

The shoreline could have largely been a source of trees producing raw materials and coconuts. Perhaps these could be considerations for other high islands.

Any early settlement before 1500-2000 BP, if it existed, may have had to have been influenced by higher sea-levels, because except for a stretch of land between Avarua and NgaTangi`ia, the lowland plain may well have been inaccessible. In most areas then, settlement may have commenced in the lower part of valleys, because even the terraces would have been exposed to more cyclonic forces such as storm surge and wind. Pure freshwater would have been impelled further back too, though not a great distance due to the mitigating effects of gradient.

APPENDICES I

A.1 Glossary of Polynesian Terms

<i>Ara Metua</i>	ancient road around the whole island of Rarotonga, following the base of the mountainous interior, also known as the 'Great Road of To`i'
<i>Ara Noa</i>	ancient roads on Rarotonga running from the interior to the coast, at right angles to the <i>Ara Metua</i>
<i>Ara Tapu</i>	road built under the influence of the London Missionary Society missionaries around the whole island of Rarotonga, following the coastline
<i>`Are kai</i>	cookhouses
<i>Ariki</i>	chief of a tribe or <i>vaka tangata</i>
<i>`Atinga</i>	regular tribute or payment made to senior title holders
<i>Kikau</i>	coconut leaf, removed from the tree, for use in thatching, basketry or any kind of weaving
<i>Kiri`au</i>	inner bark of the `au used for cordage, weaving and for making <i>tamaka</i> ( <i>kiri`au</i>)
<i>Kirikiri (teatea)</i>	(white) coral gravel spread over prepared surfaces such as <i>paepae</i> or <i>marae</i> platforms
<i>Koutu</i>	courts of the <i>ariki</i> , used among other things for investiture of new <i>ariki</i>
<i>Mata`iapo</i>	chief below the rank of <i>ariki</i> , head of a <i>ngati</i>
<i>Motu</i>	lagoon islet
<i>Ngati</i>	a sub-division of a tribe, the lineage owning a <i>tapere</i> or sub-division of a <i>tapere</i>
<i>Paepae</i>	fore-court and approach path to houses adjoining the <i>Ara metua</i>
<i>Paepae `are</i>	house platforms
<i>Ra`ui</i>	a sacred prohibition on the use of a resource, especially a food resource
<i>Rangatira</i>	chief below the rank of <i>ariki</i> and usually also that of <i>mata`iapo</i>
<i>Tamaka</i>	reef sandals to protect soles of feet against the sharp coral
<i>Tapere</i>	sub-division of a <i>vaka tangata</i>
<i>Tapu</i>	sacred, restricted, forbidden
<i>Ta`unga</i>	priest
<i>Tumu Korero</i>	talking chief or recognised expert in oral tradition
<i>Umu</i>	earth oven
<i>Vairakau</i>	traditional herbal medicines
<i>Vaka</i>	a fishing boat; a ship (<i>pai</i>) ; a tribe and a tribal area (<i>tangata</i>)

A.2 Glossary of Latin names of organisms

Latin	Maori	English
Plants (common cultigens and other plants not mentioned in A.5)		
<i>Aleurites moluccana</i>	<i>Tuitui</i>	Candlenut Tree
<i>Alocasia macrorrhiza</i>	<i>Kape</i>	Giant Taro
<i>Artocarpus altilis</i>	<i>Kuru</i>	Breadfruit Tree
<i>Cocos nucifera</i>	<i>Tumunu</i>	Coconut Tree
<i>Codiaeum</i>		Croton
<i>Colocasia esculenta</i>	<i>Taro</i>	Taro
<i>Commelina diffusa</i>	<i>Mauku vai</i>	Commelina
<i>Cordyline terminalis</i>	<i>Rau-Ti</i>	Cordyline
<i>Crinum asiaticum</i>	<i>Lili</i>	Lily
<i>Cyrtosperma chamissonis</i>	<i>Puraka</i>	Atoll Taro
<i>Hibiscus tiliaceus</i>	<i>`Au</i>	Beach or Tree Hibiscus
<i>Inocarpus edulis</i>	<i>I`i</i>	Tahitian chestnut
<i>Millettia australis</i>		Millettia Vine

<i>Musa nana</i>	<i>Meika</i>	Banana
<i>Musa paradisiaca</i>	<i>Meika</i>	Banana
<i>Musa troglodytarum</i>	'Uu	Mountain Plantain
<i>Pandanus tectorius</i>	'Ara ta'a tai	Screw-Pine
<i>Saccharum officinarum</i>	To	Sugar Cane
Animals		
<i>Acridotheres tristis</i>	<i>Manu Kavamani</i>	Mynah Bird
<i>Acrocephalus kerearako</i>	<i>Kerearako</i>	Cook Islands Warbler
<i>Aerodramus sawtelli</i>	<i>Kopeka</i>	Atiu Swiftlet
<i>Anas superciliosa (poecilorhyncha)</i>	<i>Mokora Rere-vao</i>	Grey Duck
<i>Anous stolidus</i>	<i>Ngoio</i>	Brown Noddy
<i>Anous tenuirostris</i>	<i>Rakia</i>	Black Noddy
<i>Aplonis cinerascens</i>	<i>T'oi</i>	Rarotonga Starling
<i>Columba livia</i>		Feral Pigeon
<i>Ducula pacifica</i>	<i>Rupe</i>	Pacific Pigeon
<i>Egretta sacra</i>	<i>Kotuku</i>	Pacific Reef Heron
<i>Fregata ariel</i>	<i>Kota'a Iti</i>	Lesser Frigate Bird
<i>Fregata minor</i>	<i>Kota'a Nui</i>	Great Frigate Bird
<i>Gallus gallus</i>	<i>Moa (+Moa Rere-vao)</i>	Domestic Fowl (Feral Fowl)
<i>Gygis alba</i>	<i>Kikaia</i>	White Tern
<i>Halcyon tuta</i>	<i>Kotare (Ngotare)</i>	Chattering Kingfisher
<i>Halcyon ruficollaris</i>	<i>Ngotare</i>	Mangaia Kingfisher
<i>Heteroscelus incanous</i>	<i>Kuriri</i>	Wandering Tattler
<i>Numenius tahitiensis</i>	<i>Kivi</i>	Bristle-thighed Curlew
<i>Phaethon rubricauda</i>	<i>Tavake</i>	Red-Tailed Tropic Bird
<i>Phaethon lepturus</i>	<i>Rakoa</i>	White-Tailed Tropic Bird
<i>Pluvialis dominica</i>	<i>Torea</i>	Lesser Golden Plover
<i>Pomarea dimidiata</i>	<i>Kakerori</i>	Rarotonga Flycatcher
<i>Porzana tabuensis</i>	<i>Mo'omo'o</i>	Spotless Crake
<i>Pseudococcus pandanii</i>		Pandanus Mealy Bug
<i>Pterodroma heraldica</i>	<i>Koputu</i>	Herald Petrel
<i>Ptilinopus rarotongensis</i>	<i>Kukupa</i>	Cook Islands Fruit Dove
<i>Sterna fuscata</i>	<i>Tara</i>	Sooty Tern
<i>Sula dactylatra</i>		Blue-faced Booby
<i>Sula leucogaster</i>		Brown Booby
<i>Sula sula</i>	<i>Toroa</i>	Red-footed Booby
<i>Urodynamis taitensis</i>	<i>Karavia</i>	Long-tailed Cuckoo
<i>Vini peruviana</i>	<i>Kuramoo?</i>	Blue Lorikeet
<i>Vini kuhlii</i>	<i>Manu kura</i>	Red Lorikeet

A.3 Stratigraphy

KAREKARE SWAMP

KK1

10/90	From the author's fieldnotes
Core samples:	0-80, 80-130, 130-180, 180-230, 230-280, 280-330, 330-380, 380-430, 430-480, 480-530, 530-580, 580-630, 630-680, 680-730, 730-780, 780-830, 830-880, 880-930, 930-980, 980-1030, 1022-1072.

Depth (cm) Description

PEAT AND CLAY

0-16	Yellowish black 5Y 2/2. Muddy loose humus. Th2 Sh1 Dh1.
16-26	Yellowish black 5Y 2/2. Compact humus with little mineral content. Clay size particles.
VISIBLE CHARCOAL BEGINS (FROM 84)	
26-96	Yellowish black 5Y2/2. Compact humic clay with increased mineral content. Some fibres. From 84, some flecks of charcoal. At 80 - pH = 6.0. See Plate A.3.1.
96-105.5	Transition to grey material. Charcoal flecks increasing. More fibrous material, though still very minor component. See Plates A.3.1 and A.3.10.
105.5-108.5	Black brown 10YR 3/1. Clay with less humic content than before - mostly mineral. Flecks of charcoal. Increasingly compact.
108.5-111	Band of Black brown 10YR 2/3. Slightly more humic than above. Flecks of charcoal.
111-125.5	As for 105.5-108.5, except fine bands of discolouration - e.g. at 113 and 115.5 of Dark brown

10YR 3/4. Charcoal flecks. pH = 6.0. Compact.

VISIBLE CHARCOAL ENDS

- 125.5-137 Blackish brown 5YR 2/2. Clay with more humus - even leaves preserved. pH = 6.0.
Colouration not regular - some lighter patches of Black brown 7.5YR 2/2. See Plates A.3.2 and A.3.11.

PEAT

- 137-147 As above, except lighter bands cease and there are increasing amounts of fibre with leaves and roots being preserved. T12 Th1 Sh1.
147-164.5 Darker bands of 10YR 1/1 come to dominate, though there are smaller bands of other colours present such as 10Y 2/1 at 147.5, and very thin bands of Blackish brown 5YR 2/2 material as above. Very little mineral content. See Plates A.3.2 and A.3.12.
164.5-170.5 Black 5Y 2/1. Substantially fibrous and humic - nil mineral content.
170.5-208 Yellowish black 5Y2/2. Very fibrous, but less so than above layer. Small clay fraction. Much less compact - soft. In parts very soft. pH = 7.0. See Plates A.3.13 and A.3.14.
208-216.5 As above, except more compact.
216.5-223 As for 164.5-170.5.
223-315.5 As for 170.5-208, though perhaps a little more compact. 230-280 very fibrous - many roots and very watery. See Plates A.3.3 and A.3.15.
315.5-324 5YR 1/1. Very fibrous (roots and leaves) and still soft, but not so watery. More compact.

WOOD FRAGMENTS BEGIN

- 324-356.5 Dark greyish 5Y 4/4 with bits of yellow. Humic and very lignous. Fibrous and Black 10YR 1/1 background. Compact. Peat. pH = 7.0. See Plate A.3.4.
356.5-370 Black brown 7.5YR 2/2. Humic clay band. Compact.
370-371.5 As for 324-356.5.
371.5-374 As for 356.5-370.
374-411 As for 324-356.5, except for a thin band of Yellowish black 5Y 2/2 at 374 and at 381, and a band of Black brown 2.5Y 2/2 at 399-400. More wood fragments. See Plate A.3.5.

WOOD FRAGMENTS END

- 411-464.5 A mixture of 5Y 4/4 and 5Y 2/2 with black flecks either as separate bands or a mix. 5Y 4/4 - humic 5Y 2/2. More clay. A band of 2.5Y 2/2 at 439.5. A mixture of 2.5Y 2/2 and 5Y 4/4 and a band of 7.5YR 2/2 clay at 451-460.
464.5-486 Reddish black 10YR 1/1. Peat - fibrous and humic - nil mineral content. Bands of Black brown 2.5Y 2/2 at 483-483.5 and 485-486, with a lense of Yellowish brown 2.5Y 2/2 in the latter band. See Plate A.3.6.
486-502.5 As above, except some black and yellow flecks.
502.5-507 As for 464.5-486, except bands of Yellowish brown 2.5Y 5/4 and the rest is a bit stained by the yellow. Some Black brown 2.5Y 2/2 staining.
507-513.5 As for 464.5-486.
513.5-560 As for 502.5-507. pH = 6.5. Bands of Black 10Y 2/1 at 534.5-535.5, 555-556 and 559.5-560. See Plate A.3.7.

GYTTJA

- 560-571 Dark brown 7.5YR 4/3 gyttja with band of Black 10Y 2/1 at 568.5 and another between 562 and 564. Ld2 Sh2.
571-577.5 Brown 7.5YR 4/4 gyttja. Bands of Black reddish brown 5YR 2/3 at 574.5 and 577.5.
577.5-582.5 Black brown 2.5Y 3/4 gyttja with band of 2.5Y 4/4 at 581-582. See Plate A.3.8.
582.5-586.5 Black brown 2.5Y 2/2 gyttja.
586.5-591.5 Black brown 2.5Y 3/4 gyttja.
591.5-598 Black brown 2.5Y 2/2 gyttja.
598-604.5 Black brown 2.5Y 3/4 gyttja.
604.5-607.5 Bands of 2.5Y 4/4, 2.5Y 3/4 and 2.5Y 2/2 gyttja.
607.5-638.5 Black brown 2.5Y 2/2 gyttja. Fibrous bands at 624, 625 and 627. See Plate A.3.16.
638.5-639 Transition to mineral clay.
639-640.5 10Y 3/1 mineral clay. pH = 6.5.
640.5-644.5 Black brown 2.5Y 3/4 gyttja.
644.5-743 Black brown 2.5Y 2/2 gyttja. Lenses of clay at 654.5, 661 and 672. Fibrous bands at 705, 711, 713.5, 715, 720, 720.5 and 728. pH at 644.5 = 7.0.
743-750.5 Black brown 2.5Y 2/2 gyttja. Slightly lighter than above. Some clay lenses of 10Y 3/1.
750.5-806 Black brown 2.5Y 2/2, though slightly different shade to the above. Lense of 2.5Y 3/4 at 751.5-752. Band of clay at 761.5-763 and 763.5-764. Fibrous band of 771.5 and 774.

CORAL SAND BEGINS

806-848	10Y 2/1 gyttja. More compact. Band of 10YR 2/2 between 806.5 and 807.5, and a clay and coral sand band just above that. Another band of clay and coral sand at 811-812. See Plate A.3.17.
848-856.5	Coral sand and 10Y 2/1 gyttja.
856.5-857.5	Clay band and 10Y 3/1 gyttja.
857.5-866	10Y 2/1 gyttja. More compact than before. Band of coral sand at 861.5.
866-898	Becoming lighter - Black 7.5Y 2/2 gyttja. Band of coral sand at 877. Thin band of 10Y 3/1 gyttja at 890.5. Clay/gyttja band of Yellowish black 7.5Y 3/1 at 894.5-896.
898-904.5	Black 5Y 2/2 gyttja.
904.5-910	Black 5Y 2/2 gyttja with coral sand - sometimes the coral sand is concentrated as a pure band.
910-932	Black 5Y 2/2 gyttja. Band of 10Y 3/1 clay at 911.5-912.
932-932.5	Thin band of fine coral sand, followed by coral sand and 7.5Y 3/1 gyttja.
932.5-939	Black 10Y 2/1 gyttja.
939-956	Black 10Y 2/1 gyttja and coral sand. Concentration of coral sand at 950-951.
956-976	Black 10Y 2/1 gyttja. Fine coral sand and Black 10Y 2/1 gyttja at 963-963.5. Fine band of coarser coral sand at 963.5. Gyttja becoming slightly lighter after 966.
976-983.5	Fine coral sand band at 976, followed by Black 10Y 2/1 gyttja and slightly coarser coral sand. See Plate A.3.9.
983.5-1011	Black 10Y 2/1 gyttja. Very thin band of fine coral sand at 985.
1011-1015.5	Coral sand in a high concentration, with gyttja and some dark flecks.
1015.5	Thin band of Black brown 10YR 2/2 gyttja, slightly more humic than before.
1015.5-1026.5	Black 10Y 2/1 gyttja. Band of coral sand at 1017-1017.5. Fine band of 10Y 3/1 clay at 1019.5.
1026.5-1028.5	Bands of 10YR 2/2 and coral sand with Black 10Y 2/1 gyttja.
1028-1072	Black 5YR 1/1 gyttja. Coral sand scattered thinly through out, especially down to 1035. Much humic material leaves and roots. Also large mineral content of clay particle size.
1085	Bottom of sediments reached by the head of the corer (screw part), so proper sampling was not possible. Small pieces of weathered basalt were clinging to the head of the corer when it was brought to the surface.

KK2

Core samples: 0-50, 50-100, 100-150, 150-200, 200-250, 250-300, 300-350, 350-359.

Depth (cm) Description

CLAY

0-26	Black reddish brown 5YR 2/3 clay loam. Ag1 Th1 Dh1 Sh1.
26-31	Transition to humic clay.
31-52	Black 7.5YR 2/1 humic clay.

DETRITUS

52-62	Humic detritus. Th2 Sh1 Dh1.
62-73	Wood.
73-90	Wood and other organic detritus.
90-114	Black 5YR 1/1. Fine detritus silt and clay. Bands of Black brown 10YR 2/3 soft oily clay at 94-96.
114-128	Wood.
128-132.5	Black 5YR 1/1. Fine detritus mud.
132.5-137.5	Wood.
137.5-173	Black 5YR 1/1. Fine detritus silt and clay, including rootlets and wood fragments. Fine bands of Black brown 10YR 2/3 soft oily, but compact, clay at 140, 142-142.5 and 145-146.5.
173-179.5	Black brown 10YR 2/3 soft oily, but compact, clay, with some organic detritus.
179.5-184.5	As above, but banded with silt and clay, and organic detritus, including some bands of pure detritus.
184.5-189	Black brown 10YR 2/3 soft oily, but compact, clay. A little organic detritus present.
189-190	Transition to detritus.
190-268.5	Black 5YR 1/1. Fine detritus silt and clay, but with much more detritus and rootlets than previously. Twig at 242.5-244. Less detritus from 256 downwards.
268.5-284	Wood
284-292	Black 5YR 1/1 detritus silt and clay with pure organic detritus bands of Black 10Y 2/1 silt and clay.
292-296.5	Black brown 10YR 2/3 soft oily clay, interbedded with organic detritus.

296.5-314.5	Black 10YR and 5YR 1/1 silt and clay and detritus, with fine silt and clay becoming soft muddy detritus.
314.5-318	Wood.
318-359	Black 5YR 1/1 silt and clay, and detritus. Twig at 335.5-338.5.

KK3

Core samples: 0-50, 50-100, 100-150.

Depth (cm) Description

CLAY

0-32.5	Brown 10YR 4/6 loamy clay. Ag1 Th1 Dh1 Sh1.
32.5-114	Becoming gradually darker - 10YR 3/2, with some black flecks. Rootlets penetrating. Band of soft Light brown 7.5YR 5/6 clay at 65.
114-141	Brown 7.5YR 4/4 Compact loamy clay.
141-150	Contaminated by muddy water.

KK4 (MR 1)

9/02/90 From fieldnotes of Prof J.R. Flenley
Thomas Auger used.

Depth (cm) Descript, Nig, Strat, Elas, Sicc, Hum, Comp.

0-100	Dark Brown soft peat/detritus with wood at 110-130, 3, 0, 1, 1, 1, Th2 Sh1 Dh1.
150-200	As above, except with some wood, T12 Th1 Sh1.
200-250	As above, except with wood at 225.
250-300	As above, except abundant wood.
300-440	As above, without wood. Grey clay (1 cm) band at 430.
440-450	Brown nekron gyttja, 3, 1, 0, 1, 2, Ld2 Sh2. Grey clay (1 cm) band at 448.
450-500	As above. Grey clay (1 cm) band at 450.
500-650	As above.
650-858	Very soft nekron gyttja, 3, 1, 0, 1, 2, Ld2 Sh2.
858-910	Black gyttja, peat and wood at 899, 4, 0-1, 0-1, 2, 2, Ld2 Sh2
910-930	Black gyttja, mud and detritus, 4, 0-1, 0-1, 2, 2, Ld2 Sh2 Dh+.
930-1000	Very soft nekron gyttja as for 650-858. Soft orange-brown clay on head of core.
1000-1090	Soft orange-brown clay, 2, 0, 0, 2, -.

KK4 B (MR1 B)

Stratigraphy the same except:

At 831	Transition to Black gyttja form Peat.
At 950	Transition to Orange clay from Black gyttja.

KK5 (MR2)

13/02/90 From fieldnotes of Dr J.R. Flenley

Depth (cm) Descript, Nig, Strat, Elas, Sicc, Hum, Comp.

0-200	Dark brown peat / detritus, 3, 0, 1, 1, 1, Th2 Sh1 Dh1. Wood at 150-160. Band of grey clay (2 cm) at 185.
200-285	As above with abundant wood.
285-315	As above with grey clay, Ag1 Th1 Dh1 Sh1.
315-350	As above without grey clay.
350-400	As above with ?rose thorns.
400-500	As above with thorns, fruits and wood.
500-530	As above without thorns, fruits and wood.
530-560	Black gyttja.
560-600	Dark brown nekron mud.
600-650	Very soft - would not open. Rods ran out.

KK6 (MR3)

13/02/90 From fieldnotes of Prof J.R. Flenley
Thomas Auger

Depth (cm) Descript, Nig, Strat, Elas, Sicc, Hum, Comp.

0-35	Grey clay (made ground).
35-50	Peat.

50-198	Peat and wood. Band of grey clay at 125.
198-200	Grey clay and peat mixture.
200-250	Peat.
250-255	Grey clay.
255-400	Peat and spines. Bands of grey clay at 340, 350-360 and 380-385.
400-450	Peat, spines and wood. Band of grey clay at 420.
450-460	Grey clay and peat (mainly peat).
460-480	Peat.
480-530	Black detritus (small - fine).
530-585	Dark grey - brown nekron mud.
585-620	Black peat. Very thin pale yellow band of ?clay.
620-625	Grey clay.
625-632	Black peat.
632-636	Grey clay.
636-650	Black peat.
	Ran out of rods.

ATUPA SWAMP

AT1

13/02/90	From fieldnotes of Prof J.R. Flenley
Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-44	Crumbly loam ?reworked, 3, 0, 0-1, 3, 1, Ag3 Dh1 Sh+.

CLAY

44-66	Blue-brown clay, 2-3, 0, 0, 3, 1, Ag4 Dh+ Sh+.
66-78	Brown-blue clay, 2-3, 0, 0, 3, 1, Ag4 Dh+ Sh+.
78-111	Blue-brown clay, 2-3, 0, 0, 2-3, 1, Ag4 Dh+ Sh+.

GYTTJA

111-121	Black gyttja. Coral fragments and snail shells, 4, 1, 1, 2-3, 2, Ld2 Sh2.
121-138	Coral sand, white and light brown. Weathered basalt, 2, 1, 0, 3, -, Gs4.
138-161	Gyttja and coral sand, 3, 1, 0, 3, 2, Ld1 Sh1 Gs2.
161-185	Coral sand and weathered basalt fragments (5 cm), 3, 0, 0, 2, -, Gs2 Gg2.
	Impenetrable band.

AT2

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
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CLAY

0-100	Black crumbly clay/gyttja, 4, 0, 0-1, 3, 2, Ld1 Sh1 Ag2 Dh+.
100-110	Blue clay, 2-3, 0, 0, 2, -, Ag4.
110-140	As 0-100.

GRAVEL

140-175	Coarse black gravel (1 cm), 4, 0, 0, 1, -, Gg4.
175-200	Coral sand.
	Impenetrable

AT3

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-80	Black clay gyttja, 4, 0, 0, 3, 2, Ld1 Sh1 Ag2.
80-120	Gyttja and blue clay, 3, 1, 0, 3, 2, Ld+ Sh1 Ag3.
120-130	Gyttja and gravel, 4, 0, 0, 2, 2, Ld+ Sh+ Ag1 Gg3.
130-150	Black gravel, 4, 0, 0, 2, -, Gg4.

AT4

Thomas Auger

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-30	Black gyttja and clay, 4, 0, 0, 3, 3, Ld1 Sh1 Ag2
30-50	As above with coral fragments.
50-57	As above with snail shells.
57-100	Coral sand.

AT5

Thomas Auger

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-40	Black gyttja/clay.

40-80	Blue clay.
80-130	Clay/gyttja.
130-150	As above with gravel.
150-162	Fell out. Gravel?
162-178	Black gravel (1-2 cm).
178-188	Black gravel and coral sand.

ARORANGI MORMON CHURCH SITE

ARM1

7/02/90 From the fieldnotes of Prof J.R. Flenley

Feek Borer

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-5	Black peat, 4, 0, 2, 2, 2, Th2 Sh2.
5-16	Coral sand, 1, 2, 0, 3, -, Gs4.
16-24	Brown clay, 2, 2, 0, 3, -, Ag4.
24-60	Coral sand, darker below, 2-3, 0, 0, 3, 4, Gs4 Sh+.
60-72	Black clay, 4, 0, 0, 3, 4, Ag3 Sh1.
72-100	Brown clay ?organic content, 3, 0, 0, 3, 4, Ag4 Sh+
100-159	Brown clay, paler below, 3-2, 0, 0, 3, 4, Ag4 Sh+.
159-172	Black woody peat, 4, 0, 4, 3, 4, Tl3 Sh1.
172-200	Beige-brown clayey ?gyttja, 2, 1, 0-1, 3, 4, Ag3 Sh1.
200-350	Brown clay, 3, 1, 0, 3, -, Ag4.

ARO'A SWAMP

10/02/92 From the fieldnotes of Prof J.R. Flenley

AO1

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-7	Orange and blue mottled clay, 2, 0-1, 0, 2, -, Ag4 Dh+.
7-18	Brown clay, 2, 0-1, 0, 2, -, Ag4 Dh+.
18-70	Clay and fine detritus, dark brown, 3, 1, 1, 2, 2, Ag2 Ld1 Sh1.
70-89	Grey clay, almost pure, 2, 0, 0, 2, -, Ag4 Dh+.
89-200	Dark brown gyttja and clay, 3, 1, 0-1, 2, 2, Ld1 Sh1 Ag2 Dh +.
200-250	As above, but more clay, Ag3 Ld+ Sh1 Dh+.

MURI SWAMP

12/02/90 From the fieldnotes of Prof J.R. Flenley

MU1

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-57	Grey clay and gyttja, 3, 0, 0, 2, 2, Ld+ Dh+ Sh2 Ag3.
57-100	White coral sand, 0, 0, 0, 2, -, Gs4.

MU2

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-62	Grey mottled clay and gyttja, 3, 0, 0, 2, 2, Ag3 Sh1 Ld+.
62-90	Grey / orange mottled clay, 3, 0, 0, 2, -, Ag4.
90-100	White coral sand, 0, 0, 0, 2, -, Gs4.

MU3

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-66	Grey mottled clay and gyttja, 3, 0, 0, 2, 2, Ag3 Sh1 Ld+.
66-95	As above, 3, 0, 0, 2, -, Ag4.
95-100	White coral sand, 0, 0, 0, 2, -, Gs4.

MU4

Depth (cm)	Descript, Nig, Strat, Elas, Sicc, Hum, Comp.
0-50	Grey clay and gyttja, 3, 0, 0, 2, 2, Ag3 Sh1.
50-78	Grey mottled clay, 3, 0, 0, 2, -, Ag4.
78-100	Grey clay, 3, 0, 0, 2, -, Ag4.
100-130	Orange clay and basalt fragments, 2, 0, 0, 2, -, Ag4 Gs+.
130-135	Dark grey clay and basalt fragments (? buried soil), 3, 0, 0, 2, -, Ag4 Gs+.
135-149	Orange clay and basalt fragments (? buried soil), 2, 0, 0, 2, -, Ag4 Gs+.
149-180	Dark grey clay and basalt fragments (? buried soil), 3, 0, 0, 2, -, Ag4 Gs+.

KK1 Plates

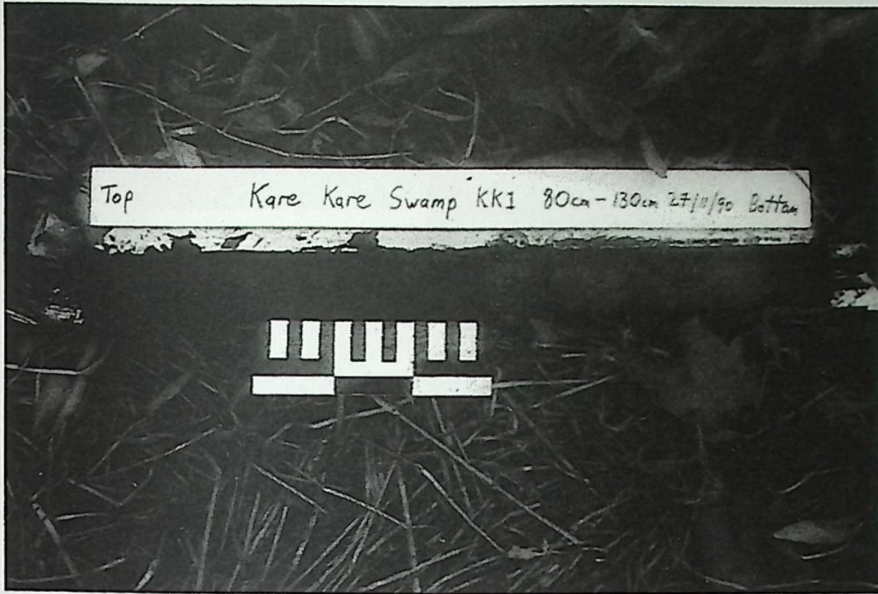


Plate A.3.1 KK1 80-130cm Colour print

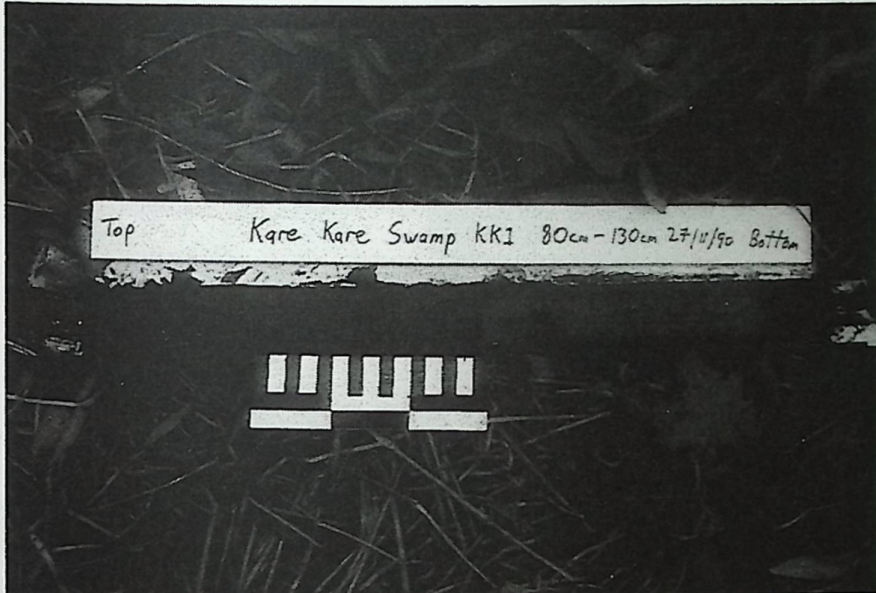


Plate A.3.2 KK1 130-180, Colour Print

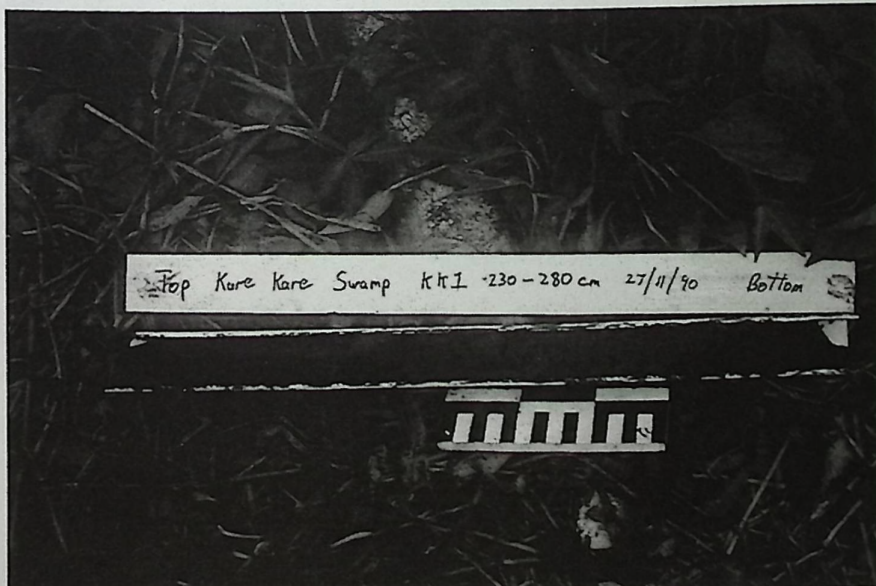


Plate A.3.3 KK1 230-280, Colour Print

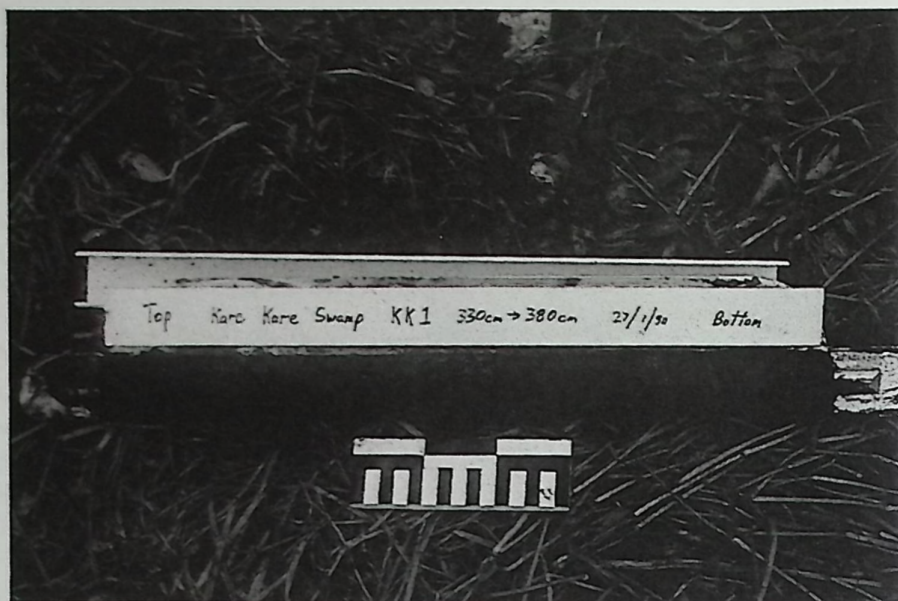


Plate A 3.4 KK1 330-380, Colour Print

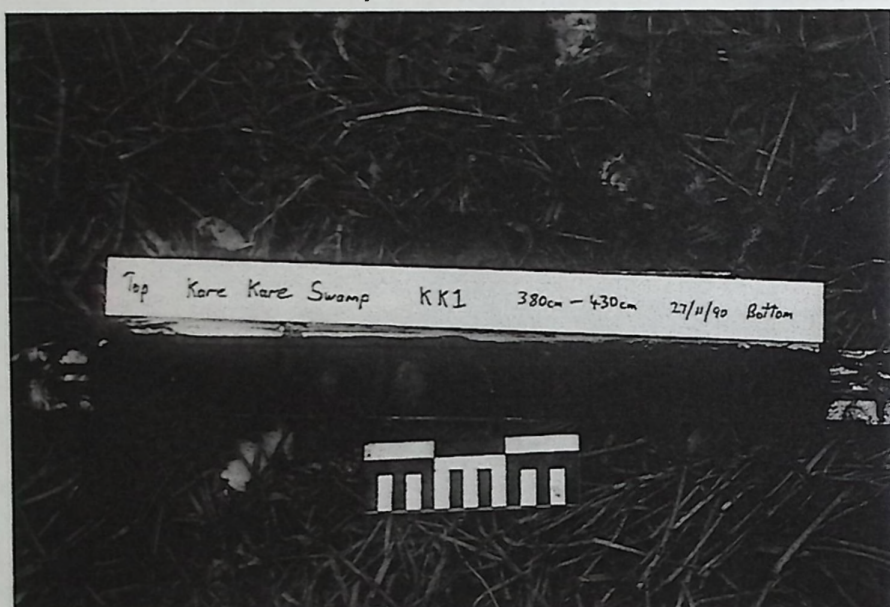


Plate A.3.5 KK1 380-430, Colour Print

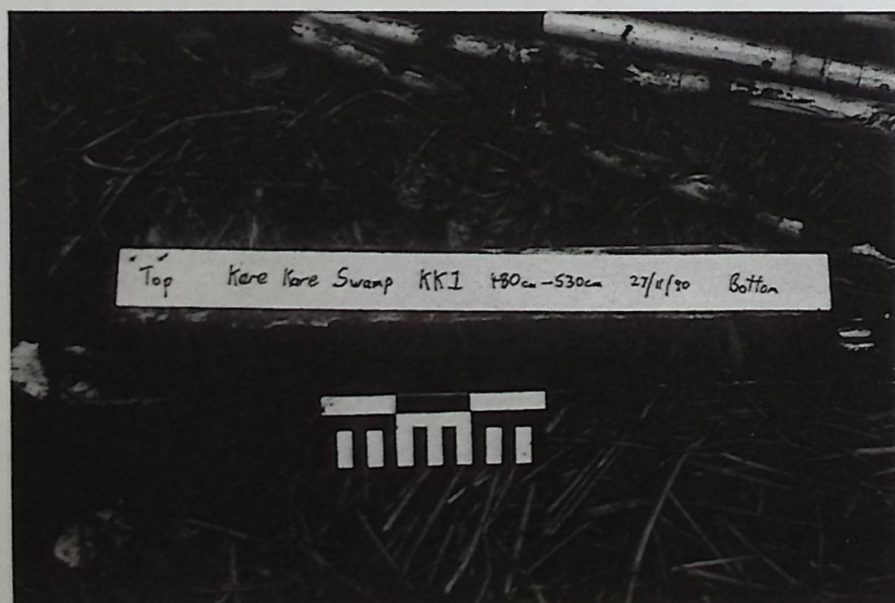


Plate A.3.6 KK1 480-530, Colour Print

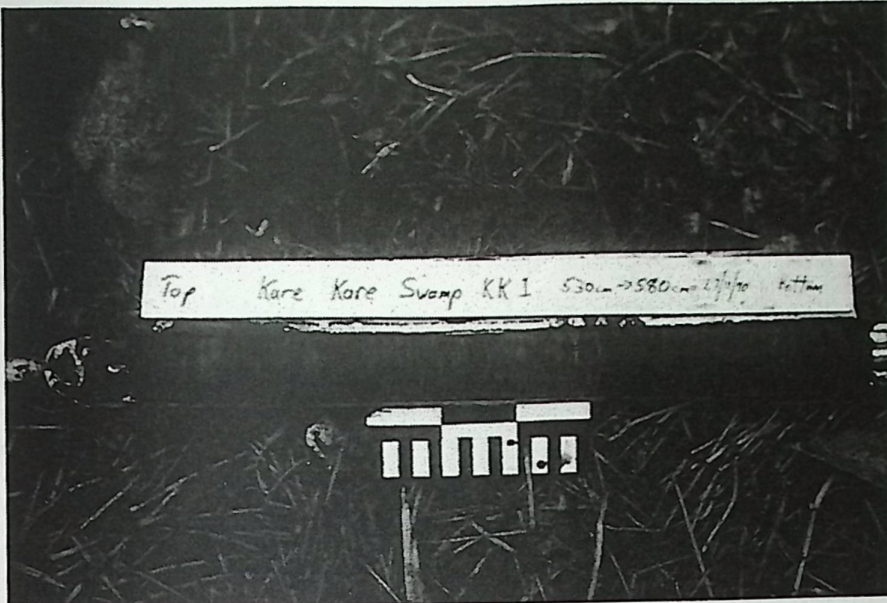


Plate A.3.7 KK1 530-580, Colour Print

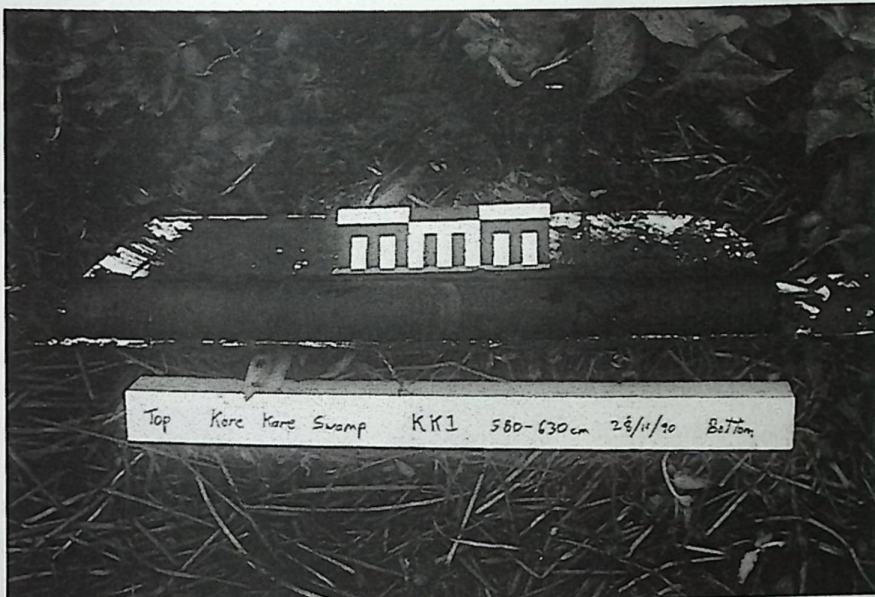


Plate A.3.8 KK1 580-630, Colour Print

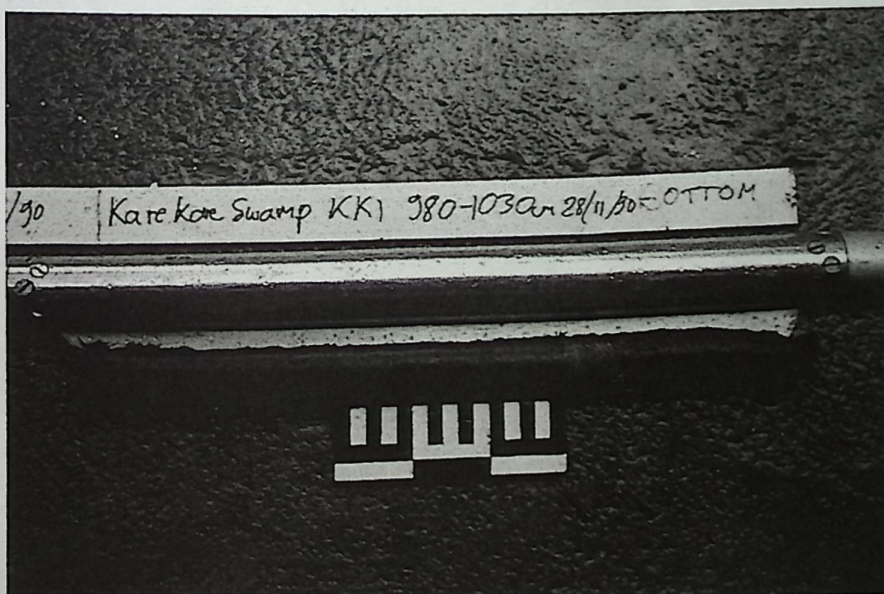


Plate A.3.9 KK1 980-1030, Colour Print

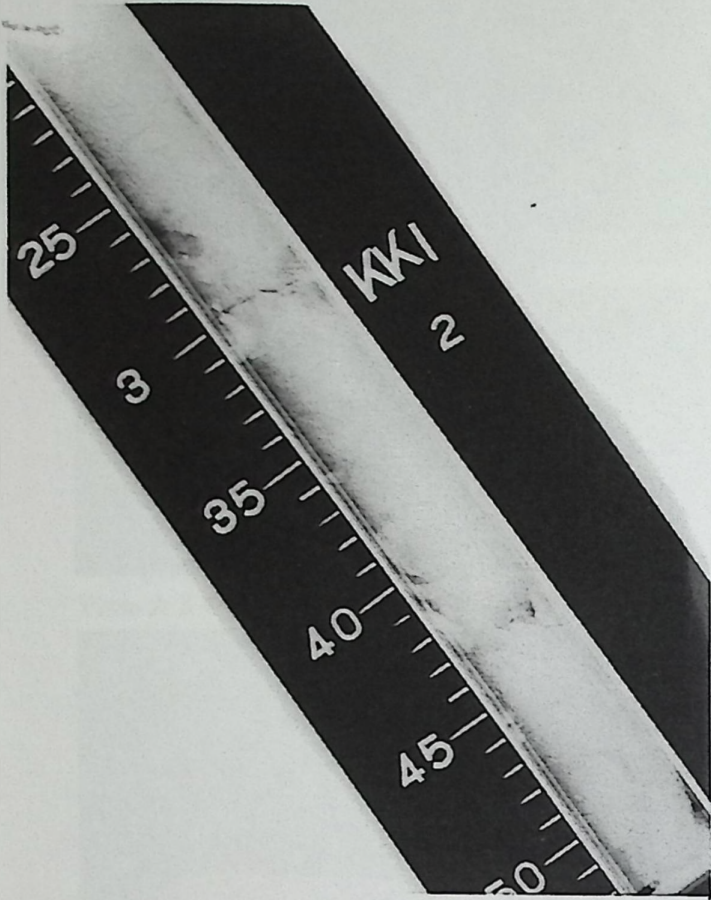


Plate A.3.10 KKI 100-130, X-Ray Print

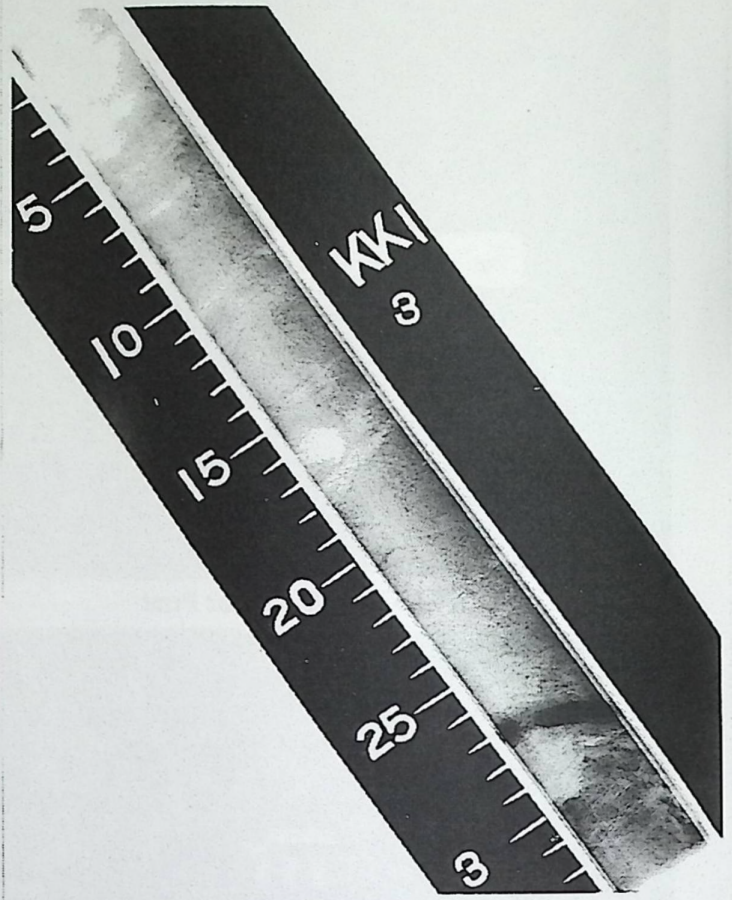


Plate A.3.11 KKI 130-160, X-Ray Print

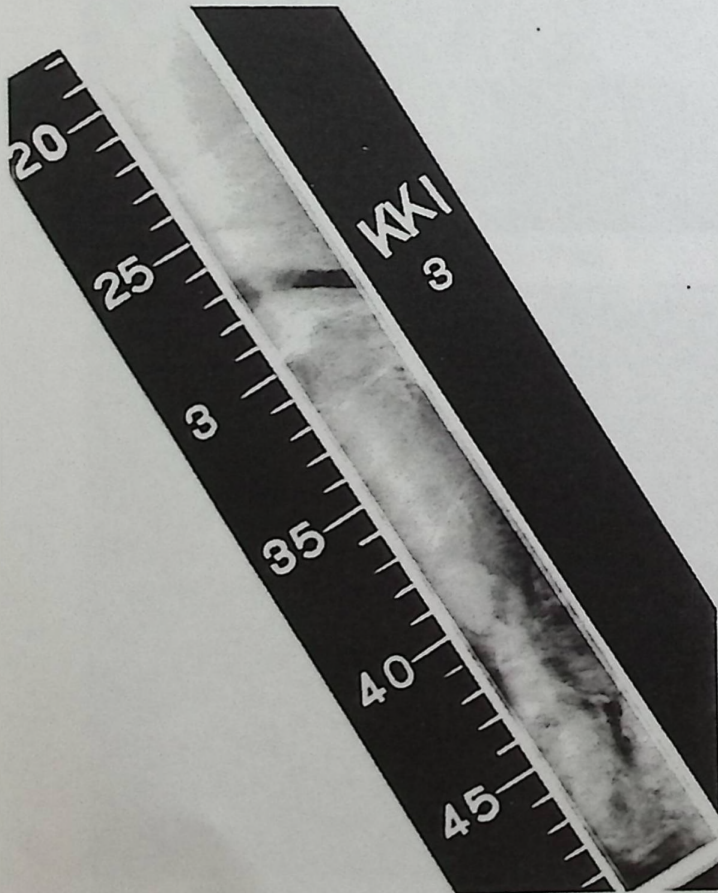


Plate A.3.12 KKI 150-180, X-Ray Print

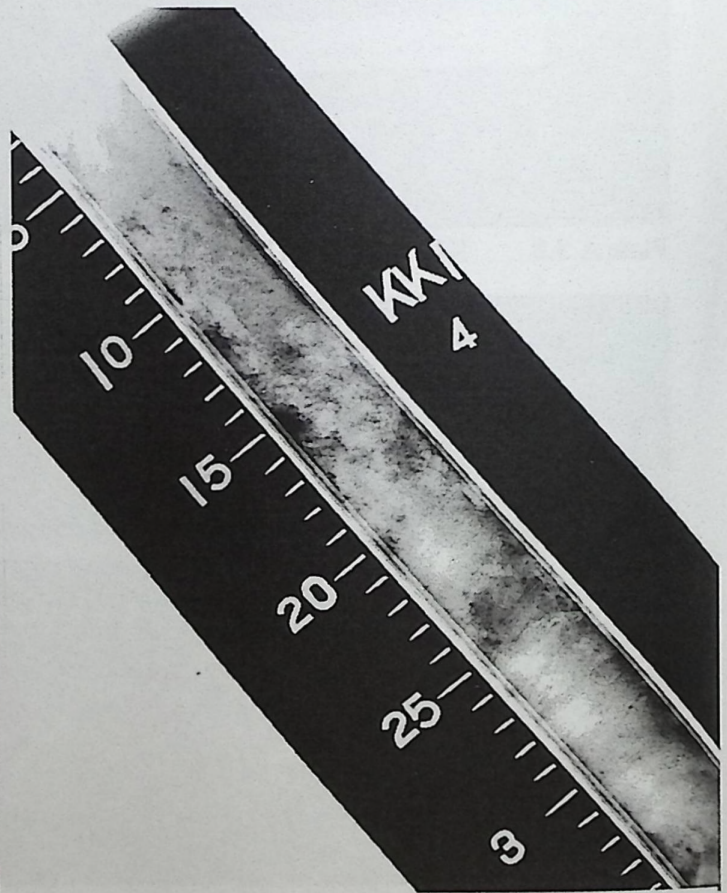


Plate A.3.13 KKI 180-115, X-Ray Print

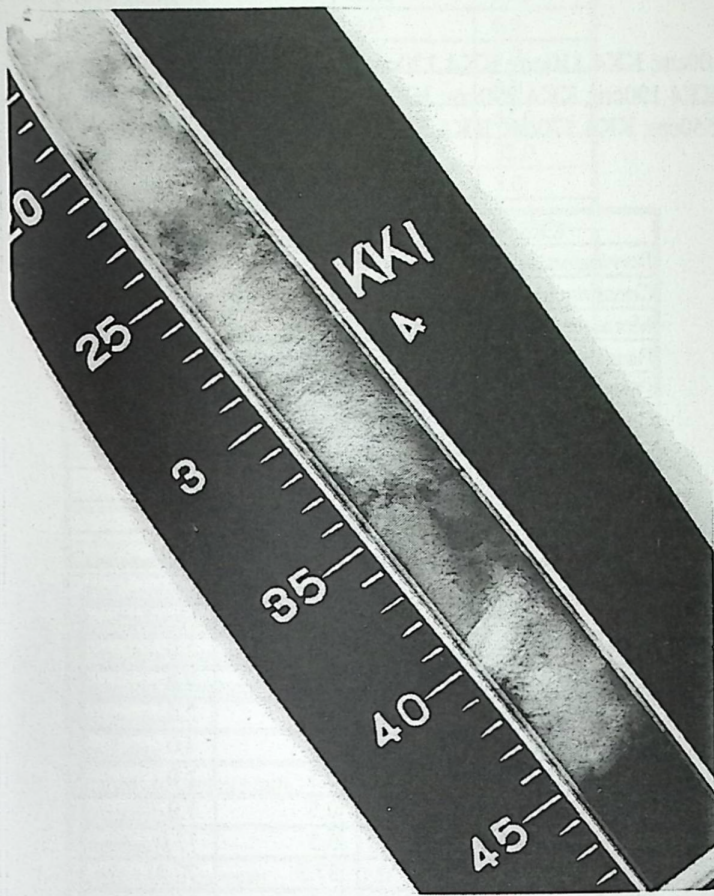


Plate A.3.14 KKI 195-230, X-Ray Print

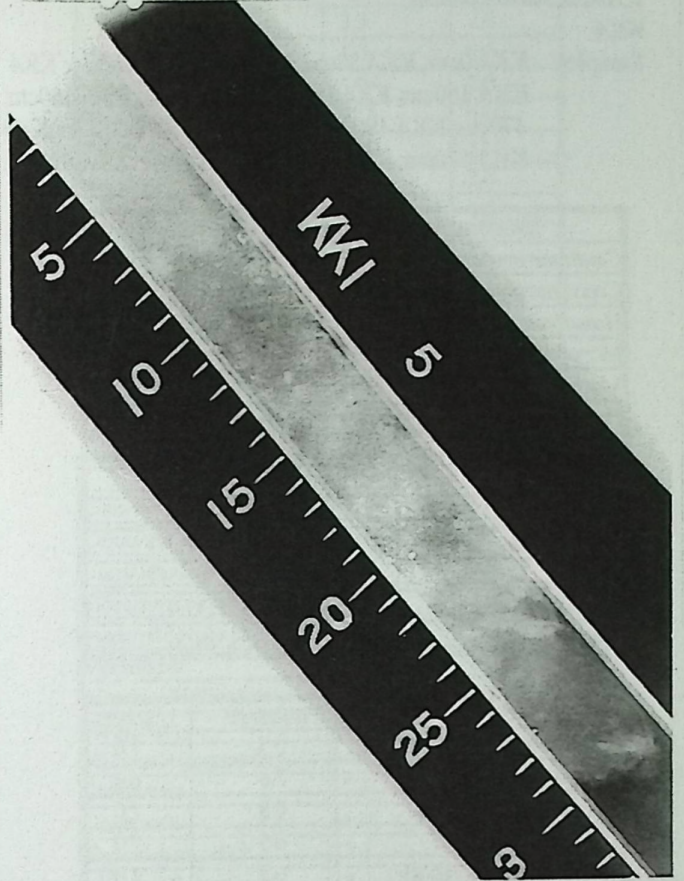


Plate A.3.15 KKI 230-260, X-Ray Print

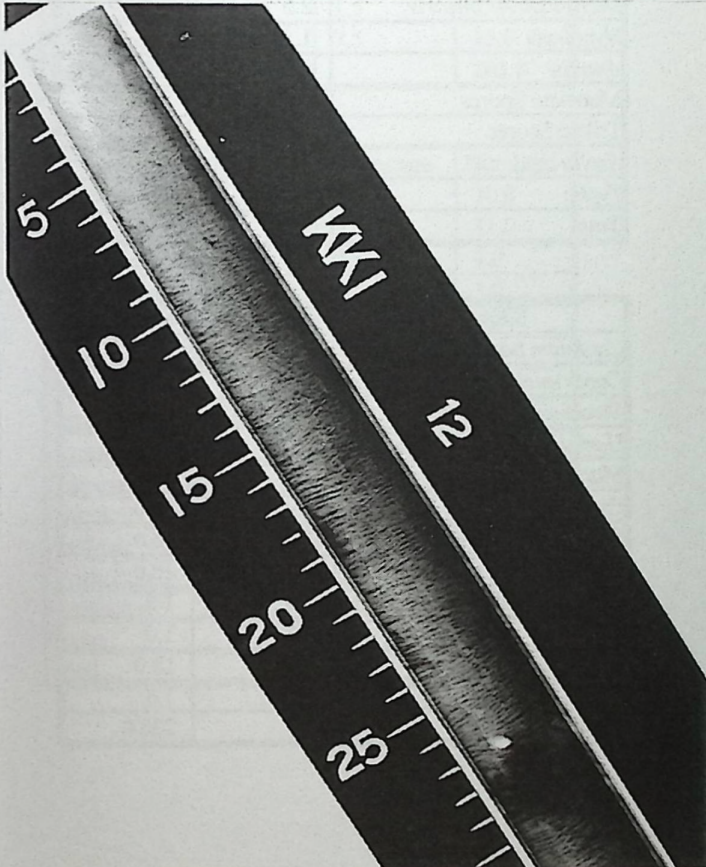


Plate A.3.16 KKI 630-660, X-Ray Print

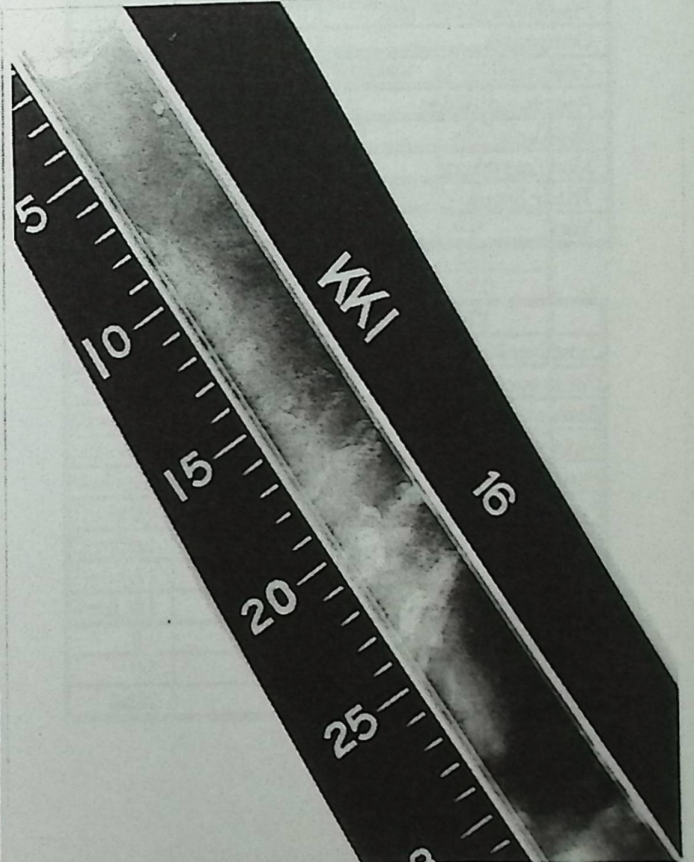


Plate A.3.17 KKI 830-860, X-Ray Print

A.4 Pollen Tables

KAREKARE SWAMP

KK4

Samples: KK4 0cm; KK4 30cm; KK4 60cm; KK4 90cm; KK4 100cm; KK4 110cm; KK4 120cm; KK4 130cm; KK4 140cm; KK4 150cm; KK4 160cm; KK4 170cm; KK4 180cm; KK4 190cm; KK4 290cm; KK4 390cm; KK4 440cm; KK4 470cm; KK4 490cm; KK4 520cm; KK4 530cm; KK4 550cm; KK4 570cm; KK4 580cm; KK4 590cm; KK4 620cm; KK4 670cm; KK4 690cm; KK4 790cm; KK4 890cm.

KK4 0cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	1.5	3.0
<i>Homalium acuminatum</i>	0.5	1.0
Moraceae/Urticaceae	2.0	4.0
<i>Morinda citrifolia</i>	3.0	6.0
<i>Pandanus</i>	18.0	36.0
<i>Pipturus argenteus</i> sim.	2.0	4.0
Compositae	3.0	6.0
Gramineae	5.5	11.0
<i>Acrostichum aureum</i>	2.5	5.0
<i>Anemia</i>	3.5	7.0
Monolet Spores	58.5	117.0
Total		202.0

KK4 60cm	Percentage	Numbers
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	3.0	6.0
<i>Elaeocarpus tonganus</i>	0.5	1.0
<i>Fagraea berteriana</i>	0.5	1.0
<i>Homalium acuminatum</i>	0.5	1.0
Moraceae/Urticaceae	2.0	4.0
<i>Morinda citrifolia</i>	0.5	1.0
<i>Pandanus</i>	19.5	39.0
<i>Pipturus argenteus</i> sim.	17.0	34.0
Compositae	1.0	2.0
Gramineae	14.0	28.0
<i>Freycinetia wilderi</i>	0.5	1.0
<i>Hypolepis</i>	0.5	1.0
Monolet Spores	40.0	80.0
Trilete Spores	1.0	2.0
Total		202.0

KK4 100cm	Percentage	Numbers
<i>Canthium barbatum</i>	2.5	5.0
<i>Cocos nucifera</i>	54.5	109.0
<i>Elaeocarpus tonganus</i>	2.0	4.0
Moraceae/Urticaceae	1.0	2.0
<i>Pandanus</i>	24.5	49.0
<i>Pipturus argenteus</i> sim.	2.0	4.0
Compositae	0.5	1.0
Gramineae	8.5	17.0
<i>Dicranopteris linearis</i>	0.5	1.0
Trilete Spores	0.5	1.0
Cyperaceae	3.5	7.0
Total		200.0

KK4 30cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Cocos nucifera</i>	25.0	54.0
Moraceae/Urticaceae	7.5	16.0
<i>Pandanus</i>	16.0	34.0
<i>Pipturus argenteus</i> sim.	38.0	81.0
Compositae	1.0	2.0
Gramineae	4.0	8.0
<i>Freycinetia wilderi</i>	3.0	6.0
Trilete Spores	1.0	2.0
Total		204.0

KK4 90cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Canthium barbatum</i>	3.5	7.0
<i>Cocos nucifera</i>	1.0	2.0
<i>Homalium acuminatum</i>	2.0	4.0
<i>Argusia argentea</i>	0.5	1.0
<i>Malvastrum</i>	0.5	1.0
Moraceae/Urticaceae	6.5	13.0
<i>Pandanus</i>	37.5	77.0
<i>Pipturus argenteus</i> sim.	6.5	13.0
Gramineae	10.5	22.0
<i>Acrostichum aureum</i>	10.0	20.0
<i>Dicranopteris linearis</i>	2.5	5.0
<i>Hypolepis</i>	1.5	3.0
<i>Anemia</i>	0.5	1.0
Monolet Spores	14.0	28.0
Trilete Spores	0.5	1.0
<i>Azolla</i> sim.	1.0	2.0
<i>Typha</i>	1.0	2.0
Total		203.0

KK4 110cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.5	3.0
<i>Cocos nucifera</i>	10.0	22.0
<i>Elaeocarpus tonganus</i>	4.0	9.0
<i>Homalium acuminatum</i>	1.0	2.0
Moraceae/Urticaceae	1.0	2.0
<i>Pandanus</i>	26.5	58.0
<i>Pipturus argenteus</i> sim.	44.0	96.0
Gramineae	7.0	15.0
<i>Acrostichum aureum</i>	0.5	1.0
<i>Cyathea</i>	0.5	1.0
Monolet Spores	8.5	18.0
Trilete Spores	0.5	1.0
Total		228.0

KK4 120cm	Percentage	Numbers
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	40.0	80.0
<i>Elaeocarpus tonganus</i>	3.0	6.0
<i>Homalium acuminatum</i>	0.5	1.0
Moraceae/Urticaceae	1.0	2.0
<i>Pandanus</i>	23.0	46.0
<i>Pipturus argenteus</i> sim.	16.0	32.0
Compositae	1.5	3.0
Gramineae	9.5	19.0
<i>Acrostichum aureum</i>	0.5	1.0
<i>Dicranopteris linearis</i>	1.5	3.0
<i>Hypolepis</i>	1.0	2.0
Monolete Spores	0.5	1.0
Trilete Spores	1.0	2.0
Cyperaceae	0.5	1.0
Total		202.0

KK4 130cm	Percentage	Numbers
<i>Canthium barbatum</i>	4.0	8.0
<i>Cocos nucifera</i>	1.5	3.0
<i>Elaeocarpus tonganus</i>	3.5	7.0
<i>Macropiper</i>	1.0	2.0
Moraceae/Urticaceae	1.0	2.0
<i>Pandanus</i>	22.5	45.0
<i>Pipturus argenteus</i> sim.	26.0	52.0
Gramineae	1.0	2.0
<i>Acrostichum aureum</i>	0.5	1.0
<i>Davallia</i>	2.5	5.0
<i>Hypolepis</i>	0.5	1.0
Monolete Spores	27.5	55.0
<i>Azolla</i> sim.	0.5	1.0
Cyperaceae	9.0	18.0
Total		202.0

KK4 140cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.5	3.0
<i>Cocos nucifera</i>	3.0	6.0
<i>Elaeocarpus tonganus</i>	2.0	4.0
<i>Homalium acuminatum</i>	0.5	1.0
<i>Thespesia populnea</i>	0.5	1.0
<i>Macropiper</i>	0.5	1.0
<i>Pandanus</i>	19.0	38.0
<i>Pipturus argenteus</i> sim.	22.0	44.0
Compositae	0.5	1.0
Gramineae	0.5	1.0
<i>Acrostichum aureum</i>	1.0	2.0
<i>Cyathea</i>	1.0	2.0
<i>Davallia</i>	0.5	1.0
Monolete Spores	39.0	78.0
Trilete Spores	1.5	3.0
Cyperaceae	7.5	15.0
Total		201.0

KK4 150cm	Percentage	Numbers
<i>Canthium barbatum</i>	15.5	31.0
<i>Casuarina equisetifolia</i>	0.5	1.0
<i>Cocos nucifera</i>	2.5	5.0
<i>Elaeocarpus tonganus</i>	1.5	3.0
<i>Inocarpus edulis</i> sim.	3.0	6.0
<i>Macropiper</i>	1.0	2.0
Moraceae/Urticaceae	2.5	5.0
<i>Pandanus</i>	10.5	21.0
<i>Pipturus argenteus</i> sim.	45.5	91.0
Compositae	2.5	5.0
Gramineae	6.0	12.0
<i>Freyinetia wilderi</i>	1.5	3.0
Monolete Spores	5.0	10.0
Trilete Spores	2.0	4.0
Cyperaceae	0.5	1.0
Total		200.0

KK4 160cm	Percentage	Numbers
<i>Canthium barbatum</i>	13.0	26.0
<i>Cocos nucifera</i>	5.5	11.0
<i>Elaeocarpus tonganus</i>	0.5	1.0
<i>Homalium acuminatum</i>	0.5	1.0
<i>Macropiper</i>	0.5	1.0
Moraceae/Urticaceae	1.0	2.0
<i>Pandanus</i>	10.0	20.0
<i>Pipturus argenteus</i> sim.	45.5	91.0
<i>Acrostichum aureum</i>	1.5	3.0
<i>Hypolepis</i>	0.5	1.0
Monolete Spores	18.0	36.0
<i>Nephrolepis</i>	0.5	1.0
Trilete Spores	0.5	1.0
Cyperaceae	3.0	6.0
<i>Typha</i>	0.5	1.0
Total		202.0

KK4 170cm	Percentage	Numbers
<i>Canthium barbatum</i>	7.5	15.0
<i>Cocos nucifera</i>	12.0	24.0
<i>Elaeocarpus tonganus</i>	1.0	2.0
<i>Homalium acuminatum</i>	2.5	5.0
Moraceae/Urticaceae	2.0	4.0
<i>Pandanus</i>	6.0	12.0
<i>Pipturus argenteus</i> sim.	7.0	14.0
Gramineae	1.0	2.0
<i>Acrostichum aureum</i>	5.5	11.0
<i>Cyathea</i>	0.5	1.0
<i>Dicranopteris linearis</i>	0.5	1.0
Monolete Spores	35.5	71.0
<i>Nephrolepis</i>	13.0	26.0
Trilete Spores	4.0	8.0
Cyperaceae	2.0	4.0
<i>Typha</i>	0.5	1.0
Total		201.0

KK4 180cm	Percentage	Numbers
<i>Canthium barbatum</i>	3.0	6.0
<i>Cocos nucifera</i>	8.5	17.0
<i>Elaeocarpus tonganus</i>	1.5	3.0
<i>Homalium acuminatum</i>	1.0	2.0
Moraceae/Urticaceae	63.0	126.0
<i>Pandanus</i>	1.5	3.0
<i>Pipturus argenteus</i> sim.	0.5	1.0
Compositae	0.5	1.0
Gramineae	4.0	8.0
<i>Acrostichum aureum</i>	0.5	1.0
<i>Davallia</i>	1.0	2.0
Monolete Spores	14.5	29.0
Trilete Spores	0.5	1.0
Cyperaceae	0.5	1.0
Total		201.0

KK4 290cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	2.0	4.0
<i>Canthium barbatum</i>	7.5	15.0
<i>Cocos nucifera</i>	0.5	1.0
<i>Ixora bracteata</i>	1.0	2.0
<i>Podocarpus</i>	0.5	1.0
<i>Argusia argentea</i>	0.5	1.0
Moraceae/Urticaceae	10.5	21.0
<i>Pandanus</i>	2.0	4.0
<i>Pipturus argenteus</i> sim.	17.0	34.0
Compositae	5.5	11.0
Gramineae	18.5	37.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	21.5	43.0
<i>Cyathea</i>	1.0	2.0
Monolete Spores	10.5	21.0
Cyperaceae	0.5	1.0
<i>Typha</i>	0.5	1.0
Total		200.0

KK4 440cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.5	3.0
<i>Cocos nucifera</i>	2.0	4.0
<i>Elaeocarpus tonganus</i>	0.5	1.0
Moraceae/Urticaceae	1.5	3.0
<i>Pandanus</i>	8.0	16.0
<i>Pipturus argenteus</i> sim.	26.0	52.0
Compositae	1.5	3.0
Gramineae	7.5	15.0
Gramineae/Cyperaceae?	2.0	4.0
<i>Loranthus</i>	1.0	2.0
<i>Acrostichum aureum</i>	45.5	91.0
Monolete Spores	3.0	6.0
Cyperaceae	0.5	1.0
<i>Typha</i>	0.5	1.0
Total		202.0

KK4 190cm	Percentage	Numbers
<i>Canthium barbatum</i>	55.5	111.0
<i>Cocos nucifera</i>	0.5	1.0
<i>Fagraea berteriana</i>	0.5	1.0
<i>Homalium acuminatum</i>	0.5	1.0
<i>Pandanus</i>	0.5	1.0
<i>Pipturus argenteus</i> sim.	6.5	13.0
Gramineae	11.0	22.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	6.5	13.0
<i>Dicranopteris linearis</i>	2.5	5.0
Monolete Spores	8.5	17.0
Trilete Spores	6.0	12.0
<i>Typha</i>	1.0	2.0
Total		200.0

KK4 390cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	2.0	4.0
<i>Cocos nucifera</i>	0.5	1.0
<i>Homalium acuminatum</i>	0.5	1.0
Moraceae/Urticaceae	15.5	33.0
<i>Pandanus</i>	0.5	1.0
<i>Pipturus argenteus</i> sim.	19.0	40.0
Compositae	0.5	1.0
Gramineae	3.0	7.0
<i>Freycinetia wilderi</i>	0.5	1.0
<i>Acrostichum aureum</i>	57.0	122.0
Monolete Spores	0.5	1.0
Cyperaceae	0.5	1.0
Total		213.0

KK4 470cm	Percentage	Numbers
<i>Cocos nucifera</i>	1.0	2.0
<i>Elaeocarpus tonganus</i>	0.5	1.0
Moraceae/Urticaceae	1.5	3.0
<i>Pandanus</i>	0.5	1.0
<i>Pipturus argenteus</i> sim.	22.0	48.0
Compositae	3.0	6.0
Gramineae	0.5	1.0
<i>Acrostichum aureum</i>	77.0	147.0
Total		209.0

KK4 490	Percentage	Numbers
<i>Barringtonia asiatica</i>	2.0	5.0
<i>Cocos nucifera</i>	4.0	8.0
<i>Homalium acuminatum</i>	1.0	2.0
<i>Pandanus</i>	2.0	4.0
<i>Pipturus argenteus</i> sim.	77.0	173.0
Gramineae	1.0	2.0
<i>Acrostichum aureum</i>	5.0	11.0
<i>Dicranopteris linearis</i>	0.5	1.0
Monolete Spores	3.0	6.0
Trilete Spores	0.5	1.0
Total		213.0

KK4 520cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	3.5	7.0
<i>Cocos nucifera</i>	9.0	18.0
<i>Fagraea berteriana</i>	0.5	1.0
<i>Homalium acuminatum</i>	1.5	3.0
Moraceae/Urticaceae	12.5	25.0
<i>Pandanus</i>	3.0	6.0
<i>Pipturus argenteus</i> sim.	64.0	128.0
Compositae	2.0	4.0
Gramineae	1.5	3.0
<i>Acrostichum aureum</i>	1.5	3.0
Monolete Spores	2.0	4.0
Total		202.0

KK4 550cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	2.5	5.0
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	12.5	25.0
<i>Elaeocarpus tonganus</i>	1.0	2.0
<i>Podocarpus</i>	0.5	1.0
Moraceae/Urticaceae	2.0	4.0
<i>Pandanus</i>	4.0	8.0
<i>Pipturus argenteus</i> sim.	61.0	122.0
<i>Acrostichum aureum</i>	11.5	23.0
<i>Cyathea</i>	0.5	1.0
<i>Davallia</i>	0.5	1.0
Monolete Spores	2.0	4.0
Cyperaceae	1.0	2.0
Total		200.0

KK4 580cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Cocos nucifera</i>	2.5	5.0
<i>Elaeocarpus tonganus</i>	0.5	1.0
Moraceae/Urticaceae	3.0	6.0
<i>Pandanus</i>	7.5	16.0
<i>Pipturus argenteus</i> sim.	83.0	176.0
Compositae	0.5	1.0
Gramineae	0.5	1.0
<i>Acrostichum aureum</i>	2.5	5.0
Total		212.0

KK4 670cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	9.0	10.0
<i>Cocos nucifera</i>	5.5	6.0
<i>Homalium acuminatum</i>	1.0	1.0
Moraceae/Urticaceae	19.0	21.0
<i>Pandanus</i>	16.0	18.0
<i>Pipturus argenteus</i> sim.	24.0	26.0
Gramineae	10.0	11.0
<i>Acrostichum aureum</i>	9.0	10.0
<i>Cyathea</i>	4.0	4.0
<i>Davallia</i>	1.0	1.0
Monolete Spores	1.0	1.0
Total		109.0

KK4 530cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	11.0	22.0
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	19.5	39.0
<i>Homalium acuminatum</i>	1.0	2.0
<i>Ixora bracteata</i>	0.5	1.0
<i>Argusia argentea</i>	1.0	2.0
Moraceae/Urticaceae	4.5	9.0
<i>Pandanus</i>	1.5	3.0
<i>Pipturus argenteus</i> sim.	57.0	114.0
Compositae	1.5	3.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	2.0	4.0
<i>Cyathea</i>	0.5	1.0
Monolete Spores	1.0	2.0
Total		204.0

KK4 570cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	3.5	7.0
<i>Canthium barbatum</i>	2.0	4.0
<i>Cocos nucifera</i>	28.5	57.0
<i>Elaeocarpus tonganus</i>	4.0	8.0
<i>Fagraea berteriana</i>	1.0	2.0
<i>Homalium acuminatum</i>	3.5	7.0
<i>Podocarpus</i>	0.5	1.0
Moraceae/Urticaceae	2.5	5.0
<i>Pandanus</i>	5.5	11.0
<i>Pipturus argenteus</i> sim.	35.5	71.0
Gramineae	3.0	7.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	7.5	15.0
<i>Cyathea</i>	1.0	2.0
Monolete Spores	4.0	8.0
<i>Typha</i>	0.5	1.0
Total		207.0

KK4 590cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	11.0	22.0
<i>Cocos nucifera</i>	14.5	29.0
<i>Fagraea berteriana</i>	0.5	1.0
<i>Homalium acuminatum</i>	1.5	3.0
<i>Ixora bracteata</i>	0.5	1.0
<i>Macropiper</i>	8.5	17.0
<i>Pandanus</i>	3.5	7.0
<i>Pipturus argenteus</i> sim.	38.0	76.0
Gramineae	8.5	17.0
<i>Freycinetia wilderi</i>	0.5	1.0
<i>Loranthus</i>	2.0	4.0
<i>Acrostichum aureum</i>	1.5	3.0
<i>Hypolepis</i>	0.5	1.0
<i>Anemia</i>	1.0	2.0
Monolete Spores	5.0	10.0
Trilete Spores	0.5	1.0
Cyperaceae	1.0	2.0
<i>Typha</i>	1.5	3.0
Total		200.0

KK4 690cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	19.5	39.0
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	8.0	16.0
<i>Fagraea berteriana</i>	0.5	1.0
<i>Homalium acuminatum</i>	1.0	2.0
<i>Ixora bracteata</i>	1.5	3.0
<i>Argusia argentea</i>	1.0	2.0
<i>Pandanus</i>	14.5	29.0
<i>Pipturus argenteus</i> sim.	19.5	39.0
Compositae	1.5	3.0
Gramineae	7.0	14.0
<i>Freycinetia wilderi</i>	2.0	4.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	11.0	22.0
<i>Hypolepis</i>	0.5	1.0
Monolet Spores	5.0	10.0
Cyperaceae	7.5	15.0
<i>Typha</i>	2.0	4.0
Total		203.0

KK4 790cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Cocos nucifera</i>	4.5	9.0
<i>Homalium acuminatum</i>	0.5	1.0
<i>Ixora bracteata</i>	1.0	2.0
<i>Macropiper</i>	6.0	12.0
<i>Pandanus</i>	27.0	54.0
<i>Pipturus argenteus</i> sim.	21.0	42.0
Gramineae	5.5	11.0
<i>Freycinetia wilderi</i>	2.5	5.0
<i>Acrostichum aureum</i>	25.5	51.0
<i>Cyathea</i>	1.0	2.0
Monolet Spores	2.5	5.0
Trilete Spores	1.5	3.0
Cyperaceae	0.5	1.0
<i>Typha</i>	1.0	2.0
Total		200.0

KK4 890cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Cocos nucifera</i>	14.5	29.0
<i>Homalium acuminatum</i>	0.5	1.0
<i>Macropiper</i>	4.0	8.0
<i>Pandanus</i>	3.5	7.0
<i>Pipturus argenteus</i> sim.	29.0	58.0
<i>Scaevola taccada</i> sim.	0.5	1.0
Compositae	0.5	1.0
Gramineae	6.5	13.0
<i>Freycinetia wilderi</i>	2.5	5.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	3.0	6.0
<i>Hypolepis</i>	1.0	2.0
Monolet Spores	17.5	35.0
Trilete Spores	0.5	1.0
Cyperaceae	8.0	16.0
<i>Typha</i>	12.5	25.0
Total		210.0

KK1

Samples:

KK1 10cm; KK1 60cm; KK1 110cm; KK1 160cm; KK1 210cm; KK1 250cm; KK1 310cm; KK1 360cm; KK1 410cm; KK1 460cm; KK1 510cm; KK1 560cm; KK1 570cm; KK1 610cm; KK1 660cm; KK1 710cm; KK1 760cm; KK1 810cm; KK1 860cm; KK1 910cm; KK1 960cm; KK1 1010cm; KK1 1052cm.

KK1 10cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	3.5	7.0
<i>Homalium acuminatum</i>	0.5	1.0
<i>Malvastrum</i>	0.5	1.0
<i>Pandanus</i>	11.0	24.0
<i>Pipturus argenteus</i> sim.	24.0	52.0
Compositae	2.0	4.0
Gramineae	2.5	5.0
<i>Davallia</i>	1.0	2.0
Monolet Spores	49.5	105.0
Trilete Spores	5.0	10.0
Total		213.0

KK1 60cm	Percentage	Numbers
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	3.0	6.0
<i>Pandanus</i>	9.5	19.0
<i>Pipturus argenteus</i> sim.	35.5	71.0
Compositae	1.5	3.0
Gramineae	4.5	9.0
<i>Freycinetia wilderi</i>	1.5	3.0
<i>Dicranopteris linearis</i>	1.5	3.0
<i>Anemia</i>	1.5	3.0
Monolet Spores	25.0	50.0
Trilete Spores	16.0	32.0
Total		200.0

KK1 110cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Cocos nucifera</i>	1.0	2.0
<i>Pandanus</i>	8.5	17.0
<i>Pipturus argenteus</i> sim.	22.5	45.0
Compositae	1.5	3.0
Gramineae	5.5	11.0
<i>Freycinetia wilderi</i>	0.5	1.0
<i>Acrostichum aureum</i>	3.0	6.0
<i>Davallia</i>	2.0	4.0
<i>Dicranopteris linearis</i>	2.0	4.0
<i>Anemia</i>	3.0	6.0
Monolet Spores	42.5	87.0
Trilete Spores	7.0	14.0
Total		201.0

KK1 160cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Canthium barbatum</i>	20.0	40.0
<i>Cocos nucifera</i>	2.0	4.0
<i>Pandanus</i>	4.0	8.0
<i>Pipturus argenteus</i> sim.	21.0	42.0
Gramineae	1.0	2.0
<i>Davallia</i>	1.0	2.0
Monolete Spores	31.5	63.0
Trilete Spores	19.0	38.0
Total		200.0

KK1 210cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	1.5	3.0
<i>Canthium barbatum</i>	7.0	14.0
<i>Cocos nucifera</i>	22.0	44.0
<i>Pandanus</i>	2.0	4.0
<i>Pipturus argenteus</i> sim.	23.5	47.0
<i>Loranthus</i>	0.5	1.0
Gramineae	1.5	3.0
<i>Cyathea</i>	1.0	2.0
Monolete Spores	40.0	80.0
Trilete Spores	1.0	2.0
Total		200.0

KK1 250cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.5	3.0
<i>Cocos nucifera</i>	4.0	8.0
<i>Pandanus</i>	18.5	37.0
<i>Pipturus argenteus</i> sim.	37.5	75.0
Compositae	4.0	8.0
Gramineae	7.0	14.0
<i>Cyathea</i>	1.0	2.0
<i>Davallia</i>	1.0	2.0
<i>Hypolepis</i>	1.0	2.0
Monolete Spores	24.5	49.0
Total		200.0

KK1 310cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	5.0	10.0
<i>Elaeocarpus tonganus</i>	0.5	1.0
<i>Homalium acuminatum</i>	1.0	2.0
<i>Pandanus</i>	15.5	32.0
<i>Pipturus argenteus</i> sim.	17.5	36.0
Compositae	0.5	1.0
Gramineae	8.0	16.0
<i>Acrostichum aureum</i>	3.0	6.0
<i>Cyathea</i>	3.5	7.0
<i>Davallia</i>	1.5	3.0
<i>Dicranopteris linearis</i>	1.0	2.0
Monolete Spores	41.5	86.0
Trilete Spores	2.0	4.0
Total		208.0

KK1 360cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.5	3.0
<i>Cocos nucifera</i>	5.0	10.0
<i>Pandanus</i>	4.0	8.0
<i>Pipturus argenteus</i> sim.	2.0	4.0
<i>Acrostichum aureum</i>	80.5	161.0
<i>Cyathea</i>	1.0	2.0
<i>Anemia</i>	0.5	1.0
Monolete Spores	6.0	12.0
Total		201.0

KK1 410cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	1.0	2.0
<i>Canthium barbatum</i>	6.5	13.0
<i>Cocos nucifera</i>	5.0	10.0
<i>Homalium acuminatum</i>	0.5	1.0
<i>Pandanus</i>	3.5	7.0
<i>Pipturus argenteus</i> sim.	10.0	20.0
Gramineae	2.0	4.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	59.0	118.0
<i>Acrostichum aureum</i> / <i>Schizaea</i>	0.5	1.0
<i>Cyathea</i>	1.5	3.0
Monolete Spores	7.0	14.0
Trilete Spores	3.5	7.0
Total		201.0

KK1 460cm	Percentage	Numbers
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	1.5	3.0
<i>Podocarpus</i>	0.5	1.0
<i>Pandanus</i>	0.5	1.0
<i>Pipturus argenteus</i> sim.	11.0	23.0
Gramineae	0.5	1.0
<i>Acrostichum aureum</i>	69.0	147.0
Monolete Spores	0.5	1.0
Trilete Spores	16.0	34.0
Total		213.0

KK1 510cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Canthium barbatum</i>	0.5	1.0
<i>Pandanus</i>	5.0	10.0
<i>Pipturus argenteus</i> sim.	1.5	3.0
Compositae	2.0	4.0
<i>Loranthus</i>	0.5	1.0
<i>Acrostichum aureum</i>	78.5	157.0
<i>Davallia</i>	0.5	1.0
<i>Hypolepis</i>	0.5	1.0
Trilete Spores	12.5	25.0
Total		204.0

KK1 560cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	1.0	2.0
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	1.5	3.0
Moraceae/Urticaceae	0.5	1.0
<i>Pandanus</i>	3.0	6.0
<i>Pipturus argenteus</i> sim.	87.0	173.0
Compositae	0.5	1.0
<i>Acrostichum aureum</i>	5.0	10.0
Trilete Spores	1.5	3.0
Total		200.0

KK1 570cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Cocos nucifera</i>	2.0	4.0
<i>Pipturus argenteus</i> sim.	1.0	2.0
<i>Acrostichum aureum</i>	89.5	179.0
Monolete Spores	6.5	13.0
Trilete Spores	0.5	1.0
Total		200.0

KK1 610cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	9.0	18.0
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	6.5	13.0
<i>Malvastrum</i>	0.5	1.0
Moraceae/Urticaceae	0.5	1.0
<i>Pandanus</i>	0.5	1.0
<i>Pipturus argenteus</i> sim.	12.0	24.0
<i>Acrostichum aureum</i>	46.5	93.0
Monolete Spores	24.5	50.0
Total		202.0

KK1 660cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	16.5	33.0
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	6.0	12.0
<i>Elaeocarpus tonganus</i>	1.5	3.0
<i>Homalium acuminatum</i>	7.0	14.0
<i>Podocarpus</i>	0.5	1.0
<i>Pandanus</i>	2.0	4.0
<i>Pipturus argenteus</i> sim.	19.0	38.0
Gramineae	1.0	2.0
<i>Acrostichum aureum</i>	14.0	28.0
Monolete Spores	31.5	63.0
Total		200.0

KK1 710cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	15.0	30.0
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	6.0	12.0
<i>Elaeocarpus tonganus</i>	0.5	1.0
<i>Pandanus</i>	7.0	14.0
<i>Pipturus argenteus</i> sim.	22.0	44.0
Gramineae	1.0	2.0
<i>Freycinetia wilderi</i>	0.5	1.0
<i>Acrostichum aureum</i>	3.5	7.0
<i>Davallia</i>	0.5	1.0
Monolete Spores	43.5	87.0
Total		201.0

KK1 760cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	6.5	13.0
<i>Cocos nucifera</i>	5.0	10.0
<i>Homalium acuminatum</i>	2.0	4.0
<i>Pandanus</i>	0.5	1.0
<i>Pipturus argenteus</i> sim.	77.5	155.0
<i>Freycinetia wilderi</i>	0.5	1.0
<i>Acrostichum aureum</i>	0.5	1.0
<i>Cyathea</i>	1.0	2.0
Monolete Spores	7.5	15.0
Total		202.0

KK1 810cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	14.0	28.0
<i>Canthium barbatum</i>	0.5	1.0
<i>Cocos nucifera</i>	1.0	2.0
<i>Hibiscus tiliaceus</i>	1.0	2.0
<i>Homalium acuminatum</i>	2.0	4.0
<i>Pipturus argenteus</i> sim.	49.5	99.0
Gramineae	0.5	1.0
<i>Acrostichum aureum</i>	9.5	19.0
<i>Davallia</i>	0.5	1.0
Monolete Spores	21.5	43.0
Total		200.0

KK1 860cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	15.5	31.0
<i>Canthium barbatum</i>	1.5	3.0
<i>Cocos nucifera</i>	7.0	14.0
<i>Elaeocarpus tonganus</i>	1.0	2.0
<i>Homalium acuminatum</i>	4.5	9.0
<i>Podocarpus</i>	0.5	1.0
<i>Pandanus</i>	9.0	18.0
<i>Pipturus argenteus</i> sim.	15.5	31.0
<i>Loranthus</i>	0.5	1.0
Compositae	0.5	1.0
Gramineae	0.5	1.0
<i>Acrostichum aureum</i>	15.5	31.0
<i>Cyathea</i>	1.0	2.0
<i>Davallia</i>	1.0	2.0
Monolete Spores	26.5	53.0
Trilete Spores	1.0	2.0
Total		202.0

KK1 1010cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	3.0	6.0
<i>Elaeocarpus tonganus</i>	3.0	6.0
<i>Homalium acuminatum</i>	4.0	8.0
Moraceae/Urticaceae	1.5	3.0
<i>Pandanus</i>	8.0	16.0
<i>Pipturus argenteus</i> sim.	70.0	140.0
Compositae	1.0	2.0
Gramineae	0.5	1.0
<i>Freyxinetia wilderi</i>	3.0	6.0
<i>Acrostichum aureum</i>	2.5	5.0
<i>Cyathea</i>	0.5	1.0
Monolete Spores	3.0	6.0
Total		200.0

KK1 910cm	Numbers
<i>Barringtonia asiatica</i>	1.0
<i>Cocos nucifera</i>	2.0
<i>Pipturus argenteus</i> sim.	1.0
Monolete Spores	2.0
Total	6.0

KK1 960cm	Numbers
<i>Barringtonia asiatica</i>	2.0
<i>Canthium barbatum</i>	1.0
<i>Cocos nucifera</i>	1.0
<i>Pipturus argenteus</i> sim.	1.0
Monolete Spores	3.0
Total	8.0

KK1 1052cm	Percentage	Numbers
<i>Barringtonia asiatica</i>	0.5	1.0
<i>Canthium barbatum</i>	1.0	2.0
<i>Cocos nucifera</i>	1.0	2.0
<i>Elaeocarpus tonganus</i>	2.0	4.0
<i>Homalium acuminatum</i>	1.0	2.0
<i>Pandanus</i>	6.5	13.0
<i>Pipturus argenteus</i> sim.	20.5	41.0
Compositae	1.5	3.0
Gramineae	0.5	1.0
<i>Freyxinetia wilderi</i>	1.5	3.0
<i>Acrostichum aureum</i>	14.0	28.0
<i>Cyathea</i>	5.0	10.0
<i>Davallia</i>	1.0	2.0
Monolete Spores	29.5	59.0
Trilete Spores	0.5	1.0
<i>Typha</i>	14.0	28.0
Total		200.0

ATUPA SWAMP

AT1

Samples: AT1 0cm; AT1 100cm; AT1 150cm; AT1 230cm.

AT1 0cm	Numbers
<i>Cocos nucifera</i>	7.0
Moraceae/Urticaceae	4.0
<i>Pipturus argenteus</i> sim.	9.0
<i>Premna?</i>	1.0
<i>Anemia</i>	1.0
Monolete Spores	1.0
Trilete Spores	2.0
Total	25.0

AT1 100cm	Numbers
<i>Cocos nucifera</i>	1.0
<i>Macropiper</i>	5.0
<i>Pipturus argenteus</i> sim.	1.0
Total	7.0

AT1 230cm	Numbers
<i>Pipturus argenteus</i> sim.	1.0

ARO'A SWAMP

AO1

Samples: AO1 0cm; AO1 50cm; AO1 100cm; AO1 200cm.

AO1 0cm	Numbers
<i>Cocos nucifera</i>	2.0
Moraceae/Urticaceae	2.0
<i>Pipturus argenteus</i> sim.	2.0
Gramineae	4.0
Monolete Spores	9.0
Total	19.0

AO1 50cm	Numbers
<i>Cocos nucifera</i>	1.0
Moraceae/Urticaceae	1.0
<i>Dicranopteris linearis</i>	1.0
Monolete Spores	5.0
Total	8.0

AO1 100cm	Numbers
Monolete Spores	1.0

AO1 200cm	Numbers
Monolete Spores	4.0

A.5 An Ecological Zonation of Human Resources

The following section lists all the useful plants, with additional information on animals and minerals exploited, according to the zone(s) in which they are found. Then by each plant are listed the various uses of that plant. The sources for this are Buck (1927; 1944) and Whistler (1990). It is hoped through this to gain some idea of the extent and nature of traditional human exploitation of each zone. One caveat is that it is not so much the number of uses of the various plants in a particular zone so much as the relative importance, especially with quantity of material used, of the plants. Some plants occur in more than one zone. In this case, one has to consider where the plants are most common or most convenient for humans to gather them.

UPLAND

Animal

Birds: See Coastal Plain and Valley

Rats: See Coastal Plain and Valley

Mineral

Basalt See Shore

Clay See Shore

Ochre See Shore

UPLAND PLANTS

Trees1) *Bischofia javanica*/Koka

Fruits medicines

2) *Casuarina equisetifolia*/Toa

See Shore Plants

3) *Celtis pacifica*/Mokopine

Wood children's tops

4) *Cerbera odollam*/Reva

Sap liniment for rheumatism

5) *Cyathea decurrens*/Panga/'Eki/Tree Fern

Pith famine food

6) *Cyathea parksi*/Panga/'Eki/Tree Fern

Pith famine food

7) *Elaeocarpus tonganus*/

Karaka timber

8) *Fagraea berteriana*/Pua

Wood handicrafts

Flowers leis, scenting coconut oil

9) *Glochidion ramiflorum*/Ma'ame

Wood furniture, house posts

10) *Hemandia moerenhoutiana*/Turina

Wood canoes

11) *Hibiscus tiliaceus*/'Au

See Shore Plants

12) *Homalium acuminatum*/Mato/Moto

Wood posts, house construction, planting stick, canoe house beams (Davis pers. comm. 1992)

13) *Inocarpus fagifer*/'i/Tahitian Chestnut

See Coastal Plain and Valley Plants

14) *Macaranga harveyana*/'Enua

- Wood
15) *Pittosporum arborescens/Kavakava*
Wood timber, firewood
16) *Santalum insulare/A'i Bertero* var. *miti'aro* Sykes (Miti'aro only)
Wood scenting coconut oil, curing headaches and earaches, mosquito repellent
17) *Sapindus c.f. vitensis/'Ake'ake* (Ma'uke only)
Wood timber, handaxes
18) *Streblus anthropophagum/Matimati*
food - edible fruit
19) *Syzygium malaccense/Ka'ika*
See Coastal Plain and Valley Plants
20) *Terminalia glabrata/Kauariki*
See Coastal Plain and Valley Plants
- Small Trees and Shrubs**
- 1) *Alyxia stellata/Maire rakau*
bark and leaves for garlands
2) *Angiopteris longifolia/'Ana'e*
Rhizome food
3) *Canthium barbatum/Matira*
Wood canoe booms, fishing pole for catching mackerel, house posts and rafter sticks, food -edible fruit
4) *Cordyline terminalis/Rau ti/Ti tree*
See Coastal Plain and Valley Plants
5) *Eugenia reinwardtiana/Nioi*
Fruit food (children)
6) *Fitchia speciosa/Neinei*
Nectar food
7) *Geniostoma/'Ange*
garlands, scenting coconut oil and bark cloth
8) *Ixora bracteata/'Itoa*
Fruit food eaten by children (Miti'aro only)
9) *Leucosyke corymbulosa/Rau ta'uri*
stakes in fishtraps
10) *Macropiper latifolium/Kavakava atua*
medicines
11) *Melastoma denticulatum/'Ua matukutuku*
children's food
12) *Myoporum sandwicense/Ngaio*
Flowers scenting coconut oil
13) *Solanum repandum/Morirei*
red dye (Mangaia)
14) *Tephrosia purpurea/Mata'ora*
See Coastal Plain and Valley Plants
- Climbers**
- 1) *Canavalia cathartica/Kaka poti*
pods used as toy boats by children
2) *Entada phaseoloides/Kaka vai*
Stem water can be obtained from cut stems, bark cloth for the poor (possible confusion with *kaka*: the roots of the Banyan Tree), rope for dragging canoes, leaf sweeps for fishing (Aitutaki)
garlands
Seeds circular fish traps, small fish traps, cylindrical fish traps
3) *Freycinetia wilderi/Kiekie*
4) *Jasminum didymum/'Aketa*
freshwater eel traps, baskets, trays
5) *Mucuna gigantea?/Kaka tea*
Stem jump ropes, temporary ropes, skipping ropes, swings
- Herbaceous Plants**
- 1) *Asplenium nidus/Kota'a*
Fronds wrapping up oven food, tips eaten, garden ornamentals, thatch for forest shelters
2) *Blechnum orientale/Moumea*
filling on top of ridge pole and beneath the ridge sheet (Mangaia), floor covering
3) *Dicranopteris linearis/Tuam'e*
medicines
4) *Leucas decedentata/Pua'ikao*
medicine for thrush, urinary tract infections, haemorrhoids and circumcision wounds
5) *Lindernia crustacea/Tutae torea*
medicine for children's ailments and some unrelated ailments

6) <i>Lycopodium cernuum</i> / <i>Remu maunga</i>	headleis
7) <i>Marattia salicina</i> / <i>Para</i>	food
8) <i>Microsorium sylvaticum</i> / <i>Maire kakara</i>	scented garlands
9) <i>Nephrolepis hirsutula</i> / <i>Toroutou</i>	medicine for treating circumcision scabs
10) <i>Phymatosorus scolopendria</i> / <i>Maire</i>	medicine for a children's ailment, other illnesses, dancing skirts, wreaths
11) <i>Pteris tripartita</i> / <i>'Are rupe</i>	camouflage for catching pigeons (Tahiti)
12) <i>Zingiber zerumbet</i> / <i>Kip'enua</i> /Shampoo Ginger Rhizome	hair softener, medicine for haemorrhoids and prolapsed rectum

COASTAL PLAIN AND VALLEY

Animal

Birds:

Bone	tattooing comb
Feathers ⁶⁵	headdresses, headbands, canoe stern, Mangaian kites, decoration, staff god ornaments, ornament for carved slabs (<i>umu</i> ? from Aitutaki and Mangaia), Atiu gods, Miti'aro gods, Ma'uke gods,

Mangaian gods

Flesh	food
Bone	necklaces, fish hooks (Ma'uke), combs
Human hair	baldrics, ear ornaments, necklaces, armlets (Mangaia), anklets (Mangaia), Atiu gods, Mangaian gods, carved slabs from Mangaia (<i>umu</i> ?)

Pigs:

Flesh	food
Tusks	fish hooks (Ma'uke)

Rats:

Bone	tattooing comb
Flesh	food (Mangaia)

Mineral

Basalt	See Shore
Clay	body paint
Ochre	body paint

COASTAL PLAIN AND VALLEY PLANTS

Trees

1) *Aleurites moluccana*/*Tuitui*/Candlenut

Bark	red dye, black dye, medicine
Kernels	tattooing pigment, body paint, wood paint, polishing wood, torches, <i>peipei</i> balls, jackstones (<i>pere</i>), food, used in massage for treating earaches and headaches
Leaves	lining of oven used in bark cloth manufacture
Wood	planting sticks

2) *Artocarpus altilis*/*Kuru*/Breadfruit

Wood	tables, bark for cloth, gunwale strake or rail (canoes), canoe bailers, fish trap floats, childrens' <i>pua</i> or throwing discs, <i>pa'u</i> (skin drums), carved slabs (<i>umu</i> /religious carved slabs placed on a <i>marae</i> ? from Aitutaki)
<i>Tapou</i> /Gum	strengtheners or adhesive for arm-sling, canoe caulking, birdlime when mixed with pounded candlenuts, weight on tip of <i>teka</i> (dart), adhesive for <i>mamu tukutuku</i> (kites), adhesive for shell patch on trumpets
Leaf stem	rat traps
Stem tips	medicine for abdominal pains
Leaves	earth oven covers, solution of burnt leaves with banana trunk sap used as medicine for shingles
Fruit	food

3) *Barringtonia asiatica*/*'Utu*

See Shore Plants

4) *Caesalpinia major*/*Tataramoa*

Seeds	children's games
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5) *Calophyllum inophyllum*/*Tamanu*

⁶⁵

The red tail and wing feathers of the *Kura* or Red Parakeet were considered the most important for headdresses and religious objects; the feathers of the Red-tailed Tropic Bird, the Greater Frigate Bird and the Domestic Fowl were used as plumes; Tropic Bird feathers were used as decoration for canoe sterns; and the feathers of the White-tailed Tropic Bird, the Pacific Pigeon, Long-tailed Cuckoo and various seabirds were also used.

See Shore Plants

6) *Casuarina equisetifolia*/Toa

See Shore Plants

7) *Cocos nucifera*/Tumunu/Coconut

See Shore Plants

8) *Erythrina variegata*/Ngatae

Wood

fish net floats

9) *Ficus prolixa*/Aoa/Ava/Banyan

Wood

fire plough, bark cloth, purgative for serious diseases thought to be cancer whip for top (*potaka*)

Aerial root

10) *Ficus tinctoria*/Mati

Berries

pounded together with *tou* for a red dye

11) *Guetarda speciosa*/Ano

See Shore Plants

12) *Hibiscus tiliaceus*/'Au

See Shore Plants

13) *Homalium acuminatum*/Mato/Moto

See Upland Plants

14) *Inocarpus fagifer*/T'i/Tahitian Chestnut

Wood

planting stick (Ma'uke), firewood

Bark

medicine for babies with teething problems, medicine for animals, especially pigs, with digestive or urinary problems

Fruits

medicine for animals, especially pigs, with digestive or urinary problems

Leaves

childrens' kites

15) *Spondias dulcis*/Vi kavakava/Polynesian Plum/

Otaheite Apple

medicine for thrush and urinary tract ailments

16) *Syzygium malaccense*/Ka'ika

Fruit

famine food

Bark

medicine for thrush and used as an emetic

Leaves

medicine for thrush

17) *Terminalia glabrata*/Kauariki

Wood

houses

Leaves

medicines to soak fractures and sprains

18) *Thespesia populnea*/Miro

See Shore Plants

Small Trees and Shrubs

1) *Abelmoschus moschatus*/

Vaivai tara

medicine for impotence, fractures, sprains and other unrelated ailments

2) *Alocasia macrorrhiza*/

Kape

food, famine food (according to Tara'are pers. comm. 1992)

3) *Amorphophallus paeoniifolius*/

Teve

famine food

4) *Broussonetia papyrifera*/'Aute/Paper Mulberry

'Aute wood

wooden peg for ripening breadfruits

'Aute

bark cloth for *tiputa*, *maro* and *pareu*

Purautea bark

fishing nets and lines

Papako bark

fishing nets and lines

5) *Cordyline terminalis*/

Rau ti /Ti tree

ornaments, medicine for sore throats, burns, used as a purgative, food, kilts, arm ornaments, leg ornaments, Mangaian kites, headdresses, famine food (according to Tara'are pers. comm. 1992)

6) *Cyrtosperma chamonis*/Puraka

Leaves

wrapping during retting process of bark cloth manufacture, oven covers

Stems

hats, mats

7) *Gardenia taitensis*/

Tiare maori

Flowers

leis, ear ornaments, scenting coconut oil, medicine for children's ailments, migraine headaches or

sinusitis

Wood

cross bar in scoop net handles (Atiu, Ma'uke)

8) *Hibiscus rosa-sinensis*/Kaute

Flowers

medicine for children's ailments and to induce abortion, blotches of red dye

9) *Musa x paradisiaca*/Meika/Banana and Plantain

Banana stems

lining of oven used in bark cloth manufacture, pig fodder

Banana fruit

food

<i>Rau-meika</i> ⁶⁶	wrapping during retting process of bark cloth manufacture, <i>tiputa</i> , wreaths, covering for <i>pa'ata</i> or food stretcher/platform, mulch, for sleeping on, wrapping food
<i>Rau-uru</i> ⁶⁷	lining for <i>ma'i</i> ⁶⁸ pit
<i>Kua</i> ⁶⁹	kite string, <i>kio</i> hook bait lashing, binding for <i>tumutumu</i> darts
Banana sap	medicine for shingles, kite glue
10) <i>Musa troglodytarum</i> / <i>Utu</i> / Mountain Plantain	
Fruit	food, famine food (Afsenius 1988a.)
Trunk epidermis	hats, mats
Sap	black dye, medicine for shingles
<i>Rau-ti</i> / Leaves	wrapping for fish to be cooked in earth oven (<i>umu</i>), weft, black dye
11) <i>Pandanus tectorius</i> / <i>Ara ta'a tai</i>	
See Shore Plants	
12) <i>Piper methysticum</i> /	
<i>Kava maori</i>	drink, medicine for urinary tract
13) <i>Saccharum officinalis</i> / <i>To</i> / Sugar cane	
Stems	food, medicines, frame for masks
14) <i>Schizostachyum glaucifolium</i> / <i>Ko'e maori</i> / Polynesian Bamboo	
Stems	knives, frame for masks, house walls, fishing rods, nose flutes, spears, water container ?
15) <i>Sida rhombifolia</i> / <i>Purumu</i>	
Stems	brooms, rakes
Bark	kilts
16) <i>Solanum viride</i> / <i>Poro'iti</i>	
Leaves	medicine for boils
Berries	famine food, necklaces, wreaths, head leis, games (<i>Atiu</i>), medicine for ringworm
17) <i>Tephrosia purpurea</i> / <i>Mata'ora</i>	
Leaves, Stems,	
Roots, Bark	
and Twigs	used as fish poison (though on a smaller scale than <i>Barringtonia asiatica</i> - Gill, W.W. 1885, p.142)
<u>Climbers</u>	
1) <i>Abrus precatorius</i> / <i>Pitipiti'o</i>	
Seeds	leis, seed rattles
2) <i>Benincasa hispida</i> ? /	
' <i>Ua roro</i>	calabashes
3) <i>Cucumis melo</i> /	
<i>Pati</i> ?	food (<i>Mangaia</i>)
4) <i>Dioscorea nummularia</i> ? /	
<i>U'i purai</i>	food (for famine, according to Buck 1944)
5) <i>Dioscorea pentaphyllum</i> / <i>Pirita</i>	
Tuber	food (for famine, according to Buck 1944)
Vine	circular fish traps (<i>Ma'u'uke</i>)
6) <i>Ipomoea batatas</i> / <i>Kumara</i> /	
Sweet Potato	food
7) <i>Lagenaria siceraria</i> /	
' <i>Ue</i>	gourds, calabashes, water containers
<u>Herbaceous Plants</u>	
1) <i>Achyranthes aspera</i> /	
<i>Kip varu</i>	medicine
2) <i>Amaranthus viridis</i> /	
<i>Va'ine'ara</i>	medicine for burns, urinary tract ailments, and other ailments
3) <i>Centosteca lappacea</i> /	
<i>Ko'eko'e</i>	medicines
4) <i>Chrysopogon aciculatus</i> /	
<i>Matie</i>	floor covering
5) <i>Colocasia esculenta</i> /	
<i>Taro</i>	food, famine food in the form of <i>po'i</i> (according to Tara'are pers. comm. 1992), pink dye
6) <i>Curcuma longa</i> / <i>Renga</i> / Turmeric	
Rhizome	yellow dye, food, medicine for urinary tract diseases, jaundice and burns
7) <i>Cyperaceae</i> /	
<i>Mauku</i>	animal feed
8) <i>Dichrocephala integrifolia</i> /	

⁶⁶ Green banana leaf
⁶⁷ Dry banana leaves.
⁶⁸ Fermented breadfruit paste.
⁶⁹ Banana fibre

<i>Takataka 'iara</i>	medicine (Nga Pu Toru)
9) Gramineae/ <i>Mauku</i>	animal feed
10) <i>Kyllinga nemoralis</i> / <i>Mauku 'onioni</i>	medicine
11) <i>Linnophila fragans</i> / <i>Mapua</i>	garlands
12) <i>Mariscus javanicus</i> / <i>Mauku tatau tai</i> Stem fibres	coconut cream, kava and medicine strainer
13) <i>Miscanthus floridulus</i> / <i>Kaka'o</i>	rafter sticks, house partitions, wall stakes (Mangaia), <i>teka</i> (darts), Mangaian kites
14) <i>Ophioglossum petiolatum</i> / <i>Rau ta'i</i>	medicines
15) <i>Oxalis corniculata</i> / <i>Kiki'i</i>	medicine for thrush, certain children's ailments, and other illnesses
16) <i>Paspalum orbiculare</i> / <i>Mata</i>	filling on top of ridge pole and beneath the ridge sheet, floor covering, oven lining
17) <i>Phyllanthus virgatus</i> / <i>Moemoe</i>	medicine for severe earache or meningitis and ear infections
18) <i>Polygonum dichotomum</i> / <i>Tamore</i>	medicines
19) <i>Rorippa sarmentosa</i> / <i>Toatoa 'emua</i>	medicine for haemorrhoids and some other unrelated ailments
20) <i>Scirpus subulatus</i> / <i>Raupo</i>	thatching, coarse mats, children's rafts
21) <i>Siegesbeckia orientalis</i> / <i>Kamika</i>	scenting oil, garlands, medicines
22) <i>Solanum americanum</i> / <i>Poroporo</i> Leaves	famine food, medicine for boils
23) Swamp mud	black dye
24) <i>Tacca leontopetaloides</i> / <i>Pia 'emua</i>	food, medicine, hats, adhesive for <i>mamu tukutuku</i> (kites)
SHORE	
<u>Animals</u>	
Birds:	See Coastal Plain and Valley
Crabs:	food
<u>Mineral</u>	
Basalt	food pounders, adzes, gouges, chisels, sling stones, road kerbing, metalling for roads and paths, religious and house platforms, boundary stones, stone walling, stone seats, sinkers for seine nets and fish traps, fish weir entrances
[Stalagmite/ Stalactite Unident Stone]	sling stones, religious platforms ⁷⁰ , food pounders (Mangaia) anchors, sinkers for fish traps, Mangaian gods, oven stones, Mangaian god images
SHORE PLANTS	
<u>Trees</u>	
1) <i>Barringtonia asiatica</i> / <i>'Utu</i> Wood	bow and stern covers (canoes in Nga Pu Toru), <i>pa'u</i> (skin drums)
Kernels	fish poison, medicine for burns and other unrelated ailments
Fruit	food
Leaves	dressing for wounds, wrapping for fish to be cooked in earth oven
Stem epidermis	hats, mats
Sap	black dye, medicine for shingles
2) <i>Calophyllum inophyllum</i> / <i>Tamamu</i> Wood	bowls, food pounders, taro pounding tables, ridge posts, ridge poles, seats, thrones, bark cloth anvils, necklaces, canoe hulls, stern and bow pieces of canoes, booms (canoes in Nga Pu Toru), <i>potaka</i> (tops), <i>pate</i> (<i>tokere</i> - Aituataki - small slit gong), <i>ka'ara</i> (large slit gong), <i>pa'u</i> (skin drums), Mangaian gods?
Seeds	<i>peipei</i> balls
Toto/Sap	varnish for bark cloth
Leaves	medicine for skin sores and rashes
3) <i>Casuarina equisetifolia</i> / <i>Toa</i> Wood	wall stakes, bark cloth beaters, booms (canoes), connecting pegs for outriggers (Aitutaki), hand-fishing rods, torches, fish spears, cross piece in circular fish traps, cylindrical fish traps (Aitutaki), fishing net mesh gauges, scoop net frames, fishing rods, digging sticks, <i>pua</i> or throwing discs, bodkin for piercing

	bark cloth in kite-making, bamboo spear points, god images, staff gods, Mangaian gods, sandal-making needles, <i>keke</i> lashing tightener, caulking implements, barracuda, hooks, house timber, posts, outrigger booms, axe handles, digging sticks, fishhooks, spears
<i>Taila</i> ⁷¹ wood	thatching needles, canoe lashing needle (Atiu), war clubs, spears
Bark	medicine for thrush and urinary tract problems, to induce vomiting, red dye
Root	<i>Ruvettus</i> fish hooks
4) <i>Cocos nucifera</i> /Tumumu/Coconut	
Fronds/Kikau	baskets, food platters, food baskets, cooking containers, oven covers, thatch sheets for dwelling houses, cooking houses and canoe houses, thatching thread, wall sheets, sitting mats, sleeping mats, floor-covering mats, disc-pitching mats (Mangaia), fans, eyeshades, neck ornaments, kilts, leaf sweeps for fishing, everyday clothing (Pukapuka)
Coir	bags, headdresses, caps, adze lashing, slings, ornament for carved slabs (<i>unu</i> ? from Aitutaki and Mangaia), Atiu gods, Miti'aro gods, Ma'u'ke gods
Ka'a/Sennit	bags, cordage, ornamentation on god-staffs, adze lashing, canoe lashing, canoe charm (Mangaia), fish hook lashing, fish trap lashing, <i>mamu tukutuku</i> (kites), <i>pa'u</i> (skin drums), ornamental lashing for spears, slings, sling stone carriers, slip nooses, Atiu gods, Miti'aro gods, Ma'u'ke gods, Mangaian gods, carved slabs (<i>unu</i> ? from Mangaia), binding thatch sheets to roofs, headdresses/skull caps, turtle nets
Kaka/Stipule	strainer for medicine, coconut cream, dye and kava, fire wood, torches, kindling material, wrapping for sinkers for seine nets, Atiu sennit and feather gods, padding under adze lashing, padding for where boom crosses the gunwales
Midrib	brooms, thread for pandanus thatch, tongs, feather attachments for headdresses
Shell	drinking cups, cooking vessels, containers, water bottles, scrapers, ear ornaments (Mangaia), fish hooks (Mangaia), <i>potaka</i> (tops), childrens' shoes, <i>tukituki teniteni</i> (childrens' game), canoe bailers
Coconut meat	food, famine food (according to Tara'are pers. comm. 1992)
Puru/Husk	lashing, rope, nets, clothing, food, coconut cream strainer, binding for headdresses, caulking canoes, padding for the gunwale strakes, cover for eel traps, rat trap nooses
Water	medicines, food
Oil	purgative, dyes, bark cloth varnish, polishing <i>puka</i> seeds for necklaces
Cream	yellow dye (Mangaia), red dye and shiny white finish (Aitutaki), food
Leaf midribs	dyeing frames, canoe lashing needle, <i>teka te mamu'iri</i> , toboggans (<i>tupa'oro'oro</i>), thread used in <i>rau</i> thatch sheets
Leaflet midrib	teetotums, jew's-harp
Leaf tip	canoe charm (Mangaia)
Dry leaves	torches
Leaflets	hoops (<i>potaka</i>), windmills (<i>porotaka</i>), spinners (<i>kuere</i>), bull roarers (<i>patangitangi</i>), leaflet canoes (<i>vaka kopae</i>)
Roro/	
Flower stipule	fire wood, kindling torches
Aka niul	
Rootlets	circular fish traps (Aitutaki)
Wood	house posts, ridge posts, clubs, spears, throwing sticks, medicine for things like fractures and filariasis
5) <i>Cordia subcordata</i> /Tou	
Wood	box for storing clothes, stern piece (canoes), <i>pa'u</i> (skin drums), posts, furniture, slit gongs, seats, clubs, paddles, spears, canoes (Tongareva)
Bark	children's ailments
Leaves	red dye, medicine for abdominal swellings, urinary tract ailments
6) <i>Guetarda speciosa</i> /Ano	
Wood	on atolls only: houses, furniture, canoes etc.
Leaves	on atolls only: oven covers, oven food wrapping, plates.
Flowers	scenting coconut oil
7) <i>Hernandia nymphaeifolia</i> /Puka	
Wood	doors, canoe hulls, <i>pa'u</i> (skin drums), stern and bow pieces of canoes, seine net floats
Seeds	leis, dancing skirts
8) <i>Hibiscus tiliaceus</i> /'Au	
Kiri'au/Bark	climbing bandages, coconut oil or cream strainers, slings, cordage, kilts or hula skirts (<i>titi</i>), <i>tamaka</i> or sandals, mats, torch binding, binding for wall plates, binding for thatch bundles, binding in fish traps, fishing nets and lines, tip of <i>tumutumu</i> and <i>okaoka</i> types of <i>teka</i> (dart), throwing attachment for <i>teka te mamu'iri</i> and <i>teka koki'i</i> , throwing strip for <i>pua</i> or throwing discs, kite string and tail, spinning strip for tops (<i>potaka</i>), string figures, lashing for <i>pa'ata</i> or food stretchers/platforms, lashing cross booms of canoes to outriggers, temporary lashing for canoe hulls, pig ropes, medicine for fractures and sprains
Wood	carrying poles, fire plough, most house parts aside from ridge poles and ridge posts, wall stakes, stern and bow pieces of canoes, outrigger floats (canoes), canoe pole, canoe bailers, masts, paddles, floats for long fishing nets, handle for scoop nets, many-pointed spear shafts, digging sticks (for

Leaves	planting sugar cane), <i>okaoka</i> (type of <i>teka</i>), <i>manu tukutuku</i> (kites), <i>potaka</i> (tops), stilts, <i>pa'ata</i> or food stretchers or platforms, firewood
Flowers	oven covers
9) <i>Pisonia grandifolia</i> /	medicine for boils
<i>Puka tea</i>	
10) <i>Thespesia populnea</i> /Miro	
Wood	firewood, animal fodder
	<i>pate</i> , <i>kamete</i> , boat parts, paddles, adze-handles, furniture, bark cloth beaters, bark cloth anvils, necklaces, stern piece (canoes), <i>tupe</i> or pitching discs (Mangaia), Mangaian kites, <i>tokere</i> (small slit gong), clubs (Aitutaki)
Berries	teetotums, medicine for urinary tract ailments, abdominal swellings (and also as an antidote against the poison of the 'no'u' fish - Gill, W.W. 1885, p.135)
Leaves and bark	medicine for ailments associated with teething of infants
<u>Small Trees and Shrubs</u>	
1) <i>Capparis cordifolia</i> /	
<i>Papiro</i>	wreaths, sunshades (Aitutaki)
2) <i>Chamaesyce atoto</i> /	
<i>Tototo</i> wood	tops
3) <i>Colubrina asiatica</i> /	
<i>Tutu</i> stems	to attach membrane to drums, fishtraps, soap
4) <i>Morinda citrifolia</i> /Nono	
Wood	yellow dye
Roots	red dye, medicine from stonefish stings
Fruit	famine food, medicine for urinary tract ailments, diaphragmatic hernia, abdominal swellings
5) <i>Pandanus tectorius</i> /' <i>Ara ta'a tai</i>	
<i>Rau-'ara</i>	
Fine Leaves	baskets, fans, sleeping mats, sails, <i>tiputa</i> , chiefly waist band, loin cloths, baldrics, belts, shoulders straps (Aitutaki), tip of <i>okaoka</i> (type of <i>teka</i>), childrens' shoes, <i>pa'u</i> (skin drums), ornamentation in 'au kilts, neck ornaments, <i>kikau</i> basket handles
<i>Rau</i>	
Coarse leaves	thatch sheets, thatch for 'are ei 'au (Mangaia), padding for where boom crosses the gunwales
<i>Kai-'ara</i>	
Aerial roots	thatch sheet midribs, wall stakes, dyeing frames, wedge to tighten up temporary <i>kiri'au</i> canoe hull lashing, famine food, purgative, medicine for urinary tract ailments and other ailments, spinning tops
Leaf thorns	fish hooks
Wood	house timbers, <i>atarau</i> /raised platform on a <i>marae</i> (Akaoro marae, Mangaia)
<i>Kati'ara</i>	paint brush
<i>Pandanus</i>	
drupes	paint brushes, wreaths
' <i>Inanol</i>	
Male flower	scenting coconut oil, garlands
6) <i>Pemphis acidula</i> /Ngangie	
Wood	(not on Rarotonga) spears, walking sticks, fishhooks, fish gorges, shark hooks, coconut husking sticks, roof sheet needles, tool handles, firewood, pointed stick for octopus catching
7) <i>Pipturus argentea</i> /' <i>Oronga</i>	
Bark	ropes, binding for headdresses and kilts, fishing nets (strongest type) and lines, string figures, slings, Atiu and Ma'u ke sennit and feather gods
Fruit	food (children)
Leaves	animal fodder
8) <i>Scaevola taccada</i> /	
' <i>Utukava</i> wood	floats for long fishing nets
9) <i>Sophora tomentosa</i>	
Wood	firewood, coconut husking stick, hollowed-out stems for peashooters, pith for making dancing kilts
Seeds	leis, medicine
Leaves	fed to goats
10) <i>Triumfetta procumbens</i> /Ngau	
Leaves	(Ma'u ke) medicine for boils
11) <i>Vitex trifolia</i> /Rara	
Leaves	medicine for postnatal problems among women
<u>Climbers</u>	
1) <i>Cassytha filiformis</i> /	
<i>Tainoka</i>	wreaths, children's headbands, medicine for children's ailments, and sore throat
2) <i>Ipomoea littoralis</i> /Pipi	
Leaves	
and stems	medicine for infants (and as an antidote against the poison of the 'no'u' fish - Gill, W.W. 1885, p.135)
3) <i>Luffa cylindrica</i> /Po'ue	

Leaves	medicine (Mangaia, Miti'aro, Ma'u'ke)
Herbaceous Plants	
1) <i>Portulaca hutea</i> / <i>Katuri</i>	food
OCEAN AND LAGOON	
Animal	
Birds:	See Coastal Plain and Valley
Fish:	
<i>Maratea</i>	fish which only priests were allowed to eat in Tauhunu village on Manihiki (Kauraka 1983, p.15)
Meat	food
Porcupine fish	
spine	knife or needle for splitting pandanus leaves
Sting-ray's	
tail	spear tips
Shellfish:	
<i>Aphysia</i> sp./	
<i>Patito</i>	small edible sea-slug or sea-hare on Rarotonga (Kauraka 1985, p.60)
<i>Ka'i</i> shell	scrapers and cutters for <i>rau'ara</i> preparation
Meat	food
<i>Pa'ua</i> shell	childrens' shoes
Pearl shell	fish hooks ?, staff god ornaments, necklaces
Shells ⁷²	scrapers, decorations, armlets (Mangaia), octopus-lure?, Mangaian gods, garlands, ornamentation on
kilts	
<i>Triton</i> shell	trumpets, Mangaian gods
<i>Turbo</i> shell	fish hooks (Mangaia)
Shark:	
Meat	food
Skin	<i>pa'u</i> (skin drums), padding under adze lashing
Squid and octopus:	
Meat	food
Turtle:	
Meat	food
Shell	fish hooks (Aitutaki), coconut grater
Whale:	
Bone	food pounders
Ivory	<i>rei</i> ear ornaments, necklaces
Mineral	
Calcite	food pounders
Coral	coconut grater, food pounders, sling stones, Mangaian gods, <i>kirikiri teatea</i> ⁷³ , road kerbing, metalling for roads and paths, fish weirs
<i>Ngaika</i> ?	dye fixer - possible introduction from Manihiki
Plants	
Sea weed	food
MISCELLANEOUS	
Bark cloth ⁷⁴	<i>tiputa</i> , <i>maro</i> , <i>pareu</i> , cloaks, waist bands, headdresses, turbans, cone-shaped caps, masks, swabs, <i>manu tukutuku</i> (kites), screen for <i>'are ei 'au</i> (Mangaia), wrapping for staff gods, ornament for carved slabs (<i>unu</i> ? from Aitutaki and Mangaia), Ma'u'ke gods, Mangaian gods
Coloured seeds ⁷⁵	decorations, ornamentation on kilts
Flowers ⁷⁶	wreaths, decorations, necklaces
<i>Miri</i> leaves ⁷⁷	mixed with hot water to exorcise spirits (See good example in Kauraka 1982)
<i>Tikoru</i> ⁷⁸	wrapping for gods (Mangaia)
Unident. wood	fan handles, breadfruit pickers, coconut stool graters, weapon platforms (<i>'ata</i>), tattooing tapper, cylindrical wooden ear ornaments, charcoal for body paint, adze hafts, thwarts (canoes), carrying

⁷² *Pare'o* (small variety of cowrie), *Pipi* (a type of bivalve), *Ka'i*, *Ungaunga* (Cat's Eyes), *Pupu* (spiral shells).

⁷³ White coral gravel used for flooring houses and religious platforms.

⁷⁴ Bark cloth could be made from the inner bark of the Paper Mulberry (the best quality), the Breadfruit tree (good quality), the aerial roots of the Banyan tree (coarser brown cloth) and poorer people in Mangaia used *Entada phaseoloides*, a woody climber.

⁷⁵ *Puka* (black seed), *Poepoe* (slaty blue seed), *Tavara* (red seed).

⁷⁶ *Kaute*, *Tiare Maori*, *'Inano* (male Pandanus flower), *Miri*, *Poro'iti*, *Mapua*.

⁷⁷ Term used for a number of types of plant with scented leaves like the introduced species of basil and mint, as well as the indigenous or aboriginally introduced *mapua* (*Limnophila fragrans*), sometimes called *miri mopua*.

⁷⁸ Special thick white bark cloth.

stringers (canoes), skids (canoe-launching), amulets (canoe images), fowl traps, *teka kiore* and *teka koka'i* (darts), surf boards, crossbars for swings, beating sticks for slit gongs, bows and arrows ?

A.6 Radiocarbon Dates

All dates expressed in terms of B.P. (before A.D. 1950).

Calibration Method: University of Washington Quaternary Isotope Lab Radiocarbon Calibration Program Rev 3.0.3 (Stuiver and Reimer 1993)

References: Stuiver and Pearson 1993; Pearson and Stuiver 1993; Pearson *et al.* 1993; Linick *et al.* 1986.

KK4 (MR1)

Depth (cm)	Sample Type	NZA No.	$\delta^{13}\text{C}$ per mille	Conventional C-14 (1 σ)	Calibrated Age (2 σ) Summary
90-100	Peat	3263	-25.81	1080 $\pm$ 60	1133 (958) 791
130-135	Peat	3265	-28.34	2438 $\pm$ 73	2730 (2353) 2157
160-170	Peat	3270	-26.16	5780 $\pm$ 77	6756 (6546) 6349
190-200	Peat	2281	-26.2	3326 $\pm$ 92	3822 (3523) 3344
290-300	Peat	2282	-27.6	3485 $\pm$ 100	3976 (3690) 3420
420	Peat	2255	-26.6	4007 $\pm$ 53	4794 (4417) 4237
460	Gyttja	2256	-25.5	4106 $\pm$ 54	4830 (4563) 4414
700-710	Gyttja	2283	-35.6	5562 $\pm$ 98	6406 (6193) 5927
		Beta Analytic Inc No.			
940-950	Gyttja	37137	-28.8	7680 $\pm$ 100	8559 (8373) 8137

KK1

Depth (cm)	Sample Type	NZA No.	$\delta^{13}\text{C}$ per mille	Conventional C-14 (1 σ)	Calibrated Age (2 σ) Summary
95-105	Peat	3261	-23.2	930 $\pm$ 61	981 (913) 781
165-175	Peat	3282	-26.52	2679 $\pm$ 57	2870 (2757) 2555
515-525	Peat	3283	-28.54	4077 $\pm$ 60	4814 (4479) 4282
560-570	Gyttja	3262	-31.39	4558 $\pm$ 66	5311 (5001) 4855

Other Swamp Sites

Sample ID	Sample Type	Beta Analytic Inc No.	Conventional C-14 (1 σ)	$\delta^{13}\text{C}$ per mille	Calibrated Age (2 σ) Summary
AO1 90-100cm	Organic Mud	37134	350 $\pm$ 100	-23.4	553 (465) 0*
AT1 150-160cm	Organic Mud	37135	1410 $\pm$ 80	-26.4	1415 (1293) 1087
ARM1 160-170cm	Organic Mud	37136	1120 $\pm$ 70	-26.1	1176 (979) 797

NZA dates in full:

NZA No.	Conventional C-14 (1 σ)	Calibrated Age 1 σ limits	Calibrated Age 2 σ limits	Median Age
2255	4007 $\pm$ 53	4522-4464	4794-4777	4417
		4457-4403	4603-4596	
		4369-4357	4570-4237	
2256	4106 $\pm$ 54	4814-4760	4830-4414	4563
		4699-4674		
		4649-4513		
		4474-4450		
2281	3326 $\pm$ 92	3680-3679	3822-3790	3544
		3635-2297	3761-3759	3523
			3730-3344	3478
2282	3485 $\pm$ 100	3835-3566	3976-3947	3690
			3935-3460	
			3420-3420	
2283	5562 $\pm$ 98	6295-6163	6406-5927	4507
		6156-6083		4479
		6077-6030		4446
		6006-5997		

NZA dates in full:

NZA No.	Conventional C-14 (1 σ)	Corrected Age 1 σ limits	Corrected Age 2 σ limits	Median Age
3261	930 $\pm$ 61	937-781	981-702	913
3262	4558 $\pm$ 66	5283-5102	5311-4855	5042
		5093-4963		5001
		4952-4875		4998
3263	1080 $\pm$ 60	1057-926	1133-1105	958
			1095-888	
			873-824	
			816-791	
3265	2438 $\pm$ 73	2702-2651	2730-2301	2353
		2481-2335	2261-2157	
3270	5780 $\pm$ 77	6702-6698	6756-6402	6546
		6673-6450	6368-6349	
3282	2679 $\pm$ 57	2790-2743	2870-2713	2757
			2566-2555	
3283	4077 $\pm$ 60	4562-4411	4814-4759	4507
			4699-4674	4479
			4649-4282	4446

Beta Analytic Inc dates in full:

Beta Analytic Inc No.	Conventional C-14 (1 σ)	Corrected Age 1 σ limits	Corrected Age 2 σ limits	Median Age
37134	350 $\pm$ 100	515-299	553-267	465
			205-143	
			17-0*	
37135	1410 $\pm$ 80	1344-1255	1415-1124	1293
			1115-1087	
37136	1120 $\pm$ 70	1068-934	1176-904	979
			853-835	
			806-797	
37137	7680 $\pm$ 100	8481-8479	8559-8137	8373
		8430-8318		

A.7 Grain Size Analysis

A.7.1 Analysis of the Coarser Fraction

1)

Sample (KK1)	Total Weight	Grain size Anal.	ICP Anal.
0-10 cm	11.8512	7.5684	4.2828
45-55 cm	13.9108	7.5726	6.3382
90-100 cm	11.1149	7.0636	4.0513
140-150 cm	5.0772	4.6706	0.4066
180-190 cm	8.6493	7.6427	1.0066
230-235 cm	11.5773	8.0511	3.5262
250-260 cm	11.3605	7.7770	3.5835
290-300 cm	10.6803	7.2823	3.3980
330-340 cm	4.7245	4.2247	0.4998
360-370 cm	7.8240	7.0480	0.7760
399-401 cm	3.1035	2.7000	0.4035
430-440 cm	8.3870	7.3627	1.0243
465-475 cm	5.0315	4.4826	0.5489
505-515 cm	9.2299	8.2108	1.0191
535-545 cm	9.8654	6.5244	3.3410
570-580 cm	5.4432	4.9395	0.5037
610-620 cm	7.8580	6.8396	1.0184
635-645 cm	16.2400	14.6470	1.5930
670-680 cm	9.5535	6.0297	3.5238
715-725 cm	9.0955	8.0955	1.0000
750-760 cm	6.1788	5.6776	0.5012
790-800 cm	8.4893	5.3424	3.1469

Sample (KK1)	Weight 2mm-63mm Sand Fraction	Weight < 63mm Mud Fraction	Weight (Mud Fraction) for SediGraph
570-580 cm	0.0341	1.9268	1.9268
610-620 cm	0.2374	1.4451	1.4451
635-645 cm	0.3663	4.5394	2.3827
670-680 cm	0.7680	2.1892	2.1892
715-725 cm	1.9941	1.8278	1.8278
750-760 cm	1.0695	1.1609	1.1609
790-800 cm	0.5050	1.8654	1.8654
820-830 cm	1.5913	1.5338	1.5338
847-855 cm	6.2375	2.0351	2.0351
870-880 cm	1.7217	1.8508	1.8508
900-910 cm	4.4568	2.0729	2.0729
950-960 cm	2.1056	2.5420	2.2808
980-990 cm	0.6881	1.9361	1.9361
1010-1015 cm	6.3433	1.8186	1.8186
1040-1050 cm	0.1308	1.1411	1.1411

General Comments:

- 1) No samples had grains > 2mm.
- 2) Some macro-organics were > 2mm but were not weighed
- 3) The sand fraction for most samples contained organic remnants from H₂O₂ treatment.
- 4) All weights are in grams

A.7.2 SediGraph Results

Samples: KK1 (0-10); KK1 (45-55); KK1 (90-100); KK1 (140-150); KK1 (180-190); KK1 (230-235); KK1 (250-260); KK1 (290-300); KK1(399-401); KK1 (505-515); KK1 (535-545); KK1 (570-580); KK1 (610-620); KK1 (635-645); KK1 (670-680); KK1 (715-725); KK1 (750-760); KK1 (790-800); KK1 (820-830); KK1 (847-855); KK1 (870-880); KK1 (900-910); KK1 (950-960); KK1 (980-990); KK1 (1010-1015); KK1 (1040-1050)

KK1 (0-10)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/1 UNIT NUMBER: 1
 SAMPLE ID: KK1 (0-10) START 16:06:51 02/04/93
 SUBMITTER: Caradoc Peters REPT 12:27:42 07/13/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:33:56
 SAMPLE TYPE: Swamp sediment (<62.5mm) SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.7 deg C LIQ VISC: 0.7272 mPa*s
 BASELINE/FULL SCALE: 116/60 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.69
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 0.68 mm MODAL DIAMETER: 3.97 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.6	0.4
31.25	99.2	0.4
15.60	97.3	1.9
7.81	89.9	7.5
3.91	76.7	13.2
1.95	64.1	12.6
0.18	35.4	28.7

KK1 (45-55)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/2 UNIT NUMBER: 1
 SAMPLE ID: KK1 (45-55) START 12:08:53 02/10/93
 SUBMITTER: Caradoc Peters REPT 12:28:40 07/13/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:34:59
 SAMPLE TYPE: Swamp sediment (<62.5mm) SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.7 deg C IQ VISC: 0.7271 mPa*s
 BASELINE/FULL SCALE: 113/67 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.70
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.30 mm MODAL DIAMETER: 6.36 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.2	0.8
31.25	98.4	0.8
15.60	92.2	6.3
7.81	80.2	11.9
3.91	66.9	13.3
1.95	55.4	11.5
0.18	28.8	26.7

KK1 (90-100)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/3 UNIT NUMBER: 1
 SAMPLE ID: KK1 (90-100) START 15:10:51 02/10/93
 SUBMITTER: Caradoc Peters REPT 13:57:37 07/13/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:34:33
 SAMPLE TYPE: Swamp sediment (<62.5mm) SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.7 deg C LIQ VISC: 0.7269 mPa*s
 BASELINE/FULL SCALE: 113/69 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.70
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.88 mm MODAL DIAMETER: 5.28 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.0	1.0
31.25	99.1	-0.1
15.60	91.9	7.2
7.81	78.1	13.9
3.91	62.6	15.4
1.95	50.6	12.1
0.18	27.4	23.1

KK1 (140-150)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/11 UNIT NUMBER: 1
 SAMPLE ID: KK1 (140-150) START 11:42:15 07/02/93
 SUBMITTER: Caradoc Peters REPT 11:10:22 07/19/93

OPERATOR: Pete Johnson
 SAMPLE TYPE: Swamp sediment
 LIQUID TYPE: Water
 ANALYSIS TEMP: 34.7 deg C
 BASELINE/FULL SCALE: 106/76 kilocounts/sec
 STARTING DIAMETER: 100.00 mm
 ENDING DIAMETER: 0.18 mm

TOT RUN TIME 0:34:04
 SAM DENS: 2.6500 g/cc
 LIQ DENS: 0.9942 g/cc
 LIQ VISC: 0.7274 mPa*s
 RUN TYPE: High Speed
 REYNOLDS NUMBER: 1.69
 FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 0.28 mm MODAL DIAMETER: 2.79 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.4	0.6
31.25	100.1	-0.7
15.60	100.0	0.1
7.81	97.5	2.6
3.91	89.2	8.3
1.95	74.6	14.6
0.18	44.2	30.5

KK1 (180-190)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/12 UNIT NUMBER:1

SAMPLE ID: KK1 (180-190)

START 12:51:39 07/02/93

SUBMITTER: Caradoc Peters

REPT 11:11:48 07/19/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:35

SAMPLE TYPE: Swamp sediment

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C

LIQ VISC: 0.7272 mPa*s

BASELINE/FULL SCALE: 106/72 kilocounts/sec

RUN TYPE: High Speed

STARTING DIAMETER: 100.00 mm

REYNOLDS NUMBER: 1.69

ENDING DIAMETER: 0.18 mm

FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.11 mm MODAL DIAMETER: 2.11 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	98.5	1.5
31.25	99.3	-0.7
15.60	98.6	0.6
7.81	92.6	6.0
3.91	80.3	12.3
1.95	62.7	17.6
0.18	18.5	44.2

KK1 (230-235)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/4 UNIT NUMBER:1

SAMPLE ID: KK1 (230-235)

START 17:13:07 02/10/93

SUBMITTER: Caradoc Peters

REPT 14:03:22 07/13/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:42

SAMPLE TYPE: Swamp sediment (<62.5mm)

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C

LIQ VISC: 0.7267 mPa*s

BASELINE/FULL SCALE: 113/71 kilocounts/sec

RUN TYPE: High Speed

STARTING DIAMETER: 100.00 mm

REYNOLDS NUMBER: 1.70

ENDING DIAMETER: 0.18 mm

FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 2.23 mm MODAL DIAMETER: 5.13 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	100.1	-0.1
31.25	99.3	0.8
15.60	94.7	4.5
7.81	82.4	12.3
3.91	63.6	18.9
1.95	47.2	16.4
0.18	16.8	30.4

KK1 (250-260)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/5 UNIT NUMBER:1

SAMPLE ID: KK1 (250-260)

START 11:19:23 02/11/93

SUBMITTER: Caradoc Peters

REPT 14:10:09 07/13/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:22

SAMPLE TYPE: Swamp sediment (<62.5mm)

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C

LIQ VISC: 0.7271 mPa*s

BASELINE/FULL SCALE: 113/71 kilocounts/sec

RUN TYPE: High Speed

STARTING DIAMETER: 100.00 mm

REYNOLDS NUMBER: 1.70

ENDING DIAMETER: 0.18 mm

FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 2.15 mm MODAL DIAMETER: 4.39 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.4	0.6
31.25	99.1	0.3
15.60	95.6	3.5
7.81	83.9	11.7
3.91	65.0	18.9
1.95	48.0	16.9
0.18	15.8	32.2

KK1 (290-300)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/6 UNIT NUMBER:1

SAMPLE ID: KK1 (290-300)

START 12:30:59 02/11/93

SUBMITTER: Caradoc Peters

REPT 14:30:06 07/13/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:29

SAMPLE TYPE: Swamp sediment (<62.5mm)

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C
 BASELINE/FULL SCALE: 113/69 kilocounts/sec
 STARTING DIAMETER: 100.00 mm
 ENDING DIAMETER: 0.18 mm

LIQ VISC: 0.7269 mPa*s
 RUN TYPE: High Speed
 REYNOLDS NUMBER: 1.70
 FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 0.96 mm MODAL DIAMETER: 3.47 mm

KK1 (399-401)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/15 UNIT NUMBER:1

SAMPLE ID: KK1 (399-401)

SUBMITTER: Caradoc Peters

OPERATOR: Pete Johnson

SAMPLE TYPE: Swamp sediment

LIQUID TYPE: Water

ANALYSIS TEMP: 34.7 deg C

BASELINE/FULL SCALE: 106/68 kilocounts/sec

STARTING DIAMETER: 100.00 mm

ENDING DIAMETER: 0.18 mm

MASS DISTRIBUTION

MEDIAN DIAMETER: 0.72 mm MODAL DIAMETER: 3.63 mm

KK1 (505-515)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/18 UNIT NUMBER:1

SAMPLE ID: KK1 (505-515)

SUBMITTER: Caradoc Peters

OPERATOR: Pete Johnson

SAMPLE TYPE: Swamp sediment

LIQUID TYPE: Water

ANALYSIS TEMP: 34.7 deg C

BASELINE/FULL SCALE: 106/83 kilocounts/sec

STARTING DIAMETER: 100.00 mm

ENDING DIAMETER: 0.18 mm

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.62 mm MODAL DIAMETER: 1.86 mm

KK1 (535-545)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/7 UNIT NUMBER:1

SAMPLE ID: KK1 (535-545)

SUBMITTER: Caradoc Peters

OPERATOR: Pete Johnson

SAMPLE TYPE: Swamp sediment (<62.5mm)

LIQUID TYPE: Water

ANALYSIS TEMP: 34.7 deg C

BASELINE/FULL SCALE: 113/87 kilocounts/sec

STARTING DIAMETER: 100.00 mm

ENDING DIAMETER: 0.18 mm

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.82 mm MODAL DIAMETER: 3.01 mm

KK1 (570-580)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/19 UNIT NUMBER:1

SAMPLE ID: KK1 (570-580)

SUBMITTER: Caradoc Peters

OPERATOR: Pete Johnson

SAMPLE TYPE: Swamp sediment

LIQUID TYPE: Water

ANALYSIS TEMP: 34.7 deg C

BASELINE/FULL SCALE: 106/82 kilocounts/sec

STARTING DIAMETER: 100.00 mm

ENDING DIAMETER: 0.18 mm

MASS DISTRIBUTION

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	100.0	-0.0
31.25	99.2	0.9
15.60	97.5	1.7
7.81	88.5	9.0
3.91	74.6	13.9
1.95	60.2	14.4
0.18	29.0	31.3

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.3	0.7
31.25	99.7	-0.4
15.60	98.5	1.2
7.81	94.7	3.8
3.91	82.2	12.4
1.95	67.7	14.5
0.18	25.8	41.9

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	98.4	1.6
31.25	99.2	-0.8
15.60	98.8	0.5
7.81	96.2	2.6
3.91	86.7	9.5
1.95	58.4	28.3
0.18	12.5	46.0

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.3	0.7
31.25	99.5	-0.2
15.60	98.9	0.5
7.81	96.2	2.7
3.91	81.3	14.9
1.95	52.9	28.3
0.18	10.8	42.1

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.1	0.9
31.25	98.7	0.4
15.60	98.7	-0.0
7.81	98.8	-0.1
3.91	95.5	3.3
1.95	85.4	10.0
0.18	11.9	73.5

MEDIAN DIAMETER: 0.70 mm

MODAL DIAMETER: 0.47 mm

KK1 (610-620)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/40 UNIT NUMBER: 1

SAMPLE ID: KK1 (610-620)

START 13:05:30 07/08/93

SUBMITTER: Caradoc Peters

REPRT 11:37:13 07/19/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:11

SAMPLE TYPE: Swamp sediment

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C

LIQ VISC: 0.7270 mPa*s

BASELINE/FULL SCALE: 106/87 kilocounts/sec

RUN TYPE: High Speed

STARTING DIAMETER: 100.00 mm

REYNOLDS NUMBER: 1.70

ENDING DIAMETER: 0.18 mm

FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 0.71 mm

MODAL DIAMETER: 2.52 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	98.2	1.8
31.25	101.8	-3.6
15.60	101.0	0.7
7.81	98.1	3.0
3.91	92.9	5.2
1.95	71.8	21.1
0.18	27.7	44.1

KK1 (635-645)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/21 UNIT NUMBER: 1

SAMPLE ID: KK1 (635-645)

START 11:13:12 07/08/93

SUBMITTER: Caradoc Peters

REPRT 11:16:12 07/19/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:29

SAMPLE TYPE: Swamp sediment

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C

LIQ VISC: 0.7272 mPa*s

BASELINE/FULL SCALE: 106/74 kilocounts/sec

RUN TYPE: High Speed

STARTING DIAMETER: 100.00 mm

REYNOLDS NUMBER: 1.69

ENDING DIAMETER: 0.18 mm

FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.03 mm

MODAL DIAMETER: 1.52 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	98.8	1.2
31.25	99.7	-0.9
15.60	99.3	0.5
7.81	94.6	4.7
3.91	84.3	10.3
1.95	67.9	16.3
0.18	16.5	51.4

KK1 (670-680)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/22 UNIT NUMBER: 1

SAMPLE ID: KK1 (670-680)

START 11:44:34 07/09/93

SUBMITTER: Caradoc Peters

REPRT 11:17:23 07/19/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:15

SAMPLE TYPE: Swamp sediment

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C

LIQ VISC: 0.7273 mPa*s

BASELINE/FULL SCALE: 106/83 kilocounts/sec

RUN TYPE: High Speed

STARTING DIAMETER: 100.00 mm

REYNOLDS NUMBER: 1.69

ENDING DIAMETER: 0.18 mm

FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 2.20 mm

MODAL DIAMETER: 3.16 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	100.4	-0.4
31.25	100.1	0.2
15.60	97.9	2.2
7.81	91.7	6.2
3.91	74.2	17.5
1.95	45.5	28.7
0.18	8.9	26.6

KK1 (715-725)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/23 UNIT NUMBER: 1

SAMPLE ID: KK1 (715-725)

START 12:57:08 07/09/93

SUBMITTER: Caradoc Peters

REPRT 11:18:33 07/19/93

OPERATOR: Pete Johnson

TOT RUN TIME 0:34:08

SAMPLE TYPE: Swamp sediment

SAM DENS: 2.6500 g/cc

LIQUID TYPE: Water

LIQ DENS: 0.9942 g/cc

ANALYSIS TEMP: 34.7 deg C

LIQ VISC: 0.7272 mPa*s

BASELINE/FULL SCALE: 106/78 kilocounts/sec

RUN TYPE: High Speed

STARTING DIAMETER: 100.00 mm

REYNOLDS NUMBER: 1.69

ENDING DIAMETER: 0.18 mm

FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.48 mm

MODAL DIAMETER: 3.43 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.5	0.5
31.25	99.9	-0.3
15.60	98.4	1.5
7.81	94.9	3.6
3.91	79.4	15.4
1.95	57.3	22.1
0.18	16.8	40.5

KK1 (750-760)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/24 UNIT NUMBER: 1

SAMPLE ID: KK1 (750-760)

START 11:23:43 07/10/93

SUBMITTER: Caradoc Peters
 OPERATOR: Pete Johnson
 SAMPLE TYPE: Swamp sediment
 LIQUID TYPE: Water
 ANALYSIS TEMP: 34.6 deg C
 BASELINE/FULL SCALE: 106/85 kilocounts/sec
 STARTING DIAMETER: 100.00 mm
 ENDING DIAMETER: 0.18 mm

REPRT 11:19:47 07/19/93
 TOT RUN TIME 0:32:27
 SAM DENS: 2.6500 g/cc
 LIQ DENS: 0.9942 g/cc
 LIQ VISC: 0.7276 mPa*s
 RUN TYPE: High Speed
 REYNOLDS NUMBER: 1.69
 FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 0.74 mm MODAL DIAMETER: 0.51 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.0	1.0
31.25	101.7	-2.7
15.60	101.6	0.1
7.81	99.2	2.4
3.91	91.1	8.2
1.95	70.9	20.1
0.18	17.5	53.5

KK1 (790-800)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/25 UNIT NUMBER: 1

SAMPLE ID: KK1 (790-800) START 13:05:58 07/06/93
 SUBMITTER: Caradoc Peters REPRT 11:21:22 07/19/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:34:57
 SAMPLE TYPE: Swamp sediment SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.7 deg C LIQ VISC: 0.7272 mPa*s
 BASELINE/FULL SCALE: 106/82 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.69
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.51 mm MODAL DIAMETER: 1.56 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	97.7	2.3
31.25	98.0	-0.3
15.60	99.2	-1.2
7.81	95.8	3.3
3.91	83.0	12.8
1.95	59.2	23.8
0.18	10.8	48.4

KK1 (820-830)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/26 UNIT NUMBER: 1

SAMPLE ID: KK1 (820-830) START 14:04:15 07/06/93
 SUBMITTER: Caradoc Peters REPRT 11:22:53 07/19/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:32:31
 SAMPLE TYPE: Swamp sediment SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.7 deg C LIQ VISC: 0.7271 mPa*s
 BASELINE/FULL SCALE: 106/77 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.70
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 1.25 mm MODAL DIAMETER: 3.48 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	98.9	1.1
31.25	99.2	-0.3
15.60	100.0	-0.8
7.81	94.0	5.9
3.91	80.1	13.9
1.95	61.3	18.8
0.18	16.3	45.1

KK1 (847-855)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/36 UNIT NUMBER: 1

SAMPLE ID: KK1 (847-855) START 09:37:29 07/07/93
 SUBMITTER: Caradoc Peters REPRT 11:32:47 07/19/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:33:50
 SAMPLE TYPE: Swamp sediment SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.6 deg C LIQ VISC: 0.7277 mPa*s
 BASELINE/FULL SCALE: 106/80 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.69
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 3.44 mm MODAL DIAMETER: 7.70 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.0	1.0
31.25	99.1	-0.1
15.60	98.7	0.5
7.81	80.0	18.7
3.91	53.7	26.2
1.95	29.0	24.8
0.18	3.5	25.5

KK1 (870-880)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/28 UNIT NUMBER: 1

SAMPLE ID: KK1 (870-880) START 12:31:06 07/10/93

SUBMITTER: Caradoc Peters
 OPERATOR: Pete Johnson
 SAMPLE TYPE: Swamp sediment
 LIQUID TYPE: Water
 ANALYSIS TEMP: 34.7 deg C
 BASELINE/FULL SCALE: 106/64 kilocounts/sec
 STARTING DIAMETER: 100.00 mm
 ENDING DIAMETER: 0.18 mm
 MASS DISTRIBUTION
 MEDIAN DIAMETER: 0.85 mm MODAL DIAMETER: 0.80 mm

REPRT 11:24:14 07/19/93
 TOT RUN TIME 0:33:40
 SAM DENS: 2.6500 g/cc
 LIQ DENS: 0.9942 g/cc
 LIQ VISC: 0.7273 mPa*s
 RUN TYPE: High Speed
 REYNOLDS NUMBER: 1.69
 FULL SCALE MASS %: 100

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.5	0.5
31.25	99.5	0.0
15.60	99.2	0.2
7.81	99.3	-0.1
3.91	98.4	0.9
1.95	93.6	4.8
0.18	2.8	90.8

KK1 (900-910)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/38 UNIT NUMBER: 1
 SAMPLE ID: KK1 (900-910) START 10:09:42 07/08/93
 SUBMITTER: Caradoc Peters REPRT 11:35:35 07/19/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:34:33
 SAMPLE TYPE: Swamp sediment SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.7 deg C LIQ VISC: 0.7274 mPa*s
 BASELINE/FULL SCALE: 106/73 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.69
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100
 MASS DISTRIBUTION
 MEDIAN DIAMETER: 3.77 mm MODAL DIAMETER: 3.72 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.1	0.9
31.25	99.4	-0.2
15.60	98.5	0.9
7.81	97.6	0.9
3.91	56.9	40.8
1.95	0.1	56.8
0.18	1.2	-1.1

KK1 (950-960)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/39 UNIT NUMBER: 1
 SAMPLE ID: KK1 (950-960) START 09:10:05 07/08/93
 SUBMITTER: Caradoc Peters REPRT 10:17:23 07/13/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:35:04
 SAMPLE TYPE: Swamp sediment SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9943 g/cc
 ANALYSIS TEMP: 34.5 deg C LIQ VISC: 0.7305 mPa*s
 BASELINE/FULL SCALE: 106/64 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.68
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100
 MASS DISTRIBUTION
 MEDIAN DIAMETER: 0.96 mm MODAL DIAMETER: 0.99 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	100.7	-0.7
31.25	101.3	-0.7
15.60	100.8	0.5
7.81	100.8	0.1
3.91	100.4	0.3
1.95	100.8	-0.4
0.18	5.4	95.4

KK1 (980-990)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/31 UNIT NUMBER: 1
 SAMPLE ID: KK1 (980-990) START 13:29:59 07/10/93
 SUBMITTER: Caradoc Peters REPRT 11:28:15 07/19/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:34:19
 SAMPLE TYPE: Swamp sediment SAM DENS: 2.6500 g/cc
 LIQUID TYPE: Water LIQ DENS: 0.9942 g/cc
 ANALYSIS TEMP: 34.7 deg C LIQ VISC: 0.7273 mPa*s
 BASELINE/FULL SCALE: 106/67 kilocounts/sec RUN TYPE: High Speed
 STARTING DIAMETER: 100.00 mm REYNOLDS NUMBER: 1.69
 ENDING DIAMETER: 0.18 mm FULL SCALE MASS %: 100
 MASS DISTRIBUTION
 MEDIAN DIAMETER: 1.92 mm MODAL DIAMETER: 3.10 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.7	0.3
31.25	98.9	0.8
15.60	98.7	0.1
7.81	93.0	5.7
3.91	75.3	17.7
1.95	50.5	24.8
0.18	9.7	40.8

KK1 (1010-1015)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/8 UNIT NUMBER: 1
 SAMPLE ID: KK1 (1010-1015) START 10:43:55 07/13/93
 SUBMITTER: Caradoc Peters REPRT 14:32:03 07/13/93
 OPERATOR: Pete Johnson TOT RUN TIME 0:34:59

SAMPLE TYPE: Swamp sediment
 LIQUID TYPE: Water
 ANALYSIS TEMP: 34.6 deg C
 BASELINE/FULL SCALE: 107/65 kilocounts/sec
 STARTING DIAMETER: 100.00 mm
 ENDING DIAMETER: 0.18 mm

SAM DENS: 2.6500 g/cc
 LIQ DENS: 0.9942 g/cc
 LIQ VISC: 0.7281 mPa*s
 RUN TYPE: High Speed
 REYNOLDS NUMBER: 1.69
 FULL SCALE MASS %: 100

MASS DISTRIBUTION

MEDIAN DIAMETER: 3.60 mm MODAL DIAMETER: 3.27 mm

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.7	0.3
31.25	98.6	1.1
15.60	92.4	6.3
7.81	73.6	18.7
3.91	53.2	20.4
1.95	27.9	25.3
0.18	3.9	23.9

KK1 (1040-1050)

SediGraph 5100 V3.02

SAMPLE DIRECTORY/NUMBER: CONTRACT/33 UNIT NUMBER: 1

SAMPLE ID: KK1 (1040-1050)

SUBMITTER: Caradoc Peters

OPERATOR: Pete Johnson

SAMPLE TYPE: Swamp sediment

LIQUID TYPE: Water

ANALYSIS TEMP: 34.7 deg C

BASELINE/FULL SCALE: 106/73 kilocounts/sec

STARTING DIAMETER: 100.00 mm

ENDING DIAMETER: 0.18 mm

MASS DISTRIBUTION

MEDIAN DIAMETER: 2.38 mm MODAL DIAMETER: 2.72 mm

START 12:53:36 07/12/93

REPT 11:31:32 07/19/93

TOT RUN TIME 0:33:58

SAM DENS: 2.6500 g/cc

LIQ DENS: 0.9942 g/cc

LIQ VISC: 0.7273 mPa*s

RUN TYPE: High Speed

REYNOLDS NUMBER: 1.69

FULL SCALE MASS %: 100

DIAMETER (mm)	CUMULATIVE MASS FINER (%)	MASS IN INTERVAL (%)
62.50	99.3	0.7
31.25	99.9	-0.6
15.60	100.1	-0.2
7.81	90.1	10.1
3.91	71.5	18.6
1.95	42.0	29.5
0.18	8.6	33.4

A.8 ICP Analysis Results

Raw Results

1) Al, As, B and Ca

2) Cd, Co, Cr and Cu

Id.No.	Sample	Al	As	B	Ca
93/191-1	2M HCL	< 0.10	< 0.10	< 0.02	1.6
2	KK1 0-10	1026	< 1.00	0.80	88
3	KK1 45-55	963	< 1.00	0.59	84
4	KK1 90-100	945	< 1.00	0.47	84
5	KK1 140-150	433	< 1.00	< 0.20	56
6	KK1 180-190	398	< 1.00	< 0.20	92
7	KK1 230-235	882	< 1.00	< 0.20	149
8	KK1 250-260	928	< 1.00	< 0.20	172
9	KK1 290-300	882	< 1.00	0.40	156
10	KK1 330-340	122	< 1.00	< 0.20	63
11	KK1 360-370	134	< 1.00	< 0.20	106
12	KK1 399-401	425	< 1.00	< 0.20	31
13	KK1 430-440	332	< 1.00	< 0.20	197
14	KK1 465-475	71	< 1.00	0.54	432
15	KK1 505-515	111	< 1.00	< 0.20	142
16	KK1 535-545	410	< 1.00	< 0.20	130
17	KK1 570-580	142	< 1.00	< 0.20	98
18	KK1 610-620	315	< 1.00	0.25	251
19	KK1 635-645	714	< 1.00	< 0.20	94
20	KK1 670-680	298	< 1.00	< 0.20	147
21	KK1 715-725	296	< 1.00	< 0.20	117
22	KK1 750-760	148	< 1.00	< 0.20	111
23	KK1 790-800	397	< 1.00	0.26	117
24	KK1 820-830	400	< 1.00	0.45	125
25	KK1 847-855	6.9	< 1.00	6.8	2097
26	KK1 870-880	171	< 1.00	< 0.20	558
27	KK1 900-910	40	< 1.00	2.0	1216
28	KK1 950-960	149	< 1.00	0.53	1150
29	KK1 980-990	243	< 1.00	0.49	860
30	KK1 1010-1015	6.8	< 1.00	2.2	2428
31	KK1 1040-1050	222	< 1.00	1.3	702

Id.No.	Sample	Cd	Co	Cr	Cu
93/191-1	2M HCL	< 0.01	< 0.01	< 0.02	< 0.01
2	KK1 0-10	< 0.10	2.2	5.4	1.3
3	KK1 45-55	< 0.10	2.0	4.8	1.4
4	KK1 90-100	< 0.10	1.8	3.1	1.1
5	KK1 140-150	< 0.10	0.63	0.91	0.28
6	KK1 180-190	< 0.10	2.2	1.7	0.58
7	KK1 230-235	< 0.10	1.5	2.9	0.73
8	KK1 250-260	< 0.10	1.5	3.2	0.86
9	KK1 290-300	< 0.10	1.5	3.2	0.78
10	KK1 330-340	< 0.10	0.57	0.74	0.12
11	KK1 360-370	< 0.10	1.9	1.4	0.33
12	KK1 399-401	< 0.10	0.63	3.1	0.50
13	KK1 430-440	< 0.10	2.2	1.7	0.36
14	KK1 465-475	< 0.10	0.61	1.3	0.10
15	KK1 505-515	< 0.10	0.93	2.4	0.23
16	KK1 535-545	< 0.10	1.1	4.1	0.72
17	KK1 570-580	< 0.10	0.55	1.6	0.34
18	KK1 610-620	< 0.10	1.0	3.3	0.56
19	KK1 635-645	< 0.10	1.2	5.8	0.96
20	KK1 670-680	< 0.10	1.3	4.3	1.1
21	KK1 715-725	< 0.10	1.4	3.1	0.78
22	KK1 750-760	< 0.10	0.80	2.7	0.46
23	KK1 790-800	< 0.10	1.4	3.7	0.88
24	KK1 820-830	< 0.10	1.9	4.3	0.98
25	KK1 847-855	< 0.10	0.51	1.0	0.30
26	KK1 870-880	< 0.10	1.2	1.3	0.31
27	KK1 900-910	< 0.10	0.66	1.2	0.21
28	KK1 950-960	< 0.10	1.6	1.8	0.54
29	KK1 980-990	< 0.10	3.0	2.7	0.78
30	KK1 1010-1015	< 0.10	0.72	1.3	0.38
31	KK1 1040-1050	< 0.10	1.0	1.5	0.40

3) Fe, K, Mg and Mn

IdNo.	Sample	Fe	K	Mg	Mn
93/191-1	2M HCL	0.78	<0.60	<0.15	<0.009
2	KK1 0-10	2003	<6.0	41	11.2
3	KK1 45-55	1810	<6.0	35	15.3
4	KK1 90-100	1425	<6.0	36	15.6
5	KK1 140-150	361	<6.0	26	1.3
6	KK1 180-190	1714	<6.0	46.5	3.3
7	KK1 230-235	1468	18.8	82	9.9
8	KK1 250-260	1379	23.0	92	8.4
9	KK1 290-300	1272	16.8	78	7.9
10	KK1 330-340	523	<6.0	30	1.8
11	KK1 360-370	1892	<6.0	51	2.6
12	KK1 399-401	644	<6.0	21	2.8
13	KK1 430-440	1282	<6.0	96	4.2
14	KK1 465-475	225	<6.0	167	4.6
15	KK1 505-515	737	<6.0	57	12.2
16	KK1 535-545	1229	<6.0	63	12.8
17	KK1 570-580	493	<6.0	43	6.0
18	KK1 610-620	1296	<6.0	80	17.1
19	KK1 635-645	1720	<6.0	47	11.4
20	KK1 670-680	1693	<6.0	46.5	14.2
21	KK1 715-725	1707	<6.0	34.5	17.0
22	KK1 750-760	676	<6.0	27	6.6
23	KK1 790-800	1473	<6.0	59	15.3
24	KK1 820-830	1422	<6.0	37.5	17.8
25	KK1 847-855	307	<6.0	207	4.9
26	KK1 870-880	672	<6.0	39.5	15.0
27	KK1 900-910	410	<6.0	110	6.0
28	KK1 950-960	762	<6.0	85	18.9
29	KK1 980-990	1212	<6.0	77	27.0
30	KK1 1010-1015	376	<6.0	304	6.3
31	KK1 1040-1050	578	<6.0	103	4.7

4) Mo, Na, Ni and P

IdNo.	Sample	Mo	Na	Ni	P
93/191-1	2M HCL	<0.10	3.7	<0.02	<0.20
2	KK1 0-10	<0.10	14.5	3.6	62.0
3	KK1 45-55	<0.10	14.4	3.4	49.5
4	KK1 90-100	<0.10	13.1	2.7	47.0
5	KK1 140-150	<0.10	15.3	1.0	6.8
6	KK1 180-190	0.16	17.4	2.3	12.2
7	KK1 230-235	<0.10	27.5	2.4	29.0
8	KK1 250-260	<0.10	30.0	2.6	29.5
9	KK1 290-300	0.11	25.0	2.4	28.5
10	KK1 330-340	<0.10	10.2	0.63	2.5
11	KK1 360-370	0.89	12.8	1.7	2.4
12	KK1 399-401	<0.10	4.7	1.5	7.4
13	KK1 430-440	0.49	21.5	2.5	9.3
14	KK1 465-475	0.43	25.5	0.49	<2.0
15	KK1 505-515	1.3	11.3	1.4	10.5
16	KK1 535-545	0.81	15.6	2.3	15.7
17	KK1 570-580	<0.10	13.7	1.9	14.6
18	KK1 610-620	0.22	25.5	3.0	42.0
19	KK1 635-645	<0.10	16.7	3.7	32.0
20	KK1 670-680	0.14	14.9	4.6	30.0
21	KK1 715-725	0.28	13.0	4.0	26.0
22	KK1 750-760	0.33	10.6	2.5	21.5
23	KK1 790-800	0.29	21.0	4.8	35.0
24	KK1 820-830	0.70	15.0	4.7	27.5
25	KK1 847-855	<0.10	33.0	0.97	27.5
26	KK1 870-880	0.30	12.8	2.1	11.2
27	KK1 900-910	0.12	18.0	1.2	26.0
28	KK1 950-960	0.38	24.0	2.2	26.0
29	KK1 980-990	0.61	23.0	3.7	27.0
30	KK1 1010-1015	0.11	42.0	1.1	37.0
31	KK1 1040-1050	<0.10	30.0	2.7	17.4

5) Pb, S, Se and Si

IdNo.	Sample	Pb	S	Se	Si
93/191-1	2M HCL	<0.10	0.64	<0.20	5.7
2	KK1 0-10	<1.00	57	<2.0	34.0
3	KK1 45-55	<1.00	53	<2.0	44.0
4	KK1 90-100	<1.00	98	<2.0	46.5
5	KK1 140-150	<1.00	238	<2.0	27.0
6	KK1 180-190	<1.00	1495	<2.0	14.5
7	KK1 230-235	<1.00	481	<2.0	21.0
8	KK1 250-260	<1.00	492	<2.0	26.0
9	KK1 290-300	<1.00	410	<2.0	29.0
10	KK1 330-340	<1.00	583	<2.0	17.6
11	KK1 360-370	<1.00	2192	<2.0	9.0
12	KK1 399-401	<1.00	562	<2.0	10.4
13	KK1 430-440	<1.00	1432	<2.0	13.3
14	KK1 465-475	<1.00	956	<2.0	10.7
15	KK1 505-515	<1.00	1158	<2.0	6.6
16	KK1 535-545	<1.00	1441	<2.0	9.5
17	KK1 570-580	<1.00	805	<2.0	7.0
18	KK1 610-620	<1.00	1858	<2.0	8.9

IdNo.	Sample	Pb	S	Se	Si
93/191-1	2M HCL	<0.10	0.64	<0.20	5.7
19	KK1 635-645	<1.00	1782	<2.0	13.0
20	KK1 670-680	<1.00	2215	<2.0	13.2
21	KK1 715-725	<1.00	2125	<2.0	12.3
22	KK1 750-760	<1.00	996	<2.0	9.4
23	KK1 790-800	<1.00	1870	<2.0	14.4
24	KK1 820-830	<1.00	1742	<2.0	19.0
25	KK1 847-855	<1.00	550	<2.0	109.0
26	KK1 870-880	<1.00	870	<2.0	25.5
27	KK1 900-910	<1.00	595	<2.0	58.0
28	KK1 950-960	<1.00	952	<2.0	127.0
29	KK1 980-990	<1.00	1313	<2.0	79.0
30	KK1 1010-1015	<1.00	569	<2.0	133.0
31	KK1 1040-1050	<1.00	835	<2.0	55.0

6) Sn, Sr and Zn

Statistics

Id.No.	Sample	Sn	Sr	Zn
93/191-1	2M HCL	<0.02	0.005	0.21
2	KK1 0-10	<0.20	2.5	3.2
3	KK1 45-55	<0.20	2.1	3.0
4	KK1 90-100	<0.20	2.1	3.0
5	KK1 140-150	<0.20	1.3	1.3
6	KK1 180-190	<0.20	1.7	1.9
7	KK1 230-235	<0.20	3.5	3.5
8	KK1 250-260	<0.20	3.8	2.3
9	KK1 290-300	<0.20	3.4	2.3
10	KK1 330-340	<0.20	0.95	1.6
11	KK1 360-370	<0.20	1.6	1.6
12	KK1 399-401	<0.20	0.69	1.2
13	KK1 430-440	<0.20	3.3	1.5
14	KK1 465-475	<0.20	5.5	0.93
15	KK1 505-515	<0.20	2.0	1.7
16	KK1 535-545	<0.20	2.5	2.1
17	KK1 570-580	<0.20	1.7	1.7
18	KK1 610-620	<0.20	4.6	2.6
19	KK1 635-645	<0.20	2.6	2.7
20	KK1 670-680	<0.20	2.5	3.1
21	KK1 715-725	<0.20	2.3	2.6
22	KK1 750-760	<0.20	2.0	1.6
23	KK1 790-800	<0.20	3.2	2.5
24	KK1 820-830	<0.20	4.4	2.7
25	KK1 847-855	<0.20	29.0	1.4
26	KK1 870-880	<0.20	9.2	2.3
27	KK1 900-910	<0.20	15.5	1.6
28	KK1 950-960	<0.20	16.8	2.5
29	KK1 980-990	<0.20	14.6	3.6
30	KK1 1010-1015	<0.20	27.5	1.4
31	KK1 1040-1050	<0.20	9.9	1.8

Element	Mean	Median	TrMean	StDev	SeMean
Al	387.0	306.5	369.5	319.4	58.3
B	0.676	0.200	0.418	1.262	0.230
Ca	402.0	136.0	286.0	597.0	109.0
Co	1.317	1.250	1.279	0.629	0.115
Cr	2.650	2.700	2.565	1.392	0.254
Cu	0.6123	0.5500	0.5942	0.3495	0.0638
Fe	1092.0	1250.0	1090.0	552.0	101.0
K	7.353	6.000	6.415	4.212	0.769
Mg	74.1	54.0	64.0	59.9	10.9
Mn	10.07	9.15	9.73	6.30	1.15
Mo	0.2957	0.1300	0.2492	0.2972	0.0543
Na	19.07	16.15	18.54	8.11	1.48
Ni	2.470	2.400	2.441	1.194	0.218
P	23.83	26.00	23.04	14.80	2.70
S	1024.0	911.0	1008.0	660.0	120.0
Sr	6.09	2.90	4.79	7.41	1.35
Zn	2.174	2.200	2.154	0.723	0.132

Element	Min	Max	Q1	Q3
Al	6.8	1026.0	140.0	503.2
B	0.200	6.800	0.200	0.532
Ca	31.0	2428.0	93.0	463.0
Co	0.510	3.000	0.705	1.825
Cr	0.700	5.800	1.375	3.400
Cu	0.1000	1.4000	0.3250	0.8650
Fe	225.0	2003.0	564.0	1528.0
K	6.000	23.000	6.000	6.000
Mg	21.0	304.0	37.1	86.7
Mn	1.30	27.00	4.67	15.30
Mo	0.1000	1.3000	0.1000	0.3925
Na	4.70	42.00	13.08	25.12
Ni	0.490	4.800	1.475	3.450
P	2.00	62.00	11.02	30.50
S	53.0	2215.0	536.0	1557.0
Sr	0.69	29.00	2.00	6.43
Zn	0.930	3.600	1.600	2.700

Correlation Analysis

Values represent r (the correlation coefficient).

	Al	B	Ca	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	S	Sr
B	-0.295															
Ca	-0.481	0.772														
Co	0.449	-0.287	-0.230													
Cr	0.673	-0.294	-0.430	0.384												
Cu	0.777	-0.207	-0.325	0.588	0.876											
Fe	0.637	-0.381	-0.507	0.733	0.720	0.785										
K	0.535	-0.111	-0.134	0.097	0.109	0.176	0.172									
Mg	-0.357	0.645	0.864	-0.259	-0.373	-0.329	-0.436	0.061								
Mn	0.182	-0.185	-0.021	0.521	0.505	0.561	0.396	-0.070	-0.183							
Mo	-0.328	-0.204	-0.133	0.208	-0.019	-0.199	0.069	-0.216	-0.099	0.242						
Na	-0.075	0.496	0.695	-0.034	-0.226	-0.111	-0.214	0.361	0.853	-0.015	-0.227					
Ni	0.412	-0.303	-0.349	0.578	0.759	0.796	0.734	0.004	-0.389	0.675	-0.001	-0.126				
P	0.584	0.155	0.123	0.344	0.646	0.780	0.477	0.118	0.079	0.519	-0.359	0.235	0.557			
S	-0.362	-0.250	-0.195	0.178	0.175	0.005	0.379	-0.282	-0.157	0.276	0.449	-0.135	0.470	-0.216		
Sr	-0.449	0.793	0.988	-0.158	-0.392	-0.275	-0.471	-0.112	0.818	0.070	-0.121	0.695	-0.279	0.155	-0.181	
Zn	0.594	-0.251	-0.235	0.656	0.668	0.804	0.696	0.232	-0.328	0.785	-0.085	-0.024	0.757	0.683	0.100	-0.150

Significance of values for r is:

$r \leq 0.35$	Not significant	$[P \leq 0.05]$
$0.35 < r \leq 0.45$	Significant	$[0.1 \leq P < 0.05]$
$0.45 < r \leq 0.55$	Highly significant	$[0.001 < P < 0.1]$
$0.55 < r$	Very highly significant	$[P \leq 0.001]^*$

*If P (probability function) < 0.001 , there is a less than 0.1% chance that there is no relationship; therefore a greater than 99.1% chance that there is a relationship.

A negative value for r implies an inverse relationship.

APPENDIX A.9

Modern Vegetation Plots⁷⁹:

a) Oneroa plot 1. - the seaward side of the *motu*

Guettarda speciosa

0.15=0.1795	0.25=0.4976	0.20=0.3177	0.30=0.7148	0.32=0.8139	0.17=0.2307	0.17=0.2307
0.29=0.6706	0.34=0.9195	0.23=0.4208	0.20=0.3177	0.48=1.8337	0.26=0.5385	0.50=1.9906
0.16=0.2043	0.24=0.4584	0.24=0.4584	0.80=5.0910	0.15=0.1795	0.18=0.2570	0.24=0.4584
0.24=0.4584	0.51=2.0714	0.15=0.1795	0.20=0.3177	0.25=0.4976	0.24=0.4584	0.25=0.4976
0.38=1.1499	0.20=0.3177	0.24=0.4584	0.17=0.2307	0.17=0.2307	0.24=0.4584	0.32=0.8139
0.53=2.2379	0.24=0.4584	0.20=0.3177	0.17=0.2307	0.19=0.2865	0.43=1.4698	0.17=0.2307
0.18=0.2570	0.20=0.3177	0.17=0.2307	0.23=0.4208	0.19=0.2865	0.25=0.4976	0.24=0.4584
0.25=0.4976	0.20=0.3177	0.18=0.2570	0.25=0.4976	0.23=0.4208	0.28=0.6249	0.25=0.4976
0.19=0.2865	0.28=0.6249	0.19=0.2865	0.55=2.4053	0.16=0.2043	0.18=0.2570	0.19=0.2865
0.67=3.5700	0.39=1.2115	0.24=0.4584	0.16=0.2043	0.19=0.2865	0.19=0.2865	0.77=4.7144
0.20=0.3177	0.25=0.4976	0.20=0.3177	0.18=0.2570	0.20=0.3177	0.19=0.2865	0.43=1.4698
0.20=0.3177	0.32=0.8139	0.22=0.3848	0.23=0.4208	0.32=0.8139	0.20=0.3177	0.25=0.4976
0.22=0.3848	0.17=0.2307	0.18=0.2570	0.15=0.1795	0.18=0.2570	0.24=0.4584	0.19=0.2865
0.23=0.4208	0.33=0.8659	0.33=0.8659	0.32=0.8139			

Casuarina equisetifolia

1.10=9.6321	0.78=4.8383	1.90=28.7285	2.75=60.1870	0.74=4.3595	0.40=1.2748	0.85=5.7510
1.02=8.2754	1.90=28.7285	0.17=0.2307	0.20=0.3177	0.18=0.2570	0.25=0.4976	1.02=8.2754
0.54=2.3181	0.39=1.2115	0.25=0.4976	0.18=0.2570	0.45=1.6106	0.21=0.3505	0.29=0.6706
0.19=0.2865	0.28=0.6249	1.84=26.9335	0.90=6.4422	2.18=37.8276	1.59=20.1249	2.62=54.6288
2.70=58.0070	1.16=10.7057					

Hernandia nymphaeifolia

0.35=0.9747	0.32=0.8139	0.76=4.5996	0.44=1.5394	0.17=0.2307	0.53=2.2379	0.32=0.8139
0.24=0.4584	0.45=1.6106	0.21=0.3505	0.22=0.3848	0.37=1.0899	0.17=0.2307	0.19=0.2865
0.47=1.7577	0.25=0.4976	0.18=0.2570	0.70=3.8987	0.38=1.1499	0.36=1.0315	0.16=0.2043
0.60=2.8652	0.64=3.2621	0.42=1.4019	0.25=0.4976	0.40=1.2748	0.42=1.4019	0.18=0.2570
0.27=0.5809	0.16=0.2043	1.14=10.3377				

Scaevola taccada

0.19=0.2865	0.18=0.2570	0.17=0.2307
0.20=0.3177	0.17=0.2307	0.16=0.2043

Leguminosae sp.

0.15=0.1795
0.17=0.2307

Cocos nucifera

0.28=0.6249
0.48=1.8337

Morinda citrifolia

0.22=0.3848

b) Regeneration plot near Ariana Bungalows, Tupapa

Hibiscus tiliaceus

0.18=0.2570	0.23=0.4208	0.20=0.3177	0.27=0.5809	0.60=2.8652	0.16=0.2043	0.30=0.7148
0.25=0.4976	0.39=1.2115	0.30=0.7148	0.19=0.2865	0.22=0.3848	0.28=0.6249	0.22=0.3848
0.24=0.4584	0.24=0.4584	0.30=0.7148	0.36=1.0315	0.46=1.6833	0.26=0.5385	0.25=0.4976
0.26=0.5385	0.39=1.2115	0.53=2.2379	0.25=0.4976	0.30=0.7148	0.40=1.2748	0.62=3.0604
0.25=0.4976	0.34=0.9195	0.83=5.4822	0.16=0.2043	0.52=2.1538	0.32=0.8139	0.24=0.4584
0.30=0.7148	0.53=2.2379	0.25=0.4976	0.23=0.4208	0.30=0.7148	0.39=1.2115	0.27=0.5809
0.43=1.4698	0.55=2.4053	0.16=0.2043	0.30=0.7148	0.35=0.9747	0.29=0.6706	0.17=0.2307
0.38=1.1499	0.35=0.9747	0.47=1.7577	0.27=0.5809	0.17=0.2307	0.50=1.9906	0.65=3.3654
0.15=0.1795	0.24=0.4584	0.29=0.6706	0.20=0.3177	0.16=0.2043	0.32=0.8139	0.20=0.3177
0.25=0.4976	0.18=0.2570	0.18=0.2570	0.35=0.9747	0.25=0.4976	0.19=0.2865	0.67=3.5700
0.24=0.4584	0.34=0.9195	0.21=0.3505	0.75=4.4788	0.25=0.4976	0.37=1.0899	0.16=0.2043
0.18=0.2570	0.50=1.9906	0.18=0.2570	0.25=0.4976	0.36=1.0315	0.41=1.3396	0.43=1.4698

0.17=0.2307	0.20=0.3177	0.19=0.2865	0.45=1.6106	0.29=0.6706	0.30=0.7148	0.23=0.4208
0.34=0.9195	0.38=1.1499	0.29=0.6706	0.21=0.3505	0.25=0.4976	0.20=0.3177	0.15=0.1795
0.15=0.1795	0.17=0.2307	0.46=1.6833	0.25=0.4976	0.25=0.4976	0.22=0.3848	0.27=0.5809
0.19=0.2865	0.85=5.7510	0.33=0.8659	0.22=0.3848	0.69=3.7875	0.37=1.0899	0.19=0.2865
0.68=3.6779	0.28=0.6249	0.48=1.8337	0.36=1.0315	0.62=3.0604	0.28=0.6249	0.42=1.4019
0.50=1.9906	0.24=0.4976	0.61=2.9620	0.24=0.4584	0.30=0.7148	0.60=2.8652	0.26=0.5385
0.34=0.9195	0.48=1.8337	0.49=1.9113	0.16=0.2043	0.30=0.7148	0.41=1.3396	0.26=0.5385
0.32=0.8139	0.33=0.8659	0.61=2.9620	0.16=0.2043	0.30=0.7148	0.44=1.5394	0.25=0.4976
0.19=0.2865	0.16=0.2043	0.22=0.3848	0.32=0.8139	0.38=1.1499	0.35=0.9747	0.25=0.4976
0.27=0.5809	0.53=2.2379	0.48=1.8337	0.32=0.8139	0.20=0.3177	0.17=0.2307	0.74=4.3595
0.16=0.2043	0.20=0.3177	0.15=0.1795	0.24=0.4584	0.18=0.2570	0.19=0.2865	0.26=0.5385
0.27=0.5809	0.40=1.2748	0.26=0.204				

Syzygium sp.

0.28=0.6249	0.84=5.6158	0.20=0.3177	0.98=7.6454
0.15=0.1795	0.78=4.8383	0.70=3.8987	1.24=12.2418

Ceiba pentandra

2.02=32.4722

Hibiscus rosa-sinensis

0.18=0.2570
0.23=0.4208

c) Oneroa Plot 2. - the landward side of the *motu**Cocos nucifera*

1.48=17.4234	1.28=13.0356	1.50=17.9001	0.37=1.0899	1.41=15.8196	0.37=1.0899	1.40=15.5948
1.49=17.6609	1.67=22.1952	1.45=16.7348	1.29=13.2412	1.39=15.3716	1.27=12.8316	1.41=15.8196

Casuarina equisetifolia

0.86=5.8879	0.24=0.4584	0.87=6.0263	0.16=0.2043	0.16=0.2043	0.20=0.3177	0.28=0.6249
0.19=0.2865						

Scaevola taccada

0.23=0.4208	0.18=0.2570	0.19=0.2865	0.20=0.3177	0.17=0.2307	0.21=0.3505	0.15=0.1795
0.22=0.3848	0.17=0.2307	0.15=0.1795	0.16=0.2043	0.15=0.1795	0.15=0.1795	0.16=0.2043
0.17=0.2307	0.16=0.2043	0.15=0.1795	0.16=0.2043	0.17=0.2307	0.15=0.1795	

Argusia argentea

0.18=0.2570	0.18=0.2570	0.18=0.2570	0.16=0.2043	0.28=0.6249	0.16=0.2043	0.30=0.7148
0.50=1.9906	0.35=0.9747	0.30=0.7148	0.15=0.1795			

Hibiscus tiliaceus

0.15=0.1795
0.19=0.2865

Guettarda speciosa

0.18=0.2570

d) *Inocarpus* dominated Forest at the top of the Avatiu Valley. 14° of slope up the ridge, and 18° of slope on either side of the ridge.*Inocarpus edulis*

3.74=111.2950	2.29=41.7393	0.69=3.7875	2.22=39.2136	1.10=9.6321
6.25=310.8380	1.09=9.4569	5.04=202.1189	0.16=0.2043	3.55=100.2875

Cecropia palmata

0.79=4.9639
0.78=4.8383

Homalium acuminatum

0.16=0.2043	0.87=6.0263	0.53=2.2379	1.18=11.0800
0.70=3.8987	0.24=0.4584	0.71=4.0115	0.35=0.9747
1.46=16.9677	0.18=0.2570	2.97=70.1974	0.37=1.0899
2.23=39.5696	0.22=0.3848	3.00=71.6303	

Canthium barbatum

0.30=0.7148
0.31=0.7636

Angiopteris longifolia

0.15=0.1795	0.15=0.1795	0.16=0.2043	0.15=0.1795	0.15=0.1795
0.15=0.1795	0.15=0.1795	0.15=0.1795	0.16=0.2043	0.15=0.1795
0.17=0.2307	0.15=0.1795	0.15=0.179		

Elaeocarpus tonganus

0.17=0.2307

Fagraea berteriana

1.15=10.5209	1.45=16.7348	0.63=3.1605
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Bischofia javanica

0.32=0.8139
0.80=5.0910

Hibiscus tiliaceus

0.19=0.2865

e) Slope and Ridge Forest: Avatiu side of the Cross-Island Track - *Homalium* and *Fitchia* dominated. Circa 200m a.s.l. 22° of slope up the ridge and 30°.*Homalium acuminatum*

0.60=2.8652	0.44=1.5394	1.08=9.2833	0.35=0.9747	0.96=7.3349	.16=0.2043	0.24=0.4584
0.24=0.4584	0.17=0.2307	0.23=0.4208	0.63=3.1605	0.19=0.2865	0.67=3.5700	0.35=0.9747
0.32=0.8139	0.85=5.7510	0.48=1.8337	0.22=0.3848	0.52=2.1538	0.89=6.2991	0.60=2.8652
1.55=19.1200	0.92=6.7334	0.54=2.3181	0.19=0.2865	0.16=0.2043	0.38=1.1499	0.40=1.2748
0.21=0.3505	0.55=2.4053	0.89=6.2991	0.97=7.4894	0.19=0.2865	0.43=0.9195	0.55=2.4053
3.36=89.8530	0.54=2.3181					

Fitchia speciosa

0.15=0.1795	0.32=0.8139	0.16=0.2043	0.18=0.2570	0.18=0.2570	0.16=0.2043	0.15=0.1795
0.18=0.2570	0.15=0.1795	0.21=0.3505	0.18=0.2570	0.29=0.6706	0.15=0.1795	0.22=0.3848
0.18=0.2570	0.15=0.1795	0.22=0.3848	0.21=0.3505	0.17=0.2307	0.15=0.1795	0.15=0.1795
0.18=0.2570	0.23=0.4208	0.15=0.1795	0.22=0.3848	0.18=0.2570	0.16=0.2043	0.19=0.2865
0.20=0.3177	0.18=0.2570	0.21=0.3505	0.23=0.4208	0.19=0.2865	0.15=0.1795	0.16=0.2043
0.19=0.2865	0.18=0.2570	0.15=0.1795	0.21=0.3505	0.16=0.2043	0.17=0.2307	0.16=0.2043
0.17=0.2307	0.15=0.1795	0.25=0.4976	0.15=0.1795	0.15=0.1795	0.15=0.1795	0.19=0.2865
0.18=0.2570	0.21=0.3505	0.15=0.1795	0.22=0.3848	0.29=0.6706	0.17=0.2307	0.16=0.2043
0.15=0.1795	0.16=0.2043	0.21=0.3505	0.18=0.2570	0.26=0.5385	0.22=0.3848	0.21=0.3505
0.17=0.2307	0.17=0.2307	0.20=0.3177	0.22=0.3848	0.21=0.3505	0.20=0.317	

Canthium barbatum

0.16=0.2043	0.29=0.6706	0.26=0.5385	0.22=0.3848	0.20=0.3177	0.29=0.6706	0.31=0.7636
0.28=0.6249	0.31=0.7636	0.39=1.2115	0.30=0.7148	0.20=0.3177	0.37=1.0899	0.25=0.4976
0.31=0.7636	0.32=0.8139	0.31=0.7636	0.26=0.5385	0.20=0.3177	0.20=0.3177	0.24=0.4584
0.22=0.3848						

Elaeocarpus tonganus

0.43=1.4698	0.25=0.4976	0.39=1.2115	0.28=0.6249	0.32=0.8139	0.27=0.5809	0.18=0.2570
0.27=0.5809	0.24=0.4584	0.27=0.5809	0.25=0.4976	0.31=0.7636	0.48=1.8337	0.46=1.6833
0.39=1.2115	0.20=0.3177	0.50=1.9906	0.31=0.7636			

Meryta paucifolia

0.15=0.1795	0.19=0.2865	0.20=0.3177
0.24=0.4584	0.17=0.2307	0.21=0.3505
0.18=0.2570	0.28=0.6249	

Fagraea berteriana

0.51=2.0714	0.44=1.5394	0.22=0.3848	0.47=1.7577
0.23=0.4208	0.40=1.2748	0.40=1.2748	1.04=8.6049
1.35=14.5085	1.37=14.930	1.72=23.5342	

Weinmannia samoensis

0.16=0.2043	0.46=1.6833
0.65=3.3654	0.33=0.8659
0.61=2.9620	0.67=3.5700

Ixora bracteata

0.19=0.2865	0.41=1.33960
0.19=0.2865	0.18=0.2570
0.16=0.2043	

Hibiscus tiliaceus

0.30=0.7148	0.45=1.6106	0.24=0.4584	0.24=0.4584
0.31=0.7636	0.41=1.3396		

Hernandia moerenhoutiana

1.26=12.6293

Xylosma suaveolens

0.21=0.3505	0.19=0.2865	0.41=1.3396	0.20=0.3177
0.50=1.9906	0.21=0.3505		

Angiopteris longifolia

0.15=0.1795 0.15=0.1795

h) Cloud Forest - ridge on Old Te Manga Track. Circa 440m a.s.l. 22° of slope up the ridge and 50° of slope down from the ridge top. The other side of the ridge top was not surveyed as it was a sheer drop.

Metrosideros collina

0.76=4.5996	0.36=1.0315	0.53=2.2379	0.60=2.8652	0.20=0.3177	2.10=35.0883	0.37=1.0899
0.18=0.2570	0.26=0.5385	0.80=5.0910	0.36=1.0315	1.35=14.5085	0.20=0.3177	0.55=2.4053
1.10=9.6321	1.39=15.3716	0.77=4.7144	0.28=0.6249	0.18=0.2570	0.68=3.6779	0.75=4.4788
0.51=2.0714	1.95=30.2687	1.50=17.9001				

Fagraea berteriana

1.55=19.1200	0.48=1.8337	1.28=13.0356	0.28=0.6249	2.00=31.8290	0.15=0.1795	1.05=8.7721
0.16=0.2043	0.75=4.4788	0.20=0.3177	0.68=3.6779	0.40=1.2748	1.28=13.0356	0.98=7.6454
0.94=7.0309	1.45=16.7348	0.49=1.9113	0.45=1.6106	0.38=1.1499	0.70=3.8987	1.30=13.4484

Weinmannia samoensis

0.22=0.3848	0.47=1.7577	0.55=2.4053	0.15=0.1795	0.45=1.6106	0.65=3.3654	0.70=3.8987
0.18=0.2570	2.10=35.0883	0.59=2.7700	0.31=0.7636	0.16=0.2043	1.05=8.7721	0.17=0.2307
1.17=10.8920	0.37=1.0899	1.38=15.1501				

Elaeocarpus tonganus

0.16=0.2043	0.80=5.0910	0.26=0.5385
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Ascarina diffusa

0.22=0.3848	0.34=0.9195	0.36=1.0315	0.38=1.1499
-------------	-------------	-------------	-------------

Angiopteris longifolia

0.15=0.1795	0.15=0.1795	0.16=0.2043	0.16=0.2043
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Canthium barbatum

0.24=0.4584

Cecropia palmata

0.18=0.2570	0.54=2.3181
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Homalium acuminatum

0.18=0.2570

Alstonia costata

0.20=0.3177

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APPENDICES II

Fig. 2.2-1

Modern Samples, Rarotonga
Sampled by Peters, C.
Analysed by Peters, C.

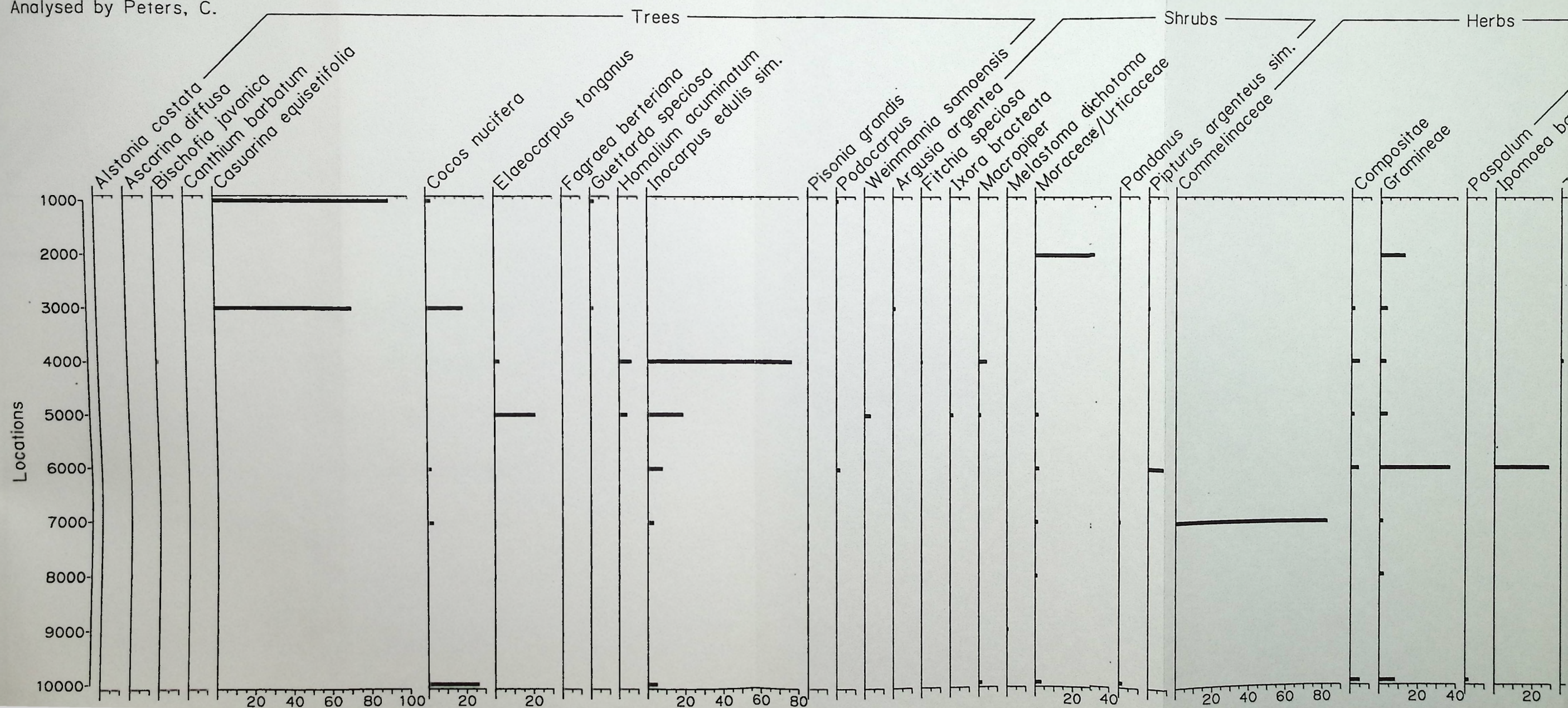


Fig. 2.2-2

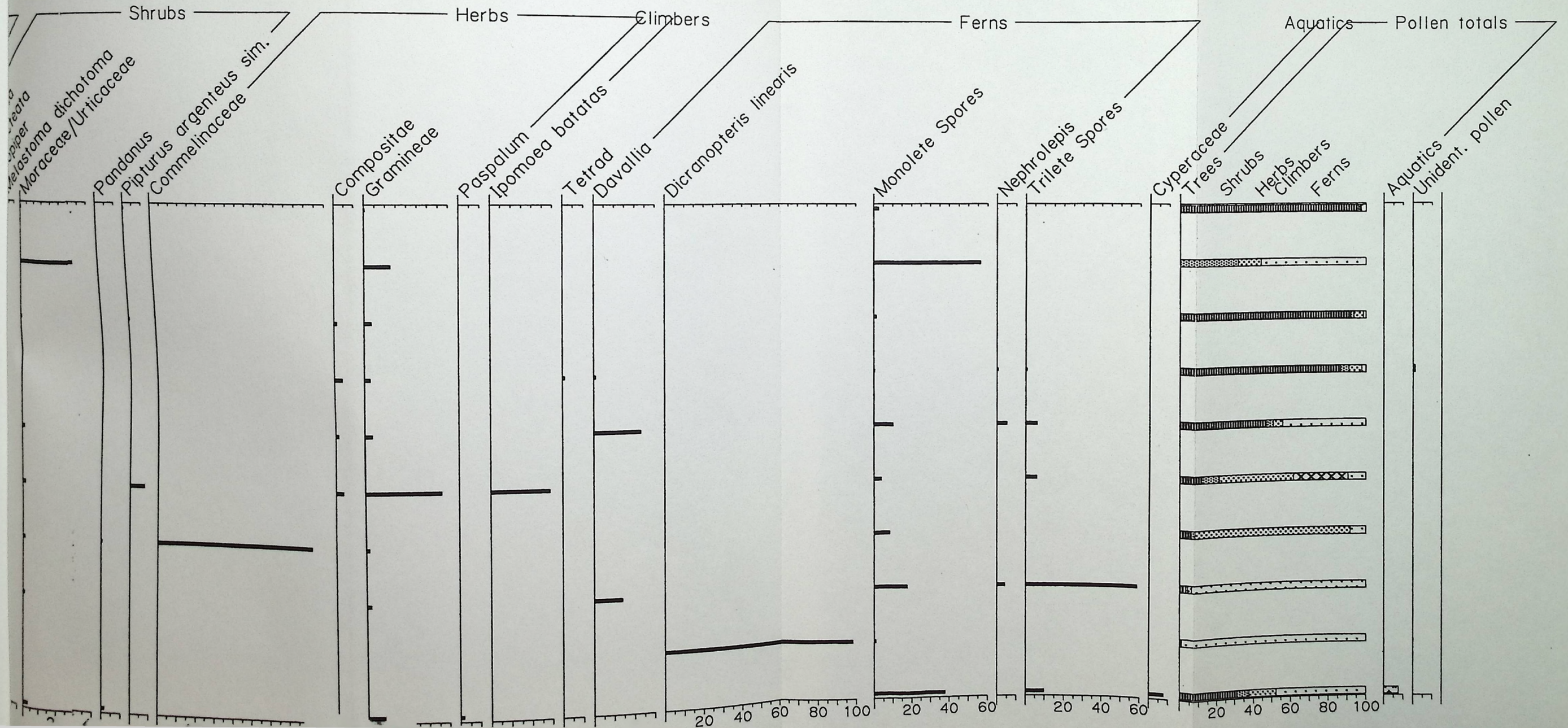


Fig. 7.7-1

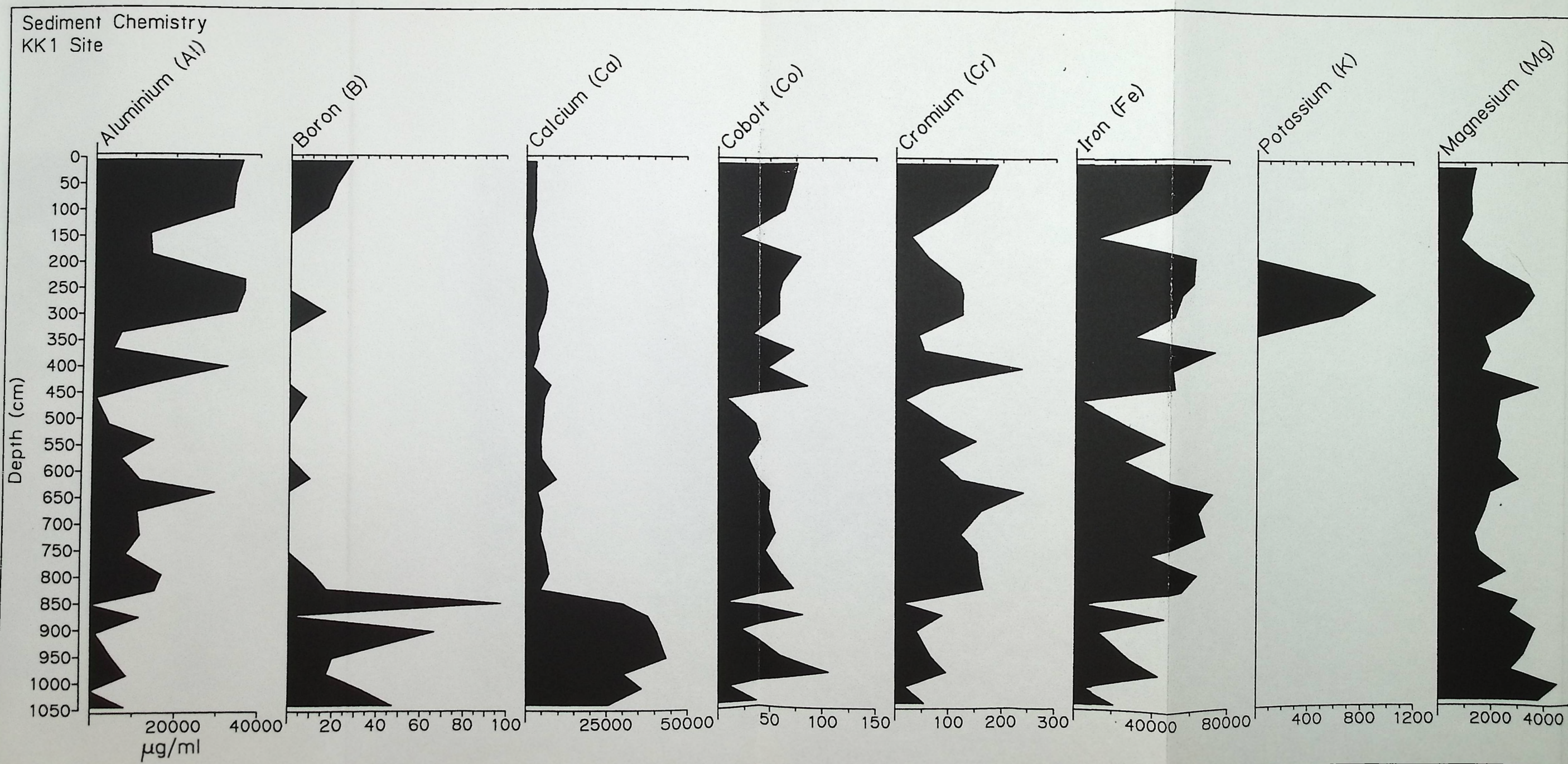


Fig. 7.7-2

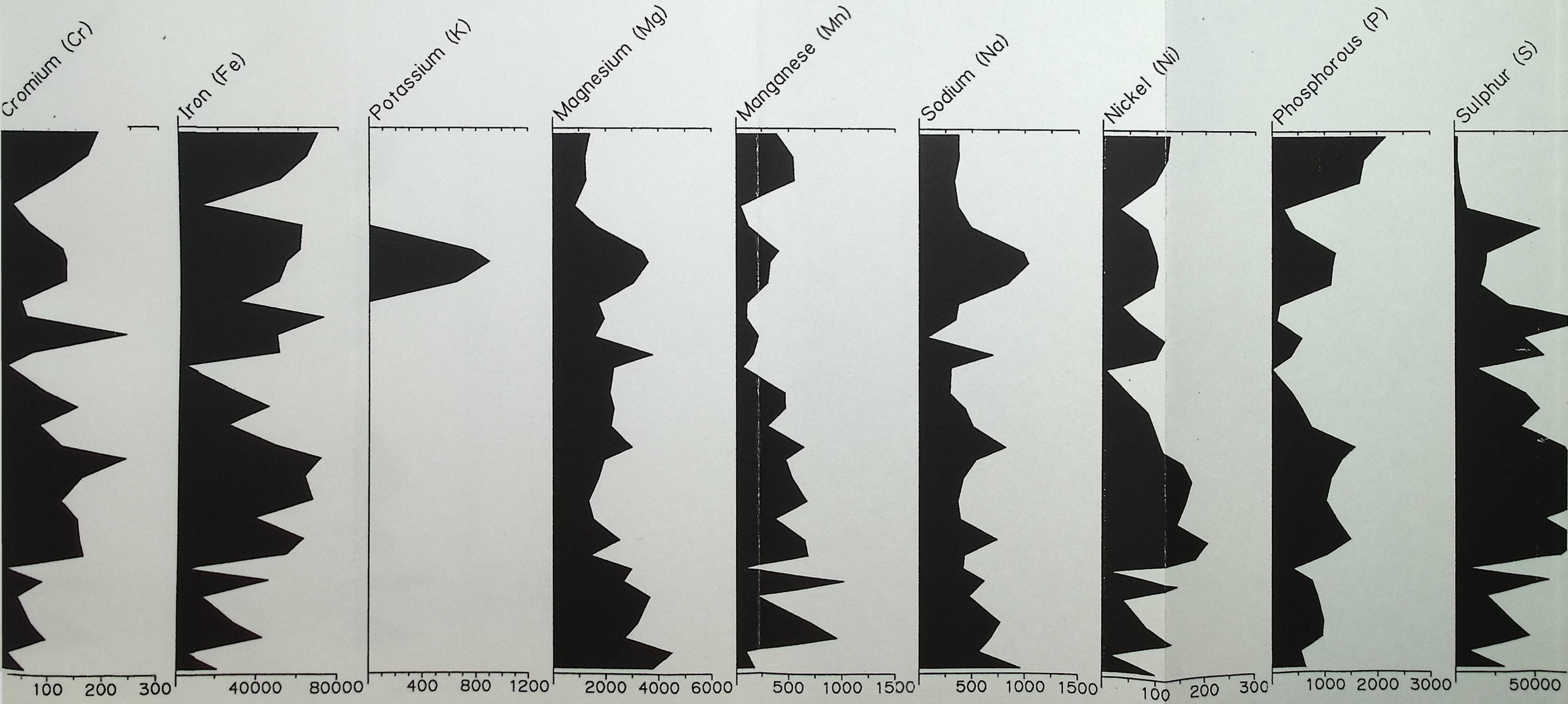
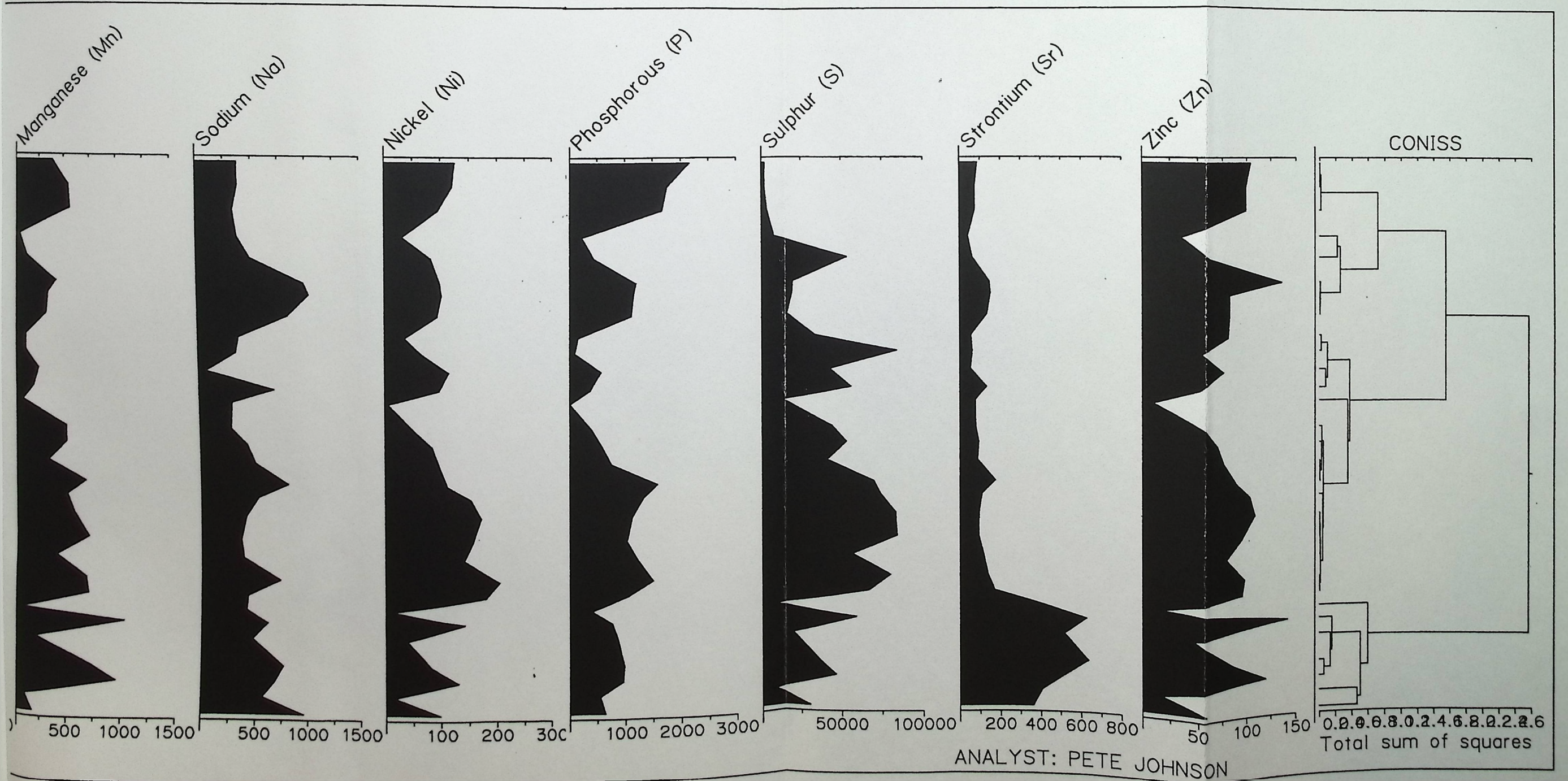


Fig. 7.7-3



Karekare Swamp KK4, Rarotonga
 Sampled by Sutton, D.G., Flenley, J.R. and Barker, W.
 Analysed by Peters, C.

Fig. 8.1-1

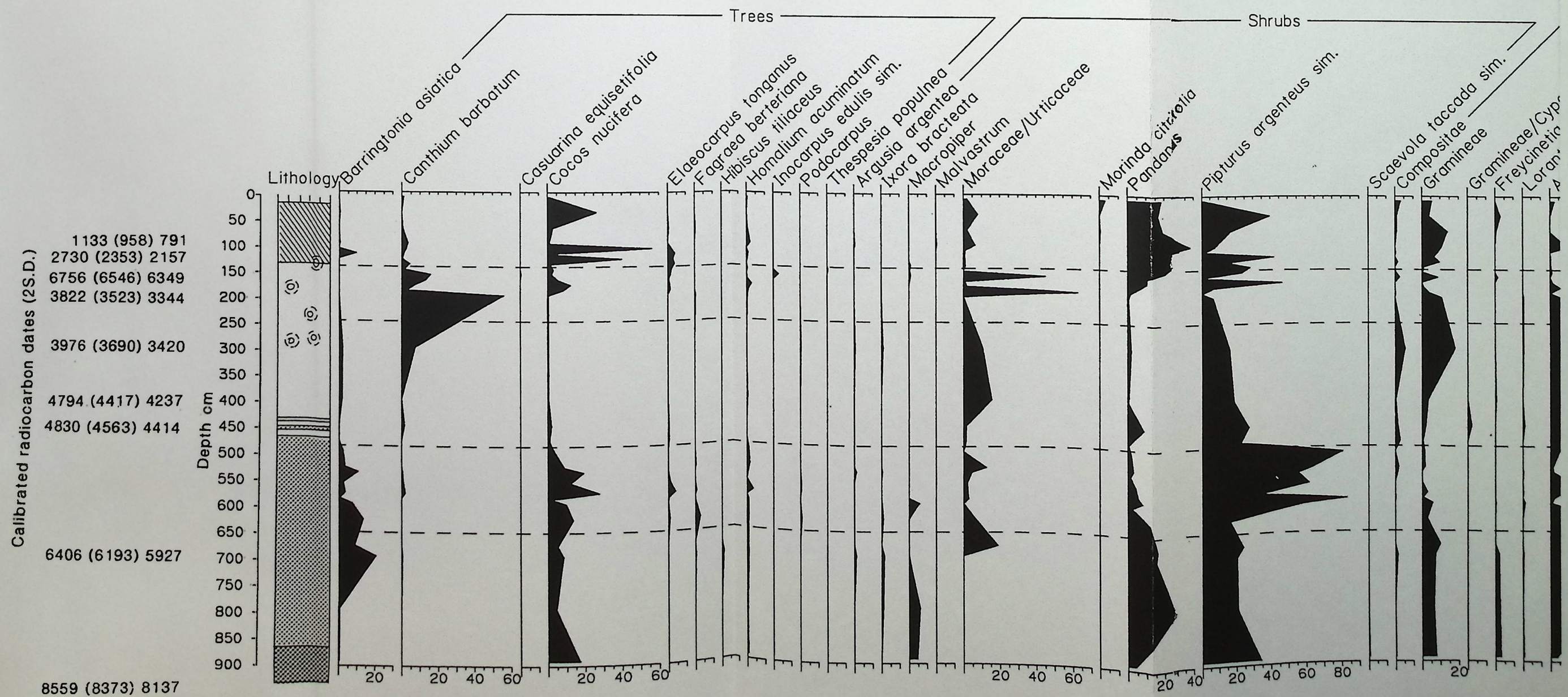
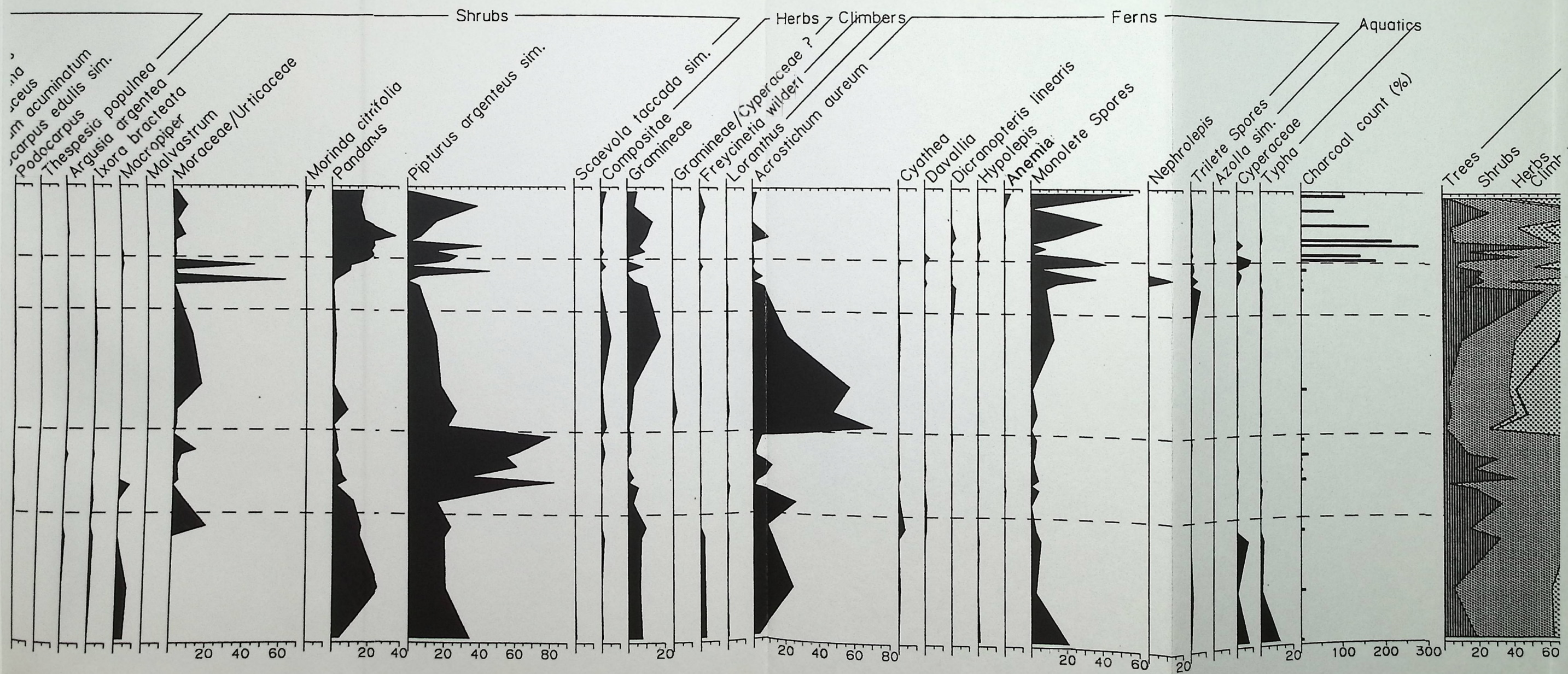


Fig. 8.1-2



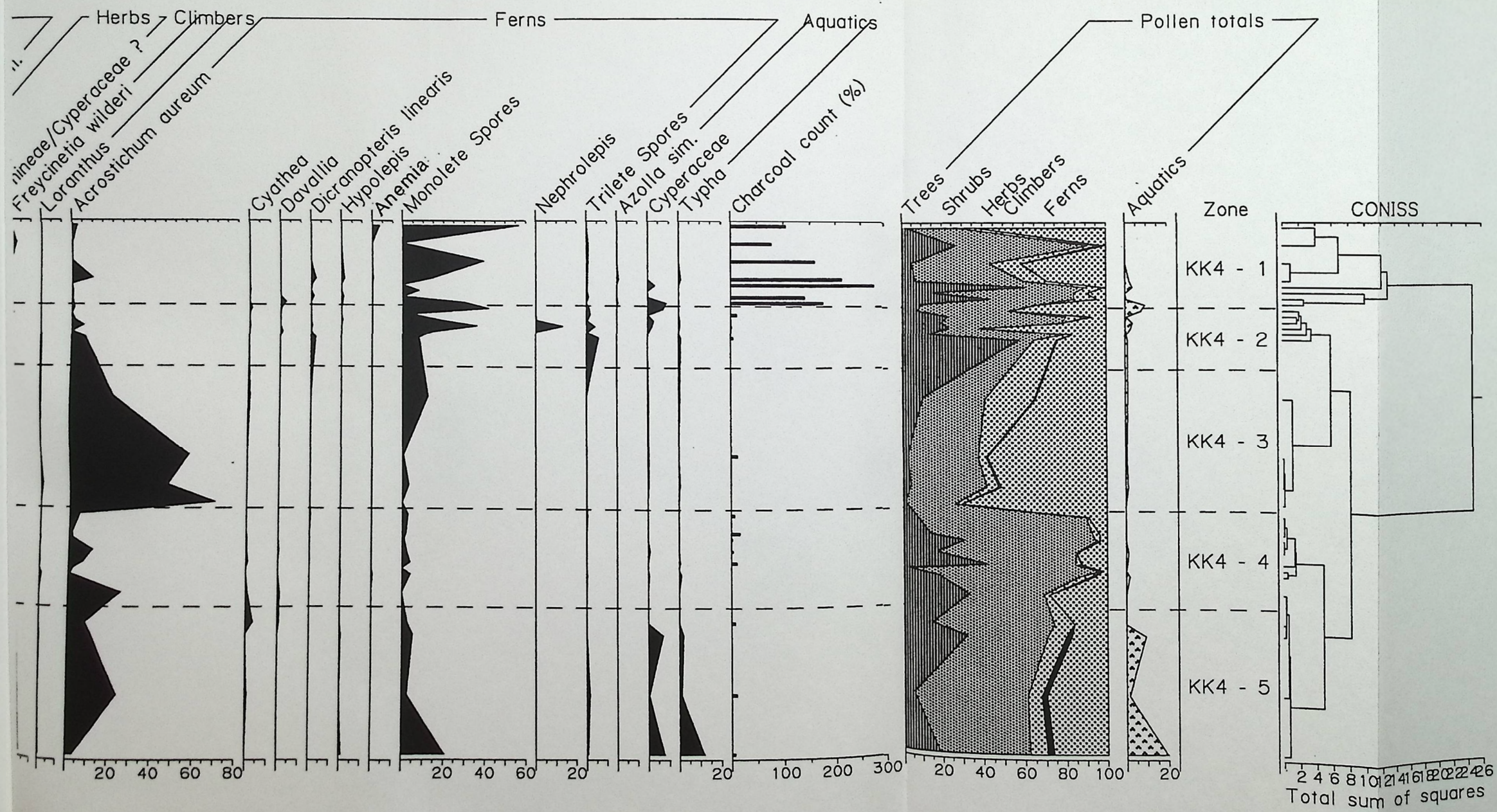
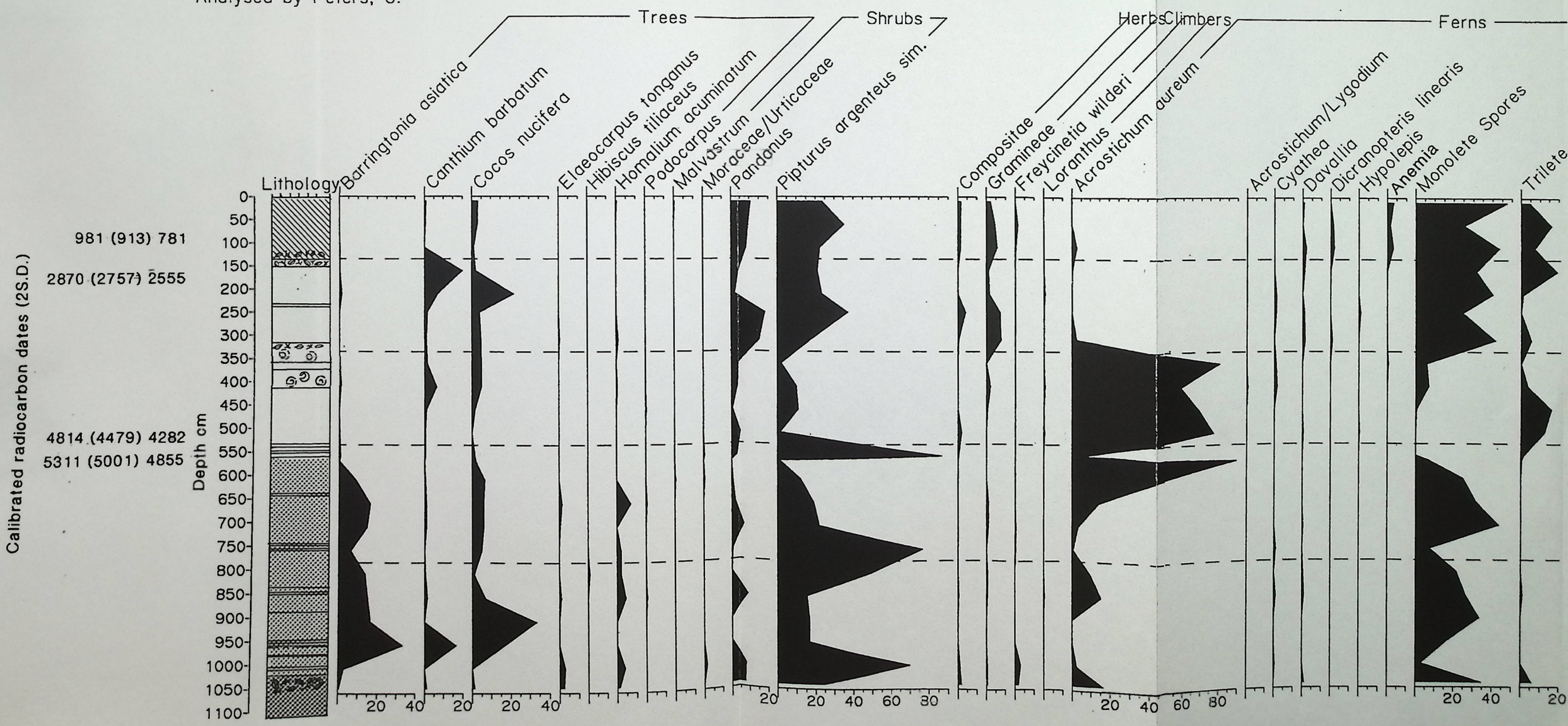


Fig. 8.1-3

Fig. 8.2-1

Karekare Swamp KK1, Rarotonga
 Sampled by Peters, C. and Feek, D.
 Analysed by Peters, C.



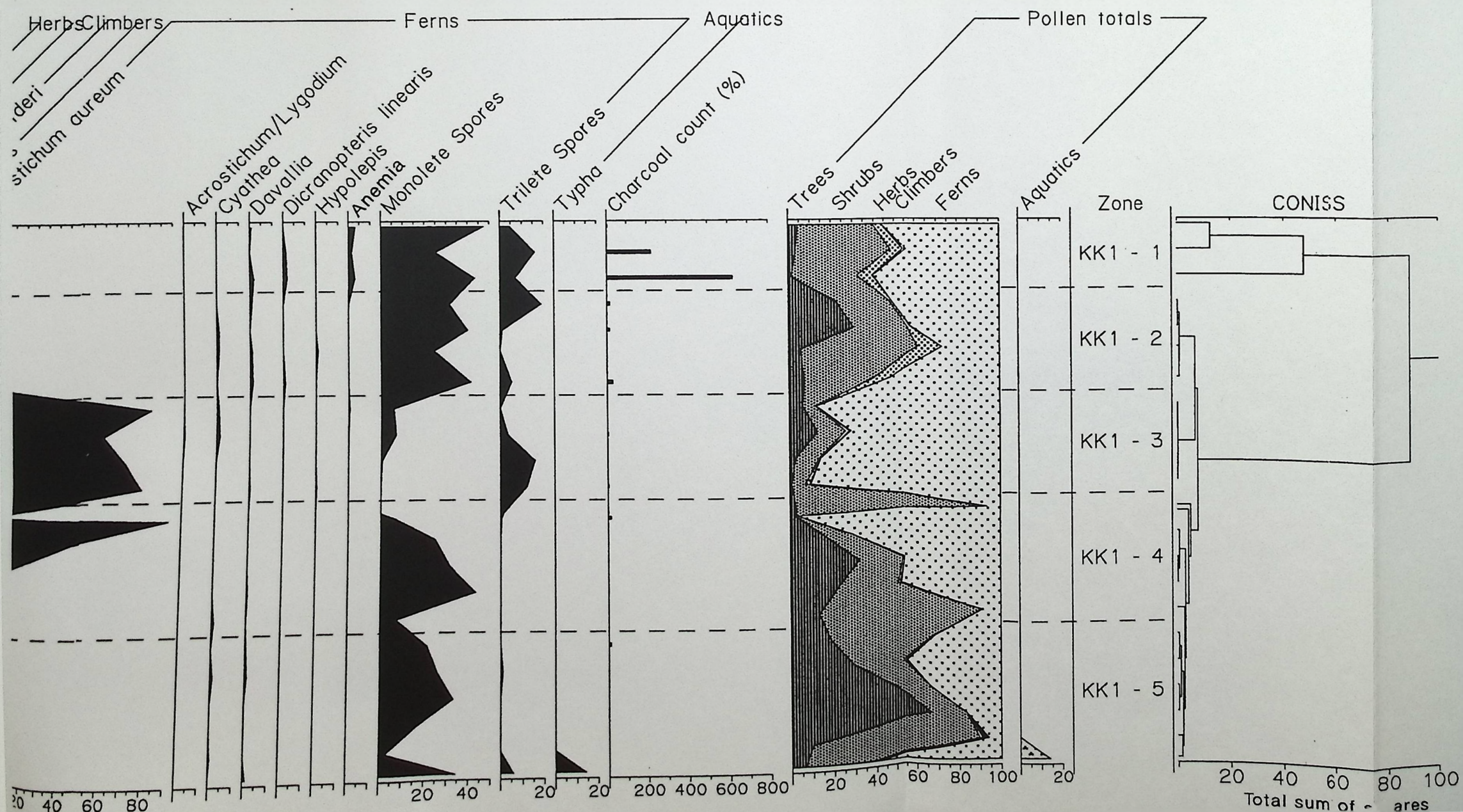


Fig. 8.2-2

