to be the rule here. Various sizes
 but all small, various densities
 but mostly open forest.

5:14

In distance to left a hilly
 partly wooded region
 A town below, visible.

5:17

Rising altitude.

Trees along ravines and watercourses.

Circling, sea now on left. What appear to be mangrove swamps and barrier islands in distance.

5:20

Hilly land, mostly savanna, some good forest on higher parts, some patches of scrub on slopes.

Jan. 10 Adelaide

National Park

Open forest of *Eucalyptus camaldulensis*, *E. odorata*, understory of *Acacia* spp., *Casuarina* sp. etc. (photos, also of emus + kangaroos in enclosure).On slopes *E. leucosylon* (photos) with *Hypericum* (photo) (result of fire).From summit of Mt. Lofty (2000') forests of stringy bark *E. obliqua*, sclerophyll scrub, changing toward Adelaide to savanna.In forest also some *E. baxteri* and a few *Banksia ornata*, *Excoecarpus cupressiformis*.Marsh of *Leptospermum*, *Gahnia*, *Drosera*, *Sprengelia* etc. in bottom of draw (photos)Phot.
photos
of
hillsSarcocolla? (artichoke?)
common in
open
fields.surrounded by *Eucalyptus obliqua* forest (photos) rather open, but 10-15 m. with sclerophyllous shrub layer almost continuous. Scattered *Excoecarpus*, several genera of leguminous shrubs, *Rhynchospora*, etc.*Isopogon cerasophyllus* (photo) *Proteaceae*. occasional.*Leptospermum* dominant in shrub layer. *Hakea* common.Sclerophyllous scrub with scattered *Eucalyptus* above, *E. leucosylon* in f.g. (photos).Lower slopes, savanna-forest of *E. leucosylon* (photos) *Aranea*, etc. mostly exotics, on ground.The color of these forests is uniformly a dull dark green. Only the *Excoecarpus* in the understory is bright green. The shrub layer, otherwise, is also dull dark green. The grass layer in the savanna and open forest, and on grassy flats is straw yellow. This is a Mediterranean type of landscape and reflects a Mediterranean climate - about 4 rainy months in winter, the rest of the year dry. Wind producing region.

Jan. 10 - Trip by air Adelaide to Melbourne. Dep. ^{3:00} 3:00 p.m. at side.

Very low coastline, mostly sand beach, a few very low cliffs to s.e. of city.

Low hills on peninsula east of city covered with savanna, replaced northward by open forest as higher slopes are reached. ~~A~~ small reservoir s.e. of city. Some slopes scrub-covered. Pattern of distribution of forests and open land suggests clearing by man, at least in many cases.

3:06 Rolling country, mostly cleared, with scattered trees. Much of it ~~is~~ apparently in pasture, some cultivated.

3:09 Trees essentially absent from here on, except a few along water-courses and ravines, and in a few areas of apparently rocky soil where there are scattered small trees and some open scrub. Hills mostly dry-farmed, now brown, or where scrub covered, black.

~~3:13~~

3:13 (Lake Alexandrina) Approaching bay - some spots of white soil have open scrub, or some seem to be desiccating pools. Along

23000' alt.

bay shore are considerable salt marshes, of strikingly black color, with slight dark green development of mangrove (*Avicennia* only acc. Womersley).

3:16

Around head of bay are extensive brown flat areas, treeless, possibly pastured, with numerous desiccating pools, white, apparently with salt. Back from this black scrub ^{forest} areas and dry farmed areas. Interspersed with dry farming areas are brown pasture, thin scrub, and dense scrub ^{forest} tracts of very considerable extent, mostly on somewhat hilly or rough ground.

3:24

Perhaps some of this is forest rather than scrub, but probably not. In distance toward coast are extensive wooded tracts, in fact, by far the larger part of the land is in forest. Soil in this region generally pale gray to almost white.

3:26

Mosaic of dry farming, pastures, and scrub or forest, in fairly large patches continues along coast. Forested area characterized by sub-parallel undulating ridges

~~Salix~~
~~sp.~~

39806

1

07

Jan. 10 - Adelaide, S.A.

slopes of Mt. Lofty

Sprengelia?

marshy place

(deg.)

common in shrub layer in
Eucalyptus obliqua forest.

Jan. 11 Melbourne (etc.)

Crataegus sp.

Ampelopsis sp.

Agapanthus ?

Ligustrum vulgare

Quercus robur } both

Quercus sp. } unhealthy looking

Lichinus molle

Muehlenbeckia sp.

Coprosmma baueri?

Abutilon pictum

Washingtonia filifera

Veronica (Hebe) sp.

Choisya ternata?

Bellis perennis

Phoenix canariensis

Fuchsia magellanica?

Hydrangea

Phlox drummondii

Prunus (Japanese red lvd.)

Lolandra ?

Phlox paniculata?

Pittosporum crassifolium?

Fibouchia

Pelargonium

Impatiens sultana

small shrub

shrub, m. tall, flowers
deep orange in color.

Viburnum opulus?

Cotoneaster pannosa

Canna hybr.

Callistemon

Tagetes sp.

Helenium?

Poa annua

Trifolium repens

Viola tricolor

Althaea rosea

Ulmus sp. (glabra?)

Alternanthera versicolor

Cedrus libani?

Liquidambar styraciflua

Fraxinus sp.

Populus nigra? (Lombardy)

Hibiscus - like tree, stellate lfidate, no inv.

Agathis sp.

Eucalyptus sp.

Populus deltoides?

Araricaria columnaris? (nucifera)

Morus alba.

Pinus sp.

Quercus sp.

Salix babylonica

Dracaena draca?
Aesculus parvis?
Ginkgo biloba
Hedera sp.
Fatsia japonica?
Quercus sp.
Grevillea robusta
Alangium? *Actinidia*??
Gaura?? fl. white, fr. ^{narrowly} ~~quercus~~
Lymphocarpus?
Brachychiton heterophyllum
Leptospermum??
Rhus pinaster?
Plumbago auriculata
Chamaecyparis?
Ficus sp.

Carduus? (artichoke?) common
 in open fields and vacant
 lots.

2:35 Jan. 11 - Melbourne - Cooma. Canber
 left Melbourne

Mostly dry to faintly
 green mosaic of harvested
 grain fields and pasture
 land with abundant
 scattered trees. Trees most
 in pastures - typical sawn
 varying locally almost to
 open forest

2:42 Reservoir ~~and then~~ surrounded
 by strip of dense forest, then

a slope with green
 grass and open forest, then
 densely wooded rounded
 hills, the forest on
 ridges very fine textured,
 that in ravines coarse
 textured. A few cultivated
 clearings on tops of
 wide ridges and on small
 plateaus. This forest
 quite extensive.

3:49

End of forest - now complex
 hilly country with
 wooded ravines and
 steep slopes, otherwise
 grassy with scattered
 trees, the grass mostly
 dry, some small valley
 bottoms green.

3:52

Narrow green flat
 valley bottom with
 kinky meandering stream
 with narrow gallery forest,
 many traces of old beds
 and meanders.

3:53

a considerable densely wooded
 range a bit to right.

3:54

Another small valley
 with meandering stream
 and incredible series of
 old meanders for such a
 hilly country. Then extensive
 dry hills with sparsely
 scattered trees.

2:57

Eildon Reservoir, a very complex drowned valley, in a mostly wooded range of low mountains. Northern arms of reservoir in savanna covered hilly country. Tremendous cumulus clouds.

3:01

Northern tip of reservoir

Then rather level to slightly rolling land, savanna, a few harvested grain fields, grass mostly dry.

3:05

Mosaic of dense forest, open forest, savanna, and cultivated land. Some of grass is green.

3:07

Vast densely wooded area, a few small cleared patches, quite mountainous. Dry plain to left of course. Rather rugged mountains to right. A little cleared and farmed or pastured land in a few of the valleys.

The woods on the mountain slopes are slightly open, showing some ground, varying to completely closed in places.

3:11

Same vast ~~area~~ wooded area on right, dry plain but with a few wooded valleys stretching into distance on left, these valleys seem to be the extensions of narrow

cleared valleys in mountains to right.

3:14

A high very rocky massif, with peaks and ridges of bare granite, ravines and joint cracks wooded. Also lower slopes. Said to be much snow in winter, and large skiing resort seen on top of one of peaks.

3:15

Large valley system, with much cleared land, mountains between well wooded. Then another lower mountain mass, solidly wooded.

3:17-18

3:19

Very large reservoir far to left (Hume Res.?) Cleared valley on it. Then vast wooded mountain area, with what appears to be one peak and a high plateau above timber-line in distance to right (~~At Koroitoko?~~) typically mountain meadow as far as can be made out from distance. Several other smaller peaks also slightly bare on tops.

3:23

Some high ridges apparently have scrub on west side, dense forest of dark brownish color on east or northeast.

3:25 A forest fire in distance on right.

3:27 The dark brownish forest seems characteristic of highest peaks. On highest ridges there seems to be a rather open scrub at least on s.w. sides. Also seem to be many bare white trees. Patches of these very conspicuous, probably from old fire.

3:30 Semi-open mountain and ridge tops, meadows in small valleys, very notable here. No roads in all this mountainous area.

3:32 An apparently new road below, high, semi-open rounded mountain-tops in distance to both right and left.

3:33-4 Passed directly over, very high, very rocky, completely open mountain top with snow patches. Road in valley to right of it.

3:36 Then more rocky semi-open mts. to right. Very high with snow patches far to left. (Mt. Kosciuszko).

3:37 Some small green valleys in dry savanna covered hills. Appro. Cooma.

3:38 Crossed river. Hills with scrubby brownish open forest. Very degraded. Thousands of fallen tree trunks.

3:40 Very odd gray plants abundant in open forest on steep slopes.

3:41 Park-like country with open grass, patches of open forest. Curious rock outcrops.

3:42 Some green patches of young grain. Mostly very close-cropped open pasture, locally patches of savanna and open forest.

3:43 Passed an air strip. (Cooma) Some small ponds.

Circled back. This is apparently typical sheep country, probably badly overgrazed. Some areas of a coarse bunch grass, much outcropping rock.

3:45 Landed. Photos of degraded open forest. Trees are low, rounded, spreading. Course from here along upper Murrumbidgee R. to Canberra.

4:15 Left Cooma. Rock outcrop abundant, especially where there are trees.

Quite a few fair-sized ponds, some full, some dry. Dry ones have holes on opposite

sides.

4:19

Ranges of low hills with open forest, grassy valley between.

4:20

Meandering stream with clear water winding through hills, then crossing into valley and joining river.

On other side of valley, to right, an extensive wooded area of low hills.

4:23

Green fields on river flats. Some serious gullying on sides of valley, but stream is not muddy, at least now.

4:25

Hills covered by savanna, look badly overgrazed.

4:26

Hilly country, mosaic of open forest, savanna and overgrazed grass, some nearly closed forest on rougher areas.

4:28

Fairly high wooded mountains far to left, a rocky rugged sparsely wooded range on right, becomes less rugged and more densely wooded as we follow it.

Valley below pasture and savanna. Badly gullied.

4:32

Hills with very degraded forest and savanna.

4:33

Grassy valley with many small artificial ponds. Then extensive savanna, covered

hilly area.

4:35

A fair sized town surrounded by low wooded hills. Canberra.

Jan. 12 - Canberra - Sydney
left side of plane.

4:35

left Canberra.

4:37

Stretch of rather tall open forest, other similar patches, otherwise savanna with enormous amounts of dead timber - possibly from fire, some stretches with all trees dead. Some rather bad erosion. Patches of open forest are angular, suggesting that the dead trees may be from clearing operations rather than fire.

4:30

Large lake or reservoir with rather muddy water, very thin grass on flats along shore, no trees except where hills or cliffs come down to shore.

Then flats of grass, with patches of savanna and fresh gullies.

4:37

Hills to left, partially wooded. Grass very thin brownish green.

4:39

A couple of large ponds.

Then grass with patches of forest and savanna, some

5:37

of the forest rather dense, perhaps some are planted. In middle distance to left considerable forest on low hills.

5:38

Same close by course. Then a large canyon cut through a rough forested area - rather a system of deep canyons almost isolating a wooded plateau.

5:41

Another part of this wooded area has a very odd pattern on plateau - like a lava flow, more thinly wooded.

Follow the main canyon for a distance, then it crosses course at point where it is joined by an intricate tributary system. This whole complex area well wooded and presumably difficult of access. Would make an excellent reserve. Is surrounded by green pastures and fields.

5:47

Wooded complex area ends.

5:48

Another large similar area in middle distance to left - ~~crossed by~~ course, possibly joins that described above - not quite. In center of this one ~~3~~ reservoirs. This area is evidently just back

of Sydney. Flats and hills around Sydney very green. - No this seems to be other coastal towns, not Sydney. Beautiful crescent shaped beaches with narrow strip of dunes behind them. Curved coast, but curbs not all pointing same way.

High escarpment just back of coast. Behind this a plateau, mostly forested, a little open grassland, some of ~~plateau~~ ^{plateau} ~~discrete~~ ^{discrete}, densely wooded, several reservoirs in canyons.

Some parts very thinly wooded, a scrub covered much bare rock exposed in this.

5:53

Several subdivisions or housing areas on this plateau, back of a very complicated coast and apparently Sydney itself. Directly back of Sydney is more or less open country with winding river or estuary ~~extending over Sydney~~ ^{extending over Sydney}.

6:02

Much forest close to city and among suburbs. Some swamp forest in estuary.

180

1959 Hawaiian Is.

Jan. 14 - Between Koko Crater
and Malapuu Pt.
roadside in ~~dry~~ low
Prosopis forest.

39808

2

Gossypium tomentosum
common locally

3

09

Euphorbia heterophylla L. Mt. R. L. Dressler
occasional

Gossypium tomentosum
still persists for a few
hundred yards along
the road and somewhat
into the forest. It ~~attains~~
attains a height of two
meters, and is definitely
woody. The flowers
open wide in the morning
(about 8 a.m.), have ~~a~~ protruding
coherent stigmas, somewhat
bent to one side.

The plants are mostly
badly infested by small
mealy bugs tended by
tiny ants, and the most
heavily infested plants
are dying back from
the tips. Also some of the
plants seem to have a
mosaic disease which
makes the leaves become

Oahu

181

MISSOURI BOTANICAL GARDEN

"SHAW'S GARDEN"

2315 TOWER GROVE AVENUE

ST. LOUIS 10, MISSOURI

PROSPECT 6-5567

February 9, 1959

Dr. F. R. Fosberg
Pacific Vegetation Project
% National Research Council
Washington 25, D. C.

Dear Ray:

Thanks very much for the Poinsettia seed.
They are both the angular, coarsely tuberculate
seed of *P. heterophylla*. As you note, the
pedicels do elongate and straighten as the
fruit mature. This gives the capsule a
relatively clear shot for its explosive
dehiscence. I am very glad to get the seeds,
though I'm not sure that I'll try to grow a
Poinsettia garden this summer. I want to spend
at least a month in Mexico, collecting over
in the west, and by the time I return from
Montreal, the summer will be nearly gone.

I have been somewhat side-tracked lately,
but I do intend to write up my poinsettia
data one of these days.

With best regards.

Sincerely,

Bob

Jan. 14 - Between Koko Crater
and Maunapuu Pt.
roadside in ~~low~~ ^{dry} low
Prosopis forest.

39808

2

Gossypium tomentosum
common locally

3

09

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Gossypium tomentosum
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The plants are mostly
badly infested by small
mealy bugs tended by
tiny ants, and the most
heavily infested plants
are dying back from
the tips. Also some of the
plants seem to have a
mosaic disease which
makes the leaves become

shrubs up to 2 m. tall;
flowers light yellow, open;
stigmas almost white.
lactiferous herb, stems
thick, no red spot at
base of involueral leaves,
scarcely paler. (seeds for Dressler)

venulose and change
shape, becoming more
deeply lobed and drawn
down at base. Seeds
collected for genetic
studies.

Leaves of *Codiaeum*, cut
with almost complete petioles,
and kept in water in a
"pin frog" for some weeks
had developed roots and
were in a completely healthy
condition. Roots radiated from
cut end of petiole.

Jan. 20 - Flight San Francisco to Chicago, left side of plane.

East of hills back of Oakland is a very considerable area that is not cut up for real estate. There are grassy pastured hills, fair areas of *Artemisia californica*, some invaded by trees, and some good patches of low open or closed forest. Roads make much of this quite accessible.

East of this, Mt. Diablo is more rugged and rocky, apparently has some true chaparral, some forest, and much rocky steep grassland, as well as some gentler grassy slopes.

Valleys filled with fog. San Joaquin mostly covered by fog, a few spots open.

Foothills of Sierras covered by fog, up to the top of largest chaparral areas. From there on is very largely a mosaic of large areas of open forest with smaller areas of chaparral, the boundaries of these often not sharp, flat valley bottoms cleared. Some areas

logged. Only well up in the mountains are areas of closed coniferous forest, these varying locally to open forest and chaparral. Open slopes with scattered trees more and more common upward. A little scattered snow in the lower open forest, more in the closed forest; upper mosaic of closed forest, open forest, and open slopes deeply snow-covered. More and more open snow and rocky ridges and slopes upward, till country is essentially bare with patches of open forest in valleys. Much bare rock. Snow not especially heavy. Some high granite domes and ridges with almost none.

Eastern slopes have almost no snow.

9:45

Pyramid Lake to north, some forest south and a little west of it, with considerable snow. Otherwise, along course south and southeast of lake very little snow, large gentle slopes of sage-brush,

scattered junipers (?)
on sides of ravines
and canyons.

Then considerable areas
of rather dissected
slopes and low mountains,
the upper parts of which
are covered by open coniferous
forest, a savanna, of low
trees, lower slopes ~~by~~ sage
bush, & some alluvial
fans covered by sage brush.


9:52 More hills with open forest
and savanna. Then what
seems to be desert with
only very sparse vegetation,
quite dissected, varicolored,
not even the low mountains
showing any visible vege-
tation from this altitude.

9:55 Several dry lakes with
broad alluvial fans leading
down to them. On the fan
south of dry lake nearest
course what appear to be
old partially stabilized
barbans, horns pointing
northwestward. A highway
crosses this fan. These dunes
would be worth investigating
on the ground.

9:58 Another small dry lake ^{"alkali flat"}
immediately to left of course,
with what appear to be clumps

of vegetation holding small
dunes or tumuli on fans
around it. Very rocky
hills or low mountains
east of this, with scattered
junipers (1).

10:01

Then broad valley,
dark areas outcropping
from fan debris covered
by scattered whitish spots
that must be prospect holes.
Slightly hilly land,
then another enormous
valley with great fans,
an  shaped air field
but no town at all on this
side of course. Large strips
of transversally arranged
dunes. Very little vegetation
evident in all this country
except on smoother fans
sparse sage-bush.

10:06

Erosion remnants protruding
through alluvium.

Then bare, low mountains
and alluvium filled
valleys, dissection not
very sharp. Rugged
high mountains far to
north.

10:08

Wide valley, some patches
of dunes.

10:10

Low mountains with scattered
trees, much higher and woodier
to north.

Then another broad flat valley. A highway (or railroad) crossed the low pass in the mts. and this valley.

10:13 Then much bare irregularly low mountainous and dissected country with mesas, alluvium-filled valleys. What appears to be a dune field immediately along course, with a large wash running down to

10:16 a large dry lake somewhat to north. South of it rather rugged mountains with open coniferous forests on slopes, a little snow. Then

10:19 much higher mountains ~~(perhaps Hole in the Mt. or Pilot Pk.)~~ Mountains with some woods to north, wide alluvial fans along course. Some fan slopes thickly spotted with paler areas - prospect holes? or what?

10:21 A wide valley with a stream with water and some small dams, rather extensive areas of marsh, extending far to north, running southward.

Rather low mountains, wooded to north, to east of

this valley, then a sandy basin. Then a low mountainous area with scattered trees, denser with a little snow on higher north slopes.

10:25 Another wide valley. This is near the Nevada-Utah border. Isolated small ranges in generally alluvium-filled area, some of these rather high and well forested, a little snow on north high slopes.

10:29 Crossed a fairly high range, with another, considerably higher, to north. Ahead alternating ranges and alluvium-filled valleys with dry lakes, for some distance. Valleys bare, scattered junipers on dissection, mountains sparsely to moderately wooded. Very little snow.

10:37 A couple of small lakes with water, in valley to north. Otherwise alternating bare flats and sparsely wooded mountains.

10:47 Low higher peaks with pretty dense forest. A little snow. The forest here

evergreen. Immediately eastward some deciduous forest patches.

10:45

To north a large valley. Along course and ahead very mountainous country with patches of good coniferous forest, some snow. Some cloudiness more so ahead. Deep

10:48

desert valleys with a small flowing river and to north, a small town or two, surrounded by high mountains, some very colorful, mostly bright red eroded mountains well to north.

10:49

Solid clouds.

10:51

A cultivated valley with a small closely meandering stream. Then more clouds.

10:54

Mosaic of woods and open ground, much snow.

10:56

A wide valley with very steep walls and rather dissected bottom cut into red ^{and bluish bedded} rocks. Almost no vegetation.

10:58

Spectacular erosion, mesa land, buttes, canyons, stretching away to north. A thick red bed with yellow above and below. Eastward

11:01

very dissected land, pattern complex but less spectacular. Then some pretty spectacular erosion again. Vegetation very sparse - in rougher spots some junipers or pinyons.

11:02

Wide bare desert plain. Then clouds.

11:05

Same or a similar plain, no visible vegetation, ground mostly reddish.

11:07

crossed a large river with a little water and much dry bed, this conspicuously white. Tributaries also with white beds. Perhaps too? Eastward this bare plane rather irregular. Then clouds.

11:30

Clouds thinned out. Land is entirely under cultivation except for numerous dendritic gully systems which are sparsely to densely wooded.

11:37

A few small woodlots.

11:40

A fairly large city on a southeastward running meandering river.

11:42

No snow at all in this whole patchwork area. Large meandering river becoming almost parallel with course, then crossing it. Dry.

1:43

a little snow in ravines. Max snow visible parts north.

1:45

Gullying more intricate and covering more ground but not very fresh. Rather little level, ungullied land. Gullies, though, not much wooded and generally cultivated. Gallery forest along rivers and streams.

Becoming more snowy.

1:50

Ground covered with thin snow. Conspicuous gallery forests along rivers to north, flowing eastward.

1:56

Some very complicated meander patterns in a wide frozen river, crossing course toward s.e.

Then gently rolling topography showing ancient dendritic gullying. Even small streams, mostly slightly incised, tightly meandering.

1:59

Wide frozen river, running generally southward. ~~Mississippi~~

Interfluvies of tributary systems showing very gentle relief.

Tributary systems dendritic. Main streams wooded. Otherwise ~~tributaries are mostly~~ land mostly treeless except around farm houses.

Small incised streams have been mostly channelized

leaving very complicated dry meander patterns in agricultural lands.

Bottom lands of larger streams or rivers wooded. Meandering conspicuous.

2:07

Crossed Mississippi R.

Very complicated system of channels and islands. A dam to north, probably one below course, also.

2:08

Series of parallel low ridge running east from river.

2:09

What seems to be an old, extremely flat bottomland with bluffs, but with no river course, running southeast. May have been an ancient lake bed. Completely cultivated.

Very flat land east of it. Completely but rather thinly snow covered.

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Tomato Bake

Cook 4 ounces elbow macaroni in boiling salted water for about 10 minutes. Drain and rinse. Combine $1\frac{1}{2}$ cups milk, $1\frac{1}{2}$ cups soft bread crumbs, $\frac{1}{2}$ teaspoon salt, 1 teaspoon Worcestershire sauce, $1\frac{1}{2}$ tablespoons prepared mustard and 1 cup cubed American cheese in a saucepan. Heat slowly until ingredients are well blend-

ed and mixture is creamy. Fold in cooked macaroni and $1\frac{1}{2}$ cups cubed cooked ham. Pour $\frac{1}{2}$ of this mixture into a greased casserole. Next, arrange a layer of 4 fresh tomato halves over the macaroni. Add remaining macaroni mixture. Top with the other 4 tomato halves. Cover entire top with bread crumbs. Bake in a moderate oven (375 degrees F.) for 35 minutes. Makes 4 servings.

GS DIE! *

U SPRAY

L-KILL®

LLER

with
Isle Hobbyists

Hikers Discover Varied Plants

By HARRY A. WHITTEN

The Hawaiian forest is unusually rich in variety of plant life, not only of native plants but also in the large number of plants introduced here.

Those who took the Waianu hike last Sunday had opportunity to observe the variety.

There is a shrub in Waianu that is endemic to this region, that is, it was found nowhere else in the world when first identified by the botanist, Dr. Joseph Rock.

It is named *Solanum carterianum*, after Hawaii's second Governor, George R. Carter.

SHRUB SPREADS

In the years since it has been reported spreading to Waiahole and Waikane, the two valleys adjoining Waianu.

Also in Waianu is the white strawberry guava, seldom seen elsewhere, according to Thomas R. L. McGuire, veteran forester.

These are a few of the examples of plants to be found along one Oahu trail.

The Hawaiian Trail and Mountain Club has no hike this coming Sunday, as members are having their annual luau at their Waimanalo clubhouse.

R. J. Baker, kamaaina photographer and president of the club in years past, has returned from a trip to Europe that included 27 days in the Soviet Union, as well as shorter stays in Poland and Czechoslovakia, topped off by three weeks in Paris.

Mary Jane Bagley has also returned to Honolulu, after working in Washington, D.C.

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