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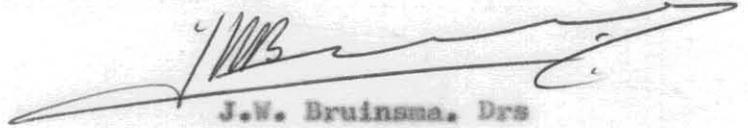
RESEARCH DEPARTMENT.

MINERALOGY OF BEACH SANDS OF

PROSPECT SPL. 39, FRIENDLY BEACHES,

TASMANIA.

This report was prepared by:



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Accepted by:



Dr. J.J. Reed.

Chief Petrologist.

20th April, 1970.

SUMMARY

The mineralogy of 150 samples from the Friendly Beaches, SPL 39, Tasmania, was investigated.

The average amount of heavy minerals is 3.42% with a range of <0.1% - 29.67%.

The most abundant heavy minerals are:

Zircon, average 1.02%, range <0.01% - 11.06%

Topaz, average 0.73%, range <0.01% - 4.18%

Garnet, average 0.80%, range <0.01% - 5.28%

Tourmaline, average 0.47%, range <0.01% - 8.18%

Opaques, average 0.31%, range <0.01% - 3.78% (including ilmenite, magnetite, titanomagnetite and leucosene).

Rutile is very scarce or absent in most samples. The average amount is 0.03%, with a maximum of 0.29%.

The average grainsize for the main heavy minerals is:

Zircon: 0.17mm

Topaz: 0.27mm

Garnet: 0.19mm

Tourmaline: 0.25 mm

Opaques: 0.22mm

The light mineral fraction consists mainly of quartz (up to 99.9%).

Part of the samples are very rich in claysize material up to 37%.

The combination of relatively low to very low amounts of zircon and rutile and low tonnage of beach sand available renders the prospect of little economic potential.

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Fig. 1 Flowsheet of Laboratory Operations.

Fig. 2 Location of Drillholes and Samples
(enclosed in back cover)

Table 1 Composition and average grainsize of
the heavy mineral fraction in samples
from Friendly Beaches, Bicheno, Tasmania.

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INTRODUCTION

One hundred and fifty samples from SPL No.39, Friendly Beaches, Tasmania, were investigated for their heavy mineral content.

The Friendly Beaches are located on the East Coast of Tasmania just south of the village of Bicheno.

General information on the area and sampling procedure are compiled in Planet Management and Research Pty. Ltd. report No.1652 by G.W. Tassell, March 1970. The sample locations are indicated on the enclosed map fig. 2.

This report replaces the previous report "Mineralogy of Beach Sands from the Friendly Beaches" under the same report number, submitted on the 29th January, 1970.

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TECHNIQUES

Fig. 1 gives a laboratory flowsheet of the investigations.

A split of approximately 50 grams of sand was dried and weighed.

Clayrich samples were subsequently washed clean of the clay fraction (L5M) and dried again. Sieving through a BS 52 mesh screen removed the bulk of light mineral fraction (mainly quartz). The - 52 mesh fraction was separated by Bromoform. The heavy mineral concentrate and remainder of the light fraction were dried and weighed. Grain mounts of the heavy fraction were prepared for optical studies. Quantitative mineral analyses were carried out by point counting 200 grains. The frequency percentages thus obtained were recalculated in weight percentages by using the following specific gravity values for the different minerals:

Zircon: 4.7	Tourmaline: 3
Rutile: 4.3	Opagues: average 4.5
Topaz: 3.5	Rest: average 3.5
Garnet: 4.3	

Thirty one samples were selected at random for studies of the light mineral fraction and grainsize determination.

The average grainsize of the different heavy minerals were determined optically by measuring the largest diameters of 100 grains.

The clay fraction of a number of samples was analysed by X-ray diffraction.

RESULTS

The results of this investigation are summarised in Table 1 .

HEAVY MINERAL FRACTIONTotal% of Heavy Minerals (Table 1, Column 2).

The average amount of heavy minerals is 3.42%. In 14 samples only a trace amount is present (<0.1%). A maximum of 29.67% was obtained in sample GWT 125A, probably representing a heavy mineral band.

Composition (Column 3 - 9)

The following heavy minerals are present:- zircon, rutile, topaz, garnet, tourmaline, ilmenite, magnetite, titanomagnetite, leucosene, amphibole, pyroxene, epidote and monazite.

Zircon forms well rounded, colourless grains and is one of the most abundant heavy minerals in many samples. The average content is 1.02% with a range from <0.01% to 11.06%. The average grainsize is 0.17 mm.

Rutile is present as rounded dark brownish red coloured grains in most samples but in extremely small amounts.

A maximum content of 0.29% occurs in sample GWT 125A, but the average is only 0.03%.

The grainsize ranges from 0.20mm to 0.28mm. No average size was determined because of its scarce occurrence.

Topaz occurs as sub-rounded to well rounded colourless grains and is, with zircon and garnet, the most abundant heavy mineral. The average grainsize is 0.27mm. The average content is 0.73% with a range from <0.01% to 4.18%.

Garnet is generally sub-rounded or occasionally sub-angular with a range in colour from distinctive brownish-red to colourless. The average amount present is 0.80% with a range from <0.01% to 5.28%. The average grainsize is 0.19mm.

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Tourmaline is present in all samples as rounded to well-rounded grains.

The average amount is 0.47% with a range of <0.01% to 3.18%.

Most of the tourmaline is of a yellowish brown to dark brown or light olive green to greenish-brown variety, but very small amounts of a grey to dark grey, bright green and blue colour do occur in some samples.

The average grainsize is 0.25mm.

Opagues. Ilmenite, magnetite, titanomagnetite and leucosene are grouped together in this study as opagues. The average content is 0.31% with a range of 0.01% to 3.78%. The average grainsize is 0.22mm.

Rest. In this Column are grouped the remaining heavy minerals, e.g. epidote, amphibole, pyroxene and monazite. Their amounts are generally small.

LIGHT MINERAL FRACTION

The light mineral fraction forms the bulk of each sample with a maximum of 99.9%. In most samples it is entirely composed of rounded to well-rounded quartz with an average grainsize of 0.38mm. The size sorting is generally very good. However, a number of samples contain a considerable amount of claysized material, up to 37%.

The clay fraction of 7 samples was studied using X-ray diffraction, and identified as Halloysite with minor kaolinite, chlorite and illite.

CONCLUSIONS

An average heavy mineral content of 3.42% was found in the area investigated.

From the heavy minerals present only zircon and rutile are of economic importance. Their average amounts are 1.02% and 0.03% respectively. However, the combination of relatively low to very low amounts of zircon and rutile and low tonnage of beach sand available (as stated by Mr. G.W. Tassell in report No.1652, March 1970) renders the prospect of little economic potential.

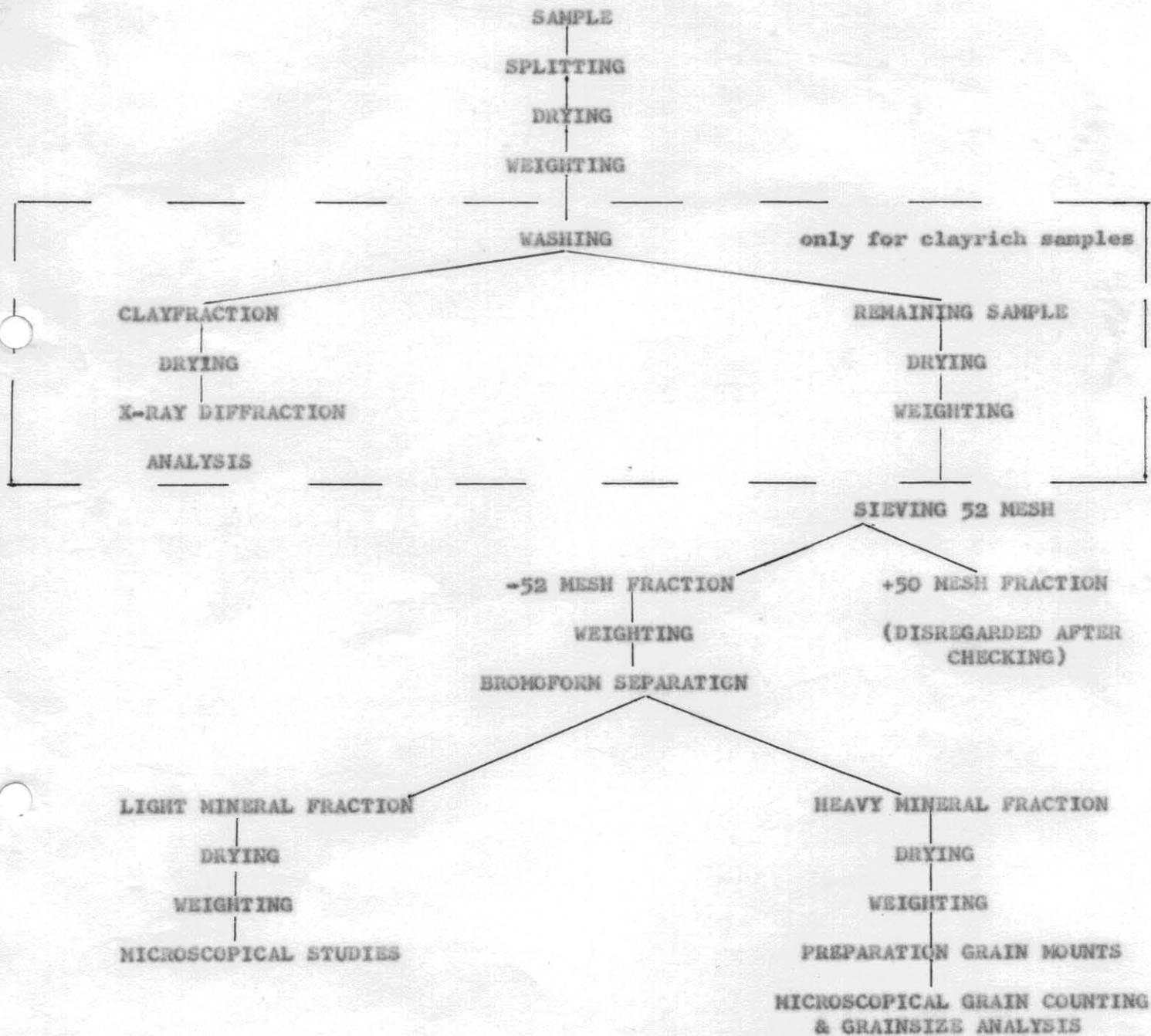


Fig 1 Flowsheet of Laboratory Operations.

TABLE I
COMPOSITION AND AVERAGE GRAIN SIZE OF THE HEAVY MINERAL FRACTION
IN SAMPLES FROM FRIENDLY BEACHES - BICHENO, TASMANIA.

SAMPLE NO. GWT.	Total % of Heavy Minerals	COMPOSITION % of Total Sample						
		Zircon	Rutile	Topaz	Garnet	Tourmaline	Opagues	Rest *
1	0.14	0.06	-	0.40	0.20	0.17	0.05	0.52
2	2.56	0.51	0.04	0.77	0.56	0.28	0.28	0.07
3	1.04	0.11	0.01	0.38	0.13	0.15	0.21	0.03
4	5.55	3.30	0.09	0.66	0.76	0.06	0.59	0.10
5	6.63	2.18	-	1.31	1.41	0.58	0.88	0.24
5A	5.29	1.51	0.09	1.15	1.41	0.47	0.51	0.15
6	5.95	1.57	0.12	1.41	1.49	0.83	0.41	0.12
7	3.17	1.40	-	0.42	0.66	0.41	0.20	0.09
8	3.79	1.74	0.02	0.38	0.69	0.22	0.68	0.05
9	2.32	1.00	-	0.44	0.37	0.13	0.29	0.05
10	4.53	1.50	0.09	0.74	1.32	0.58	0.14	0.16
11	0.11	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.08
12	2.86	1.07	0.01	0.52	0.64	0.42	0.13	0.04
13	2.50	0.40	0.01	0.65	0.68	0.41	0.12	0.19
14	6.98	1.04	0.10	2.29	1.25	0.89	1.31	0.08
15	9.47	4.04	0.09	1.11	2.03	1.19	0.64	0.34
16	5.85	0.91	0.03	1.92	1.55	0.96	0.33	0.14
17	7.43	2.94	0.10	0.60	1.73	0.66	0.99	0.37
18	9.59	2.98	0.10	2.18	2.37	1.40	0.32	0.25
19	6.81	2.40	0.03	0.25	1.61	0.88	0.44	0.20
20	11.81	2.35	0.13	3.03	3.22	2.02	0.66	0.41

* Epidote, amphibole, monazite, pyroxene

TABLE I - cont'd.

SAMPLE NO. GWT.	Total % of Heavy Minerals	COMPOSITION % of Total Sample						
		Zircon	Rutile	Topaz	Garnet	Tourmaline	Opagues	Rest *
21	11.02	3.60	0.11	1.64	2.42	2.17	0.72	0.32
22	trace			No count				
23	4.25	0.70	0.10	1.76	0.71	0.56	0.27	0.14
24	1.40	0.23	<0.01	0.50	0.30	0.26	0.05	0.06
25	2.46	0.67	0.01	0.62	0.47	0.50	0.16	0.03
26	10.36	2.60	0.17	2.51	2.26	2.35	0.18	0.28
27	10.49	2.76	0.05	2.40	2.53	1.40	1.27	0.09
28	11.00	2.60	0.04	1.56	1.84	1.07	3.78	0.09
29				NOT TAKEN				
30	4.0	1.25	0.05	0.52	0.99	0.40	0.62	0.14
31	6.29	1.66	0.10	1.16	1.49	0.41	1.42	0.05
32	5.52	1.08	0.03	1.65	1.29	0.99	0.45	0.03
33	9.34	5.07	0.13	0.59	1.97	0.69	0.85	0.03
34	12.79	3.92	0.12	2.55	4.03	1.96	0.13	0.05
35	13.14	4.57	0.20	2.25	3.71	1.74	0.57	0.11
36	1.21	Not counted due to high iron staining.						
37	5.22	2.36	0.05	0.75	0.84	0.87	0.34	0.02
38	9.55	3.18	0.19	1.58	2.04	0.44	2.08	0.04
39	12.47	4.75	0.14	0.46	4.06	1.91	0.37	0.96
40	20.59	7.57	0.09	5.71	4.07	1.33	1.63	0.21
41	11.29	4.35	-	1.86	2.71	1.07	1.28	-
42	11.16	1.03	0.26	1.88	5.05	1.55	1.25	0.14

TABLE I - cont'd.

SAMPLE NO. GWT.	Total % of Heavy Minerals	COMPOSITION % of Total Sample						
		Zircon	Rutile	Topaz	Garnet	Tourmaline	Opagues	Rest *
43	1.24	0.62	< 0.01	0.15	0.22	0.07	0.14	0.03
44	1.33	0.27	0.01	0.35	0.32	0.26	0.08	0.04
45	1.58	0.40	0.02	0.46	0.26	0.29	0.09	0.05
46	1.32	0.19	< 0.01	0.46	0.36	0.20	0.05	0.05
47	2.88	0.45	0.07	1.06	0.55	0.42	0.32	0.01
48	5.06	0.96	0.05	1.39	1.36	0.93	0.31	0.04
49	0.59	0.18	< 0.01	0.14	0.12	0.09	0.02	< 0.01
50	0.11	0.03	< 0.01	0.03	0.01	0.01	0.01	< 0.01
51	5.73	1.81	0.06	1.05	1.56	0.83	0.42	-
52	6.91	1.30	0.03	2.37	1.61	1.25	0.23	0.09
53	0.64	0.11	< 0.01	0.22	0.02	0.12	0.16	-
54	0.98	0.18	0.01	0.32	0.02	0.10	0.34	0.01
55	0.36	0.14	< 0.01	0.09	0.03	0.03	0.07	< 0.01
56	2.89	0.66	0.02	0.99	0.65	0.46	0.06	0.05
57	8.36	1.55	0.14	2.23	2.37	1.68	0.09	0.27
58	10.37	3.81	0.09	1.59	3.39	1.23	0.14	0.07
59	6.65	2.71	0.06	1.16	0.95	1.13	0.42	0.13
60	1.33	0.22	0.01	0.37	0.31	0.17	0.31	0.03
61	3.77	1.42	0.08	0.67	0.74	0.53	0.23	0.07
62	4.08	0.18	0.02	1.87	0.70	0.96	0.06	0.26
63	2.26	0.32	< 0.01	0.81	0.66	0.36	0.05	0.02
64	0.93	0.33	< 0.01	0.18	0.22	0.11	0.04	0.01

TABLE I - cont'd.

SAMPLE NO. GWT.	Total % of Heavy Minerals	COMPOSITION % of Total Sample						
		Zircon	Rutile	Topaz	Garnet	Tourmaline	Opagues	Rest *
65	1.48	0.17	0.01	0.51	0.35	0.32	0.02	0.06
66	2.37	0.56	0.02	0.54	0.77	0.39	0.06	0.01
67	0.93	0.18	0.02	0.29	0.27	0.14	0.02	0.01
68	trace		No count					
69	trace		No count					
70	trace		No count					
71	1.50	0.20	-	0.56	0.26	0.18	0.31	-
72	7.44	3.62	0.07	0.62	0.53	0.30	1.30	-
73	1.37	0.38	< 0.01	0.36	0.19	0.13	0.28	0.02
74	1.78	0.63	< 0.01	0.23	0.48	0.08	0.92	0.02
75	2.99	0.43	0.13	0.75	0.68	0.47	0.48	0.05
76	0.36	0.04	< 0.01	0.12	0.03	0.07	0.09	< 0.01
77	0.80	0.10	< 0.01	0.26	0.14	0.13	0.17	-
78	0.39	0.03	< 0.01	0.16	0.05	0.08	0.06	< 0.01
79	0.67	0.08	< 0.01	0.28	0.04	0.10	0.15	< 0.01
80	1.75	0.14	0.02	0.62	0.52	0.21	0.24	< 0.01
81	2.13	0.30	0.04	0.73	0.53	0.39	0.08	0.02
82	1.69	0.28	0.01	0.52	0.39	0.34	0.09	0.03
83	0.83	0.08	0.01	0.31	0.22	0.15	0.01	0.02
84	2.15	0.28	0.01	0.75	0.61	0.42	0.03	0.01
85	2.90	0.58	0.04	0.79	0.95	0.41	0.06	0.05
86	3.90	0.92	0.01	0.98	0.09	0.71	0.07	0.07
87	0.93	0.17	< 0.01	0.36	0.19	0.14	0.06	< 0.01
88	4.28	1.46	0.04	0.91	0.02	0.54	0.23	0.07

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TABLE I - cont'd.

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SAMPLE NO. GWT.	Total % of Heavy Minerals	Zircon	Rutile	COMPOSITION % of Total Sample				
				Topaz	Garnet	Tourmaline	Opagues	Rest:
89	6.57	2.35	0.08	1.10	1.52	0.71	0.66	0.13
90	4.79	1.40	0.03	1.33	1.47	0.07	0.34	0.16
91	3.22	0.58	< 0.01	0.78	1.10	0.43	0.27	0.06
92	2.96	0.45	0.03	0.66	1.01	0.48	0.26	0.07
93	0.83	0.25	0.01	0.32	< 0.01	0.15	0.08	0.01
94	0.79	0.14	< 0.01	0.24	0.20	0.10	0.05	0.02
95	0.24	0.03	-	0.09	0.06	0.04	< 0.01	0.02
96	0.41	0.08	< 0.01	0.13	0.06	0.07	0.02	0.01
97	3.33	0.80	-	1.20	0.52	0.65	0.13	0.01
98	0.14	0.03	< 0.01	0.05	0.02	0.02	< 0.01	< 0.01
99	0.18	0.01	-	0.08	0.02	0.05	< 0.01	0.02
100	0.63	0.12	< 0.01	0.21	0.11	0.11	0.02	< 0.01
101	1.72	0.15	0.02	0.62	0.43	0.39	0.05	0.07
102	1.26	0.27	0.03	0.42	0.32	0.24	0.05	0.02
103	0.53	0.13	< 0.01	0.11	0.11	0.08	0.04	0.03
104	1.17	0.20	0.02	0.34	0.28	0.13	0.20	0.01
105	4.19	1.26	0.06	0.59	0.89	0.27	1.09	0.02
106	0.50	0.08	< 0.01	0.16	0.10	0.07	0.07	< 0.01
107	0.46	0.04	< 0.01	0.14	0.11	0.06	0.10	< 0.01
108	1.42	0.18	0.02	0.46	0.31	0.16	0.27	< 0.01
109	2.16	0.30	0.01	0.58	0.55	0.19	0.50	0.03

TABLE I - cont'd.

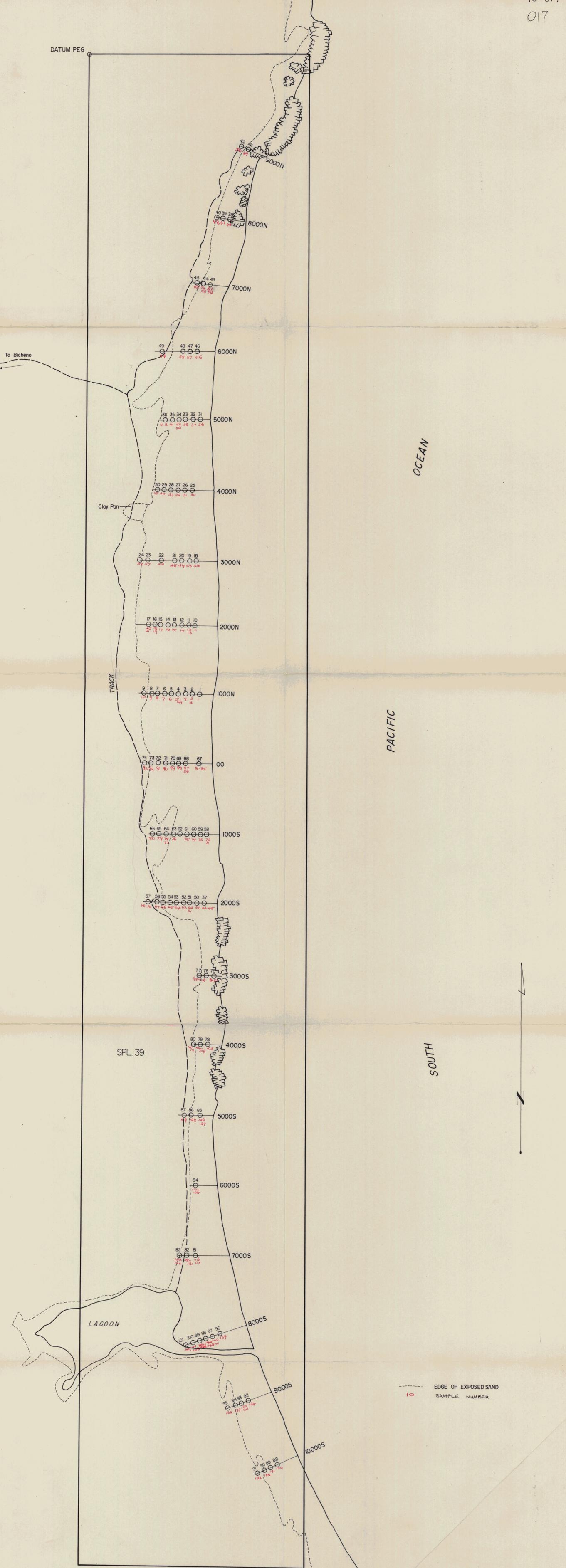
SAMPLE NO. GWT.	Total % of Heavy Minerals	Zircon	Rutile	COMPOSITION		Tourmaline	Opagues	Rest*
				% of Total Sample Topaz	Garnet			
110	2.00	0.59	0.01	0.43	0.47	0.16	0.34	< 0.01
111	0.63	0.08	< 0.01	0.18	0.09	0.08	0.07	0.10
112	trace		No count					
113	trace		No count					
114	0.39	0.05	< 0.01	0.13	0.08	0.08	0.02	0.02
115	4.43	0.28	0.03	1.02	0.55	0.22	0.34	1.99
116	0.62	0.05	< 0.01	0.26	0.12	0.12	0.02	0.05
117	trace		No count					
118	0.82	0.08	0.01	0.26	0.18	0.13	0.14	< 0.01
119	1.77	0.47	-	0.39	0.42	0.08	0.40	0.02
120	1.16	0.38	0.02	0.21	0.27	0.08	0.20	0.01
121	2.00	0.59	0.01	0.45	0.43	0.11	0.39	0.03
122	trace		No count					
123	0.83	0.15	-	0.27	0.15	0.15	0.07	0.03
124	0.87	0.14	< 0.01	0.31	0.21	0.13	0.02	0.05
125	4.38	1.28	0.02	0.86	1.08	0.78	0.16	0.18
125A	29.67	11.06	0.29	4.18	5.28	8.18	0.15	0.60
126	6.57	0.06	-	0.27	0.08	0.11	0.03	0.03
127	3.02	0.35	0.05	1.22	0.64	0.54	0.19	0.03
128	0.41	0.11	< 0.01	0.10	0.05	0.04	0.11	-
129	0.38							
130	trace		No count due to high iron staining.					

TABLE I - cont'd.

SAMPLE NO. GWT.	Total % of Heavy Minerals	COMPOSITION							
		Zircon	Rutile	% of Total Sample		Garnet	Tourmaline	Opagues	Rest*
				Tepax					
131	2.49	1.16	0.06	0.35	0.40	0.44	0.06	0.02	
132	1.29	0.52	0.03	0.15	0.27	0.24	0.03	0.05	
133	trace		No count						
134	trace		No count						
135	trace		No count						
136	2.47	0.73	0.01	0.58	0.68	0.38	0.02	0.04	
137	0.51	0.21	-	0.10	0.10	0.06	0.01	0.02	
138	trace		No count						
139	2.45	0.53	0.01	0.61	0.61	0.31	0.27	0.08	
140	5.86	2.68	0.03	0.21	0.77	0.26	1.88	0.02	
141	10.81	3.60	0.05	1.88	1.70	0.65	2.93	-	
142	0.44	0.05	-	0.18	0.07	0.11	0.02	0.01	
143	0.55	0.06	<0.01	0.27	0.11	0.06	0.08	<0.01	
144	trace		No count						
145	0.61		Not counted due to high iron staining.						
146	0.69	0.03	-	0.31	0.11	0.16	0.02	0.04	
147	0.77	0.25	<0.01	0.09	0.20	0.07	0.10	0.03	
148	0.54	0.16	-	0.15	0.09	0.08	0.05	0.01	
149	1.74	0.54	<0.01	0.35	0.38	0.18	0.21	0.08	
Average	3.42	1.02	0.03	0.73	0.80	0.47	0.31		
Average									
Grain size in mm		0.17	-	0.27	0.19	0.25	0.22		

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DATUM PEG



PACIFIC

OCEAN

SOUTH

SPL. 39

LAGOON

EDGE OF EXPOSED SAND
SAMPLE NUMBER

5 cm

SCALE OF FEET
0 500 1000 1500

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Fig. 2.

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PLANET MANAGEMENT & RESEARCH PTY. LTD.		
FRIENDLY BEACHES, TASMANIA.		
LOCATION OF DRILL HOLES		
Geologist	Drawn by G.J.G.	Date 10-3-70
Lib. No. M3/1/2	Report No. 1652	Trac. No. TAS108