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4. CENTRAL AND NORTHERN ISLANDS

Pinzon

Rabida

Beagle

Bainbridge

Santiago

Marchena

Pinta

Isla Pinzon. May 14-16, 1970

Landed on the north coast of the island.

Ascending trip to the highland. No records until alt. 130 m, where fruticose lichens were seen on branches of *Prosopis juliflora*. Same lichens at alt. 150 m. The area is dominated by *P. juliflora*; no trees of *Bursera graveolens*. See vegetation Record no. 51401 and 51402.

At altitude 220 m (Record no. 51403), filamentous lichens (look like *Ramalina* sp.) abundant; same at alt. 340 m (Record no. 51404, *Scalesia baurii*).

At altitude 390 m, brown liverworts appeared; thicket of *S. baurii*.

Table 4.1 *Prosopis juliflora* thicket on Isla Pinzon. May 14-15, 1970.

No.	1	2	3	4	5	6
Record no.	51401	51402	51403	51502	51503	51504
Altitude	130	150	220	400	30	70
Slope aspect	NE40	NE30	NE70		NE40	SE40
Slope steepness	15	10	10		10	5
Percentage of lava (%)	100	99	100	95	-	100
Shrub layer: height (m)	3.5	2.0	2.5	1.0	2.5	2.5
total cover (%)	10	60	40	50	50	50
Herb layer: height (m)		0.7	0.7	0.5	0.7	0.7
total cover (%)		10	60	70	20	10
(Shrub layer)						
<i>Prosopis juliflora</i>	1.3	1.1	1.2	2.3	2.3	2.3
<i>Croton scouleri</i>	1.1	.	2.2	2.2	2.1	2.2
<i>Cordia lutea</i>	1.2	1.1	.	1.2	+ 2	1.2
<i>Maytenus octagona</i>	.	+ 2	2.3	.	.	.
<i>Parkinsonia aculeata</i>	1.1	.	.	.	.	.
<i>Zanthoxylum fagara</i>	.	.	+ 2	.	.	.
(Herb layer)						
<i>Lantana peduncularis</i>	3.2	+ 2	1.2	2.2	1.2	1.2
<i>Alternanthera echinocephala</i>	+ 2	1.2	+ 2	+ 2	.	+ 2
<i>Gastela galapageia</i>	+ 2	.	+ 2	.	.	.
<i>Tournefortia psilostachya</i>	.	.	+ 2	.	.	.
<i>Lycium minimum</i>	.	.	+ 2	.	.	.
<i>Galactia velutina</i>	.	.	+	.	.	.
<i>Ipomoea habeliana</i>	.	.	.	+	.	.

Table 4.2 *Scalesia baurii* thicket in the summit area of Isla Pinzon. May 14, 1970.

No.	7	8	9	10	11
Record no.	51404	51407	51408	51409	51410
Altitude	340	450	440	445	450
Slope aspect		NW60	NW30	NE20	NE60
Slope steepness		25	15	15	7
Percentage of lava (%)	70	80	90	90	85
Shrub layer: height (m)	1.7	1.5	1.0	1.2	1.2
total cover (%)	70	40	60	40	40
Herb layer: height (m)	0.7	0.5	0.5	0.6	0.6
total cover (%)	30	30	50	80	70
(Shrub layer)					
<i>Scalesia baurii</i>	2.2	1.2	2.2	2.2	2.2
<i>Croton scoulerii</i>	4.4	2.2	2.2	2.2	2.2
<i>Cordia anderssonii</i>	+ .2	+ .2	1.2	+ .2	1.2
<i>Cicocca alba</i>	+ .2	1.2	1.2	+	+ .2
<i>Zanthoxylum fagara</i>	.	1.2	+ .2	+ .2	+ .2
<i>Duranta mutisii</i>	.	.	+ .2	1.2	+ .2
<i>Tournefortia rufo-sericea</i>	.	.	+ .2	+ .2	.
<i>Acacia macracantha</i>	.	+ .2	+ .2	.	.
<i>Tournefortia pubescens</i>	1.2	.	.	.	.
<i>Prosopis juliflora</i>	+ .2	.	.	.	.
<i>Maytenus octagona</i>	.	.	+ .2	.	.
(Herb layer)					
<i>Aternanthera filifolia</i>	2.2	1.2	1.2	+ .2	+ .2
<i>Polypodium tridens</i>	+ .2	1.2	3.3	4.3	4.3
<i>Darwiniothamnus tenuifolius</i>	.	+ .2	1.2	+ .2	+ .2
<i>Tillandsia insularis</i>	.	2.2	1.1	2.2	2.1
<i>Peperomia</i> sp.	.	+ .2	+	+ .2	+
<i>Phoradendron henslovii</i>	.	E	.	.	.

51407

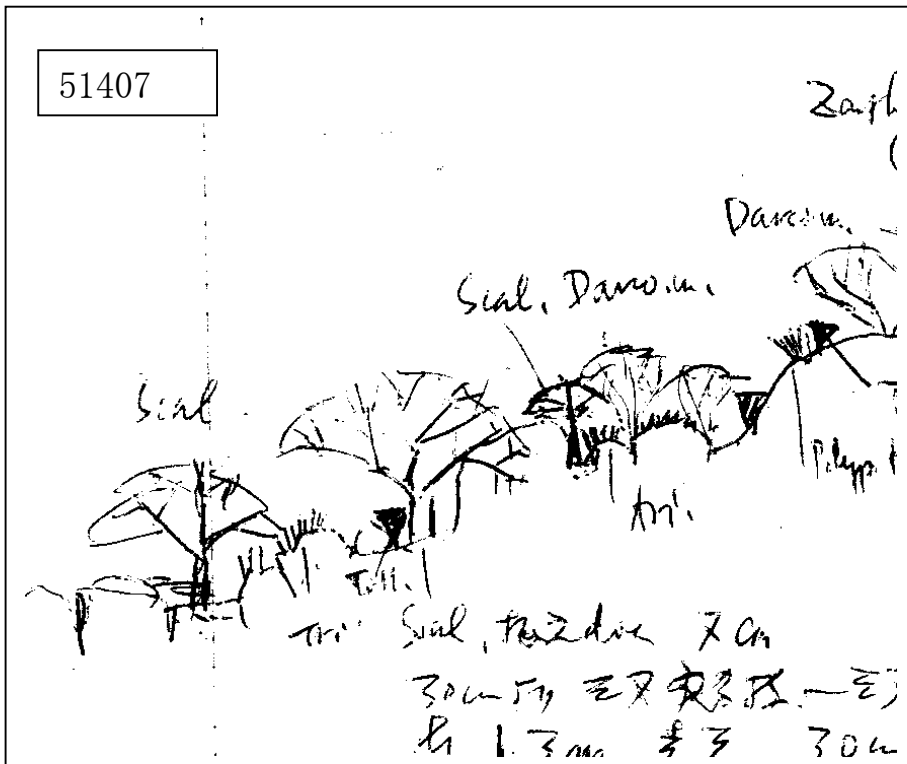


Table 4.3 Brake of *Polypodium tridens* in the summit area of Isla Pinzon. May 14, 1970

No.	12	13	14
Record no.	51405	51406	51411
Altitude (m)	450	450	450
Slope aspect	S	S	S
Slope steepness	20	35	15
<i>Polypodium tridens</i>	5.4	5.4	5.4
<i>Darwiniothamnus tenuifolius</i>	+2	+2	2.2
<i>Pityrogramma tartarea</i>	.	+2	.
<i>Nephrolepis cordifolia</i>	.	1.2	.
<i>Blechnum occidentale</i>	.	+	.
<i>Tournefortia rufo-sericea</i>	.	.	1.2
<i>Zanthoxylum fagara</i>	.	.	1.2
<i>Tillandsia insularis</i>	.	.	1.2

The highest point of Isla Pinzon is ca. alt. 450 m, lava blocks exposed, facing to south, hit directly by SE trade wind, where *Polypodium tridens* and *Darwiniothamnus tenuifolius* predominate, as below.

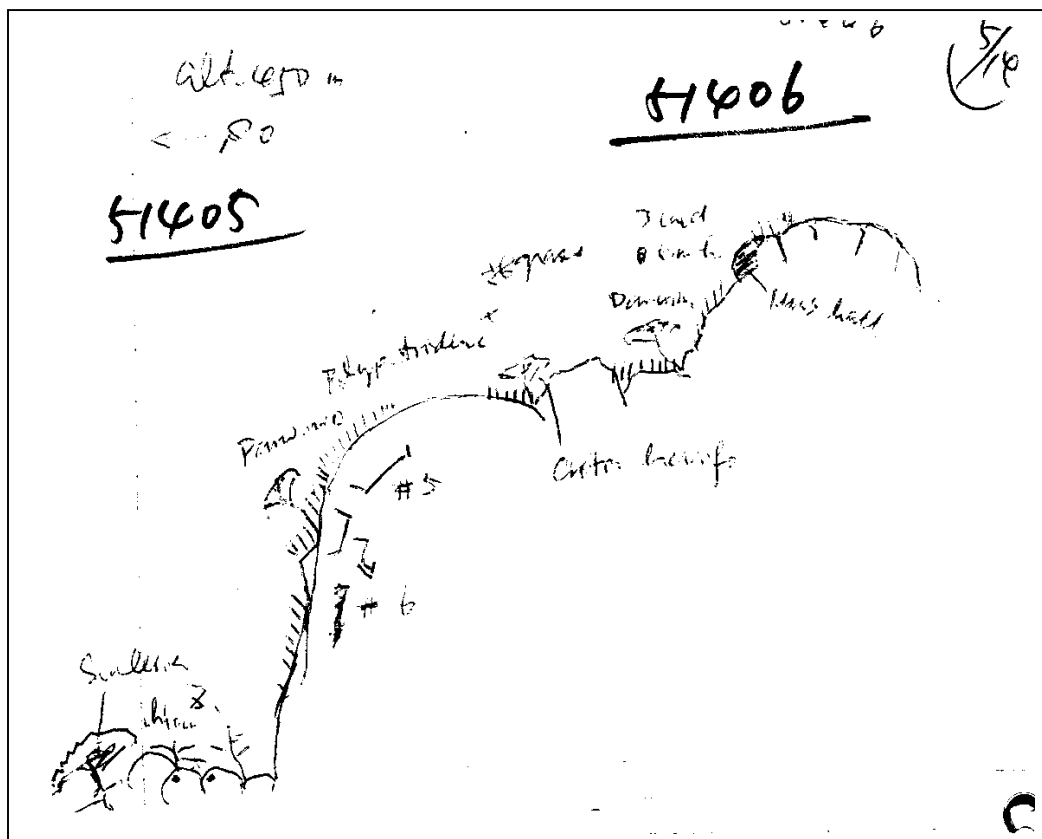


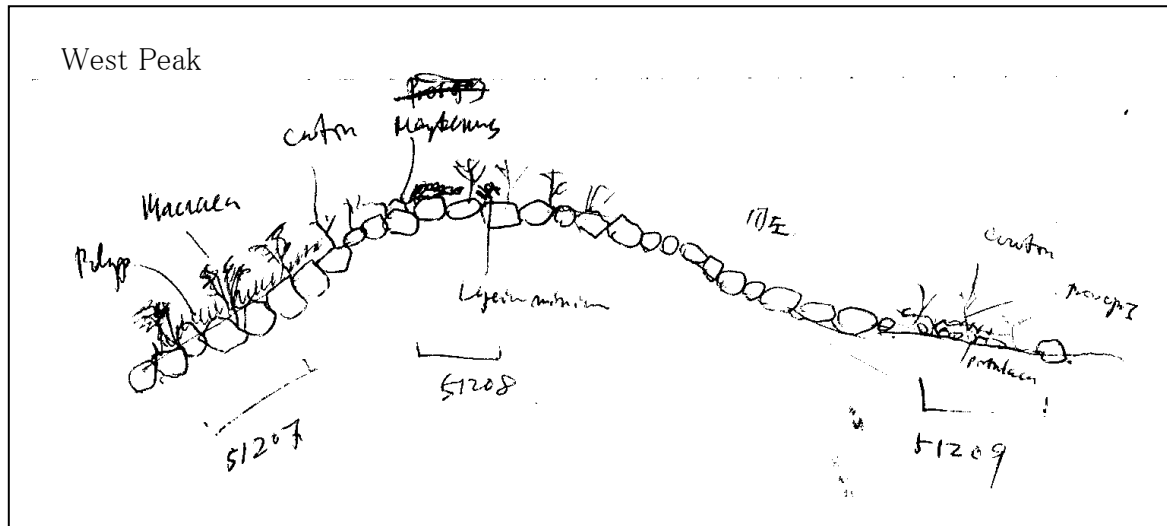
Table 4.5 *Macraea laricifolia* thicket in the summit area of Isla Rabida. May 12, 1970.

No.	7	8	9	10
Record no.	51204	51205	51207	51212
Location	E peak	E peak	W peak	W peak
Altitude	360	350	360	350
Slope aspect	SE40	SE40	S	SE60
Slope degree	30	25	30	20
Percentage of lava (%)	100	70	100	70
Shrub layer: height (m)	1.5	-	1.3	1.5
total cover (%)	40	-	40	-
Herb layer: height (m)	0.5	0.5	0.5	0.5
total cover (%)	100	60	70	-
(Shrub layer)				
<i>Macraea laricifolia</i>	3.3	3.2	3.2	4.3
<i>Maytenus octagona</i>	.	1.2	1.2	1.2
(Herb layer)				
<i>Polypodium tridens</i>	5.5	4.4	4.4	3.3
<i>Borreria ericaefolia</i>	+ .2	.	.	.
<i>Chamaesyche vivinea</i>	.	+ .2	+ .2	.

Table 4.6 *Croton scouleri* thicket in the summit area of Isla Rabida. May 12, 1970.

No.	11	12	13
Record no.	51209	51210	51211
Location	On ridge	N of W peak	N of W peak
Altitude	350	350	350
Topography	Flat	Flat	Flat
Percentage of lava	70	60	60
Shrub layer: height (m)	0.7	0.8	0.8
total cover (%)	20	70	70
Herb layer: height (m)	0.3	0.4	0.4
total cover (%)	50	50	50
(Shrub layer)			
<i>Croton scouleri</i>	2.2	4.4	3.3
<i>Opuntia</i> sp.	1.2	4.3	2.3
<i>Maytenus octagona</i>	1.2	1.2	1.2
(Herb layer)			
<i>Prosopis juliflora</i>	2.3	2.3	2.3
<i>Lantana peduncularis</i>	1.2	1.2	1.2
<i>Portulaca howellii</i>	4.3	+ .2	2.2
<i>Alternanthera</i> sp.	+ .2	.	1.2
<i>Castela galapageia</i>	.	1.2	2.2
<i>Scutia spicata</i>	.	+ .2	.
<i>Lycium minimum</i>	.	.	+ .2
Dead grasses	1.2	1.2	+ .2

Isla Rabida, May 12-13, 1970.



Isla Beagle, studied on May 13, 1970.

Isla Beagle consists of 3 islets, south, north and a satellite, which were originally the crater rim of a single volcano. The south and north islands are good nesting place of blue-footed boobies, and the coast abounds with sea lions. *Sesuvium edmonstonei* is dominant in the lower part of the island, *Portulaca howellii* predominates in the middle part of island slopes, and *Chamaesyche amplexicaulis* is restricted on ridges and SE-facing slopes.

Table 4.7 Vegetation transect of south island of Isla Beagle. May 13, 1970.

No.	1	2	3	4
Record no.	51303	51304	51305	51306
Slope aspect			SE	SE
<i>Sesuvium edmonstonei</i>	2.2	.	.	.
<i>Portulaca howellii</i>	1.2	3.2	2.2	1.2
<i>Heliotropium currasavicum</i>	.	+2	.	.
<i>Chamaesyche amplexicaulis</i>	.	.	1.2	1.2
<i>Tiquilia darwinii</i>	.	.	+	.

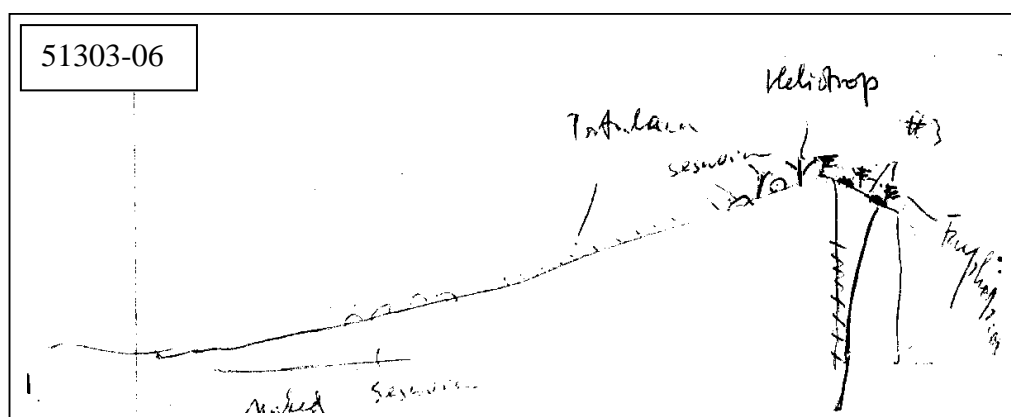


Table 4.8 Vegetation on the south island of Isla Beagle. Aug. 1

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Record no.	81048a	81048b	81048c	81049	81050a	81050b	81050c	81051a	81051b	81052a	81052b	81052c	81053	81055a	81055b	81057a	81057b	81058	
Slope aspect												Flat							
Slope degree								30	30	25	25					25	40	3	
Remarks				Blue-footed booby nesting									Nesting	Nesting					Nesting
Vegetation height (cm)	50			30			20	20	30	20	30		20	20	20	20	30	30	
Vegetation cover (%)				30	70	40	40	40	40	40	50		40	40	20	50	40	30	
<i>Sesuvium edmonstonei</i>	.	.	.	.	3.3	2.2	2.3	.	.	.	.	.	2.3	2.2	1.2	.	.	2.2
<i>Portulaca howellii</i>	2.2	2.2	1.1	2.1	3.2	2.2	2.2	2.1	2.1	2.2	3.2	2.2	2.2	2.2	1.1	3.2	3.2	2.3	
<i>Chamaesyche amplexicaulis</i>	1.1	1.1	1.2	1.1	.	.	.	1.1	2.1	.	.	.	.	.	.	+	1.1	.
Gramineae sp.	+	+	2.1	+	.	.	.	1.2	+	1.1	1.2	.	.	+	+	1.2	1.2	.	
<i>Heliotropium curassavicum</i>	.	.	.	.	.	.	.	.	+	+ .2	1.2	1.2	.	.	+	1.2	+ .2	.
<i>Boerhaavia caribaea</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.

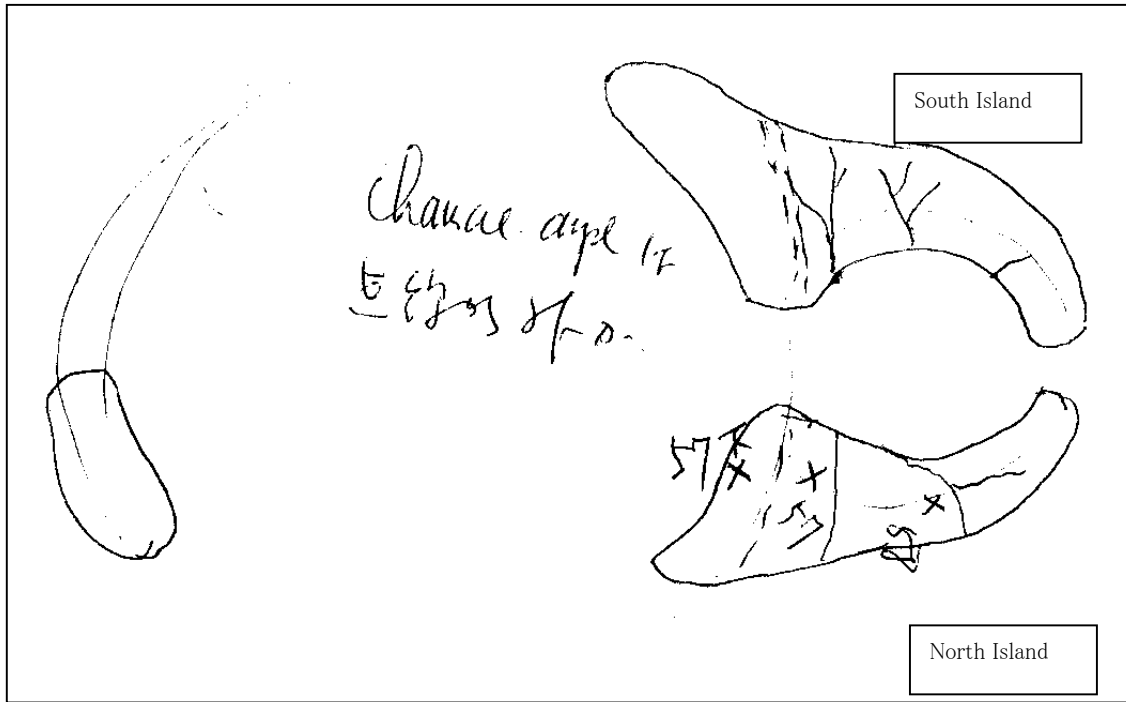
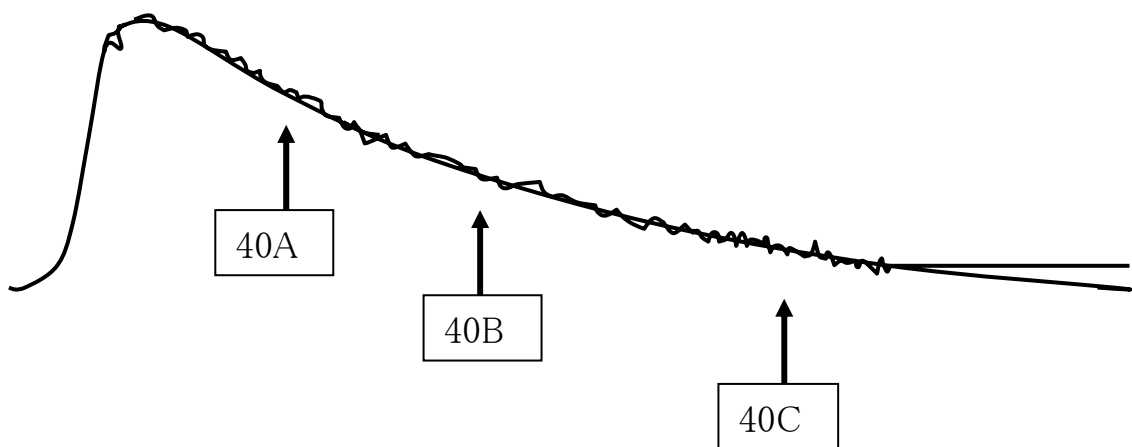


Table 4.9 Vegetation of Isla Bainbridge.
Aug. 14, 1981.

No.	1	2	3
Sample no.	81040A	81040B	81040C
<i>Sesuvium edmonstonei</i>	5.5	4.4	.
<i>Portulaca howellii</i>	1.2	1.2	.
<i>Tiquilia</i> sp.	+	+	.
<i>Chamesyche amplexicaulis</i>	1.2	.	.
<i>Batis maritima</i>	.	.	5.5

Isla Bainbridge. Aug. 15, 1981



Isla Santiago. April 11, 1970.

Ascending trip to the Santiago highland.

Altitude records are according to portable altimeter readings.

Figures given in the bracket following plant names are specimen numbers. Example: 00-2 means 70411/00-2. See Itow, S. 1997. Bull. Liberal Arts, Nagasaki Univ. (Nat. Sci.), Vol. 38, No.1.

8.50 a.m., Altitude 0 m.

Leave Espumilla Beach.

9.30 a.m., Alt. 180 m.

Palo Santo trees scattered, diameter 10-40 cm; no filamentous lichens on branches. *Erythrina velutina*, *Castela galapageia*, *Vallesia glabra*, *Zanthoxylum fagara*, *Acacia* sp.

9.45 a.m., Alt. 240 m.

Palo Santo, *Clerodendrum molle* var. *pubescens* abundant.

9.55 a.m., Alt. 285 m.

Percentage of lava 60 %, Slope steepness 15 degree.

(Tree layer: 7 m, 50 %) *Bursera graveolens* 3.3, *Psidium galapageium* 2.1, *Zanthoxylum fagara* +; (Shrub layer: 2 m, 30 %) *Clerodendrum molle* 2.2, *Castela galapageia* 1.2, *Tournefortia pubescens* +; (Herb layer: 0.2 m, 5 %) *Heliotropium angiospermum* 1.1, *Castela galapageia* +, 2, and some other species.

10.25 a.m., alt. 390 m.

Psidium galapageium and *Bursera graveolens*. *Ramalina* pendent from tree branches.

10.40, 450 m.

Mixed woodland of *Psidium galapageium* (10 m high and 20 cm DBH) and *Bursera graveolens* (13 m high and 50 cm max DBH). *Clerodendrum molle* abundant, *Trachypteris pinnata* and *Adiantum* sp.

10.50, 490 m.

Trachypteris pinnata (00-2) frequent.

500 m.

Percentage of lava 95 %, slope steepness 15 degree.

(Tree layer: 10m, 60 %) *Bursera graveolens* 3.3 (filamentous lichens pendent), *Psidium galapageium* 3.3, *Zanthoxylum fagara* 1.2, *Pisonia floribunda* 1.2. (Shrub layer: 2 m, 40 %) *Clerodendrum molle* 3.3. (Herb layer: 0.3 m, 20%) *Z. fagara* +, *C. molle* +, *Trachypteris pinnata* 1.1, *Heliotropium angiospermum* +, *Salvia* sp. +.

11.45, 540 m.

Palo Santo disappeared, brown liverworts appeared on branches, *Peperomia* (broad-leaf form) epiphytic. *Doryopteris pedata*.

12.05 p.m., alt. 610 m.

Open woodland of mixed *Psidium galapageium* and *Pisonia floribunda*. *Croton scoulerii* var. *grandifolius* (00-3), *Clerodendrum molle*.

Alt. 620 m.

Psychotria rufipes.

12.20, 640 m.

No lava block on the ground surface; flat topography.

(Tree layer: 6 m, 70 %) *Psidium galapageium* 3.3, *Zanthoxylum fagara* 2.2, *Croton scoulerii* var. *grandifolius* 1.2. (Shrub layer: 1 m, 70 %) *Psychotria rufipes* 4.3, *Croton scoulerii* var. *grandifolius* 1.1, *Tournefortia rufo-sericea* +. (Herb layer: 0.3 m, 80 %; heavily grazed) *Salvia* sp. 4.4, *Alternanthera* sp. +, *Doryopteris pedata* +. (Epiphytes) *Asplenium* sp., *Polypodium lanceolatum*, *Phoradendron henslovii*)

Alt. 710 m.

No lava block on the ground surface; Slope steepness 10 degree.

(Tree layer: 7 m, 40 %) *Scalesia pedunculata* (00-4) 1.2, *Psidium galapageium* 1.1, *Croton scoulerii* var. *grandifolius* 3.2, *Zanthoxylum fagara* +, *Pisonia floribunda* +. (Shrub layer: 1.5 m, 80 %) *Psychotria rufipes* 5.4, *Croton scoulerii* var. *grandifolius* +, *Tournefortia rufo-sericea* +.2. (Herb layer: 0.7 m, 30 %) *P. rufipes* 1.2, *Doryopteris pedata* 1.2, *Pteris quadriaurita* +.2, *Asplenium cristatum* +.2, *Alternanthera* sp. +, *Peperomia ? petiolata* +, *Ichnanthus nemorosus* 1.2. (Epiphytes) *Phoradendron henslovii*, *Polypodium lanceolatum*, *Peperomia* sp., *Ionopsis urticularioides*, *Epidendrum spicatum*, brown liverworts and green mosses.

1.45 p.m., 880 m. Highest point I reached on this day.

Zanthoxylum fagara abundant, 5 m high, 20 cm dbh. Epiphytes abundant: *Epidendrum spicatum*, *Polypodium lanceolatum* (00-6), *Polypodium aureum* (00-11), *Peperomia* sp., *Asplenium feei* (00-7), *Nephrolepis cordifolia* (00-10), *Hymenophyllum polyanthus* (00-9)

Acnistus ellipticus seen down there.

Descent from the summit area.

2.20 p.m., leave the summit area.

Down to alt. 700 m. Woodland of mixed *Zanthoxylum fagara* and *Croton scoulerii* var. *grandifolius*; *Psychotria rufipes* abundant in the ground vegetation; epiphytic brown liverworts abundant.

Between 700 m and 610 m. Woodland of *Psidium galapageium*, *Clerodendrum molle* abundant; brown liverworts on branch.

3.35 p.m., Alt. 610 m. Lichen pendent from *Psidium galapageium* and *Bursera graveolens*.

4.35, 480 m.

Mixed woodland of *P. galapageim* and *B. graveolens*, no filamentous lichen.

5.00, 370 m.

Bursera graveolens woodland, no trees of *P. galapageium*.

Arrived at Espumilla beach in dusk.

Isla Marchena. March 5, 1978.

Cinder cone, right-hand side of landing place on the south coast of the island.

(Tree) *Bursera graveolens* 2.1 (7 m high)

(Shrubs) *Croton scouleri* 2.1, *Waltheria ovata* 1.2, *Castela galapageia* 1.2, *Lantana peduncularis* 2.2, *Cordia lutea* +.

(Herb-layer species) *Ipomoea habeliana* 1.1, *Chamaesyche* sp. 1.1, *Tiquilia* sp. 1.1, *Rhynchosia minima* 1.1, *Cyperus anderssonii* +, *Opuntia* sp. +, Grasses +.

Marchena. March 6, 1978.

Altitude 120-160 m.

Bursera graveolens 8 m high, on which pendent lichens abundant.

Chiococca alba, *Waltheria ovata*, *Croton couleri* (narrow-leaved form), *Lantana peduncularis*, *Tournefortia psilostachya*, *Cordia lutea*, *Ipomoea habeliana*, *Cyperus anderssonii*, *Cyperus ligularis*, *Polypodium tridens*.

Isla Pinta (Field note p.175-)

March 7, 1978

Campsite on the beach of the south coast.

Leave 7.45 a.m. Alt. 0 m

8.10, Alt. 30 m. *Cyperus anderssonii* frequent on lava field.

8.25, alt. 70 m. Arid zone. *Scalesia baurii* subsp. *hopkinsii*, *Cyperus anderssonii*, *Bursera graveolens*. No pendent filamentous lichen on tree branches.

8.40, Alt. 100 m. Infrequent pendent lichen. *Bursera graveolens*, *Opuntia* sp., *Castela galapageia*, *Scalesia baurii* subsp. *hopkinsii*, *Cyperus anderssonii*.

9.55, Alt. 120 m. Transition zone. Abundant lichen.

Alt. 150 m. Transition zone. *Scalesia baurii* subsp. *hopkinsii*, *Opuntia* sp., *Croton scouleri* var. *grandifolius*, *Pisonia floribunda*, *Zanthoxylum fagara*, *Waltheria ovata*, *Lantana peduncularis**, *Sarcostemma angustissima*.

Alt. 190 m. *Scalesia baurii* subsp. *hopkinsii*.

Alt. 220 m. *Tournefortia rufo-sericea*, *Darwiniothamnus* sp. Pendent lichens abundant on *Bursera graveolens*.

Alt. 270 m. Well weathered lava blocks scattered. Open woodland of *Bursera graveolens* and *Opuntia* sp., mixed with *Pisonia floribunda*. *Darwiniothamnus* sp., *Tournefortia rufo-sericea*, *Croton scouleri* var. *grandifolius*, *Lippia rosmarinifolia* var. *latifolia**, *Tournefortia rufo-sericea*, *Trachypteris pinnata*, *Cheilanthes microphylla*, *Alternanthera filifolia**, *Ichnanthus nemorosus**.

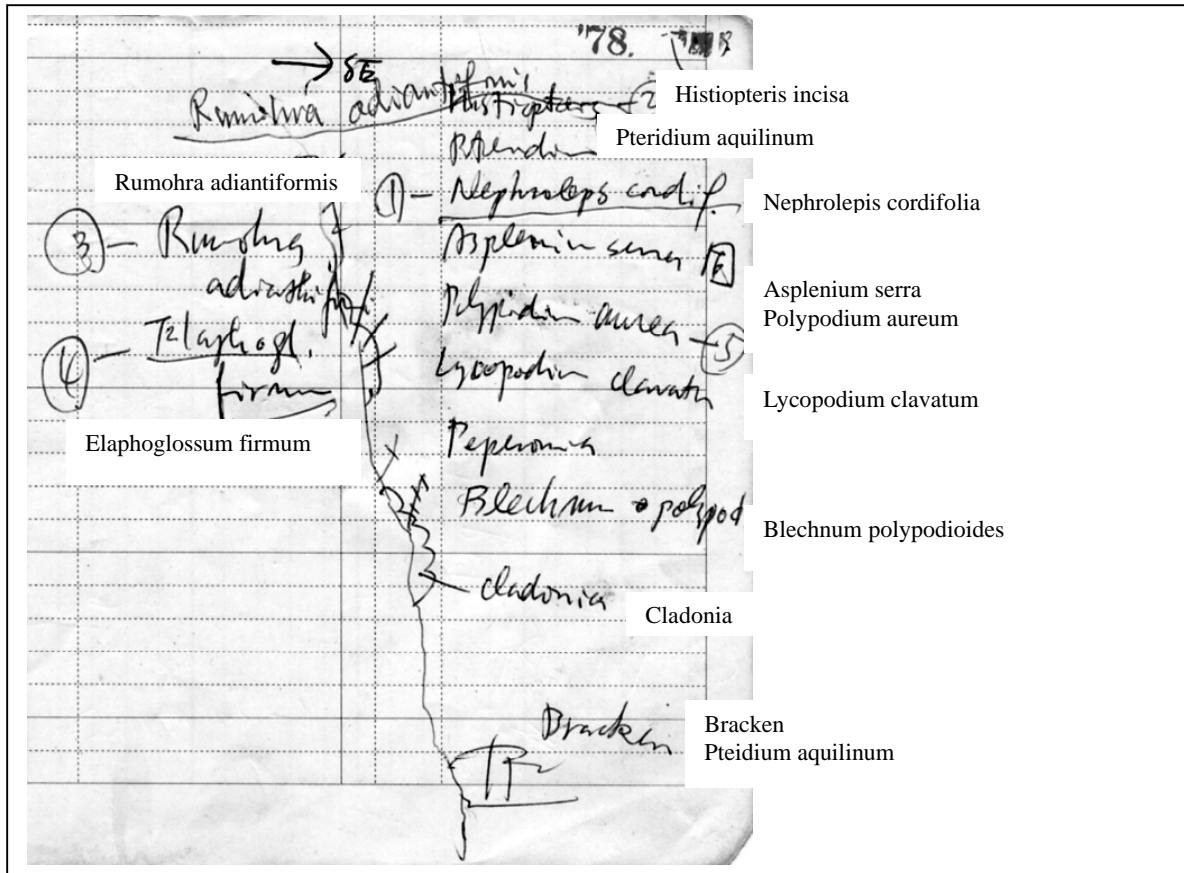
10.00 a.m., Alt. 330 m. Grassland dominated by *Paspalum galapageium* var. *galapageium**, *Rhynchosia minima**, with scattered trees and shrubs of *Zanthoxylum fagara*, 4-6 m high, *Pisonia floribunda*, *Croton scouleri* var. *grandifolius*, *Tournefortia rufo-sericea*. No trees of *Bursera graveolens*. Pendent lichen very rare.

Alt. 340 m. Green mosses on *Zanthoxylum fagara*, indicating air moisture.

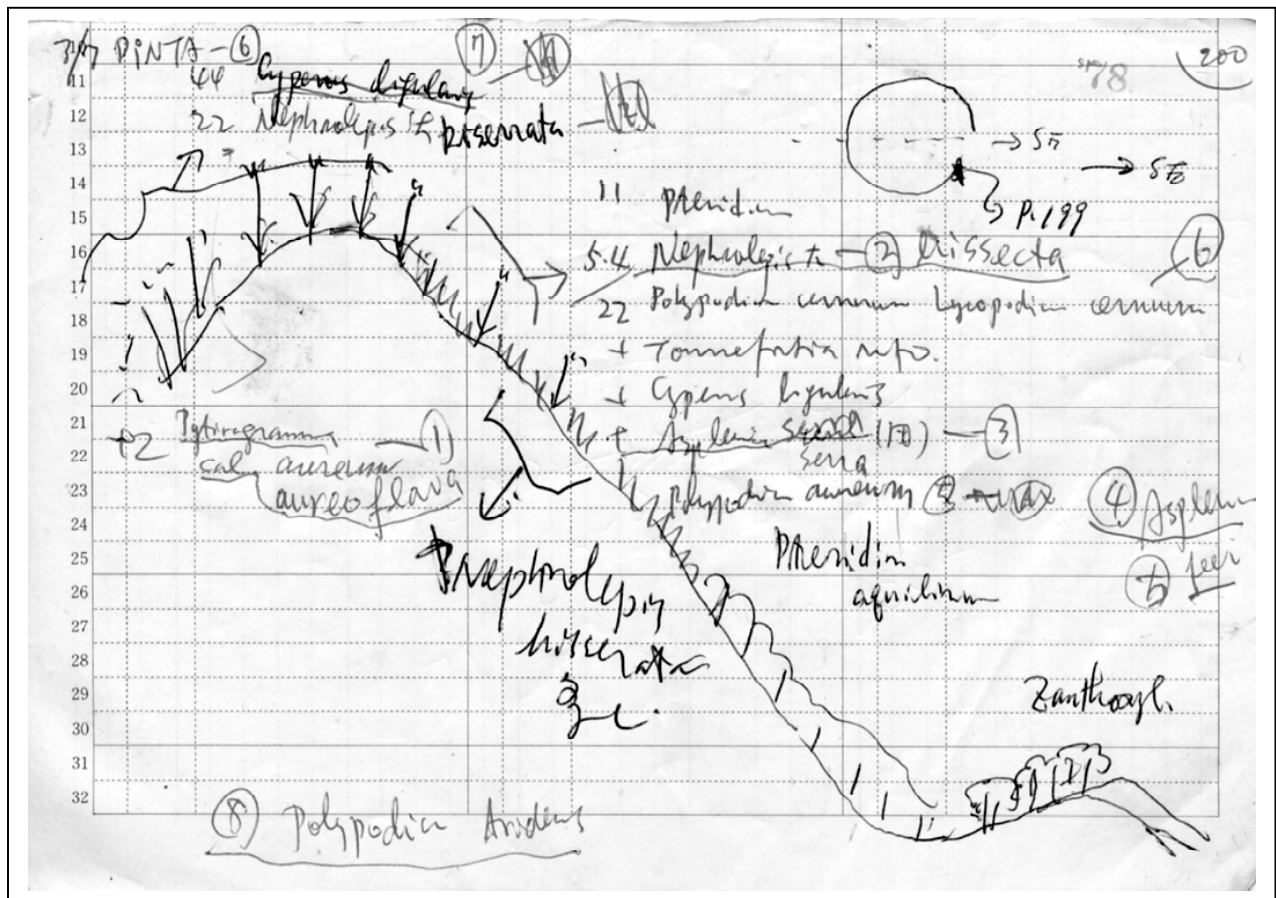
10.20, Alt. 450 m. Green mosses on *Zanthoxylum fagara*, 4 m high. *Darwiniothamnus* sp., *Croton scouleri* var. *grandifolius*, *Chiococa alba*, *Tournefortia rufo-sericea*, *Pteridium aquilinum*, *Blechnum occidentale*, *Adiantum henslovianum*.

10.30, Alt. 500 m. Brown Zone.

11.00, Alt. 580 m. Cliff vegetation.



Vegetation profile at summit area of Isla Pinta.



Descent begins 12.30

Alt. 550 m. Brown zone, dominated by *Zanthoxylum fagara*.

Species compositions of the two vegetation records taken in the Brown zone, as below.

Table 4.10 Brown Zone vegetation dominated by *Zanthoxylum fagara*, Isla Pinta. March 7, 1978.

Record no.	78198	78201
Location	Pinta	Pinta
Elevation (m)	500	550
Tree (height (m))	5	4
<i>Zanthoxylum fagara</i>	4.4	5.4
(Shrubs)		
<i>Acnistus ellipticus</i>	2.1	+
<i>Psychotria rufipes</i>	+	1.1
<i>Tournefortia rufo-sericea</i>	1.1	1.1
<i>Pisonia floribunda</i>	+	.
(Herbs & ferns)		
<i>Acalypha</i> sp.	1.2	1.2
<i>Asplenium crisatatum</i>	+.2	2.2
<i>Adiantum henslovianum</i>	+	2.2
<i>Polypodium phyllitidis</i>	+	+
<i>Blechnum occidentale</i>	3.3	.
<i>Ichnanthus nemorosus</i>	+	.
<i>Asplenium formosum</i>	+	.
<i>Ctenitis sloanei</i>	+	.
(Epiphytes)		
<i>Asplenium auritum</i>	+	+
<i>Peperomia</i> sp.	+	+
<i>Asplenium praemorsum</i>	.	+
<i>Polypodium lanceolatum</i>	.	+
<i>Epidendrum spicatum</i>	.	+
<i>Ionopsis urticularioides</i>	.	+
<i>Phoradendron henslovii</i>	.	+
<i>Nephrolepis cordifolia</i>	.	+
Brown liverworts	+	+
Green mosses	.	+

1.05 p.m. Alt. 450 m.

Zanthoxylum zone, abundant green mosses, but no vascular epiphytes. *Tournefortia rufo-sericea*, *Croton scouleri* var. *grandifolius*, *Phoradendron henslovii*, *Lippia rosmarinifolia*.

Alt. 420 m. Upper limit of *Scalesia baurii* subsp. *hopkinsii*, *Pisonia floribunda*, *Darwiniothamnus* sp.

Alt. 410 m. Below this altitude, Transition Zone. *Cordia scoulerii*, *Doryopteris pedata* var. *pedata*, *Polypodium tridens*, *Paspalum galapageium*, *Justicia galapagana*.

Alt. 350 m. *Zanthoxylum fagara* infrequent, with pendent fruticose lichen. *Pisonia floribunda*.

2.00 p.m., Alt. 300 m. Pendent lichen abundant. *Zanthoxylum fagara*, *Pisonia floribunda*, *Croton scouleri* var. *grandifolius*, *Opuntia* sp., *Darwiniothamnus* sp. *Lantana peduncularis*, *Alternanthera filifolia*, *Trachypteris pinnata*.

Alt. 200 m. *Bursera graveolens*-*Scalesia baurii hopkinsii* zone. Pendent lichen.

Alt. 100 m. Pendent lichen disappeared.

Alt. 50 m. *Scalesia* infrequent. *Bursera graveolens*, *Opuntia* sp., *Castela galapageia*, *Lantana peduncularis*.