F. R. Fosberg
Collection Book # 21
Nos. 28323 - 28868
<table>
<thead>
<tr>
<th>Location</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PERU</strong></td>
<td>2-27, 132-195</td>
</tr>
<tr>
<td>Paso de Acanacu</td>
<td>28323-28329</td>
</tr>
<tr>
<td>Puente Mercurio</td>
<td>28330-28331</td>
</tr>
<tr>
<td>Santa Ysabel</td>
<td>28350-28358</td>
</tr>
<tr>
<td>Valley, Rio Cosnipata</td>
<td>28359-28360</td>
</tr>
<tr>
<td>Rio Tambomayo</td>
<td>28361-28363</td>
</tr>
<tr>
<td>Paso de Acanacu</td>
<td>28364-28368</td>
</tr>
<tr>
<td>Cuzco ruins</td>
<td>28369-28377</td>
</tr>
<tr>
<td>Rio Huatansay</td>
<td>28378-28392</td>
</tr>
<tr>
<td>Rio Vilcanota</td>
<td>28393</td>
</tr>
<tr>
<td>Ollantaytambo</td>
<td>28394-28398</td>
</tr>
<tr>
<td>Pisac ruins</td>
<td>28399-28404</td>
</tr>
<tr>
<td>Train trip leaving Cuzco</td>
<td>28405-28409</td>
</tr>
<tr>
<td>La Raya</td>
<td>28410</td>
</tr>
<tr>
<td>Puno-Cuzco by rail</td>
<td>28711</td>
</tr>
<tr>
<td>Araranca</td>
<td>28712-28714</td>
</tr>
<tr>
<td>Cuzco</td>
<td>28715-28730-28735</td>
</tr>
<tr>
<td>Machupicchu</td>
<td>28736</td>
</tr>
<tr>
<td>Puno-Arequipa by trail</td>
<td>28737</td>
</tr>
<tr>
<td>s.w. Vincocaya</td>
<td>28738</td>
</tr>
<tr>
<td>Pucanchachca</td>
<td>28738</td>
</tr>
<tr>
<td>Arequipa-Chala by road</td>
<td>28739</td>
</tr>
<tr>
<td>s.e. Camana</td>
<td>28739-28770</td>
</tr>
<tr>
<td>n. of Chala</td>
<td>28771-28778</td>
</tr>
<tr>
<td>s.e. Valle de Vaca</td>
<td>28779-28781</td>
</tr>
<tr>
<td>Nassa</td>
<td>28782-28785</td>
</tr>
<tr>
<td>Chala-Ica by road</td>
<td>28786-28787</td>
</tr>
<tr>
<td>Ica-Lama by road</td>
<td>28792-28796</td>
</tr>
<tr>
<td>n.w. of Chinch怯</td>
<td>28793-28796</td>
</tr>
<tr>
<td>Asia</td>
<td>28796-28797</td>
</tr>
<tr>
<td>Lima</td>
<td>28799-28800</td>
</tr>
<tr>
<td>Tingo Maria</td>
<td>28802-28803</td>
</tr>
<tr>
<td>Tingo Maria-Pucallpa</td>
<td>28804-28805</td>
</tr>
<tr>
<td><strong>BOLIVIA</strong></td>
<td>28-131</td>
</tr>
<tr>
<td>Guaquí</td>
<td>28</td>
</tr>
<tr>
<td>n.e. of Oruro</td>
<td>29-31</td>
</tr>
<tr>
<td>Tolapalca</td>
<td>28411</td>
</tr>
<tr>
<td>Cona Cona</td>
<td>28412-28416</td>
</tr>
<tr>
<td>Tacopaya</td>
<td>28417-28420</td>
</tr>
<tr>
<td>Colcha</td>
<td>28421-28423</td>
</tr>
<tr>
<td>Arpa-irpa, Parotani</td>
<td>40-41</td>
</tr>
<tr>
<td>Cocha bamba</td>
<td>42-63</td>
</tr>
<tr>
<td>Rio Huairamayu canyon</td>
<td>28424-28452</td>
</tr>
<tr>
<td>Montepunco</td>
<td>28452-28457</td>
</tr>
<tr>
<td>Inca Chaca</td>
<td>28458-28463</td>
</tr>
<tr>
<td>28469-28472</td>
<td>62-63</td>
</tr>
<tr>
<td>La Cumbre</td>
<td>28493-28501</td>
</tr>
<tr>
<td>Unduavi</td>
<td>28502-28503</td>
</tr>
<tr>
<td>Chuspipata</td>
<td>28504-28508</td>
</tr>
<tr>
<td>Sacramento Chico</td>
<td>28508</td>
</tr>
<tr>
<td>Rio Corico</td>
<td>28509-28518</td>
</tr>
<tr>
<td>Cupulani Valley</td>
<td>28512-28523</td>
</tr>
<tr>
<td>Rio Unduavi Vly.</td>
<td>28524-28527</td>
</tr>
<tr>
<td>Quebrada de Zongo</td>
<td>28528-28565</td>
</tr>
<tr>
<td>Zongo</td>
<td>28566-28567</td>
</tr>
<tr>
<td>La Paz</td>
<td>28568-28576</td>
</tr>
<tr>
<td>Rio La Paz Canyon</td>
<td>28577-28588</td>
</tr>
<tr>
<td>Air trip La Paz-Oruro, Cochabamba, Santa Cruz</td>
<td>90-91</td>
</tr>
<tr>
<td>Trip Santa Cruz-Peru-Tres Cruz</td>
<td>28589-28593</td>
</tr>
<tr>
<td>Trip Santa Cruz-Peru-Bernardo</td>
<td>28593-28653</td>
</tr>
<tr>
<td>Bermejo</td>
<td>28654-28660</td>
</tr>
<tr>
<td>Tres Cruces</td>
<td>28602-28616</td>
</tr>
<tr>
<td>Bermejo</td>
<td>28617-28643</td>
</tr>
<tr>
<td>Rio Bermejo gorges</td>
<td>28644-28652</td>
</tr>
<tr>
<td>Trip Santa Cruz-Peru-Chinoi</td>
<td>28654-28660</td>
</tr>
<tr>
<td>Rio Chiquiyapu canyon</td>
<td>28656-28666</td>
</tr>
<tr>
<td>Rio Unduavi</td>
<td>28667-28689</td>
</tr>
<tr>
<td>w. of Chulumano</td>
<td>28670-28674</td>
</tr>
<tr>
<td>w. of Tajma</td>
<td>28675-28689</td>
</tr>
</tbody>
</table>

(see next page)
No. 21  
(continued)

BOLIVIA (continued)

Chulumani-Tajma Rd 28692 120-121
Chulumani 28693-28694 120-121
La Paz 28695-28696 122-123
  28708-28710 128-129
s. of La Paz, El Alto-Ayoayo,
  Altiplane 122-123
La Paz-Guaquin by rail 128-129
Collano 28697-28699 124-125
Colamarca 28698-28707 124-125
Lago de Titicaca (Crespo & Perez) 130-131
Miniature Account Book
No. S 136

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Cash Book
Record (29 Lines)
Ledger, Double Entry
Ledger, Single Entry

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Smithsonian Institution
Washington, D.C.
Aug. 4 - Pass to Acangaa, steep, sparsely bushy slope, 3,900 m.

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Gaultheria</td>
<td>Rare</td>
</tr>
<tr>
<td>25</td>
<td>Gerardia</td>
<td>Rare</td>
</tr>
<tr>
<td>26</td>
<td>Gaultheria (common)</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Galium</td>
<td>Rare, well-covered</td>
</tr>
<tr>
<td>28</td>
<td>Gaultheria (common)</td>
<td>Mostly shrub</td>
</tr>
<tr>
<td>29</td>
<td>Rubus</td>
<td>Rare, local on steep slope</td>
</tr>
</tbody>
</table>

Aug. 5 - Puerto Mercurio, Rio Magotamo, with Mr. Magotamo, well above where it unités from Rio Tampu, thick, wet forest on steep slope.

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Calceolaria</td>
<td>Rare in wet ravine</td>
</tr>
<tr>
<td>31</td>
<td>Rubus</td>
<td>Common in second growth slope</td>
</tr>
</tbody>
</table>

Berries lavender, said to be poisonous.

- Macha macha
- Fruit black
- Recumbent, flowers
- Turns purple
- Berries black, edible
- Prostrate, fruit greenish
- Fruit black
- Small shrub; fruit very large, free from receptacle

Aug. 6 - Huancartambo, 3,800 m.

Calceolaria

- Subsulate erect herb 2 m. long
- Flowers yellow
- Tangled vine; fruit immature, said to be black, edible when ripe
28 32  Calceolaria
common in wet places

12 33  Cinchona pubescens
common locally on steep slope

14 34  Cinchona pubescens
same

6 35  Palicourea
in undergrowth in dense forest on steep slope

15 36  Cinchona
common locally on steep slope, mostly

56 37  Cinchona
same

5 38  Cinchona
same / Det. P. E. Berry, 1938

49  Fuchsia sanctae-rosae O. Kuntze
common in brush near road

Cupes - Puncabambos

herb 1 m. tall; flowers bright, deep orange

tree 10 m. tall; leaves dull above; flowers very fragrant, crimson outside, pink inside tube, pale pink inside lobes; fruit infect-tw with Elsinoe cinchonae.
(bark sample A)
same, tree 3 m. tall  
(bark sample B)
slender shrub 3 m. tall, fruit green.

tree 10 m. tall, 20 cm. thick, flower crimson without and inside tube, lobes pink within, odorless (only as seen), fruit mostly immature, apparently infected with Elsinoe.
(bark sample D)
same, Philip's peak no. 68
(bark sample C)
same buds pink.
(bark sample D)
shrub 2 - 3 m. high, flowers scarlet.
1947 Peru

23 July
1. Morning
local in thick tangle

2. 41. Bryangliv
local in undergrowth

3. 42. Meltema granadensis
not place at side of road

4. 43. Liphoscyamus
brushy slope

44. Fuchsia australis
common on brushy slope
Det. P. E. Berry, 1998

Aug. 6 - Río Marquetilla
below Suerte Mecurio
steep slope of slaty, rotten shale, second growth brush.

45. Melastomataceae
common

46. Liphoscyamus
common, open slopes

47. Vernonia
common on open slopes

48. Fuchsia Chlorodora I. M. Johnson
Det. P. E. Berry, 1998

Cuzco - Pucantarombo

vines, leafy, flowers
deep purple
slender shrub
flowers, white
prostrate; flowers pale greenish, fruit
dull, juicy, red
elliptical shrub
flowers scarlet, lobes, greenish yellow
weak shrub 1.5 m. tall, flowers crimson.

2300 m. a.

shrub 1 m. tall,
flowers crimson-purple
herb 1 m. tall, petals greenish yellow, red outside of tube;
anther in black;
herb 1.5 m. tall,
flowers, purple
a tuberous, rooted, slender
shrub, flowers pendant, verrucills with green tuber.
1447 Peru

222a. Polypondium

commum

Aug & Santa Isabel,
Rio Cusircata,
very weedy cultivated land
along river.

50 Eupatorium

common

51

common

52 Gardenia

cultivated

53 Acalypha

54 Centropogon

55 Cinchona (Hadenbergia) magnifica

tree, in clump of trees

on wet bench above river.

6 56

common in cultivated field

6 57 Drymaria

common weed in cultivated field

5 58 Lipomaria

thicket near river, wet ground.

Carpes. Paucaartamba

herb 1 m. tall, flowers
white.

herb 1 m. tall, flower
violet.

shrub; flowers
white, fragrant
shrub 2 m. tall.

elagante shrub;
flowers vermilion,
lobes yellow, column
pale yellow, anther bladed
tree 15 m. tall, 40 cm. thick;
leaves sub-glossy; flowers
white, very fragrant
with gardenia - like odor,
colla lobes somewhat fleshy;

fruit mostly immnate

and flowers pinkish, white.
Aug. 6 - Valley of Rio Maytambos and Conchacate, road from Pancartambo to Santa Isabel.

The road starts crossing Pase de Acana at 1900 m. in puna with sparse brush. Soon patches of forest are reached and at about 2400 m. all cleared land is left behind, except that roadsides are cleared. The valley is solidly wooded below. The two species of lindens are growing commonly together, but no evidence of hybridization was seen. This may be due to the lack of overlapping to any degree of their flowering seasons. The narrow leafed one had only a few buds and no open flowers, while the broad leafed one was just coming into flower. The narrow one is certainly connected with...

Cuyos - Pancartambo

The purple flowered northern one, though the flowers are red almost as in the C. gracilipes. At Santa Isabel is another linden, locally called "caliza" (23355). Apprarenty no large quantities were harvested there during the war. (Owner of f. y. says much was exported, all of it "caliza" which here is Ladenbergia magnifica (23355). This is hardly likely but should be checked."

Above, near where the R. yanamayo & R. Mayutambos unite to form R. Cusapa, are other linden, one a Ladenbergia magnifica type with leaf blades decurrent on petiole, the other a linden pubescens (2) type similar to that of quillabamba, also with leaf blades decurrent. The pink flowers of this have no odor!"
Aug. 7 - Valley of Río Corinipata, just above Santa Yta, road cut in wet forested region.
Lycianthes 70 Plectena common

Aug. 7 - Río Pasquantambó, just above where it joins the Río Jamamayo to form the Río Corinipata 1800 m. (2)
Dense wet forest with tangled underbrush in remnant of old alluvial fan with huge boulders
Chusquea

Cinchona Ladenbergia

Cinchona pubescens var.
Aug. 7 - Paso de Acacana, headwaters of Rio Cornipata

rocky, roadside, on steep, grassy slope: 1800 m.

28364: Hypopodium
- 65: Asplenium
- 66: Jasminia
  common locally
- 67: Jasminia
  common
- 68: Salix
  rare

Aug. 8 - Cupeo, mine of Lasahuanan and canyon below mine

dry, grassy hills

- 69: Grapholium
  canyon walls, common
- 70: dry, canyon walls, rare

Cuyos - Taxacambos - Cuyos

28364a: Galium, hypopodium
- vine-like, fruit carpy, fleshy

- erect.
- erect
- strictly erect
- erect
- shrub-like tree, 3 m. tall.
- flowers, campanulate, yellow, often dusted outside with purple.

- 69: Tephrodon sprucilis
  spreading, sprawling herb
  1 m. long. (mostly dried up)
  leafless, stem brown,
  purple, pedicels and
  many races: 20 percent
  red.

- 71: Cerotheca
  rare on dry, canyon walls.
<table>
<thead>
<tr>
<th>2872</th>
<th>Quindelis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>common on dry hills, mostly dryish</td>
</tr>
<tr>
<td>2</td>
<td>73</td>
</tr>
<tr>
<td>5</td>
<td>Fasciculas</td>
</tr>
<tr>
<td>7</td>
<td>Cassia</td>
</tr>
<tr>
<td>10</td>
<td>between rocks in ruins of temple</td>
</tr>
<tr>
<td>11</td>
<td>Chilopsis</td>
</tr>
<tr>
<td>12</td>
<td>between rocks in ruins of temple</td>
</tr>
<tr>
<td>13</td>
<td>76 Aprium</td>
</tr>
<tr>
<td>14</td>
<td>between rocks in ruins of temple</td>
</tr>
<tr>
<td>15</td>
<td>77 Galium (Beluranus)</td>
</tr>
<tr>
<td>16</td>
<td>between rocks in ruins of temple</td>
</tr>
<tr>
<td>17</td>
<td>78 Baccharis triuncata or lancea (Cuat.) beaut (det. J. Fasciculas)</td>
</tr>
<tr>
<td>18</td>
<td>Fasciculas</td>
</tr>
<tr>
<td>19</td>
<td>Gentiana sedoides</td>
</tr>
<tr>
<td>20</td>
<td>occasional in very salty places</td>
</tr>
<tr>
<td>21</td>
<td>79 Hypochaeris radicata</td>
</tr>
<tr>
<td>22</td>
<td>common on wet banks along river</td>
</tr>
</tbody>
</table>

**Additional Notes:**

- Aug. 9 - Rio Huatanay, 1 km below San Sebastian, 7 km.
- e.s.e. of Cuzco
- grassy salt flats and wet sandy river bed.
- 78 Fasciculas: plant slightly glaucous, somewhat fleshy, flowers white or slightly lilac, with green stripe outside; fruits liquide, white, tinged with pink, mature purple, grey villous.
1947 Penn

5

2.8.31

common in wet sand and in running water

Bygququina

in wet sand

83 Rupejia

in running water

84 Pea

in wet sand, rare.

85 Juncus

in wet sand

86 Cotula

in wet sand, common

87 Halocnemum

in very salty flat, encrusted with white powdery salt deposits

88 Juncus

very common in grassy flat

89 Plantago

in very salty place, encrusted with white powdery salt deposits

90 Cotula

rare in grassy flat

91 Senecio

rare in wet sand

92 Galium

in dry banks around edge of salt flat

Circea - Circea

Leaves smaller and narrower on sand than in wet, forming small circular mats. Leaves fleshy, flower white, prostrate, fleshy; flower purple, forming large mass, immature, no fruit. Spreading tuft

Spreading dense tufts

Dense tufts; leaves sub-fleshy, fleshy; spikes tenote much thicker than stem, red.

Leaves bluish green, bracts purplish, disk yellow.

Disk yellow

Prostrate; leaves purple, fruit white, fleshy.
Aug. 10 - Rio Vilcanota - about half-way between Urubamba and Allantaytamb. Puro Urubamba, Dept. Cuzco, dry salt flat near river; 2,500 m.


94 Nicotiana common, weedy, large, showy

95 Nicotiana common, weedy

96 Tillandsias common on rock cliffs

97 Heliotropium occasional

98 occasional

Aug. 10 - Pisaq, ruin, Pisaq, Puro Cuzco, Dept. Cuzco, crevices in stone walls of ruins; 2,250 m.

99 Solanum

23400
Aug. 11 - Leaving Cuzco by train, went down the valley of Río Huatanay, then up to the Río Vilcanota. The Lower R. Huatanay is a canyon with steep sides, covered by Puya and other cacti, as well as shrubs, with a flat floor. The R. Vilcanota is broader, with cultivated flats and saltly grassy ones, some very neat. Eucalyptus is very common planted. Extensive salt flats below Sicuani. Valley lined by dry hills, cultivated wherever possible, steep slopes made less susceptible to erosion by half-terracing.

After Aqua Caliente, where there is a boiling spring of hot water, the landscape becomes pure pampa, with scarce slopes on the side, the great chain of snow-capped peaks at the left ending in the Nudos de Vilcanota. The vegetation is sparse bunch-grass with small Cycophyllum cushions between, these a golden green. There is no cultivation here, though people are occasionally seen driving herds of llama. To the left near the top are frozen waterfall. Patched of gray Puya on slopes.
Aug. 10 - La Paya, top of pass bet. Vilcanota and
Lucana drainages
puna, with several bunch grasses, wet in
places and supporting
large Distichia mat

Agolla
floating in ditch

Azolla
in green cushion

common. small dry tufts

common

Distichia muscoides,
common, flat mass less dry ground

On the Lucana side the
descent is gradual through
a flat valley. Here are
white cushion \& Opuntia,
on the slopes patcher of luga.
The floor is grassy and
large herds of llamas,
cattle and sheep are grazed
on it. Apparently burning
is much practiced.

Cuyos - Canchis
paddles and ditches
with Agolla, etc.

reddish, firm
heads drooping
large dry tufts
short tufts
flat, prickly but yielding
cushion

Near Santa Rosa a slight
amount of cultivation
begins. It is so slight
as to be unimportant
and does not increase
much till after Ayacucho.
Even as far as Tinajasta
grazing seems much more
important, esp. on the
broad flat valley floor.
Below Lucaná, the valley greatly broadens out, until below San it becomes a wide, grassy plain. Still grazing seems to be the main industry, except on some hills and the surrounding slopes. The grass has in most places been grazed too close.

Aug. 11. Juliaca. [1° 10' 19" S. 70° 8' W. 15\,°\,30' S.]

Buddleia

cultivated in plaza

Vanqar told me in Cuzco that Acanthophyllum is an important "fourth for alpacas."

This continues to Juliaca, a bit more cultivated toward there. In the plaza is an unusual species of Buddleia, with many orange, yellow flowers, cultivated as an ornamental tree.
Aug. 14 Guani. started about Lake Titicaca.

From the first toward the lake in a flat about 2.5 m. above the level of the lake. It is said locally that since 1930 the level of the lake has fallen that much. The top layer are a pretty black soil, but just above water level is a stratum of white clay of indefinite thickness.

La Paz, Cusco
Aug. 17 - Salt flats, n.e. of Cusco, 3700 m. Basic vegetation a fine grass, Prob. Diastichis, very closely cropped. Here and there, over large areas, the ground is covered by cushions of Hypenophyllum up to 0.5 m. across, variously distributed, sometimes 1 m. apart, sometimes almost confluent. In other places, nearer Cusco, are similar cushions of Astipicra (?), a prostrate species, with short erect inflorescences a few cm. high. Toward the east, grass, toward the east, becoming abundant. Toward the east, the cushion plants disappear, the soil becomes sandy and probably less alkaline, saline.
cushion plant, ocassionally. Still further east begins a grassy up the foot of this mountain. Here bunch grass becomes dominant but with an important admixture of baccharis (?) and several gray thorny plants, all dwarf shrubs. This is near Lake (itself situated in a salt lake flat bottom of a ravine. A Nicotiana (?) is common among the embankment.

Beyond Lake the grass becomes less abundant and the dwarf shrubs, esp. with spines, and tiny pinnate leaves, become dominant. The fine grass still forms a thin ground cover. The railroad here follows up a stream on the side of its ravine. It is saline.

Near the stream the bunch grass is still abundant, varying locally at 10 a.m. in bright sun there is still ice in places along the stream. There are still cushion plants, resembling some other resembling species of willow may be remaining a something else of that sort. Among the ravines bottomhighest into a plain and is cultivated. Upward to the right.

The flat bottom becomes narrow and almost bare gravel, while on the ravines after the dwarf shrubs become larger, more varied. The cushion plants becomes more common, possibly more than one sp. Then the railroad enters a canyon, through rocky spurs. Formed of a hand vertically tipped almost vertical bed. In this canyon cushion plants, dominate on flat benches, dwarf shrubs, and grass on slopes, nothing on gravel stream bed.
1947 Bolivia

32

**1947 Bolivia**

*32* 

**1947 Bolivia**

**33**

above Tolaapala the slopes of the canyon become steep, and grass more dominant. In occasional flat benches, 38411 is still dominant. In the headwaters of the pass (4137 m) grasses take on almost completely. They are still cultivated in patches. In the past 38411 is still common.

Aug. 17 Tolaapala. Oruns.

Mixture of 38411 + bunch grass of several sp. in broad ravine wall of decomposed rock.

38411 Parastrephia lepidodonta (Webb) Leut. co-dominant

The gray spring shrubs reappear on the Cochabamba side of the pass. A mixture of grass and 38411 in continuous to Tondaani. Here is a small Astragalus, and a Helicich (1) become common. Here also is a salvia flat covered by a close grass turf. In wet places Hypochaenion andina: **3906 m**

17° 5′ 9″

60° 48′ W

green dwarf shrubs up to 4 dm. resinous, flowers yellow, several plants represented.

is present. This region is overgrazed. The rocks are sedimentary beds, strongly tilted and dissected. Down the canyon the scrubby vegetation becomes richer and more small columnar Erica appear. Also Solanum, *Barnadias*.
Aug. 17 Cena Cena, Rio Arque

Dry scrubby canyon with common

28.412

Lolaneum

Aug. 17 just below Cena Cena

Rio Arque

14

Common on steep wall of decomposing rock

15

Ventilla

Aug. 17 Aquascaliente Station, Rio Arque, Cerro canyon with dry brushy wall

16

Cupressus

Planted near m. station

16

Salix

Planted near m. station

3952 m (3.8)

3378 m (3.6)

Erect, branched at base

0.3 m tall, flowers yellow

Shrub with tall, spines mainly distal

Young tree 1 m tall, bluish green

Trees 4 m tall, weeping habit
Below Aquascalientes, Achimia molle appears on canyon walls, also luya and a blend of yellowish cores, as well as the thick one mentioned above. Nicotiana planca is common. The vegetation is more luxuriant but still a dry scrub. *Matisia centro.*

*Populus (sombolo), Eucalyptus globulus,* + *Salix* (28416) are cult. A red purple field length (or labish) becomes common.

Aug. 17 Tacopaya, or Río Arque, Cochabamba

28417 *Cassieia*

occasional

18 *Franseria*

common

19 *Achimia molle*

common

37 Cocha-bamba

*Salvia franseria* (28418), *Alnus* (?), *Cassieia* (28417), several composites also become common: also *Buddleia* (?)

Aug. 21 Cocha-bamba

3148 m. (m.)

erect, sparsely branched shrub.

straggling shrub, leaves grayish.

small tree 5 m. tall, flowers with unpleasant, oily odor when broken. fruit small, erect shrub 1.5 m. tall, leaves somewhat lanceous, flower pale.
Below Chanchalla the canyon gets drier and drier, but rhamnus is still common on walls, with a
23-branched, slender Calaf.

Ang. 17 Colcha, Río Arque

shale cliff (w. cut)

2341
stercus

23 sterig

23 Buddlia

occasional

The Río Arque is very saline, a salazarina.

Below Arque the bed is white & eroded. Here the valley broadens, with alluvial fans
covered by rhamnus and still another branched
slender Ceaser. The bed is wide, flat, gravel and
almost without vegetation.

at Arque Lambardey people,
and the erect form of Falax
Oxilens is growing together,
planted, of course.
Above Colcha Platypunita
first appears.

2707-81 (m. a.)
2773 m. (m.a)

branched at base, 23 m. tall,
flowers white.
much branched, weak.
flowers pale, yellow-green.
hausts purple-tipped.
weaks much branched
hanging shrub; flowers
burnt-orange.

Several Cerri are very
common in the brush-choked
walls of the canyon.
What appears to be a small
hieroglyph is also common.
Dodonaea appears below
Arene at 2 almost 2530 m.
A Calaba or other Bombacaceae
small tree with thick
conical trunk 
branching also appears here.
Poeppigia cvm dominate alluvial fans.
Inca-Inca is a great alluvial fan, dry & brusky with Cacti, Helichrysum, etc. Here the m. starts to climb up the broad valley of Rio Ucchis, green and more vegetated on its floor than that of Rio Pongo & Thpondias (?1) is furnished also Prosopis. Near Buenaventura (2373 m.) a Phragmites australis is common along dry watercourses. This is the station for Capinota. Above here the finest on sides and floor of valley is the Prosopis Cearensis Helichrysum, etc. Along the river (much more water than Rio Pongo) are Helichrysum and small irrigated patches. The hills are bedded shale. In the branches of several Prosopis were seen what appeared to be unbelievably large tree snails, 3-4" long and half that thick, dull chestnut brown mottled.

Cochabamba

The hills above Chalamorro are dominated by a fairly large much branched Cereus in Glacies codominant with Prosopis. The river is alkaline & saline with broad salty bed and Distichlis flat.

Tarotani (2450 m.) is surrounded by an artificial forest of Eucalyptus & Helichrysum, planted so regularly that a German must have done it. Above here the valley narrows, the walls are brusky. Where the slopes are not too steep there are small trees. The bottom is of low woods, mostly Helichrysum. A red-fl. Tecoma here, too, & Cortadaria.

Upward the valley widens and again the floor with Helichrysum & cult. Eucalyptus. Here in Lutti Collo (2502 m.) at Vinto the m. crosses into the Road cultivated Cochabamba Valley (Rio Rocha)
In the Cochabamba Valley, which is broad and flat, eucalyptus is the most conspicuous tree.

The valley appears dry, at this season, and has an aspect almost like southern California, with dry hills surrounding a flat plain with alluvial fans.

Aug. 20 - Cochabamba to Tota by road. There is a long gradual climb through dry country, to an altitude of about 12000 feet, this in June pruna-bunch grass.

On the way are a few patches of the dry thin forest that may have remained have been the original vegetation of the region.

Before the pruna is reached, and on the other side, from the pruna down to Tota, the commonest shrub or small tree is Polylepis spp. It does not form a close growth, but is abundantly scattered. Its trunk becomes about 20 cm. thick, covered with a reddish coppery, exfoliating bark. The trees reach 5 m. leaves reduced to about 126s.

Tota at 6 m. near Montipunco are about 2800 m. alt.

Wheat is the main product. Toward Tota the bushy vegetation becomes more succulent, but is, of course, badly eaten by sheep.

Cochabamba

There are many fruit trees, peaches, pears, apple. But according to resident Americans, only the peaches are good.
Aug. 21 - Rockies, Upper Canyon of Río Huairamayu (Río Monteguano) thick forest on steep slopes

Barnadesia polyacantha Wedd. "common"

common in brush in openings and near stream

24. Mutisia tenuata R.P. del. "Chaceaeae" occasional in brushy woods along trail near stream

27. Capsotylin occasional in brushy woods along trail

Aug. 21. Same, above lhuena

23. Lithospermum rare in brush or vertical bank along trail

27. Drymanus along trail

30. Centropogon common along trail

2700 m. shrub 2 m. tall, arching flowers crimson somewhat aromatic shrub up to 2 m. tall flowers very pale lavender to white (looks like Hedysarum superficially), "Mutsa" Stem vine climbing in small tree, heads ascending, rays vermilion vine, not stinging, flowers orange-red

2500 m. tubular vine-like, coryllus red, column yellowish, anther gray, stigma greenish, decumbent, dull green, herb.

Shrub, flowering from 1 to 4 m. tall, sparsely branched, flowers pale green, exerted, anthers, filaments, stamens-like, look-like oxen.
1947 Bolivia

1. Nicotiana
   common along trail

2. Senecio cabrasae Cuate det. E. Austreng
   common along trail
   Det. P.E. Berry, 1998

3. Fuchsia boliviana Carr.
   common along trail

4. Neptera granadensis
   common on open banks

Aug. 21 - same, Chacatacamane
   just below titicaca

5. Fuchsia juniflora S. Kuntze
   bushy banks Det. P.E.
   Berry, 1998

6. Limia
   bushy banks

7. Menning
   once along trail

8. Neptera granadensis
   common along trail and
   under trees

57. Cryptota
   abundant all along
   trail

410. Enigmula
   same

# Cochabamba

shrub 5' 5 - 6 m. tall
flower, white tinged with
orange - purple
shrub, or small tree
5 m. tall; leaves white,
disks dull white
shrub, up to 4 m. tall
flower, pendent, crimson
mattate; fruit
red, juicy

weal, elongate, sparsely
branched shrub, leaves
just appearing; flowers
pendent, purple
small mint; flowers
maroon with yellow ankles
flowers purple


2 40 mi
mattate; fruit
blue-red; flowers yellowish


mattate, forming a
petal; flowers deep
purple, 9.
same flowers 9.
Aug 21 Same, Arche
Guachada

Trusky forest along rise
Cinchona pubescens m.
occasional, in small
groups a "mandac".

42 Morning
   occasional

42 Palicourea
   rare, along trail

44 Psychotria
   rare, in shady undergrowth

45 Fuchsia
   common

46 Pepperomia
   rare along base of cliff trail

47 Physalis
   local at base of cliff

Cochabamba

Tree 10 m. tall, trunk
inclined with, crevices,
trunk 20 cm. thick;
leaves dull above, veins
and petioles green, scarcely
reddish; stipules erect, green;
flowers crimson without,
lobes pink within,
very fragrant; fruit,
reddish. (Only sample
from erect branch.)

Stems 2 m. tall, leaves
dark green; flowers
deepest indigo blue with
yellow-green head.

Cut shrubs 1.5 m. tall; thyme
blue violet, flowers blue.

 erect 1 m. tall, fruit
white

Wald shrub to 4 m. tall, tending
to be supported by other plants;
flower vermilion,
flabell, odorless; spike
erect.

 Heath 1.5 m. tall, handker;
flower greenish, white.
23.44 3  *Lophocarpus*
  rare on cliff by waterfall

7  49  *Cinchona pubescens* var. occasional, this or m. veg. of vine.

7  51  *Cissus*
  occasional on cliff, ab. trail

9  51  *Cinchona*
  occasional in woods, m. walls of ravine ab. vine.

10  51  *Cinchona*
  same

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24.44  *Cochabamba*

vine-like; flower: vinelike
with range: yellow lobes, column yellowish, anther, pap.
trifoli with several
trunks, up to 12 m. tall,
30 cm. thick; leaves
full to subglobose above,
vein, and petiole, green
to somewhat reddish;
stipules green, erect;
fruits immature, reddish
(3-bark sample)

lactiferous, slender,
take white; fruits
cream-white.

Tree 3 m. tall; idem. thick,
several small trunks;
leaves full, slightly
iridescent above, veins,
and petioles scarcely
reddish; stipules reflexed
slightly persistent;
fruits reddish immature
(3-bark sample.)

Tree 4 m. tall; 6 cm. thick,
branching at base; cor. same.
Turning red when old. (3-bark sample.)
Aug. 22 - Montejuancos,

Crusby slopes, mainly
Polylepis, Geraniid, Baeclia,
Piquera, etc.

28492 Gaiadendron
Comm

3 54 Baccharis trimetata L. f. var
Comm

28492 Det. J. Eustace

57 Piqueria
Comm

56 Polylepis, tenatella, Wied.
Dramint

57 Geraniad
Comm

Shrub 2 m. tall,
flowers white, turning
dull straw yellowish,
fragrant.

Bush 1 m. tall, flowers
yellowish white,
bush 1 m. tall, past
flowering.

Shrub 3 m. tall, with
papery red exfoliating bark.

Shrub 1 m. tall (other
taller), flowers rose,
purple, orange inside,
stamens yellow.

Lord, green stipules, early
caducous, crimson fragrant
flowers. The 3rd, has smaller,
narrower pointed leaves,
stipules more persistent,
and early reflexed. The
flowering seasons may
be distinct enough to prevent
crossing. (The second var.
(28491, 28492) resembles mine
the northern form often refers to.)

The two Cusdonias found
along Rio Huairamayu are
growing together, but show
no signs of hybridization.
Both seem to be varieties of
E. pubescens. One is more
less the sort found
in the countries to the north,
with large leaves, somewhat
decurrent on the petiole.
1947 Bolivia

Aug. 23 - Inca Chaca, valley of Rio Malaga,

thick wet forest on left and near top of bluff

V3 493 Fuchsia
occasional in undergrowth near trail on steep slope

V5 59 Fuchsia
occasional in second-growth brush on steep slope

V5 60 Calceolaria
common in undergrowth on steep slope

V5 61 Vaccinium
occasional in thin woods at top of bluff

V14 62 Cinchona
occasional in these woods at top of bluff

V5 63 Cinchona
same

Cochabamba

2500 m (8000 ft)

shrub 1.5 m. tall; flowers in pendant racemes, hypanthium dull flesh-like, corolla red.

shrub 1.5 m. tall; flowers scarlet;

scrambling branchy to 3 m. long; flowers yellow,

semi-scandent, probably monopodial

3 cm. thick

small tree 4 m. tall; leaves badly eaten by a hairy lepidoptera larva, deep purple beneath, dull green above; fruits reddish green. ( calibration)

small tree 5 m. tall; 4 cm. thick; leaves dull green above, deep green beneath; fruit greenish. ( calibration)
Palicourea
occasional at top of bluff

Cinnamomum
occasional in forest on top of bluff

Cinnamomum
occasional in woods at top of bluff

Cinnomomum
rare (this form) in woods near top of bluff

A wide forested bend about 330 m. above floor of valley, near Cinchona.

Euphorbia occidental at top of bluff

Corymbia pilosa
common along trail
Aug. 24. same wooded sides of deep ravine of river cut in flat bed of valley. Second-growth bushy woods, with Escallonia, Myrica, etc.

Bolivia

1947

Cochabamba

This valley seems to have been rejuvenated twice, leaving broad benches both times. The bottom of the ravine is a narrow twisted gage only a few m. wide, through which the river rages, carving the compact sedimentary rock into bajada forms.

18470 Parocharia venosa (Rf. P.) Be. det. Flattressum common on steep valley slopes

71 Boronia

avenally side of trail

72 Escallonia

common on steep slopes

73 Myrica

common on steep slopes

74 Clethra

occasional on steep slope

75 Gaultheria

common in brush on ridge

76 Amsinoria

common along trail

77 rae on vertical earth bank

78 Gaultheria

common in brush on ridge
1947 Bolivia

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Bolivia
Aug. 24 - slopes above electric plant (brought in by local people)

Cinchona occasional in woods.

Aug. 26 - steep side of valley near head of Rio Malaga, above Inca Chaca, steep, wet, thickly wooded slopes, cloud forest.

Nectandra granadensis (L.f.) Pau, common on banks and cuts along trail.

Centropogon rare on steep slopes.

Aug. 26 - leaves green beneath, reddish above, stipules reddish when reflected, wine with flowers firm, waxy, in texture, crimson magenta with maroon scales (petals?) in mouth, fruit green, very fragrant to taste.

These slopes are of shrubs, they have no Cinchona, as far as seen, and few Rubiaceae except Galium and Nectandra.

Gallium prostrate, flowers greenish yellow, fruit scarlet, juicy, shrub branched from near base, 1.3 m. tall, calyx long, corolla dull red, column red, anthers black, with purple hair, stigma dull pale greenish, prostrate.
1947 Bolivia

Aug. 27 - slopes west of La Cumbre, 4,000 ft.

"Puna" - dry meadows

28.493 Werneria

5 496 common

Aug. 27 - same, east of La Cumbre, near Yungas

Puna, step loose shale

5 49 8 common

2 98 Lycostrirum

3 97 common

1 99 occasional

30 500 Lencio adenophyllidae Sch. Bip. det. J.

01 occasional

La Paz, Near Yungas

cut flat dense cushion plant, flo. white
dense soft cushions.

dense tufts
dense tufts
tufts

flat soft cushion

Dwarf much branched shrub, flowers dull yellow,
tufts.
Aug. 27 - Chusquea, Rio Corico.
road with steep cliffs.
04 Netania granadensis
common
05 Lycopus
in brush, woods, on steep slopes.
06 Lycopodium
in dense brush
07 Cinchona
side of trail
Aug. 27 - Sacramento Chico, Valley of Cupulani, Rio Corico drainage. No Yungas side of bushy wooded ravine.
08 Cinchona
Aug. 27 - Chusquea, Rio Corico.
road with steep cliffs.
04 Netania granadensis
common
05 Lycopus
in brush, woods, on steep slopes.
06 Lycopodium
in dense brush
07 Cinchona
side of trail
Aug. 27 - Sacramento Chico, Valley of Cupulani, Rio Corico drainage. No Yungas side of bushy wooded ravine.
08 Cinchona
"Guina pata" or "paite pata"
Aug. 7 - Río Conico, 5 km. above Conico, Pro. Na Yungas, steep, brushy side of valley. *Cinchona calisaya* var. in brushy ravines.

"Quina calisaya lamarri"  
10 *Cinchona calisaya* var. brushy slopes, common.

Aug. 7 - 4 km. above Conico, on steep walls of valley, near banana plantation.  
11 *Cinchona calisaya* var. planted abundantly.

The drainage of Río Conico near above Conico is very steep, walled, and densely wooded. The rocks seem to be sedimentary. The road from La Paz enters the valley about Chusopata, at about 3000 m.

No Yungas

Slender shrub 4 m. tall, like *Reastricta* but hairy. (Leaves badly attacked by insects.) Bark sample shrine 3 m. tall, several stems from base. Leaves turning red. Bark sample - lower bark had been removed and regrown.

Slender shrub 2 m. tall, fruiting, in a zone of elfin forest and chusquea. This rapidly becomes typical dense cloud forest. At least near the road this is fairly well choked with Chusquea and vines. Probably the result...
of the road construction.
At about 2,100 m appears a variety of Cinchona pubescens young plants are very common in the brush along the road, but mature ones rare - only two seen.
It is probably C. ovata Willd. or something close to it. It differs from the Cochabamba form (28434, 28438, etc.) in the erect, early caduceus stipules, glossy leaves, etc. At about 1,900 m, this is replaced by another variety of C. pubescens & "quina palo" which has long leaves, acute at both ends, tending to be pendent on deflexed, coarsely pubescent. No large plants of this were seen, but some small ones were flowering.
Near where Cuzquilani valley enters the main Cuzco valley, the forest disappears, having been cleared and burned, replaced by coca and banana.

No young C. calisaya plantations and second-growth bushy slopes. In this brush, C. calisaya is frequent as small bushes, up to 4 m tall. It occurs, both as a smooth and a tormentor form, otherwise more or less identical.

Around banana plantations, this has been largely preserved and eaten abundantly planted. There are small trees, flowering and fruiting abundantly when only 2-3 m tall - probably because they are cut in the sun. Besides, the tormentor "quina, lama" form mentioned above, local quiniones recognize a "quina calisaya blanca" with smooth, green leaves and pink flowers, and a "quina calisaya morada" with white flowers. The leaf shape varies considerably, but is generally narrow and with an obtuse apex. All are harvested and considered more less equal in taste quality.
It was noticed that flowering plants were much easier to feel than fruiting ones, and this was confirmed by

Aug. 23 - Cotiwis. Mr. Yungar planted in and around edges of banana plantation on slope.

2852 Cinchona calisaya common

13 Cinchona calisaya common

8 Cinchona calisaya uncommon, edge of range

15 Cinchona calisaya

Non Yungar

the guineers who served as guides.

16° 9' 3" W.

shrubby tree 7.5 m tall, flowers fragrant, pink outside, yellow shell, pink within, "guine calisaya blanca" same, without flow and with immature fruit (bark sample)

shrub 3 m tall, several stems, leaves large, fruit beneath, flowers said to be white, but not seen; fruit immature "guine calisaya muda" (bark sample)

shrub less than 3 m tall, very heavily fruiting, most of leaves red, ready to fall. Some bark has been removed sometime back "guine calisaya blanca" (bark sample)
Aug. 23 - Valley of Cupulane, below Chusipata, Rio Grande drainage, near Yungas. Wet cliff, and dense Chusqued filled forest.

17. Cinchona endivia
   along trail at base of wall

18. Cinchona calisaya

23. Fuchsia
   wet cliff, common

21. Centrosema
   steep bushy cliff

19. Deeringia

17. Cinchona pubescens var.
   on steep side of ravine

20. Cinchona pubescens

22. Fuchsia
   wet cliff

23. Fuchsia
   wet cliff and ravine

19. Deeringia

No. Yungas

Shrubby tree 3.5 m tall; flowers pink, without\polka dots; fruit within; flower, white

Shrub 2.5 m tall; leaves green, fruit immature

Gruna calisaya blanca

Shrub climbing in trees;
tree 12 m tall, 25 cm thick;
leaves glossy, oldest ones turning red.

Gruna nanangaja Tahay
scandent; flowers magenta, column green;
yellow, anthers black

Pendent shrub; flower crimson

Elongate shrub; flower scarlet.
Aug. 28 - high on side of Valley of Río de Tangos, road to Carillo, 9 km. below Unduraran.

**Nin Yungur**

vertical road cut in bushy vegetation

275 Gaultheria

can be seen

25 Vaccinium

very common

26 Gaultheria

very common

27 Vernettia

common

small shrubs, racemes, red, flowers rose pink.

Montane, flowers deep rose red.

shrubs, from 1 dm to 3 dm tall, flowers purple, pink, fruit black.

Dwarf shrub, fruit pale purple.

Sep. 4 - pass at head of Quebrada de Zongo

great fields with patches of soil between them, thin matting of snow on ground. Vegetation typical puna, with thin grassy turf, some tufted grasses, also shrub with granite tufa.

3857b

Valeriana

rich in crevices and ledge

29 Lupinus

rich in crevices, rare
common in rock crevices

Distichis

on gravelly patches of
decomposing granite

patch of earth between rocks

Hygrphyllum

common in earth patches

in rock crevice

rock crevices with earth

common everywhere

common locally

occasional

Occasional 1984

Luzula racemosa Desr. det. Balsam

common in open

Geranium

occasional on cliff

common locally

common on cliff and talus

Luzula

Dense tufts

Luzula racemosa Desr. det. Balsam

1984
1947 Bolivia

23544  Stipa
   granite talus
   dense

3   45  Silene
     rare on cliff

46  Chersodoma antennaria (Wedd.) Cabrera dtt. J.
     occasional on cliff

47  Lenessia adenophyllodes bek. Dtt. J.
   common on talus

48  Stipa
   common on talus

49  Lycosodioum
   rare on cliff

50  Bomarea
   rare on cliff

51

52  Asplenium
    in crevice under overhanging rock

53

Dec 28th 1-3 - Quebrada de Jungs 2-4 km above Jungs
   little wet wooded canyon side

54  Eremouia
   rare

flowers red

flowers prostrate, matted

flowers shrub up to 4 dm. tall, bushy, flower annuals
flowers yellow.

dense stiff bunch

flowers coral red with green tips.

dense bunch

forming dense cushion

flowers purplish blue;

fruit immature
1947 Bolivia

28557 Myrsine
2 57 Fuchsia, bushy trail-side
3 57 Polycamara, wet brushy trail-side
4 57 Gaultheria, open brushy slope
5 57 Vaccinium, open brushy slope
6 60 common along bushy trail-side
7 61 Phyllanthus, rare along trail
8 62 Galium, hypocaespitum, (1) walks, rare along trail
9 63 Lophocampa, occasionally in brush along trail.
10 64 Cinchona pubescens, tall var. common locally

33638 shrub 3 m. tall
44672 shrub 1 m. tall, flowers pendent, cord-vermilion with greenish-tipped calyx-lobes, shrub 1.5 m. tall; leaves pale greenish, flowers straw yellow, shrub 1 m. tall; flowers pink, fruit black, shrub 1.6 m. tall; flowers red with white tips, vine-like; flowers and tracts white.

610 shrub 0.8 m. tall.
636 vine-like; flowers dark red, fruit orange-red, shrubling shrub; flowers red

11212 small tree 5 m. tall; leaves turning red in age, more or less glossy; fruit dry. (leaves variable in size on different trees, this not small)
1947 Bolivia

28565 - *Cinchona pubescens var. campana* Cotton

Dept. 4 - Zongo

28566 - *Cinchona calixay*

- planted on banana patas
- on steep slope (view plant in forest below).

- *Drymaria*
- weed in village, common

- dept. 5 - La Paz, Bolivia
- cultivated in parks and gardens.

- 28 *Cantua bursifolia*

- 29 *Cantua bursifolia*

- 30 *Cantua bursifolia*

- 71 *Lawarea aspergentiflora* Kel.
- commonly cultivated and spontaneous in gardens.

Tree 17 m. Tall; leaves were a less glossy; fruit damaged by insect (vark sample)

Tree 8 m. Tall, 12 cm. thick; flowers pink, mostly stigmas (vark sample)

Diffuse; reddish veins.

Erect shrub; flowers yellow, limb pale than tube; stigma exerted from bud; erect shrub; flowers with orange red tube; "cantuta" and crimson limb; stigma exerted from bud; erect shrub 2.5 m. Tall; flowers crimson, tube redder than limb, (more slender than in nos. 23568-9), "cantuta".

Shrub 1.3 m. Tall; trunk thick; flowers more with white center and maroon stipules.
1947 Bolivia

2857 a. Liquistrium
commonly planted

73 Cassia tomentosa (Sprague)
planted and spontaneous

74 Vermica

74 Vermica
commonly planted

75 Buddleja
commonly planted (apparently
native to region)

76 Laratua assurgentiflora Kell.
spontaneous in garden

77 Yeoma arequipensis (Sprague) Sandwi.
det. A. Henry 1974

78 Yeoma arequipensis (Sprague) Sandwi.
det. A. Henry 1974

79 Prunus serrulata var.
occasional

La Paz

small tree 4 m. tall;
buds white.

small tree 3.5 m. tall;
flowers said to be yellow;
pods said to be eaten
occasionally as they are sweet.
shrub 1 m. tall; flower
fungiform at first, turning
white.

shrub 1 m. tall (but
reaches small tree size);
flowers orange.

"Kushwa"

shrub flowers rose-pink
with white center and
maroon stripe.

shrub 1 m. tall, sparsely
banded; flowers dull pink; millia;
shrub 1.5 m. tall, sparsely
banded; flowers dull pink; millia

tree 6 m. tall; flowers
white; fruit immature,
said to be very sweet and
edible when ripe.
Bolivia 1947

88. Cassia tomentosa L. (Fam. Flacourtiaceae) common
89. Centauria arvense occasional
90. Matricaria chamomilla occasional weed

La Paz

3. Schizanthus 1.5 m. tall, flowers yellow, fruit immature, prostrate, branched at base; flowers rose-purple, aromatic, ray white, disk yellow. "manzanilla" used medicinally. branched low shrub; flower bright yellow, erect to tangled.

10. flower yellow with a green stripe outside each segment, wider in outer segments. leaves green, pinnate, flowers green.

Flower shrub, up 2 m. tall, ray vermilion, brace black-purple. "chinchicrona" low weak shrub, flowers green, ripe fruit black, flashy, used for coloring fabrics.
1947 Bolivia

Left 7 - trip by air from La Paz to Cruz, Cochabamba, and Santa Cruz.

To Cruz is mainly an altiplano - dry, salt and almost completely under cultivation except where they are alkaline or saline plate, or where erosion has formed dendritic patterns of gullies.

From here east to Cochabamba and far beyond are range upon range of dry, brown, bare hills, also largely under cultivation or overgrazed.

Finally, to the eastward, the hills begin to clodder with a thin brush that indicates the approach of the wetter eastern slopes. Then comes a broad band of completely green lower hills, obviously cultivated.

Santa Cruz, formed of warped and eroded sedimentary beds, densely wooded on all except the broken off steep faces which show their pink granite, with very little vegetation. The crest of the ridges are largely brush-covered rather than wooded, too.

This flattens out into the plain on which Santa Cruz is situated. This has largely been denuded though just east of the hills is an expanse of palm forest. Second-growth woods is common, though most of the land is cultivated.

**Circumcisside.**
Calyx prismatic, slightly plicate.
Bushy shrub 2 m tall; flower white, open only at night; "slips slowly."
Bolivia 1947

**Biota**

1. Dianthus
   - weed with potted plant
2. Apium
   - weed with potted plant
3. Cestrum
   - climbing epigeal
   - in garden, notably planted
4. Graphium
   - weed with potted plant

**Santa Cruz**

- flowers purplish
- vine several m. high
- fruit black
- leafy or terminal, a large yellow bamboo
- Mangifera indica
- Phoenix american
- Ficus pandura
- Clerodendrum sp.
- Ceiba sp., (bottle shaped)
- Zelina pendula
- Acerca sp.
- Catharanthus roseus
- Plumeria rubra
- Cecropia sp.
- (fruit said to be delicious, and free from cents)
- Musa sapientum
- Eucalyptus variagata
- Asparagus plumosus
- Asparagus sprengeri
- Cuscutus semperfervens
- Crinum comum
- Carludovia Valnata
Sept. 8 - Trip from Santa Cruz to Bermejo, this plain:

Flat sandy plains

with tall second-growth brush, with Tecoma very conspicuous, also a green-leaved, shrubby, white-flowered Dolichos and a berjania. Cerus peruviana (?) occasional.

Many other shrubs and vines. The sand appears to have very little humus in it.

Approaching the mountains, palms become very abundant, finally the dominant note in the vegetation. Also scattered tall trees appear apparently left in clearing. Cultivated plots are scattered.

After passing the first range of hills the valley is in a broad river valley, and the palms disappear. The forest becomes dense and dominated by legumes.

Santa Cruz

patches of tall trees are common here. The hill slopes become covered by what appear to be deciduous trees just starting to leaf out. For a while the valley is quite dry. At about Angostura it becomes wetter and Berjania become common. But it is still rather dry in most places. Several large Dolichos, Verna fasciculata, several Malpighiaceous vine, Tecoma, etc. Besides various legumes and shrubs and trees are common. Beyond Angostura the terrain is hilly, of a soft pink and white conspicuously bedded sedimentary rock, the beds varying greatly and much warped.
Dept 3 - Bermejo, valley of Rio Pirai. (His Bermejo)
A weedy brushly bluff of sediments over having of river.

28594 Yersinia stans 
occasional in genera now

95 Ephedra nevadae var. coconinoensis H.B.K. det. Foskell

96 Echinocereus canariensis H.B.K. det. Foskell
common weed

97 Heliotropium transalpinum Vell. 
common in brush

98 Santanora arizonea var. californica H.B.K. det. Foskell
occasional in brush

99 Alternanthra flavescens (Lind.) Urb. 
common weed in small 
opening on top of bluff

20000 Randia 
occasional on top of bluff in brush

From here the hilly seen uniformly wooded to the tops with the 
same type of deciduous 
forest just leaving out. 
The lower slopes just
Bolivia

1947

Solanum tripalatum Kurz

dry yard


Bolivia

1947

prostrate, rooting at nodes, extensive, forming dense mat; flower white; fruit immature, not spherical, wide, more grey than the stem in medicine to remove miasms from new-born infants—pounded and used as infusion.

83 Sept 9 - Tres Cruces

above Bermejo, north of

Río Pirai (Rio Bermejo)
dry second growth with
open grassy areas or
slopes and crests
has been severely burned

4. 02 Anisothamnus azutae (Baker) Boiss. ex. intermedia det. L. Steenis

are in second growth brush

4. 03 Lippia digitata W. et J.

common in low brush

5. 04 Oenothera sagittata (Rusby) Rusby det. P. Gutierrez

in shade at foot of cliff

5. 05 Calcisalis

wet seeps and cracks in

cliff

3. 06 Eupatorium

brusky ridge

"melendre"

erect shrub 1.5 - 2 m. tall;

heads brilliant orange;

slender aromatic shrub 1.5 m. tall; flower white;

flowers magenta;

flower bright yellow;

flowers bright purple, involucre tipped with deep purple.
Piqueria
common on brushy ridge

Gouania
occasional in second-growth

Cinchona pubescens var.
common very locally
on brushy ridge
plants have apparently
survived severe burning

Cinchona pubescens var.
same

Justicia rusbyana Lindau
det. D. Washbourn 1949
in brushy ridge, common

common tree on slope
and brushy ridge, but
mostly sterile

Santa Cruz - Florida
slender shrub up to 3
m. tall, flowers cream
white, very fragrant,
wine climbing in trees,
tough; fruit immature.
the 4 mtall, partly
dead, several small
trunks up to 7 cm. thick;
leaves firm, redding
green, stipules erect &
spreading; fruit stellate, immature;
[bank sample].
man collection of several
sterile clumps of
sprouts, the tallest
1.5 m. (check all.) (To show
lack of variation except
in leaf size.)

erect herb to 1 m. tall;
flower, white, with
n folds in lower lip that
are striped with purple;
tes with thick corky
ridged bark; leaves
glossy; flower wax
white; fruit dry.
shrub, m. tall, nearly
leafless; flowers white.
occasional weed

15 Ruellia longipedunculata Lindau det. D. Wasmann 1869
rare on eroded open slope

common on brushy slope

Sept. 19, Bermejo around dwellings

17 Bmeria

uncommon in grassy place

Amaranthus hybridus L.
commom weed

in early terraces above river

Scyphi det. Fryxell

common weed

Gea.Erziiane Kupol.
dept. L.J. Day Jan. 1947

20 Portulaca

occasional weed

21 Richardia brasiliensis Himes

rare weed

22 Santa Cruz Florida

flowers white

subshrub up to 1 m.
tall, flowers dull red,
tube light, stamens 1.5 m. tall,
flowers purple, calyx grayish purple.

"digella"

flowers white

weed

suffrutescent herb up to
0.7 m. tall, flowers white,
delicate, with purple center, purple filaments,
yellow anthers, red style,
fluffy flowers dull pink,
with deeper center,
about 1.5 cm. across, stamens
about 10, style branches
yellow, 5-6.

prostrate, flowers white

corolla lobes 4-5.
Potulaca

Delicia tijera

Brenia

Potulaca

Streptanthus divaricatus

Jacobinia brevispera

Clematis

Santa Cruz - Florida
clear
fleshy, flowers yellow, 2 cm across, stamen many, yellow
orm 25", style branches yellow,
flowers yellow.

prostrate to ascending,
flower pink.
fleshy, flowers pale
straw yellow, style, stamen
10-12, filaments, yellow,
anther, orange red, style
branches 6-8, yellow,
flowers white.
fleshy, leaves more less
pressed into one plane;
flowers crimson, pink,
7-3 mm, across, stamen
about 15, red with yellow
anthers, style branches
6-8, deep crimson, twisted
into two irregular masses.
shrubs up to 7m. tall,
flowers white.
uprighting, elongate
shape, flowers yellow
fading distally to straw
wine, flowers greenish
white.
Crotom
common in brush

Graphalium
common weed

Senecio plectoides
Rusby dit. Plant word-cut in earth

Tricachne insularis
common weed

common weed on earth banks

occasional weed

Cypalis
occasional weed

Ageratum conyzoides
occasional weed

Vertic
occasional weed

According to subprefect of Lamaypata there is growing in various localities around Lamaypata. The trees are not necessarily small, but reach several dm. diam. In former times it was worked, at least to some extent.
28640  Mikania  occasional in sparse bush
9  41  Dolanum  occasional
1  42  Panicum  rare, growing up through a dewy fig
1  43  Riyvum hulives  occasional weed

Sept. 10  Rio Sierra (Rio Piriápi about 1-2 km. above Lagosina, P. Florida, Dept. Sot. Cruy
cliffs of soft shale above river, weedy roadside, and cut

1  44  Plumbago  weedy roadside
6  45  Actinotus helianthos  on bushy shrub
4  46  Schima  common in woods below road
1  47  common in bushy woods
1  43  Alternanthera  occasional in woods
5  47  Ruellia grecigana Buck. (red eff)  common along road

Santa Cruz - Florida
heliconious vine, flower, cream-white.
spreading tree 5-6 m. tall, gum thick, curly seed, flowers purple, nodding.
flowers pinkish, white, fruit red.
depressed plant, spreading, flowers white.
wine flowers grayish, white.
slender tree 5 m. tall, absolutely bare except for clusters of green fruits, extensive tough vine, flowers bright yellow, one petal marked with red, heads whitish.
plant up to 1 m. tall, corymb scarlet, somewhat prolific, fat fibrous roots.
23650 Turner

1. \textit{Scutellaria boliviana} (R.E. Fries) Bals. & Reznikov
   - native to rocks

2. \textit{Laburnum} (JUL. Fries) Bals. & Reznikov
   - native to rocks

3. \textit{Crossosoma sagittatum} (Rusby) Rusby
   - native to J. Castellanos

\textbf{Sept. 12 - Santa Cruz}

53. \textit{Pogonomus tubulosus} (DC.) fisch.
   - cultivated in park

59. \textit{Boronia}
   - weed with potted plants

55. \textit{Nicotiana}
   - weed with potted plants

\textbf{Sept. 16 - Canyon of Rio Chiquiagile above La Puy
enrolled steep dry grassy slopes of coarse gravel, dominated by \textit{Stipa}, \textit{Baccharis}, and in places \textit{Lupinus}}

56. \textit{Solanum}
   - common, mostly in monte places

\textbf{Santa Cruz - Florida}

\textbf{La Puy - La Puy}

\textbf{Flowers, deep yellow.}

\textbf{Bushy, up to 0.7 m tall.}

\textbf{Flowers orange.}

\textbf{Flowers bright purple.}

\textbf{Spreading tree 5 m tall, flowers purple distally, green below, expanded calyx-lobes bright rose-pink.}

\textbf{"Guinea."}

\textbf{Flower, white.}

\textbf{Flowers green, slightly drooped.}

16°33'5"

68°8'W.

3750m

2-3 branched 1 m tall, leaves glossy, of a dull green color, flowers violet, fruit black when ripe.
1947 Bolivia

12357 Baccharis papillosa Rusby det. J. Catezucco
common

53 Lupinus
common

59 Baccharis papillosa Rusby det. J. Catezucco
common

60 Baccharis papillosa Rusby det. J. Catezucco
common

61 galium

62 Muchenbeckia
common locally on bare gravel

63 common

La Paz - La Paz

Dwarf shrubs; flowers whitish.

Small shrubs; flowers blue, with center of banne bright yellow
turning to purple distally.
mostly not yet in flower

Dwarf shrub, 0.5 m tall

Dwarf shrub, 0.5 m tall

Prostrate, purplish

Fruit fleshy, white

Prostrate

Small shrub, up to 1 m tall, aromatic;

flowers white, "muna" used for stomach

medicine.

Fruit dry, easily dropped.

Dwarf shrubs 0.4 m tall;

flowers whitish.

very common
1947 Bolivia

Sept. 17 - Rio Unduani, about 10 km. below Unduani. steep wall of vines above river, dense Chusquea filled woods. 2000 m. (4)

Cinchona pubescens var. occasional

Cinchona pubescens var. occasional

Sept. 17 Rio Unduani, 10 km. below Chusco

Cinchona calisaya around edges of banana and coffee plantations

Cinchona calisaya bushy tree 5 m. tall, with several trunks; old leaves red.

Sept. 17 - just west of Chusco

Steep bushy slopes, full sun

Cinchona calisaya edge of banana plantation

Cinchona calisaya in bush

Cordylineae crymborea common in bush

La Paz

16° 17' 5" 67° 52' W.
tree 10 m. tall, 15 cm. thick, sterile, leaves subglossy above, veins reddish below. (Dark sample) sterile sprout 2 m. tall leaves dull above, veins reddish.

1700 m. (4)

16° 51' 5" 67° 51' W. vigorous clump of sprouts 5 m. tall; fruit immature. small tree 3 m. tall; leaves dull, turning red in age; shrub 2 m. tall.
1947 Bolivia

La Paz - Lur Jungas

3 small trees 4 m. tall; flower whitish.
clump of sterile sprouts
3 m. tall; leaves dull above.

16°15'-17°5'
67°32'-34°10'

Sept. 17 - hills 3 km. W. of
La Paz, drainage of Río Chulumani
steep, densely wooded
slopes, not especially wet
at this season

75
lythraceae

common in cleared, brushy
areas

76 Cinchona pubescens var.
common on steep slope

77 Cinchona pubescens var.
common on steep slope

78 Vaccinium

vino-like shrub

tree 10 m. tall, 18 cm. thick,
leaves dull above, veins
slightly reddish; flower
fragrant, pale pink
(tall sample)

tree 8 m. tall, 9 cm. thick;
leaves dull above, pale
beneath; flowers fragrant
pale pink. (tall sample)
vino-like shrub, tangled
in undergrowth, 1stly
coal pink, mouth white,
whole broadly ellipsoidal,
very fleshy.

ascending 0.6 m. tall;
fruit blue.
1947 Bolivia

2.6.30 Centropogon

race along trail in woods.

3.1 Psychotria

race in woods along trail.

3.2 Cinchona

common locally in woods.

on steep slopes.

"ging annailla"

dark not harvested.

8.3 Cinchona

same.

8.4 Cinchona

in woods on steep slopes.

8.5 Belicosea

race in woods.

8.6 Cinchona

common in woods.

8.7 Galium

common locally in woods.

on flat place.

8.8 Cinchona pubescens

local in flat place.

La Paz - Lur yungas

arching weak shrub

1.5 m. long; flowers brilliant orange, pale distally;

column yellow, red at summit;

anthers purplish-gray.

slender, erect shrub 2 m.

tall; flowers whitish; fruit

red when ripe.

tree 10 m. tall, 10 cm. thick;

old-look leaves glossy;

red when old; flowers

said to be whitish, and

to appear in December and January; (dark sample); same (dark sample).

sterile, sapling 4 m. tall

(possibly showing juvenile character)

slender shrub 3 m. tall;

ධısıŋ green; fruit immature;

small tree 8 m. tall;

leaves dull above, buds

deeep pink. (Dark sample)

view-like; fruit fleshy

red-orange.

Tree 8 m. tall, leaves sub-glossy

above, veins at green, turning

red in age. (Dark sample).
2863.9 C. pubescens var. local on level place

Dept. 17 - Tajma, tui yunga
- coffee and coca plantation
- 90 Erythroxylon coca planted in rows on narrow terraces on open slope
- 91 Cinchona calisaya trees persisting at edge of coffee plantation m and at base of adobe wall

Dept. 17 - road bet. Chuluman and Tajma
- brushy runway
- 92 Cinchona calisaya steep brushy slope

Dept. 17 - Chuluman, tui yunga
- man fore ground in cactus orchard of experiment station
- 93 Drymario
- 94 Diastatea

La Paz - tui yunga
- tre 7 m. tall, 15 cm. thick.
- flowers fragrant, pale pink (glossy)

shrub 0.5 m. tall; fruit immature.
- "tree" leaves, chewed by Indians.
- 4-5 m tall, gnarled and spreading, leaves glossy
- "quirocalisaya" bark harvested extensively

Dept. 17 - road bet. Chuluman and Tajma
- brushy runway
- 92 Cinchona calisaya steep brushy slope

clump of sprouts 1.5 m. tall, stelit.

clumps probably from seeds in manna.
fls. lavender.
Sept. 19 - Altiplano south of La Paz, from El Alto to Ayaraco.

Entire altiplano is treeless, mostly intensively cultivated. Engaged badly over-grazed and eroded. Rolling land, occasional steeper ridges. The steeper ones down to 8,000 ft. The gentler slopes are most intensively cultivated than the flat deposits areas below, probably because of drainage or impermeability of soil below. No humus in evidence, much broken rock in soil.

Corn with basal half of tube yellow, distal half and limb crimson.

Corn with tube yellow more or less flushed with pink without limb old-rose pink.

Very thin, close grass and #28702 covers ground, newly grazing to certain extent. Baccharis and Tomacrocus are dominant in eroded slopes. Tola was formerly abundant on most of these areas, but now has been completely eliminated near La Paz by being harvested for fuel. An area at Collanda still has Achillea (Tolita) as an almost pure stand, but relatively small plants. 

High ground, up to 1 m. in low sandy bottom-land, the larger ones having been harvested for fuel. Tola certain
Dept. 7 - Collano
Presently an alluvial, shallow, dominantly and almost only species.

Dept. 23 - Calamarea

bare, very eroded slope

93 Baccharis incana Wadd., det. J. Cuatrecasas

dominant plant

01 Baccharis spinosa Benth. det. J. Cuatrecasas

rare (one seen)

02 Jasminum miniatum (Reyn.) Roth., det. Wadd.

very common in places, forming continuous ground cover.

03 Chrysocoma spinosa (Sch. Bip.) Benth.

dominant plant

Occasional

Branched shrub up to 0.7 m. tall, aromatic, resinous,

low, yellow "tola" bales, and baled and sent to La Pay for fuel.

400 m

much,ranked to bush 1.5 m. tall, leaves mostly fallen; pod

flowering
dwarf shrub, intricately branched, 0.4 m. tall;

flowers yellow with purple-black markings

on banner

Cuatrecasas dense, dwarf shrub,

resinous; flowers whitish, deep purple with yellow anthers;

forming dense gray mat; flowers white, tinged with pale lavender

rounded densely branched bush.

dried when collected, laid to be aromatic when fresh.
Tetraglaciaria
one of dominant plants
over large areas of badly
eroded land.

cultivated in plaza

06 Salix

07 Salix

much resin and is not
eaten by anything but llamas.
Their excrement, because of
this resin, is a valuable fuel,
and when used as fertilizer,
& decomposes only very slowly.
The plants are pulled up
by the roots, dried, and
shipped by rail to La Paz.
Several cacti including
two of cacti of Echinocactus,
and a red flowered Echinocactus
with caespitose heads with very long
dense slender spines are

shrubby tree, diffuse
habit, 4 m. tall, with
young fruit, leaves
scarcely out, "raizs" 

came & flowers, stigma,
yellow-green, 5 petals,
not seen "raizs"

found on the rocky
places. Pyreneopitypus
is locally common.
Oct. 1 - La Paz

Weeds in plaza between stewards.

23704
Genesia

09
Eryngium

10
Matricaria

The rainy season has started a month earlier than usual, and the grass tufts are already showing a slight tinge of green.

The normal rainy season here is from about November to April. The rain supposedly comes from two sources -

Pacific winds which bring violent rains of short duration, and the "Yungas (really red)" winds which bring rains of longer duration but less violent (pale Poenansky).

During the dry season it is almost useless to try
1947 Bolivia

Sept. 23 - plants collected at

on shores of lagoon Titicaca

by Guillermo Cervantes RaultoUpperCase

A
B Polyplepis
C Baccharis
D Baccharis
E Cassia
F Graphical
G Cassia
H Baccharis

"muña"

"guinea"
Oct. 2 - Puno- Chungará by rail around the lake at night. There were many geese and some cormorants. Great expanses of mud flats have been exposed by the lowering of the level of the lake (4.38 m. since 1870 m.). The valley above and below Juliaca is quite grassy - Huaca, etc.

Near Puno the flat valley floor is of small hummocks of white clay. There is a local pottery industry here, producing small figures, ash trays, mugs, bowls, pitchers, etc. of a rather unattractive dark greenish brown glaze.

The upper valley of Río Puno is has broad flat rich upland fields. The grass is违章 clandestin.

Puno and less overgrazed here than anywhere I have seen. Herds of llamas, cattle and sheep are abundant here.

It is said that during the last few years when the level of Lake Titicaca has lowered, the Huacas (HUACAS) have largely died off, and that the "valsa" or boat made of them have largely disappeared. The boats only last 2-3 years and must be replaced. How the Indians are learning to use their boats and the "valsa" may not come back, even though the Huacas reappearing with the rise of the water.
1947 Peru

Oct. 2 Araraca - Chanchabamba

Dept. Puno, Prov. Puno, Aguarico

- Alchemilla

North bank of small stream
in open pura grassland

Oct. 3 - Cuyes - ruins of Lachashuaman

Brushy trail side

Berberis - occasional

Oct. 4 - Cuyes - cultivated in patio

13 Lavatera

Slopes below

Oct. 4 - Machupicchu, canyon of the Urubamba

Steep slope not dry but cleared and burned, in some places bushy, 2040-2840 m

15 Monroe - rare

16 Dodonaea viscosa - common locally

17 Leucrinc - rare in open places

Puna - Aguarico

Cuyes - Cuyes, Urubamba

Prostrate, flowers greenish-yellow.

Lentasis is in much fuller bloom than 1 month ago, everything is much greener.

Shrub 1 m tall, intricately branched; flowers yellow

Shrub 2.5 m tall, flowers white.

Shrub 3 m tall, flowers rose-pink

2200 m - Shrub 1.5 m tall, slender; flowers indigo-purple, with greenish-yellow beard.

2250 m - Slender small tree 4 m tall.

Scrawling herb up to 1 m long, lactiferous, flowers deep yellow.
1947 Peru

23713 Lantana
- rare

21 Tanecio
- rare

20 Galium
- occasional

21 Phytolacca
- rare

22 Baccharis
- rare

23 Graphiolum
- not common

24 Baccharis
- not common

25 Declingia
- rare

26 Begonia
- rare

27 common in rock crevices

28 common in brush

29 Verbena
- common weed

30 Sphenium
- occasional

Cuyos - Umbamba

2350 m slender shrub 1 m tall
flowers lavender, purple

2400 m herb 1 m tall; flowers yellow

vine, leaf, fruit
orange, fleshy

low, much branched herb;
flower white, touched with red

2500 m dwarf shrub 3 dm tall;
leaves all at base;
heads yellowish

2700 m sparsely branched shrub
2 m tall; flowers cream white

scapes long; flowers vermilion

2250 m buds very young

shrub 2 m tall; flowers
bright purple

herb, branched at base;
flowers violet

2400 m lamb 1 m tall; flowers mauve
Oct. 4. Macchu Picchu
paths and terraces abundant

2. 31. Fragaria
abundant

3. 32. Stipa tenuissima
common on cut earth banks

4. 33. Nepeta
arch walls

5. 34. Capsicum
cultivated on terrace of ruins

6. 35. Galinsoga
weed on terraces of ruins


near head of the Vilcanota

meadow filled with warm

springs and streamlets flowing

from them

36. Tarassicum
in spring noticeably warmer
than body temp. but not uncomfortably
warm, not sulfurous but with

some iron
1947 Peru

Oct. 7 - Puno - Arequipa by rail. Valley of Rique is very flat, obviously recently drained lake-bed. Valley of Rio Cabanillas is pure puna, great expanses of "ichu" (Pipa) grazed but not much cultivated, apparently burned once frequently. Mountains here are mostly not rugged. To Santa Luzia (4,539 m.) the valley bottom is flat. After L. 1, a steep climb follows.

In the hills between lakes Cachipascana & Llacastra (1,440 m.) "tola" scrub replaces the puna, locally, but mostly mixed with "ichu." Some "tola".

At Lagunas del Puno, a herd of llamas loaded with "tola" was seen. It is shipped to Arequipa for fuel.

above Lagunillas, around lake alto. The grass changes. "Ichu" is replaced by a Festuca (?) also a bunch grass.

(Cañagua - cereal like Quinoa, smaller, plant very small 2-3 dm.) Puno.

Cruce Alto (1460 ft. acc. sign on station), alkaline flats with turf & pools of water surrounded by low walled hills. Most abundant grass are a very low turf, sp.

Dry at this season. Just beyond here are large herds of alpacas, smaller and more squat than llamas. Schoenocne Thacheri, thicker, wool. Grazing in low wet meadows. Also several small herds of vicuñas were seen not far from track. Grazing in low wet meadows.
Beyond this area of bare, light soil with scarcely any vegetation, a scattering bunch of grass and patches of *Pyrochrysum* cover the ground. The grass is dull; dark, yellow-green. A few clumps of *Pyrenium* yellowish. Another like old lake bed. One part has a small lake still. Patches of *Pyrenium* mostly eaten, but in center, prob. by alpacas.

This plain is the *Pampa del Cono.*

In distance is magnificent, snow-covered cone of *Nudo de Ampato* (6500 m.) looks volcanic, or close. prob. *Nudo Tanferino* a little this side of it. Alpaca said to need to eat close to soil to fetch teeth from growing too long.

This *Pampa* changes around *Vincunayoc* (19377 ft.) into a more low, sparse *tola* widely spaced.

In hills about *Begadama* *Vincunayoc* is puna. Large of *S. punence* (or *S. ichu*). The lower part is called *ichu,* the leaf, *paja.*

Beyond *Vincunayoc* tola is the dominant vegetation for a long distance, varied here and there by patches of *puna* or mixed.

Near *Arequipa* are several large, bare volcanoes. The principal ones being *Chachani,* a compound, *Misti,* a simple, high one, *Picchu Picchu,* etc. Little snow on them now.

March and April said to be best months for plants here in *tola* areas. The dense *Puna* or puna with *tola,* widely spaced.
At Pampa de Arriero, at west base of Volcan Chachani, Laked tola seem to be a principal item of commerce.

From here on for a long distance is a waste land of lava flows and ash beds, with a true desert vegetation - small leafed, intricately branched shrubs, widely spaced. Casti (Cerus) common. No trees. No livestock seen. Watersource in deep gully. A few flat places with water planted with alfalfa. Here on Jufus & Eucalyptus, and a few Schinus.

Oct 7 - 5 km. S.W. Viscocayo, P. Cailloux

Dept. Ancapana

33737

Succulent

Dominant on sandy flat.

Oct 7 - Pacacancha

Dept. Ancapana

Leptisphyllum

Dominant over large area

caespitosus, prickly.

common aromatic shrub 0.5 m. tall, leaf yellow "old" used for fuel.
Oct. 9 - Arequipa to Chala by road.

Leaving Arequipa the road climbs the rocky dry hills to the south of the valley. These have a good growth of at least 3 species of Cereus, one the massive cacti columns, one seen further north. One a slender freely branching very spiny cacti, and one with a trunk and a dense irregular vertical of horizontal branches. Sparse brush occurs here between the cacti. Nearest the coast the road descends and descends the valley below Arequipa. It is the usual green irrigated valley with dry bare walls. North of here the hills and flat places are completely without vegetation except for a few irrigated valleys.

until about 15 km. S.W. of Camaná, the land had apparently been maintained by fog and supported a thin but colorful growth of herbaceous plants. Most of these have thick roots or tubers. Their flowers, in many cases, are quite variable in color, i.e. Molana, Holonum, Parthenium, etc. Molana is dominant, so that it actually gives a solid color to the landscape. The soil is a fine, light colored silt.

The Camaná valley is extensive and has an important irrigation system. North of here are a few patches of lemon vegetation, but poorly developed. About 10 km. S.W. of Chala are rocky hills with the columnar Cereus and some other vegetation (seem thick).
Oct. 9 - 13 km. s.e. Camará

"Lomas" or hills of fine light colored silty soil, with herbaceous vegetation only, dominated by Molana.

28739 Phacelia

care on small alluvial fans

40 Chenopodium
abundant locally on alluvial fans

41 Calandrinia (catalinae)
common locally on alluvial fans

42 Chenopodium
rare on alluvial fans

43 Cryptantha
rare on alluvial fans

44 Verbena
rare on slopes and alluvial fans

45 Alectoria
common on steep slopes

46 occasional on alluvial fans

47 common in slopes and alluvial fans

48 Lotus
common on slopes and alluvial fans

49 Lotus
common on alluvial fans (with #7,7, 143)

Plant branched at base
flowers deep purple

Annual (possibly young plant of #11, but possibly #7,7.2), very glaucous, fleshy, spike nodding, oval-cla
depth crimson magenta
probably young plant of #11
flowers white

flowers white, tub
grapefruit tinged, stings
fragrant with honey-like ole.
not in flower now

flowers bright red

flowers bright red

flowers purple

flowers white
occasional on slopes

51. Hypadenus
abundant locally on slopes

52. Notana
rare among plants of 2

occasional at foot of slopes

54. Solanum
abundant & common on slopes

55. Solanum
rare, with # 23754

56. Diogenea
common on slopes

57. Chenopodium
occasional on slopes and roadside

59. Notana
dominant plant, abundant everywhere

60. Oxalis
occasional on slopes, especially near roads

51. Cardamine
local on steep slopes, especially near roads

flower white, purplish outside, especially in midle of segments.

white flowered exteme of # 23757

rays deep yellow, inner tract reddish.

bases of outer tract reddish

flowers varying from white to deep purple, upper

anthus yellow.

entire leafed exteme of

# 23754.

flowers white, petals entire.

perennial, plant depressed.

prostrate, flowers violet, varying to deep purple and to white.

tube orange within.

flowers bright yellow, flushed with vermilion outside.

nect: flowers white.
2 Cryptantha
steep slope near only, very local
3 Tetragonia
common on steep slope

1 Plantago
common on slopes
3 Nicotiana
common along roadside and bank of ravine
5 Hypericum
rare on banks of ravine
6 Erodium
rare on banks of ravine

leaves fleshy, covered with crystal-like glistening distended cells, flowers yellow.

flowers bright rose.

excit herb 1-15" tall, flowers yellow

flower range - yellow

flowers bright rose

flower rose.
1947 Peru

Oct. 10 - First headland north of Chala, kem. 600

Rocky slope, dominated by low shrubs Helichrysum and Ephedraeae sp.

1. 71 Angemium mexicanum common along roadside

2. 72 Helichrysum dominant on rocky slope

3. 73 Helichrysum same

4. 74 Helichrysum same

5. 75 Ephedraeae sp. Nolana dominant, in places coloring slope purple.

6. 76 Cothurnium, Jasminum

Oct. 10 - Los Arenalles, kem. 600

West, n.w. of Chala

Flat sand, flat and small dunes just back of beach

8. 77 Descuria

Large mass, holding small hummock-like sand dunes

9. 78 Macrocystis

Thrown up on beach in large quantities

10. 79 Strong plant, with long, red, fleshy, vine-like stems

11. 80 Leafy, with erect, fleshy leaves

12. 81 Flower, white, with stamens, pistil, ovary, and calyx

13. 82 Flower, white, with stamens, pistil, ovary, and calyx

14. 83 Flower, white, with stamens, pistil, ovary, and calyx

15. 84 Flower, white, with stamens, pistil, ovary, and calyx

16. 85 Flower, white, with stamens, pistil, ovary, and calyx
28797 - 837
28338 - 47
28848 - 63

please see whether
28702 - 10 (Bolivia)
and 28711 - 96 (Peru)
are OK

Also see if 28000 - 165
and 28250 - 70 are
missing too.
1947 Pen

Oct. 10 - First headland
north of Chala, km. 640

rocky slope, dominated
by dwarf, shrubby Helichrysum
and Aphacaena holandra

27771 Angenehme mexicanum
common along roadside

72 Helichrysum
dominant on rocky slope

73 Helichrysum
same

74 Helichrysum
same

75 Aphacaena holandra
dominant, in places
coloring slope purple

576 Crotalurus, Tanaca

Oct. 10 Los Arenales, km. 650
north, n.w. of Chala

for sand flats and small
dunes just back of beach

77 Sesuvium
large masses holding
small hummock-like sand dunes

78 Macrocystis
thrown upon beach in large quantities

glaucous herb, up to 6 ft.
tall; flowers pale yellow.
low, branched dwarf shrub,
flowers fragrant with
long, linear-like odor,
white with yellow ends;
same, if flowers tinged with
purple.
same, flowers white.
slender, slightly greenish.
spreading; flowers
rose-purple.

slow, much branched shrub.
back of this, across a flat
is an actual mountain
of sand

stems 1 mi. thick; leaves
very fleshy but compressed.
green; flowers pink.
much larger in every way than 50th
long, red, of wine-like.
Oct. 10 - 4 km. S.E. of Valle de Vaca, 2 km. of Nazca.

Desert with little vegetation, but lichens, except along road sides, where a number of plant are common.

*Chenopodium*

Common along road side.

*Lucedig*

Rare along road side.

*Amaranthus*

Abundant along road side.

Oct. 10 - Nazca

*Burnesia retama (Gill.) Quie.*

Common on stony ground in washes and alluvial fans (for many miles, alluvial fans practically the only plant)

*Buddleia*

Common along fence row

*Fluehea*

Common along fence row

*Trifla*

Common along fence row and on rocky ground.

Reddish - glaucous, densely branched.

Glaucous, fleshy, densely branched, erect.

Reddish, bushy erect.

Dull green, erect.

Shrub 1.5 m. tall

Almost leafless, flowers yellow, "Calato."

Shrub 3 m. tall, flowers lemon yellow.

Shrub 2.5 m. tall, heads purplish, flowers yellow.
Oct. 10 - Chala to Ica by road.

Just north of Chala across the bay there is a small area of rocky hills that are green - and there are patches of what are probably Lobibus mellea, it also runs down certain ravines, a Gynandronax and purple morning glory, and some black berries. Many of the hills, purple locally, there is something that looks a bit like Echinocactus, but I did not get a close look at it.

About 40 km. NW. of Chala there are small dunes covered and held by a gigantic Flexurina. Behind this, some way in from the coast, is a mountain of sand. Several much like this seen further north, but further in from coast.

About 50 km. NW. of Valle de Vaca, (30 km. NW. of Nasca), is an area with a very noticeable greenish vegetation of a prostrate Heliotrope, an erect Solana (3) and quite a number of other things. Did not stop. This extends much further, north night along the road, but not naturally. I don't know if there is vegetation along road sides, and not away from them.

The Valle de Vaca region, outskirts of Nasca valley, is interesting in that it is the southern limit of a number of plants at least as far as the road is concerned such as Peuropsis, Vallesia, Parkinsonia aculeata, Trianthelia, etc. The delta is practically the only shrub a plant in tremendous areas of alluvial fan, such as Imperial Lines, Illas, M. of Nasca. Present more or less
intermittently as far as Ica Valley.

Cucumber, occasional in some of valleys between Nazca & Ica, with Parkinsonia aculeata, is very common here.

Cotton is raised farther south as Nazca, some sporadic unsuccessful attempts further south. A curious slimy perennial species is raised, which blooms and produces cotton at same time.

In valley between Nazca and Ica, oranges are principal tree crop, as well as cotton. In Ica Valley cotton and grapes are most abundant. As this season the grapes seem to have just leafed out. They were trellised up somewhat and watered with diffusely and weedy types, as now in full flower.

Both squares in Ica are dominated by large Ficus nitida (1) trees.

In all these valleys, from Camana to Ica, Ficus carica, here called fig, is very common.

In the near valley to Junín, south of Valle de Vaca, is a tremendous grove of olives. It fills the whole irrigated part of the valley.

In Ica the ravine on the steep slopes are conspicuously filled with sand.

In Ica are occasional Eucalyptus, Phoenix and Washingtonia Frévillei, Cedrillo, Delicia.
Oct. 11 - I go by road from Joe west as east sand plains and sand hills, about 30 km. In a large area where Phoenix dactylifera is abundant. Again about 30-50 km. Further is another such area, quite extensive. Here ficus carica is also common. Both appear wild. These areas are quite saline. Distichlis and another grass, a slender reed, are dominant. In the second area, at about km. 271, salt water apparently comes to the surface by capillarity, evaporates, leaving an extensive deposit of salt in the surface layers of the sand, in some places being almost pure, in others much mixed with soil. This should be analyzed for potassium. If by chance there is any it should be exploitable.

Beds of limes are salt marshes and standing salt water. Distichlis is principal vegetation but Falacna is common. Phoenix dactylifera is occasional throughout this salty area. Its fruit are said to be not very good.
Oct. 11 - Km. 170
Chinab
Desiccated roadside depression with patches of vegetation in otherwise absolutely bare ground, with
Chenopodium murale
Trifolium sp. (saini)
Lemna truncatula
and Heliotropium curassavicum

Heliotropium curassavicum

37 Lutaria truncatula

Oct. 11 - Asia,

Hairy dry roadside

38 Solanum

39 Verbena

occasional in brush

40 Lippia

common along road side

41 occasional in brush

prostrate, glaucous; leaves fleshy; flowers white with greenish
anthers

prostrate, stem reddish; leaves flat; fleshy; flowers pink

semi prostrate; flower yellow;

shrub 1.5 m. tall; many yellow, disk greenish; hairy

prostrate; flowers pink

shrub 1.5 m. tall muck branched, mostly bare of leaves.
Oct. 12 - Lima
botanical garden
Cardaminum lanaiense
in muddy ditch

2-9-22
Lamburnum
planted

99 Viburnum
planted

93 Helicostyrum
planted

96 Cantua pygipolia
planted

Lima
flowers white, values of pods elastically coiling in sheathing

tree bushy tree 5 m. tall
flowers white, fruit black

Tree 5 m. tall flowers white

Shrub 1 m. tall flowers white
Oct. 20 - Things Maria, Rio Huallaga.

Flat valley floor with tall forest, now largely cleared, but evidently formerly with a canopy 30-40m from ground. Now largely open, even when remains patches of forest, so there is a dense undergrowth of Heliconia, acaulescens, etc.

The sides of the valley are bluffs and some of limestone, magnificently wooded. However, even with all this limestone the soils are said to be acid.
Giving from Tingo Maria to Castillo Azul as soon as the road begins to rise over low foot-hills along side of valley Ladenbergia magnifica and Cinchona micrantha begin to appear, but only as seedlings and sprouts as the plants near the road have been cleared.

At km. 160 there are quedada walls with second growth woods with Ladenbergia magnifica and another Ladenbergia with brown hair. All trees seen were young and stunted. The road gradually climbs and the Ladenbergia magnifica persists, but C. micrantha drops out, C. pubescens vars. similar to the guamaills of Tabacan appears rather, seedlings only. Cambrunia also no large tree seen. Tea plantations frequent here. Very wet, the woods, where remaining are thick.

At Dinisao, the gap in the mountains is a belt of Cinchona – C. pubescens (ovata) and C. 3 (like lucumaegola)
Oct. 21 - Km. 160, road from Tingo Maria to Lucallpa, drainage of Río Huallaga

second growth forest on steep side of ravine.

Cinchona (Radenburgia)
common locally

Oct. 22 - Km. 139, road from Tingo Maria to Lucallpa, just w. of La Division, Cordillera Azul, weedy roadside thickets

Acalypha
common

Amaranthus spinosus
common weed

Loesingia
common

Physalis peruviana
occasional
28902 phanas
occasional

4 05 liatrim
common

3 06 erigeron canadensis
common

Oct 21 - La Division, Cordillera Azul
second growth wood, quite wet.

07 vaccinium
occasional on forest banks.

10 cinchona
common

10a cinchona pubescens
occasional

subshrub

herb 1-15 m tall, ending, lactiferous; flowers pale yellow.
herb 1 m. tall; heads white; "huarmanta" boiled and used for Giovanni.

sprawling shrub; flowers ovadial, pale, distally.
sprouts 2 m. tall, sterile; leaves green, tree 5 m. tall, several trunks 8 cm. thick; leaves green, subglossy, petiole & midrib only slightly red, (bark sample). turning vine; flowers white.

seedling m. tall sterile, leaves dull brown, red-purple stems.
Oct. 21 - Funds Linchons, Cordillera Azul, Rio Chinos, drainage of Rio Ucayali

wet forest, largely cleared.

- 17 Cinchona (Ederbergia) magnifica
  occasional on steep wall of river gorge

  tree 25 m tall, 4 dm thick; fruit immature
  shrub 2 m tall

  young stem plant
  1.5 m tall into newattig
  shrub 2 m tall;
  flowers white

- 13 Cinchona
  planted in plantation

- 14 weed in small ravine in plantation

- 15 Polymnia
  weed in roadside thicket

- 16 Drymaria carota
  roadside weed

- 17 Centropogen
  common in roadside thicket

  spreading herb, heads of orange-yellow, achene, large, green
  ascending, diffuse
  elongate, sprawling shrub
  leaves diminishing distally, terminal part of branch bearing raceme
  variously bare or leaff, flowers scarlet, orange
distally, column pale yellow, anthers light gray
1947 Peru

23  Lycopodium
   cut bank above road

19  Cinchona glandulifera
   in seed beds, in full sun

18  erect

Oct. 22 Divisoria, Cordillera Azul
   main divide of Cordillera, wet forest, mostly clear.

23  Cinchona pubescens tall
   in clearing

24  Cinchona pubescens
   in bushy cleared land, very common

25  Cinchona pubescens
   in thick tangled very wet woods, beside standing water

old half dead stub
with a few living branches; leaves purple beneath; flowers (out of season) very fragrant, deep pinkish without, pale pinkish within.

mass collar of an upper side-branch tip each from various plants, to show variation, possibly due to hybridization

with # 28209

tree 8 m. tall, 20 cm. thick; leaves green beneath, fruit abundant (bark sample)
1947 Peru

23326 Cinchona pubescens
in clearing

27 Pulicaria
in undergrowth in woods

28 Jolanda
in undergrowth in woods

29 Cinchona pubescens
in plantation clearing, left from forest

30 Cinchona pubescens
wild plant planted in plantation

31 Cinchona calisaya
planted in plantation

32 Cinchona pubescens
planted in plantation from wild

Small tree, 4 m. tall,
leaves green beneath;
heavily fruiting;
apparently infected
with Elsinoe cinchona.

Apple, shrub, 1 m. tall,
tree, somewhat sprawling;
flowers white.

Flower shrub, 1 m. tall,
leaves purplish beneath, especially on veins,
not fruiting abundantly.

Sapling 3 m. tall
leaves, purplish beneath, especially on veins;
small tree, 2.5 m. tall,
flowers pink, fragrant;
seedling from Japanese planting at Lunija (Hy).
1947 Peru

Oct. 22 - Pumahuaní
Río Tulumaga, affluent
of Río Huallaga

steep rocky cut near river
Corniflora
occasional, but only
young plants, seen
(true both here and at
Divisoria)

Oct. 22 same, further
down
flat valley bottom
Hamelia patens
common along roadside

ditches.

Synthyris oxacensis
cultivated in valley floor
(also on slopes)
plants planted in
holes about 2-3 dm.
square and deep, these
gradually transformed
by cultivation into
ditches as the ditches are
shoetf connected.

shrub 1 m. tall; leaves
green, very thick.

shrub 1 m. tall;
flowers deep orange-

slender shrubs
1-1.5 m. tall; leaves
pale green; flowers
white; fruits red
when ripe. Leaves
have been stripped
frequently.

Her
Oct. 23 - same
steep wooded slope
Cedrela (Ladenbergia)
occasional stumps, hollow twigs inhabited by ants.

38 Virginia common

Oct. 23 Hacienda La Vega, drainage of Río Tulumayuy, moist forest, partly cleared, clearings planted to tea and pineapples, but badly overgrown with Pteridium aquilinum

39 Cinnamomum micranthum
small tree left in clearing

40 Pteridium aquilinum (Li.) Kuhn, extremely abundant, dominant weed over tops and sides of cleared hills, often burned.

41 Psychotria capitata R. & S. det. Kirkbridge
left in clearing.
This region, an old flood plain in the valleys of Rio Itumayos and Río Azul, stretching between the two, is dissected toward the two rivers by several quebradas. It is said to be and apparently is much drier than either the Valley of the Huallaga or the Cordillera Azul.

Sleender tree 7 m. tall, others many times as large, small clumps.

Sterile sprout, 1/2 m. tall.

Tree 15 m. tall, 18 cm. thick; leaves dull to sub-glossy. (dark sample)

Shrub 1.5 m. tall, caltha curved, yellow.

Vine, twining; flowers white, fruit green.

The forests on the quebrada slopes are largely eleagias and Hardenbergias, but have a liberal sprinkling of Hecea (with yellow leaves) and some other trees, including a small palm. The flat is cleared. Cinchona micrantha is found on the flat and slopes over its edges in the heads of the quebradas, but not much further down.
Oct. 24 - Carpinch Pass, 2 1/2 m. j.n. of pass.

Low mossy cloud forest w. of pass, w. with brush or ridges.

Sparingly branched shrub, m. tall; flowers red with yellow, blue, and column, blackish anthers.

Prostrate, forming mat, fruit dark red, 4 seeds.

g9 Neotena tetrasperme / BCK. abundant locally.

St. Thuidium abundant

51 Cryptocerae common

52 Gaultheria occasional in brush
tangled climbing cane, inflorescences dark red-purple, commonly flowering over a small area, shrub m. tall; flowers coral pink, shrub 2 m. tall; flower somewhat flattened laterally, rose-crimson, with white and purple lines in throat, tube vermilion without, erect shrub 2.5 m. tall.

53 Symphalanthus occasional in brush
1947 Peru

28358  Palicourea
1  rare in brush

56  Myrsine
common in brush

57  Nertea granadensis
rare on ground in forest

58  Cinchona (orvata 2)
common in brush and woods

59  Cinchona
same

60  Cinchona
same

61  Cinchona
same

62  Cinchona
same

Ficus

Stiffer shrub (m. tall)
Influence green, fruit immature

Stout, sparsely branched shrub
2 m. tall; fruit immature

Mostral, sterile

Shrub 2 m. tall; fruit
deep red, ribbed when fresh

Shrub 3.5 m. tall; fruit
deep red, ribbed when fresh

Slender tree 5 m. tall

Fruits; ov. vermilion

Fruits; deep red, ribbed when fresh (dark sample)

Shrub 1 m. tall; fruit

Leaves purples; flower

Fruits; deep red, ribbed when fresh

Tree 8 m. tall, flower (are
old or only seen) orange, violin without; outer pink within,

Apparently odorless, fruit
deep red, ribbed when fresh (dark sample)

Steep canyon wall, with dense wet forest.

Cinchona nitida
common locally

Incarii
common locally, along road

Centropogon
common locally.


Thin second growth woods on precipitous slope.

Cinchona purpurea
common (with 2 flowers)

60 feet tall, 10 cm. thick,
leaves dull above, purple beneath.

Twin sample.
1947 Peru

1967 Cinchona (root 2)

common (with # 23864)

Oct. 24 Divisoria, Cordillera Azul

in woods

(brought in by Rivers)

Huanuco

tree 8 m. tall, 10 cm. thick,
dull green above and below,
turning red in age.
(bark sample)

stumpy sprouts (tree
reaching great size);
flowers yellow with white;
fruit discoid, red when
ripe, with powerful
turpentine odor when broken.
Rafael Peña

lawyer of Santa Cruz, Bolivia, who
published Flora Crucianensis (1901 tavo) and
1903 an earlier edition. Locally said it was
based it on an early ms. left by a French-
man who died here. Supported by a similar
fact that Peña was addicted to the use
of a drink consisting of alcohol in
which had been soaked a plant
llorona de ceva(?) which does not appear
in the book.

Brola: botanical student of
Santa Cruz who apparently never wrote
anything but who studied the flora there
and one of whose sons now teaches Botany at S.C.
Peña R. (rafael)

Flora Crucifera

1-287, Lares, Bolivia 1901

an extremely badly prepared flora
of the Santa Cruz area, Bolivia. It is
reputed to have been a ms. left by
a Frenchman who died here long
ago. Apparently a sheet edition
was published previously, and
recently a new, much more accurate
has
been issued. (over)
The plants are arranged alphabetically either by local or supposedly botanical names. There is scarcely a name more recent than the time of Linnaeus. Principal value is local names and uses. Of Cascarilla, said to be in Santa Cruz "diversas especies, como Quina lanuflica Quina Hexandra." "Iboli" said to be Guarani name.
ALICE IN BLUNDERLAND

Alice in Wonderland never saw anything more fantastic and grotesque, yet legal, than the action of the city-county liquor commission last week.

The liquor commission suspended the license of a local retailer for four violations of selling liquor below the "locally prevailing retail price."

The fantastic and grotesque aspect of this is not only in the penalizing of a man for selling at low prices. It is that the penalizing is according to law—in fact the city-county license commissioners had no alternative if they followed strictly the provisions of the law.

For this ridiculous situation we have to thank the action of a past legislature which wrote into the Revised Laws of Hawaii this section:

"It shall be unlawful for any person holding a retail dealer's license to sell any liquor under such license at any price less than the locally prevailing price."

And the law so stands today though an abortive effort was made to amend it at the 1947 session of the legislature.

And so a dealer who was endeavoring to pass along to his customers savings which he was able to make in liquor on hand, has been penalized by the suspension of his license for one week.

Alice in Blunderland is right!

*   *   *

Why didn't the 1947 legislature go through with the amendment which would have eliminated this ridiculous stipulation?

Who put on the pressure or threw the sand in the machinery of legislation?
house

Blankets

Blanket for truly luxurious and while one lightweight
virgin wool; 41 75
72" x 90", ....

Blankets

60% wool blankets cover
ness. Secret of its warmth
Insect Problem Studied Here by Entomologists

Insect pests of the western Pacific face a bleak future with some of the leading entomologists of the nation now in Honolulu to conduct a historic meeting to evolve methods of combatting the tiny visitors.

The three day conference, first of its kind ever held, begins Tuesday and has been arranged by the Pacific science board of the national research council in conjunction with the navy department, Hawaiian Sugar Planters association and other scientific groups.

Arriving from the mainland this morning were Harold J. Coolidge, executive secretary of the science board; Dr. C. P. Causen, principal entomologist of the U. S. bureau of entomology and plant quarantine in Washington; D. C. and Theodore R. Gardner of the nation entomology bureau.

Edward H. Bryan Jr. is the Honolulu representative of the science board who will participate as well as representatives from HSPA.

From the meeting a detailed set of quarantine regulations covering insect pests of Micronesia is expected to evolve.
High Tides Force Closing of Moana Hotel Dining Room

Because of the damaging effect of recent high tides and waves the dining room of the Moana hotel will be closed Wednesday, October 1.

MIGHTY MITE

PALO ALTO, Calif., Sept. 29 (U.P.) — A bazooka-sized atom-smasher that will generate the first artificial cosmic rays and the highest charge of electricity ever produced by man has been revealed here.

The three foot long electron linear accelerator, a tiny cousin to the cyclotron, already has produced energies of more than 1,500,000 electron volts.
Missing 78708↓ still missing?

to 796347

78844

318
Sr.
Mr.

**Habitación - Rom. $1.5**

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**Área de pago**

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**Bill payable upon presentation.**

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**NOTA**

¡No olvide entregar la llave!!
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Eilif V. Miller
The Middle Hvallaga River
1-66 (typewritten, in O T A R files)

Jan. 1947

Excellent geographic study emphasis on soils.
Maccurdy, E. (ed.)

The Notebooks of Leonardo da Vinci
1-1747 Garden City, N.Y.
1941-42

da Vinci, Leonardo

The Notebooks of Leonardo da Vinci
edited by Edward Maccurdy
1-1747 Garden City, N.Y.
1941-42

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