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)

250000 - 200000 = 50000

Collection and Field Note Book

No. 53

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

(39651 - 39809)

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ch. 11

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 Tangkubanprahu, 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.

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 savana-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 lebbekoides* 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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1958 Maryland

1

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

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* *rubra*?
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 1953 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 - Pennsylvania 3
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, 3:01 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 ^{groups} on top, but ~~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
0	Lv SAN FRANCISCO (PST) Cal. 11:15AM	4225	1428	Ar CLOVIS (MST) N.M. 2:45PM	4225
36	Cross San Francisco Bay. 11:20AM			At Clovis turn watches AHEAD one hour.	
40	Lv OAKLAND Cal. 11:25AM			Richmond-Houston and Los Angeles Dallas Pullman and Chair Car switched to Train 76 at Clovis.	
43	Lv BERKELEY Cal. 11:35AM			Train 36 Lv. Carlsbad 8:45 am. Ar. Clovis 1:00 pm. to connect with Train 2.	
43	Ar RICHMOND Cal. 11:54AM			Lv CLOVIS (CST) N.M. 4:20PM	
43	Lv RICHMOND Cal. 11:59AM			Lv FARWELL-TEXICO Tex. 4:31PM	
26	Lv PINOLE Cal. 12:14PM			Lv FRIONA Tex. 4:52PM	
52	Lv PITTSBURG Cal. 12:47PM			Lv HEREFORD Tex. 5:12PM	
	Cross Old River. 1:08PM			Lv CANYON Tex. 5:38PM	
	Cross San Joaquin River. 1:19PM			Ar AMARILLO Tex. 6:00PM	
86	Lv STOCKTON Cal. 1:24PM			Train 94, Lv. Lubbock 3:05 pm. Ar. Amarillo 5:25 pm., where Chicago Pullman joins Train 2.	
	Cross Stanislaus River. 1:48PM			Lv AMARILLO Tex. 6:10PM	
112	Lv RIVERBANK Cal. 4:49PM			Lv PANHANDLE Tex. 6:35PM	
118	Lv EMPIRE Cal. 1:55PM			Lv PAMPA Tex. 6:59PM	
	Cross Tuolumne River. 1:58PM			Lv MIAMI Tex. 7:21PM	
	Cross Merced River. 2:10PM			Lv CANADIAN Tex. 7:45PM	
151	Lv MERCED Cal. 2:30PM			Lv HIGGINS Tex. 8:12PM	
	Cross Chowchilla River. 2:48PM			Lv SHATTUCK Okla. 8:30PM	
	Cross Fresno River. 2:59PM			Lv GAGE Okla. 8:41PM	
209	Lv FRESNO Cal. 3:30PM			Lv WOODWARD Okla. 9:12PM	
	Cross Kings River. 3:50PM			Lv WAYNOKA Okla. 10:05PM	
240	Lv HANFORD Cal. 4:05PM			Lv ALVA Okla. 10:27PM	
295	Lv WASCO Cal. 4:48PM			Lv KIOWA Kan. 10:50PM	
302	Lv SHAFTER Cal. 4:56PM			Lv ATTICA Kan. 11:14PM	
320	Ar BAKERSFIELD Cal. 5:25PM			Lv HARPER Kan. 11:53PM	
320	Lv BAKERSFIELD Cal. 5:30PM			Lv WELLINGTON Kan. 12:20AM	
389	Lv MOJAVE Cal. 7:50PM			Lv WICHITA Kan. 1:10AM	
408	Lv EDWARDS Cal. 48:11PM			Lv NEWTON Kan. 2:05AM	
	Cross Mojave River. 9:08PM			Ar EMPORIA Kan. 3:10AM	
458	Ar BARSTOW Cal. 9:10PM			Lv TOPEKA Kan. 4:25AM	
458	Lv BARSTOW Cal. 9:20PM			Lv LAWRENCE Kan. 4:50AM	
623	Lv NEEDLES (PST) Cal. 12:05AM			Cross Kan.-Mo. boundary. 5:38AM	
	Leaving Needles turn watches AHEAD one hour.			Ar KANSAS CITY Mo. 6:00AM	
635	Cross Colorado River, Calif.-Arizona boundary. 1:17AM			Lv KANSAS CITY Mo. 6:30AM	
684	Ar KINGMAN (MST) Ariz. 42:14AM			Cross Missouri River. 7:05AM	
777	Lv SELIGMAN Ariz. 3:52AM			Lv CARROLLTON Mo. 7:39AM	
797	Lv ASH FORK Ariz. 4:25AM			Cross Grand River. 7:50AM	
824	Ar WILLIAMS Ariz. 5:15AM			Ar MARCELINE Mo. 8:10AM	
	For Grand Canyon Lv. Williams 7:40 am., via motor coach, Ar. Grand Canyon 9:25 am.			Cross Chariton River. 8:38AM	
851	Cross Arizona Divide. 5:48AM			Lv LA PLATA Mo. 8:44AM	
858	Ar FLAGSTAFF Ariz. 5:53AM			Cross N. Pabian River. 9:11AM	
889	Cross Canyon Diablo. 6:28AM			Cross Wacanda River. 9:18AM	
916	Lv WINSLOW Ariz. 6:50AM			Cross Des Moines River. 9:43AM	
919	Cross Little Colorado River. 6:58AM			Missouri-Iowa boundary. 9:55AM	
948	Lv HOLBROOK Ariz. 7:19AM			Lv SHOPTON Ia. 10:00AM	
1022	Cross Ariz.-N.M. boundary. 8:14AM			Lv FT. MADISON Ia. 10:00AM	
1043	Lv GALLUP N. Mex. 8:38AM			Cross Mississippi River. 10:08AM	
	Cross Continental Divide. 9:07AM			Iowa-Illinois boundary. 10:08AM	
	Cross Rio Puerco. 10:27AM			Lv GALESBURG Ill. 10:50AM	
4785	Ar BELEN N. Mex. 10:50AM			Cross Spoon River. 11:05AM	
	For Albuquerque take motor coach Lv. Belen 11:00 am., Ar Albuquerque 11:55 am.			Lv CHILLICOTHE Ill. 11:35AM	
	Lv Albuquerque 9:50 am., Ar. Belen 10:50 am., via motor coach to connect with Train 2.			Cross Illinois River. 11:37AM	
4785	Lv BELEN N. Mex. 11:00AM			Cross Vermilion River. 12:13AM	
1192	Cross Rio Grande. 11:05AM			Lv STREATOR Ill. 12:15AM	
5952	Ar VAUGHN N. Mex. 12:45PM			Cross Kankakee River. 12:50PM	
4040	Lv FT. SUMNER N. Mex. 11:48PM			Lv JOLIET Ill. 1:05PM	
	For Albuquerque take motor coach Lv. Belen 11:00 am., Ar Albuquerque 11:55 am.			Cross Des Plaines River. 1:25PM	
	Lv Albuquerque 9:50 am., Ar. Belen 10:50 am., via motor coach to connect with Train 2.			Cross Des Plaines River. 1:40PM	
5952	Ar VAUGHN N. Mex. 12:45PM			Ar CHICAGO (CST) Ill. 2:00PM	
4040	Lv FT. SUMNER N. Mex. 11:48PM				

† 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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Thank you—happy traveling

1958 California

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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 Typha. 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 brakes of *Scirpus*, some ^{some Phragmites} typha, patches of *Salix*, great masses of floating *Jussiaea californica* and *Eichhornia 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 or 2 min. before Denair).

Dominant agricultural types from Merced to beyond Placinda orchards and some vineyards. Around Placinda 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. Then more 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.

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

Between Williams and Flagstaff - open but 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 piñon-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. 8.20PM
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		Cross Purgatoire River.. 8.44PM
		Long Beach passengers for El Capitan leave at 7.00 p.m., via motor coach for Pasadena.	1269		Caddoa Dam..... 8.51PM
830	9	Lv PASADENA.....Cal. 8.30PM	3603	1288	Lv LAMAR.....Colo. 9.05PM
	21	Cross San Gabriel River. 8.58PM			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		Cross Arkansas River.. 9.28PM
1077	60	Lv SAN BERNARDINO..... 9.37PM	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			Ar DODGE CITY (MST) Kan 11.15PM
476	308	Ar NEEDLES.....Cal. 2.07AM			At Dodge City turn watches AHEAD one hour.
476	308	Lv NEEDLES (PST).....Cal. 2.17AM	2486	1437	Lv DODGE CITY (CST) Kan. 12.18AM
		Leaving Needles turn watches AHEAD one hour.			Cross Arkansas River.. 12.50AM
	326	Cross Colorado River, Calif.-Arizona boundary. 3.25AM	1476		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 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		Cross Kan.-Mo. boundary. 5.21AM
4843	601	Lv WINSLOW.....Ariz. 9.05AM	1776		Ar KANSAS CITY.....Mo. 5.35AM
	604	Cross Little Colorado River 9.08AM	1776		Lv KANSAS CITY.....Mo. 5.50AM
	707	Cross Ariz.-N.M. boundary 10.28AM	1802		Cross Missouri River... 6.22AM
6506	729	Lv GALLUP.....N.Mex. 10.52AM	1857		Cross Grand River... 7.18AM
7247	758	Cross Continental Divide. 11.20AM	1903		Cross Chariton River... 7.53AM
	854	Cross Rio Puerco..... 12.59PM	1947		Cross N. Fabius River... 8.18AM
	878	Cross Rio Grande..... 1.03PM	1958		Cross Wyaconda River.. 8.35AM
4934	889	Ar ALBUQUERQUE.....N.M. 1.15PM	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		Cross Mississippi River, Iowa-Illinois boundary.. 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
		Passing through Rocky Mountains—beautiful views of mountains.			Stops at Galesburg only to discharge passengers from Lamy, N. M. and scheduled stops Albuquerque and beyond.
6666	1131	Ar RATON.....N.Mex. 6.01PM	2063		Cross Spoon River... 10.30AM
6666	1131	Lv RATON.....N.Mex. 6.04PM	515	2096	Ar CHILLICOTHE.....Ill. 11.00AM
7588	1138	Cross New Mexico-Colo-rado boundary through Raton Tunnel, one-half mile long and highest point on the Santa Fe. 6.26PM	2098		Cross Illinois River... 11.02AM
		Lv TRINIDAD.....Colo. 7.01PM	2135		Cross Vermilion River.. 11.35AM
		Stops at Trinidad only to receive passengers for Kansas City and beyond or South of Newton and discharge passengers from Albuquerque and beyond.	625	2137	Lv STREATOR.....Ill. 11.40AM
			2174		Cross Kankakee River... 12.15PM
			549	2188	Lv JOLIET.....Ill. 12.30PM
			2202		Cross Des Plaines River. 12.49PM
			2215		Cross Des Plaines River. 1.10PM
			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.

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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 burshia, some altiples (?). This grades into steppe with practically no bushes locally 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. There 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 *Pinon-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 *Pinus ponderosa* in open *Pinon-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 siddellii* (?) 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.

8.

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 piñon-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 ~~has~~ 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
~~and~~ 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
become 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?

Thinner says best
time to visit Texas is 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. 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

Penna - New Jersey - N.Y. 25

pattern as nearly 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 ~~on~~ 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 land 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 cupped 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 humps 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
~~all~~ either pure deciduous
 or pure conifer.

Dusseldorf to Geneva -

Rhin 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}
~~Alps~~ (?) 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}
~~Alps~~ about 75%
 in conifer woods, 25% cultivated
 in grain(?) This mostly in
 small valleys, the ridge
 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 dusty looking semi-transparent fog with mountain stretching 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 most plentiful on north sides of mountains.

Portion of Jura showing above clouds between Zurich and Geneva largely ^{coniferous} 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. 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

fohar

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' right side of plane, crossed peninsula of Trucial Oman at a just north of ~~fohar~~ ^{fohar}.

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 ravine 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 *Fohar* 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 expanses 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
brom of *Pseuderanthemum*

canuthersii 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*, ~~above~~ 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 north-west of Indus delta in desert. Most striking I have ever seen.

Upper part of delta seems to ~~lack~~ ~~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 now, 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
irregularly
shallow
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 (12), 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 onto 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 ravine 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 ^{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-south axis of the Vindhya Range.

^{increasingly} From here the country is generally rough, with uneven open woods. Trend of ridges north-south or 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 Lon 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 area 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.

Southward 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

pea 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. Uneven 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.

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, ~~and~~ clearings
bright green, perhaps lalang,
possibly rice but no love pattern.
Some paths visible. Then
more forest, vast areas.

Little or 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.
Further ^{east} of island low, wooded
Hill local very light colored trees.

Rice fields around
Djoharta airport have
villages with coconuts,
Musa, Artocarpus, etc.
Tilted roofed houses, village
like wooded islands
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.

Dec. 16 - Between Tjiawi
and Tugur

Tenaced rice, with
bamboo, bananas, ^{pale fruit} mango,
other tree crops, much
Manihot, Carica, etc. The
rice in all stages from
planting to harvest. Replanted
immediately. Many ornamentals.
Some Cyathaceae and other
wild plants on ravine walls.
Above Tugur same pattern
along roads. Tea planta-
tions 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.

sweet
potatoes

Tjibodas

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

Altingia, ^{early} Castanopsis,
Dioscorea,

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,

Plectocoma, - very irregular

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

Photos 5 h.w. 3 h.d. 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 4 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. Low
cane, apparently *Saccharum*,
though the branchlets
do not disarticulate
properly.

Dec. 16 - Above Tjibodas,
in rather open lower montane
rain forest.

~~29652 ~~Podocarpus imbricatus~~~~

39652 Nephrolepis
abundant on tree trunks

53 Podocarpus imbricata Bl.
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 Lasianthus
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 completely
~~destroyed~~ lower montane
forest almost completely
destroyed by mud-flow
2 years ago, very open

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.

Polypodium

✓2

common, terrestrial, in open.

✓1

64

Pratia montana

occasional, in low bushes

✓2

65

Lascharium?

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.

✓1

68

Davallia

occasional on fallen logs in open

1692m

scrambling, flowers

purplish blue.

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

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

bright green above, white beneath.

very coriaceous.

Dec. 18 - Trip Bogor to

Udjong Kulon by bus + boat.

Around Bogor is a pattern of dryland 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, acaia, Carica, Phoenix dactylifera (1), tamarind, Muntingia, Anacardium ^{sugar cane}

Ornamentals:

Acalypha amontacea.

Alacasia macrorhiza

Jatropha curcas

Canna hybr. Coleus sp.

Delonix regia

Caesalpinia pulcherrima

Dieffenbachia maculata

Catharanthus

Thevetia peruviana

Sporoxa erecta

Lambucus sp.

Hibiscus tiliaceus

Glinicidia repum

Allamanda hendersonii

Codiaeum variegatum

Leucaena glauca

Zephyranthes rosea

Zephyranthes candida

Thunbergia erecta

Tobermoutana coronaria

Hibiscus hybrid.

Merium oleander

Filicium?

Lamanea samar

Casuarina

Bougainvillea sp.

Pedilanthus tithymaloides

Erythroxylon cocc.

Clerodendrum thomsonii

Averrhoa bilimbi

Gerbera jamesonii

Tagetes

Solidago sp.

Malvaviscus

Cupressus sp.

Plumeria obtusa

Plumeria rubra

Caladium bicolor

Polycias scutellaria

Scindapsus aureus

Euphorbia sp.

Chrysalydocalyx lutescens

Hymenocallis littoralis

Hibiscus schizopetalus

Pisonia alba

Duranta repens

Antigonon leptopus

Polycias guilfoylei

Passiflora quadrangularis

street trees in Djakarta

Mangifera indica

Delonix regia

Artocarpus heterophyllus

Rossternea regia

Ficus benjamina

Muntingia calabura

Thonnetia 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.

(fls. eaten, acc. Kostermans)

Janggarang - enormous market.

~~westward~~ - along road

Sweetenia macrophylla

Cassia siamea

Cosas 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 villages
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 treaded
and the bouquets of
panicles are dried in the
roadside.

Serang - much more open,
less crowded than the
west. Large tamarind trees.
Turn southward. Coconuts
abundant. Mangoes + Achras.
Some areas of *Imperata*.
Thickets with *Gleichnia*.

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
jak-fruit and coconut.

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

This is the pattern to Labuan
where *Crocos* 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. w.
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 *Sophora tomentosa*
to 3 (4) m. tall, as placed
here and there by *Vitex* sp.
and with a little *Scaevola*.
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 ~~west~~ ^{inner} 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 6-11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 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986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000)

Small islet has *Pernpithis* 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 *Summitzera racemosa* growing to a height of 10-12 m., with abundant pneumatophores.

Along the gravel ridge are scattered *Pernpithis* 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~~ ridge is of gravel, there is much gravelly and bouldery rubble back on the flat. The tidal wave ~~it~~ 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 ^{flats} generally supports a good forest of *Calophyllum*, fringed by a fringe of *Sophora tomentosa* and *Vitex*, with occasional patches of *Pandanus*, ^{by the} *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*, *Thysanotus*, etc.

Dec. 18 - Uoljung Kulon Reserve
across from Pulau Bentang
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 Sarjan
(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
bare 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.

Dec. 18 - Pulau Pentjeng (island)

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

39669

Tournefortia argentea L.f.

12

occasional to rare in scrub
at top of beach.

13

70

Vitex

common, forming fringe at
top of sandy beach

12

71

Sporobolus per-caprae L.

common locally on
sand in disturbed
places at top of beach

12

72

Scaevola sericea

rare at top of beach

13

73

Sophora tomentosa L.

dominant in fringe
at top of sandy beach

12

74

Hibiscus tiliaceus L.

common in edges of
forest at top of beach

3

75

Cassytha filiformis

common locally at top
of beach, parasitic on
Sophora tomentosa.

same, exposed stony beach

12

76

Barringtonia asiatica

dominant in forest on
stony ground back of beach

12

77

Hernandia sonora L.

codominant with *Barringtonia*
on stony ground at top of beach.

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.

- 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 charissonis* 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 elaeagnoides* Benth.
abundant on exposed
top of low cliff.
- ✓2 88 *Fernbristylis cymosa* 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

- 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.

no checked
80
labels applied

1958 Java

- 39692 (Euph.) *Trigonemon?*
occasional in undergrowth
- 3
✓ 2 93 *Pelea*
rare in undergrowth
- 5 94 *Varzea palembanica*
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
- 39700 *Hernandia sonneria* L.
rare in fringe of forest
(more common on rocky beach)

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.

Dec. 19 - Cape Lajar

edge of forest back
of beach39701 *Leea sambucifolia*?

common in undergrowth

3 02 *Cordia myxa* L.common in cleared
roadway.3 03 *Pyrostachys lanceolata*
common on tree trunks12 04 *Hedyotis albido-punctata* (Merr.) Forb. ?
common in grassy cleared
area, grazed by wild oxen.open areas on rocks
above sea shore12 05 *Ipomoea littoralis* Bl.
occasional12 06 *Cyperus*
local in rock crevices12 07 *Phyllanthus*
local in rock crevices
and weedy places.12 08 *Ischaemum muticum* ?
very common in grassy
areas grazed by wild oxen.1 09 *Justicia*
local just back of
sea-shore in open place1 10 *Cyperus byllingii*
local in weedy places.

shrub 2.5 m. tall.

fruit immature brownish.
small tree about 8-10
m. tall; fruit, 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

not checked
84
Labels typed

1958 Java

397 11 (amar.)

- 1 rare in weedy place at foot of cliff.
- 12 12 *Echaeum* sp. (intermedium?) abundant on cliff of volcanic tuff.
- 12 13 *Fimbristylis cymosa* R.Br. common on cliff of volcanic tuff.
- 12 14 *Zoysia* common on cliff of volcanic tuff.
- 12 15 *Hedyotis albido-punctata*? common in crevices of cliff of volcanic tuff.
- 3 16 *Ficus* (Lorenz says *F. septica*, but does not have ribbed fruit) common in edges of thickets just back of shore.
- 12 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 Handeulung

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

Guettarda speciosa
Hibiscus tiliaceus
Zhesperia populnea
Pasmodium umbellatum

Drymaria
Pyrosia
Cassytha filiformis
Crinum

Ardisia (humilis?)

Lantana camara

Cayratia

Premna obtusifolia

Wedelia biflora

Navallia solida

Acrostichum aureum

Cycas circinalis

Pandanus tectorius

Desmis trifoliata

Ilex (or Pavetta)

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 pellucida

Acalypha indica

Pteris ~~brasiliensis~~ cretica?

Ananas comosus

Ageratum conyzoides

Sporobolus diander?

Eragrostis amabilis

Piper aduncum

Neonauclia

Laccharum spontaneum

Morinda citrifolia

Scaevola sericea

Fimbristylis cymosa

Eupatorium

~~DD~~ *Gomelina*

Loranthus sp.

Euphorbia hirta

Chrysopogon aciculatus

Stachytarpheta jamaicensis

Ficus septica

Rademacheria gigantea

Hernandia

Tacca palmata

Blumea balsamea?

Dendrobium

Oberonia

Phallosenopsis amabilis

Jatropha gossypifolia

Capsicum frutescens

Sonneratia
Dutisia bijuga
Coccoloba muricata
Eupatorium balsamifera
~~*Leucaena*~~
Alternanthera versicolor
~~*fabaceae*~~
Digitaria 2 sp.
Calceolaria argentea
~~*from rot*~~
Mirabilis jalapa
Cosmos sulphurea
Myrica lanceolata ?
Rhizophora apiculata

Forested ~~for~~ border, mostly
 strand species. Cultivated
 area around houses. Then
 a large open area covered
 by a ~~thick~~ 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
 "fees", with thick woods
 of *Buchanania*, *Radernachia*,
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*, *guava*,

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 differences?

1958 Jan 9

labels typed

Dec. 19 Tendong Kalund

- 39719 *Desmos cochinchinensis*
in ~~so~~ 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 *Smyntha?*
local ^{gregarious} in Pemphis forest
on small gravel just
inside beach
- 23 *Pemphis acidula*
dominant in forest on
small gravel flat just
inside beach
- 24 *Thuarea*
small patches in
Pemphis forest not far from beach
- 25 *Blumea*
occasional in Pantang
scrub on very thin soil
- 26 *Bridelia*
occasional in forest
- 27 *Glochidion*
common in forest and
forest edges.

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 trees; ~~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.

not checked
labels typed

- 3978 *Ximenia americana* L.
near outer beach in forest
- 29 *Digitaria*
common around dwelling
- 30 *Digitaria*
common around dwelling
- 31 *Digitaria*
common around dwelling
- 32 *Tacca palmata*
common in stony trail
in shade
- 33 *Emilia sonchifolia*
occasional ~~at~~ in grassy
place around dwelling
- 34 *Ixora*
common in undergrowth
- 35 *Desmodium umbellatum*
very common in undergrowth
- 36 (alga)
parasitic on *Tacca palmata* leaves.

Dec. 22 - Pasir putih

- 37 *Aegiceras corniculata*
pure stand on basaltic
rocks, covered by salt water
at high and medium tides.
- 38 (family?)
on basaltic rocks well above
~~at~~ tide level
- 39 (ascl.)
on basaltic rocks well
above high tide.
- 40 *Hibiscus tiliaceus*

shrub; fruit immature.

flowers purple.

flowers purplish.

fruiting
bracts
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. 10 - Krakatau Volcano
 Krakatau ^{313m}, Verlaten I. ^{187m}, Lang I. ^{147m}
 and Anak Krakatau ^{175m}
 (Jebei 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 slopes, 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 - Pasir Tjir, 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 *Scaevola spontanea*, etc.

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

Bandung - Lurisdang.

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. Teak said to have been introduced 1000 years ago. Bands of *Leucaena macrophylla* planted with teak for fire control. *Acacia auriculiformis* planted on very degraded soils. These soils in limestone region are called "marl" soils.

Kanuku 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 these are few waste spots. Road 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 buffaloes. 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 Tegal 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.

Oryctes 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.

1960

teak, and to f. from our during dry season. Clean-felled, all coppice

5. Yellow.
6. Yellowish.
7. Yellowish.
8. Yellowish.
9. Yellowish.
10. Yellowish.

Yellowish.

1. Yellowish.
2. Yellowish.
3. Yellowish.
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Yellowish.

1. Yellowish.	5. Yellowish.
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Yellowish.

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Dec. 22 - ~~Solo~~ - ~~Solo~~ -

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

Ficus burzi (*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.

20 year old Teak plantations east of Solo (photos). Tall straight trees. Shrub layer of coppice 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 coppice

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 downyand permission required from forest officers. 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 Sals 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. Cocon much less common here. Rice is dominant through this entire area.

Near the sea, in the vicinity of Pasuruan *Opuntia* and *Borassus* reappear. Soil is black.

Warrung, set 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 Pasirputih 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 iron gray pillow-basalts, apparently a thick flow. The surface weathers darker than the normal color of the rock.

Teak forest with dense undergrowth here.

Dec. 23 - Pasirputih

fire climax forest on basalt slope - *Schleichera*, *Albizia lebbioides*, *Homalium tomentosum*, *Leboutea*, *Flacourtia*, *Uvaria*, *Lantana*, *Syzzyphus*, 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. *Protium*, *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 Baluran

at Asembagus photos of oxcart, horse cart, store, 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 Baluran 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* or *rabies*.

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 wanders, 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,

ayedinahta

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

Gallery forest in ravines - rather dense - Spondias, Premna, Ficus, Morinda, Grewia, Pisonia ^{aculeata}, Phyllanthus emblica, Schleichera, etc. A tiny trickle of water in canyon.

Spondias ~~fruits~~ stones scattered over dry hillside, well above Spondias 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 and of open ^{or semideciduous} deciduous forest! (photos, ending Kod. roll 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 (*Lamproloma*? *Casearia*?)
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 Baluran 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*
one tree in gallery forest
in ravine
- 2 53 *Morinda*
very common
- 43 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 Baloran 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 ~~is~~ 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 3 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.

Dec. 25 Coast north of Banjaruangi

39768 *Capparis*

occasional in dry thickets

69

Trientalis portulacastrum L.

common on rocks along shore

scandent shrub.
prostrate, sub-glabrous,
flowers pale lavender.

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, k. & b. & w.)

(Photos of cracked ground and grassland on it)

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

Photos from lookout. Behol.

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 Kain

Dec. 25 Wongsorejo

39766

Acorus calamus L.

small clump along stream

67

Thunbergia alata

common around buildings

Wongsorejo - Banjaruangi
great trees along road of
Salmaria malabarica (Banda,
m. 1), *Lamanea*, 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, but 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 bare)

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

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

The *Brassia* 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 North Bali. Saw several white storks. This is game reserve.

Gunung Sangyang (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 *Brassia*). *Brassia* 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, or can 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*, *Mitchelia*, *Eugenia*, *Schefflera*, *Morcania*.

Dec. 26 Bedugul, on Lake
Bratan

39770 *Drymaria*

on cut banks of volcanic soil
near building

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

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

73 *Adinandra*

common in montane forest

74 *Lambucius*

very common in open places
along trail

75

75 *Michelia* () glauca

occasional in wet forest on ridge

76 ~~Adiantum~~ *Astronia*

occasional in wet forest on ridge

77 *Rubus*

common along trail in wet forest
on ridge

4200'

1280m

weakly erect.

flowers purplish pink

det. Corner

Corner

4700'

↓

1440m

woody climber reaching
high in trees, fruit
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 inflorescences
purple setting very few fruits,
these immature.

tree. leaves glaucous
beneath.

tree; inflorescence and
flowers pink.

scandent shrub,
flowers white.

1953 Bali Pochocarpus ^{Casuarina}
 Medinilla, many ^{of} Urticaceae, ^{Laportea}
 with epiphytic ^{Ficus},
 many ferns, orchids,
 mosses, Freziera, etc.
 Rubus moluccensis in
 undergrowth, with very
 conspicuous lacinate bracts
 in young inflorescence.

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

Peaters 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
 E. robusta; said to be some
 E. 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 ~~Agung~~ and Batur
 and caldera lake - Batur

Photos of Kehen temple.
 Bangli

Photos of Agung volcano
 and rice ^{pen} ^(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 their back
 and a pot 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
spiralDec. 26 Hotel Kintamani
dormyard

1 80

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

1 81

Drymaria cordata (L.) Willd.
common

Dec. 27 Sacred Forest of Bangkah

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?

etd. 4.122

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.

Sangeh - Sacred forest of *Dipterocarpus hasseltii* & *Pisonia silvestris* (photos Kod. 1 & Kod. 2)

finish
box up
roll 6

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 ~~grass~~ ^{shrub} layer 1-2 m. more varied comp.

Epiphytes in canopy.

Gray monkeys around temples.

(acc. Womersley forest around burial grounds in N. 9.)

Village complex - coconuts, arenga, areca, ~~and~~ jackfruit, breadfruit, mango, citrus, Musa, bamboo. *Hibiscus tiliaceus*, *Salakia*, *Ceiba*, *Carica*, *Manihot*, *Eugenia cinnamomi*, *Plumeria*.

Gulingan temple - ~~photos~~ Kod. photos rice edendecb temple.

End Kod roll 1 in Uluwatu Village - mud walls, etc. Sadeh temple (Kod. 8-10 beginning of roll 1.)

Coconuts and arenga attacked by *Anagrus*, areca not. Coconuts more damaged than arenga.

The palms commonly seen are *Cocos nucifera*, *Arenga pinnata*, *Areca cathecu*, less commonly, *Salakia 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 Lanan *Pisonia grandis* var. *alba* is common. Not seen elsewhere in Bali.

- 39787 *Psychotria*
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~~ *Dipterocarpus* ~~truncatus~~ *haseltii*
common in undergrowth
as seedlings.

Dec. 27 - ~~Sadeh~~ ^{Sadeh} Temple

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

- with ~~Posternans~~
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
pou 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 ~~divine~~ (?)
or argite (?) (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 in 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
 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,
 5-10 m. tall. scattered
 large trees remain from
 original forest. On the
 other side of this hill
 coffee does not
 reappear, but there is a
 little teak, suggesting
 that the hill is limestone.

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

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

^{terrible rain}
 Djember - Probolinggo
 Tobacco - rice - sugar - rubber
 coffee areas. Occ. teak on low hills.
 Remains dissected
 volcano - Rungto to right.
 North of Lumadong 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 Djember
 Follow canal toward
 Semeru Volcano, ^{3770m} highest
 Mt. in Java. Lamongan
 on V. on right. Said to be
 lakes or maars in small
~~one~~ 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

128 1958 Java

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

Rise again at Letjes.

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

Vast rice fields.

Probolinggo - Madure

West of Phobolinggo 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 Madras to Purnacheto

Machine River very high,
very muddy.

N. e. of ~~fold~~ ^{camp} 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.

some new photos (col.) of rice planting
~~first~~ of Luankanta (photo).
Lragen.

Photos of rice harvest
24 km sw. of Solo.

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

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

Temple at Pambanan -
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 Kalantan.

Komodo Dragon (photos) in
Jogjakarta Zoo. Very sluggish.
Tongue yellow, forked.

Barobura. Mimosa asper,
along edges of rice fields.

limestone range to south
almost completely deformed.

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, a missing taken to Liem
by Chulalongkorn. (Many photos)

Kepumen 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 -
Impatiens.

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

Dec. 30 Purwokerto to Bogor.
South of Purwokerto limestone
hills with teak plantations.
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.g. Wangan)

Cocos

Bambusa

Hibiscus tiliaceus

Bala

incinatus

Terophyllus

to be

ngon
ge of

BALI TOUR

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 Kejen) 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 Sebati, Susut, Bangli (Pura Kejen) 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 Udjung (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.

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)

Keprumen 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 coconuts, 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 Wangan)

Cocos
Bambos
Hibiscus tiliaceus
Mango
Annona
Ceciba
Averrhoa caranbola
Muntingia
Saccharum officinarum
Areca
Annona sp.
Artocarpus heterophyllus
Citrus sp.
breadfruit
Manihot
Averrhoa
Jea
Psidium
Albizia sp.
Poncirus
Glinicidia
Ceciba
Tectona
Tamarindus
many ornamentals
Canna edulis

A few km. W. of Wangan
another 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 10 km.

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

Then about Mawlung 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 Wandarepa, this much smaller.

On both sides of Tachmalaj 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 Parit 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 Kosterma says 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 poor trees seen at
3400', several others nearby
badly attacked by Dryopteris.

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

Phuchea ~~indica~~ indica
commonly used as hedge.
Celtis papyrifera curcas.
A small bamboo more
rarely.

Jan. 2 - Bogor

planted in gardens

39795 *Endiandra bassii*

5

3 96 *Pseuderanthemum*5 97 *Hura crepitans*5 98 *Hura*

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 ~~at~~
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 ~~stamens~~ stigma
of female flowers deeply
lobed.

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

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

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 it have been
 raining from Monday till today,
 Thursday.

The area around Darwin
 is green. Open forest of rather
 small trees. Mostly *Acalypha*.
 In town a typical tropical
 assortment of ornamentals:

Allamanda cathartica v. *henderoni*
Calophyllum inophyllum
Polyscias tricochleatus
P. guilfoylei
Delonix regia
Pseuderanthemum cantharidis
Polyscias frutescens var. *filicifolia*?
Polyscias pinnata?
Mussaenda frondosa var. *aff.*
Thevetia peruviana
Plumeria rubra
Ficus sp.
Antigonon leptopus
Lawsonia inermis
Bougainvillea spectabilis
Catharanthus roseus
Acalypha ornamentalis var.
A. hispidula
Jatropha podagracea
Nephrolepis sp.
Synedrella nodiflora
Leindorffia aurea
Euphorbia pulcherrima
Lantana camara
Marikot exultans 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 emblica
very common (introduced)

Locally, with no obvious topographic difference, is a type of monsoon forest, densely tangled with vines, difficult to walk through. Mature 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 subdivided golf courses, etc.

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

in parts seen, but a white flowered *Bumelia* 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 *Leucaena sericea*, *Cordia subcordata*, *Guettarda 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
Plumonia obtusa
Quincagalia indica
Tamandua indica
Lamanea samar
Musa sp.

label
 type

39799 Jan. 8 - Darwin, N.T.
 (Myrt.)

2 among mangroves on rock
 substratum covered by high tide.

39800 *Exocarpus latifolia*

2 In thickets just back of beach

2 01 *Borreria*

abundant in open forest
 and in disturbed places.

2 02 *Stachytaraxis*?

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 *Boerhaavia*

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 - DC-4, left side. ^{at 7:25}

Raining hard. Sea very rough, about 25 lines of breakers, water muddy. Considerable mangrove ^{thicket} west of Darwin in a small bay. also ³ small estuary systems ~~west~~ ^{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, ravines 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 ^{drier green} savanna, rocks showing locally. Rocks 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. Areas 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 of

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

9:43

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

9:46

Grass under trees thinner, soil red. Clouds.

9:50

Thin savanna. Clouds.

9:59

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.

9:27

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 Alice Springs. 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 depression between them. ~~Shallow~~ dendritic gully system with more vegetation.

10:15

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.

10:27

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

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

cylindric *territaria* abundant in green open scrub and shrub savanna around field

*Plumieria
obtusata
Calliandra
rosea*

Tamarix cf. *aphylla*, and
Arbinsonia aculeata planted
here, also the lemon yellow *Caesalpi-*
nia 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 Spr.

Savanna with *Tridens*?
clumps - circular, dead in center.
Low 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. Entire
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.
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} of grass. Scrub
apparently collects sand. All reddish.

11:21

Patches of scrub scarcer,
mostly thin desert grassland.
Elongate somewhat meandering
depression more vegetated
than surrounding grassland;
more scrub patches.

11:24

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.

11:29 Irregular mosaic of areas 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 areas. Shallow vegetated ravines.

11:42 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.

11:43 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.

11:59 The lake bed is extensive. At other side of it long dune ridge, with concentric bands of shrubs. (hodachrome). 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).

12:01 Scattered dark low mountain masses, covered by open scrub or 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 is, pattern very extensive (Kodachrome).

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. Open gallery forest along stream.

12:14

arborescent 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 ^{valley} 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 distinctive spikes), *Melia azedarach*, *Persea* sp. *Patuna*, *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~~ with ~~the~~ narrow strips of open forest. Mostly arborescent desert and desert grassland.

1:27

1:28

a few patches of steppe savanna.

A low range of dark brown hills transverse to course.

1:30

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

1:32

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 large hills. Much geology showing, if there were only time to interpret it.

1-41 Large area of almost bare 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. (red) strikingly red against blue of *Atriplex* savanna.

1-52 Not so anastomosed any more. (red)

1-54 almost no dunes, or mostly stabilizes 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. (photo)

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 or quite as bare as before, pale buff in color. Locally splashed with dull purplish.

2:29 Tawny parallel dunes at about a 45° angle backward from course on a buff plain. Scattered shrubs between dunes.

2:37

Dunes have become redder, ~~and~~ closer together and much broader. Ground between them almost covered. Very little vegetation.

2:40

Dunes anastomose and lose their parallel alignment become a vague irregular sea of dunes. Some vegetation.

2:41

Crossed a broad braided series of ^{dry} water-courses outlined by vegetation.

2:42

A broad plain colored like the painted desert, no vegetation except in ~~a few~~ dry watercourses. (hot.)

2:50

Crossed a broad white dry watercourse with a few lines of vegetation.

Then more painted desert very bright hematite color.

2:55

A tributary watercourse ~~to the left~~ with prominent lines of vegetation dark green small trees. Then another. ~~Then it is the~~

This does not join the main one crossed at 2:50 but flows into Lake Eyre (?) ~~in a~~ separate still another, and another.

2:59

Conspicuous vegetation in the lower courses of these, before they come out into the white salt (?) flats of which

3:00

probably must be ^{edges of} Lake Eyre. Tawny flats with white patches.

3:03

Crossed meandering stream-course with stretches of water in it.

3:06

A vast dry white lake bed. A very sparse ~~to~~ vegetation of small bushes on tawny margins but apparently nothing in the bed itself.

3:12

Very odd streaky clouds of white dust (?) evidently being driven across lake bed more or less transversally to course (hot.)

3:15

This white flat is probably the most absolute desert on the face of the earth. Not a sign of visible vegetation.

3:17

An island or two of slightly (or a peninsula) of slightly higher tawny land, then more salt.

3:19

Shifting along the west shore. Tawny, little vegetation. Across lake is a great series of subsidiary smaller lakes to the west.

3:26

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.
 4:55 Gallery of 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.

4:00 More strike ridges, these more
 vegetated than others, though
 still desert.

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

4:04 Strike ridges form a very
 interesting pattern, not altogether
 understandable, as ridges
 seem to intersect. Fair areas of
 open forest on lower slopes.

4:30 Scattered cultivated fields
 on thin grassland, a few
 patches of forest and savanna.
 4:47 Some dry farming of flatter
 areas, ~~grass~~ steppe and steppe
 savanna on low hills.

4:50 But a couple of patches of
 dense obviously planted forest
 green ravine bottoms.
 Soil in plowed patches dark purplish

red.

4:55

Mostly under cultivation
 now, except a strip of patches
 varying from ^{steppe} savanna to
 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 one.

5:17

losing altitude.

Trees along ravines and watercourses.

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

9:30

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

Jai. 10 Adelaide National Park

Open forest of *Eucalyptus camaldulensis*, *E. odorata* understorey of *Acacia* spp. *Casuarina* sp. etc. (photos, also of *Ernus* + *Crangon* in enclosure).On slopes *E. leucoxylon* (photos) with *Hypericum* (photos) (result of fire).From summit of Mt. Lofty (rocks) 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*, *Dioscorea*, *Sprengelia* etc. in bottom of draw (photos)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, *Styphelia*, etc.*Progonocera* (photos) *Proteaceae*. occasional.*Leptospermum* dominant in shrub layer. *Hakea* common.Sclerophyllous scrub with scattered *Eucalyptus* above, *E. leucoxylon* in f.g. (photos).Lower slopes, savanna-forest of *E. leucoxylon* (photos). *Arum*, etc. mostly exotic, on ground.The color of these forests is uniformly a dull dark green. Only the *Excoecarpus* in the understorey 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.

hot photos of banks

Sardines! *Cartilago*? common in open fields.

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

23000' alt.

3:16

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

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} 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 course. Forested area characterized by sub-parallel undulating ridges.

- that may be dunes, but not necessarily, if so mostly very well stabilized by vegetation. Large unbroken area.
- 3:30 In several places the cover has been disturbed and the dunes have become active again.
- 3:32 Area of fixed dunes, with thin scrub, rather than thick scrub or forest, and
- 3:35 Partially cleared land, with numerous ~~scattered~~ elongate spots remaining in ~~parallel~~ alignment along course for some distance. To left of plain vast wooded area.
- In middle distance dry farming almost continuous.
- 3:44 Most curious brown scrub area with lines, somewhat wavy, parallel but numerous and close ~~to~~ together, as though combed. Then more black densely wooded hills.
- 3:48 Solid cultivated land and pasture. In places scattered trees. Some patches of wood or savanna.
- 3:47 Then a broad band of irregular forest or scrub, red. These bands run at about 60° to road, forward to left

3:50

hill.

3:53

Another band of cultivated land, dry burned, but this with irregular cross bands of forest and hundreds of ~~ponds~~, some of them white, others gray or greenish. This band very broad. Much pasture with scattered trees. Open gallery wood along meandering watercourses.

Cloud.

4:24

Large patches of forest, ~~savanna~~ (pasture), and cultivated ground. Forest on rounded hills, very dense, dull dark green.

Jan. 11 Melbourne - street and park ornaments
Eucalyptus sp. *Tristania*? 5 fascicle of stamens
Machura pomifera?
Genista sp.
Ailanthus altissima
Nerium sp.
Cestrum (red)
Abelia grandiflora
Jacaranda ovalifolia?
Platanus hybr.
Cytisus scoparius
Betula alba
Ficus pumila
Helianthus annuus? (over)

Lobelia
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 (ext.)

Crataegus sp.

Ampelopsis sp.

Agapanthus ?

Ligustrum vulgare

Quercus robur } both
Quercus sp. } unhealthy looking

Schinus molle

Muehlenbeckia sp.

Coprosma baueri ?

Abutilon pictum

Washingtonia filifera

Veronica (Hebe) sp.

Choriza ternata ?

Bellis perennis

Phoenix canariensis

Fuchsia magellanica ?

Hydrangea

Phlox drummondii

Prunus (Japanese red bud.)

Lolandra ?

Phlox paniculata ?

Pittosporum crassifolium ?

Fibouchia

Pelargonium

Impatiens sultana

small shrub

shrub, 1 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 ?

Arancaria columnaris ? (crescens)

Morus alba.

Pinus sp.

Quercus sp.

Salix babylonica

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

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

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 saw
 varying locally almost to
 open forest

Reservoirs ~~and then~~ surround
 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.

352

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 norwesterly 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 & 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 & 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 Hume Res.~~). Typically mountain meadow as far as can be made out from distance. Several other smaller peaks also slightly bare on tops. Some high ridges apparently have scrub on west side, dense forest of dark brownish color on east & northeast.

3:23

- 3:25 A forest fire in distance on right.
The dark brownish forest seems characteristic of highest peaks. On highest ridge 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.
- 3:34 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 and 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. 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 grazed. Some areas of a coarse bunch grass. Much outcropping rock landed. Photos of degraded open forest. Trees are low, rounded spreading. Course from here along upper Murrumbidgee R. to Canberra.
- 3:45 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
- 4:15

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.

4:29 Fairly high wooded mountain back 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

Jan. 16 - Between Koko Crater
and Makapuu Pt.
roadside in ~~forest~~ ^{dry} low
Prosopis forest.

39808 *Gossypium tomentosum*
common locally

3 09 *Euphorbia heterophylla* L. M. R. L. Dressl.
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

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. 16 - Between Koko Crater
and Malapuna Pt.
roadside in ~~low~~ ^{dry} low
Prosopis forest.

39808

Gossypium tomentosum
common locally

3

09

Euphorbia heterophylla L. M. R. L. Dressl.
occasional

Gossypium tomentosum
still persists for a few
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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 involucral leaves,
scarcely paler. (trees for Dressl.)

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

Leaves of *Cordia* 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 ~~to~~ sage
bush. ~~A~~ some alluvial
fans covered by sage brush.

9:55 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 veg-
etation 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 appears to be
old partially stabilized
barhans, horns pointing
northwestward. A highway
crosses this fan. These dunes
would be worth investigating
on the ground.

9:59 Another small dry lake ^{on alkali}
immediately to left of course,
with what appears 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 (?).

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 another fan
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.

10:09

Wide valley, some patches
of dunes.

10:10

Low mountains with scattered
trees, much higher and wooded
to north.

Then another broad flat valley. A highway (or railroad) crossed the low pass in the mts. and the 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 ~~with some~~ ~~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 mountain, 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 slope.

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.

10:32 A couple of small lakes with water, in valley to north. Otherwise alternating bare flats and sparsely wooded mountains.

10:40 Some 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 out into red ^{and bluish} 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? 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.

1:46

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. ~~Interfluves~~

Interfluves 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. Crossed Mississippi R.

2:07

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 $\frac{1}{2}$ 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.

ES 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 Wai-anu hike last Sunday had opportunity to observe the variety.

There is a shrub in Wai-anu 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.

KHRUR SPREADS

In the years since it has been reported spreading in Waiahole and Waikane, the two valleys adjoining Wai-anu.

Also in Wai-anu 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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