

1969/151
Part 1

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

053847

Record No. 1969 / 151



Miscellaneous Investigations
carried out in the
Geological Laboratory

Part 1. January to June 1969

Compiled by

H.R. Lord

1. The purpose of this report is to provide a summary of the work carried out in the Geological Laboratory during the period January to June 1969. The work was carried out under the supervision of H.R. Lord and was aimed at providing a basis for the development of a new method of determining the age of rocks.

PART 1
of 2

MISCELLANEOUS CHEMICAL, PETROGRAPHIC AND MINERAGRAPHIC
INVESTIGATIONS CARRIED OUT IN THE GEOLOGICAL LABORATORY

Compiled by

H.R. Lord

PART I. JANUARY - JUNE, 1969.

RECORDS 1969/151

This Record is composed of reports on minor chemical, petrographic, and mineragraphic investigations, carried out in the Geological Laboratory, Bureau of Mineral Resources, during the period January 1969 to December, 1969. The Record is divided into two parts; the first deals with reports covering the period January - June, 1969; the second part deals with reports covering the period July to December, 1969. In each part the reports are in chronological order.

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MISCELLANEOUS CHEMICAL, PETROGRAPHIC AND MINERAGRAPHIC
INVESTIGATIONS CARRIED OUT IN THE GEOLOGICAL LABORATORY

PART I.

JANUARY TO JUNE, 1969.

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32.	Analysis of water samples from Corin Dam A.C.T.	H.R. Lord
33.	Phosphate analysis of rock samples from Mt. O'Connor and Alexandria Homestead areas, W.A. and N.T.	C.W. Claxton
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35.	Mineral identification - Mollymook N.S.W.	G. Berryman
36.	Mineral identification - Bloods Range, N.T.	G. Berryman
37.	Mineral identification - Ayers Rock, N.T.	G. Berryman
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39.	Analyses of shales and siltstones from East Kimberley.	T.I. Slezak
40.	Mineral identification - Victoria River, N.T.	G. Berryman
41.	Mineral identification - Mt. Isa, Queensland.	G. Berryman
42.	Mineral identification - Narooma, N.S.W.	G. Berryman
43.	Mineral identification - Zeta Prospect, 3½ miles WNW Batchelor, N.T.	G. Berryman
44.	Mineral identification - McClarty No. 1., Canning Basin W.A.	G. Berryman
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51.	Analysis of carbonate samples from the McArthur River Area, N.T.	H.R. Lord
52.	Mineral identification - Rum Jungle N.T.	G. Berryman
53.	Identification of minerals in pigments from T.P.N.G.	G. Berryman
54.	Mineral identification - Mt. Pyroclast near Gosses Bluff, N.T.	G. Berryman
55.	Mineral identification - Narooma N.S.W.	G. Berryman
56.	Mineral identification - Ridge N.M.S., 148.5 miles west of Beaver Lake, Antarctica	G. Berryman
57.	Mineral identification - Eastern Bolingen Islands, Antarctica.	G. Berryman
58.	Mineral identification - Mt. Pyroclast, 2 miles south of Gosses Bluff, N.T.	G. Berryman
59.	Analysis of phosphate samples from the Australian Continental Shelf.	H.R. Lord
60.	Phosphate determination of samples from the Coomalie dolomite, N.T.	H.R. Lord
61.	Mineral identification - Murray Island	G. Berryman
62.	Mineral identification - Marimo Slate area Cloncurry, Queensland.	G. Berryman
63.	Mineral identification - Christmas Island phosphates.	H.R. Lord

ANALYSIS OF MUD SAMPLES FROM PERNATTY LAGOON,
SOUTH AUSTRALIA.

by

H.R. Lord

The following results were obtained for the determination of Cu, Mn, Pb, Fe, Ni, Zn, in five samples of muds from Pernatty Lagoon, South Australia. Samples submitted by I. Lambert.

Analyses were carried out by atomic absorption spectrophotometry following acid digestion with aqua regia and 5N HCl.

Sample	Fe %	Cu %	Zn ppm	Mn ppm	Ni ppm	Pb ppm
1. Black, brown muds from filled in man-made pit.	4.2	0.5	230	330	130	80
2. Yellow coated sand from edge of lagoon.	0.2	0.1	130	50	100	1220
3. Yellow sand from edge of green water pit.	0.4	0.01	80	50	130	50
4. Sand containing green salts.	0.2	1.3	300	280	100	230
5. Brown mud from green water pit.	1.6	0.2	200	200	100	80

ZINC CONTENT OF MOLONGLO RIVER WATER

by

D.W. Bennett

The following results were obtained for the determination of the zinc content of nine water samples from the Molonglo and Queanbeyan Rivers collected on 7/1/69, and submitted by Mr.M.Elliott of the Department of the Interior.

Location	ppm. Zinc (total)
A	< 0.02
B	33
C	34
D	36
D2	3
E	< 0.02
F	0.62
G	0.04
H	0.03

The sampling points are as follows: -

- A. Molonglo River 5 miles upstream from Lake George Mine.
- B. Molonglo River immediately downstream from Lake George Mine.
- C. Molonglo River at Hoskinstown-Bungendore Road turnoff.
- D. Molonglo River at the 11-mile turnoff.
- D2. Molonglo River at Burbong bridge.
- E. Queanbeyan River at Queanbeyan.
- F. Molonglo River at Sutton-Queanbeyan Road bridge.
- G. Molonglo River at Duntroon bridge.
- H. Lake Burley Griffin.

ANALYSIS OF GEOBOTANICAL SURVEY SAMPLES FROM
WOODCUTTERS AREA, RUM JUNGLE.

by

H. R. Lord

The following results were obtained for the determination of Cu, Pb, Zn, and Ni, in 470 leaf, twig and bark samples of Eucalyptus miniata from mineralised and unmineralised areas in the Woodcutters Area, Rum Jungle. Samples were submitted by Dr. W.R. Ridley.

Analyses were carried out by atomic absorption spectrophotometry following digestion with nitric acid. All results are shown in parts per million. Mineralised areas are shown thus "+"; while the unmineralised areas are shown as "-".

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031021	1	3	+	leaf	dry	9	2	14	10
22	17	3	-	leaf	dry	7	2	12	9
23	15	5	-	leaf	wet	5	2	10	14
24	1	4	+	twig	dry	4	5	11	4
26	3	4	+	twig	wet	4	4	11	5
29	20	5	-	bark	dry	4	2	4	< 2
31	20	2	-	bark	dry	4	3	3	< 2
32	3	4	+	bark	dry	4	2	4	2
34	16	2	-	twig	dry	6	4	10	6
35	18	4	-	leaf	dry	8	2	11	10
36	7	3	+	leaf	dry	6	4	15	2
37	13	2	-	twig	dry	3	3	13	4
40	13	4	-	twig	dry	4	3	6	3
44	12	3	-	twig	dry	6	3	11	4
45	20	2	-	leaf	dry	4	3	9	7
47	6	2	+	bark	dry	4	6	9	2
49	12	3	-	leaf	wet	4	4	13	9
51	19	5	+	twig	dry	6	3	9	6
53	20	5	-	twig	wet	4	3	19	5
54	14	3	-	bark	wet	5	2	5	4
55	12	3	-	twig	wet	5	3	17	9
57	9	4	+	leaf	wet	5	4	14	5
58	19	3	-	bark	wet	3	< 2	3	2
59	12	5	-	twig	dry	5	11	10	8
60	10	2	+	twig	wet	9	3	32	2
61	5	4	+	twig	wet	6	4	15	6
62	20	3	-	bark	dry	3	2	4	2
65	14	5	-	twig	wet	6	3	11	7
66	10	4	+	leaf	wet	7	3	12	5
67	9	2	+	leaf	dry	no sample available			
70	18	2	-	twig	dry	5	< 2	14	9
67031071	12	4	-	leaf	wet	4	3	14	13

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Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031072	14	5	-	leaf	wet	4	4	11	10
74	1	4	+	bark	wet	3	2	3	2
75	13	4	-	twig	wet	5	3	7	4
76	10	5	+	bark	dry	3	3	4	2
78	3	5	+	leaf	wet	5	4	15	8
79	5	3	+	twig	dry	5	2	17	3
80	3	4	+	leaf	wet	4	3	9	9
81	8	3	+	leaf	dry	7	3	11	4
82	2	5	+	bark	wet	6	2	9	2
83	7	3	+	twig	dry	6	7	23	5
85	15	5	-	bark	dry	6	2	4	2
87	9	5	+	leaf	dry	6	4	10	3
88	5	4	+	bark	wet	6	2	3	2
89	15	2	-	bark	dry	5	2	2	2
92	20	5	-	bark	wet	6	2	5	3
93	4	5	+	bark	wet	6	3	4	2
94	13	3	-	leaf	dry	6	3	7	5
95	8	4	+	leaf	wet	9	3	19	7
96	17	4	-	bark	wet	5	1	9	2
97	3	2	+	leaf	dry	9	5	14	5
99	4	3	+	leaf	dry	10	3	14	3
100	15	2	-	twig	wet	8	5	13	7
104	6	4	+	leaf	wet	7	3	9	4
105	18	2	-	bark	dry	7	2	6	2
106	5	5	+	twig	dry	6	7	17	4
108	16	3	-	leaf	dry	6	5	11	7
109	6	4	+	leaf	dry	5	2	9	2
111	2	3	+	leaf	wet	8	3	17	9
114	16	2	-	leaf	wet	9	5	13	9
115	17	3	-	bark	dry	7	2	8	2
116	16	5	-	twig	wet	6	6	23	15
117	7	5	+	bark	wet	6	3	16	2
118	15	4	-	bark	dry	7	2	13	2
120	17	4	-	twig	dry	5	13	18	9
121	9	2	+	twig	wet	7	4	20	7
122	3	5	+	bark	wet	5	2	2	2
123	5	2	+	bark	wet	9	4	10	2
124	4	2	+	leaf	dry	10	1	12	4
126	1	5	+	bark	wet	4	2	4	2
128	17	2	-	bark	dry	4	2	4	2
129	5	2	+	leaf	dry	6	3	8	4
130	19	4	-	leaf	dry	4	2	10	6
131	3	5	+	bark	dry	7	2	4	1
132	17	2	-	twig	dry	6	6	14	6
133	11	2	-	bark	wet	5	2	5	2
134	10	2	+	bark	dry	4	2	5	2
135	12	2	-	bark	wet	4	2	3	2
136	3	4	+	twig	dry	6	8	12	6
137	1	4	+	twig	wet	8	6	21	8
138	6	3	+	leaf	dry	7	4	11	3
139	10	3	+	leaf	dry	7	3	10	2
140	9	3	+	bark	dry	7	2	4	2
141	2	4	+	twig	dry	6	3	11	7
67031142	19	4	-	bark	wet	4	3	3	2

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031143	7	2	+	bark	wet	2	3	13	2
144	6	3	+	leaf	wet	4	4	14	4
145	3	2	+	twig	dry	6	< 2	13	8
147	5	3	+	leaf	dry	120	5	70	3
150	6	2	+	leaf	dry	4	4	14	5
152	18	5	-	twig	dry	4	3	15	5
153	11	6	-	leaf	dry	25	3	9	4
156	15	2	-	bark	wet	8	2	6	3
157	11	3	-	twig	dry	3	3	11	3
158	20	2	-	twig	dry	5	3	9	4
159	15	4	-	leaf	wet	6	3	8	10
160	9	2	+	bark	wet	6	2	4	2
161	17	5	-	twig	dry	6	3	13	6
162	11	6	-	bark	dry	7	2	3	2
164	18	5	-	leaf	wet	6	3	8	8
165	9	4	+	twig	wet	9	3	30	3
166	11	6	-	bark	wet	7	2	3	2
167	15	5	-	twig	wet	5	3	12	11
169	8	2	+	twig	dry	4	3	12	2
173	18	5	-	leaf	dry	3	8	9	6
175	4	5	+	twig	wet	7	5	18	5
176	19	5	-	bark	wet	2	2	2	< 2
177	15	3	-	bark	wet	4	3	5	2
178	18	4	-	twig	dry	5	5	12	7
179	1	2	+	leaf	wet	7	3	9	7
181	14	4	-	twig	dry	4	4	7	3
182	2	5	+	twig	wet	5	5	23	6
183	7	2	+	twig	wet	6	3	19	3
184	16	2	-	bark	dry	7	2	32	2
185	16	4	-	twig	dry	4	2	7	2
186	3	4	+	bark	wet	7	2	4	2
187	14	4	-	leaf	wet	8	3	9	8
189	1	2	+	twig	wet	6	2	11	4
190	1	3	+	bark	dry	9	2	4	2
194	19	3	-	twig	dry	5	4	9	7
195	20	4	-	twig	wet	6	2	20	9
199	10	3	+	bark	wet	6	2	3	2
201	8	4	+	bark	wet	3	2	3	2
202	8	3	+	bark	dry	3	3	3	2
205	6	3	+	bark	wet	3	3	5	2
206	4	3	+	leaf	wet	5	14	10	5
207	3	2	+	leaf	wet	7	5	16	9
209	6	3	+	twig	dry	5	2	12	2
211	13	4	-	leaf	wet	5	4	10	4
213	2	10	+	leaf	dry	10	3	16	10
215	18	4	-	twig	wet	6	2	16	10
216	14	2	-	bark	dry	5	3	5	2
218	10	4	+	bark	dry	3	1	3	2
219	17	5	-	twig	wet	5	3	14	11
221	4	5	+	twig	wet	4	3	8	3
222	8	2	+	leaf	dry	8	3	12	8
224	13	5	-	bark	dry	6	3	3	7
226	10	2	+	twig	dry	4	3	14	5
228	18	4	-	leaf	wet	6	3	12	21

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031229	10	5	+	leaf	wet	7	3	14	6
230	1	5	+	leaf	dry	6	4	27	14
231	18	4	-	bark	dry	3	1	8	4
232	13	5	-	twig	wet	6	3	17	6
234	5	5	+	bark	dry	3	5	8	9
235	14	3	-	leaf	wet	7	3	8	10
239	10	4	+	twig	wet	5	4	18	2
240	11	3	-	bark	dry	4	1	3	2
241	9	2	+	twig	dry	7	4	18	4
244	2	4	+	leaf	wet	8	4	19	13
247	3	3	+	bark	wet	4	3	3	1
248	11	1	-	bark	wet	3	4	3	2
251	13	5	-	bark	wet	5	2	4	2
253	12	3	-	bark	wet	3	2	7	2
254	18	4	-	bark	wet	4	2	6	2
255	2	4	+	bark	wet	2	2	2	< 2
256	6	4	+	bark	dry	3	2	9	< 2
257	18	3	-	twig	dry	4	4	8	7
259	19	3	-	bark	dry	3	2	3	2
260	5	5	+	bark	wet	2	3	5	< 2
262	6	5	+	bark	dry	2	1	2	2
263	12	4	-	leaf	dry	3	4	10	8
264	15	4	-	leaf	dry	4	4	12	9
265	13	3	-	twig	dry	4	4	16	8
266	1	3	+	bark	wet	3	3	3	2
267	13	5	-	leaf	wet	4	6	13	8
268	17	4	-	twig	wet	5	5	22	15
271	12	2	-	twig	wet	6	6	25	11
272	19	4	-	twig	wet	4	4	20	9
273	1	5	+	twig	wet	7	5	25	10
274	17	5	-	bark	wet	3	1	3	2
275	11	2	-	twig	wet	7	8	19	8
277	16	2	-	bark	wet	3	1	3	2
279	13	2	-	bark	dry	2	1	2	2
280	5	5	+	twig	wet	6	5	26	8
281	12	5	-	bark	dry	3	1	2	2
282	17	3	-	bark	wet	4	1	4	1
283	15	4	-	twig	wet	4	5	13	11
286	19	2	-	leaf	dry	5	4	15	9
288	12	4	-	bark	dry	2	1	2	12
290	7	4	+	leaf	wet	3	3	9	4
292	14	3	-	bark	dry	10	17	23	6
293	9	4	+	twig	dry	5	8	18	4
294	6	4	+	twig	wet	6	8	21	7
296	15	3	-	leaf	wet	5	18	31	10
299	3	5	+	twig	dry	6	9	17	6
301	14	2	-	leaf	wet	5	3	14	15
303	4	2	+	twig	wet	15	83	67	7
304	2	10	+	twig	wet	12	13	23	9
306	14	5	-	bark	dry	4	14	13	13
307	8	5	+	leaf	dry	4	6	23	5
309	16	3	-	twig	wet	4	5	17	11
312	4	4	+	bark	wet	3	13	14	3
313	19	2	-	bark	dry	3	19	21	5
67031314	1	4	+	leaf	dry	5	11	19	8

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031315	8	2	+	twig	wet	6	10	34	6
316	18	5	-	bark	wet	3	6	8	4
317	11	3	-	leaf	dry	3	10	27	9
318	16	4	-	bark	dry	3	1	3	2
319	16	3	-	bark	wet	2	1	1	2
320	3	2	+	bark	dry	2	3	3	1
321	3	2	+	twig	wet	5	nil	30	5
324	15	2	-	twig	dry	5	2	7	3
325	20	2	-	twig	wet	7	4	14	7
326	7	4	+	bark	dry	3	3	3	1
329	11	2	-	leaf	dry	4	2	9	2
331	12	5	-	leaf	wet	5	2	11	16
332	1	5	+	twig	dry	6	3	14	10
333	18	2	-	leaf	wet	7	3	11	20
336	20	3	-	bark	wet	3	3	4	1
337	14	5	-	twig	dry	4	2	7	3
338	7	5	+	twig	wet	5	3	43	4
340	9	3	+	twig	dry	7	3	22	4
341	17	5	-	leaf	wet	3	2	11	12
342	7	2	+	bark	dry	4	5	6	1
345	5	3	+	twig	wet	6	2	25	4
346	14	5	-	bark	wet	3	3	3	2
347	11	1	-	leaf	dry	4	3	6	3
348	18	3	-	twig	wet	5	2	11	8
349	9	5	+	bark	dry	2	3	5	1
351	9	3	+	leaf	dry	5	3	13	3
353	7	4	+	leaf	dry	4	10	13	4
354	19	2	-	twig	wet	6	3	22	13
355	9	4	+	bark	dry	4	3	5	1
357	14	2	-	bark	wet	3	3	2	3
359	6	5	+	twig	dry	7	4	5	4
360	18	3	-	leaf	dry	4	3	7	6
363	18	3	-	leaf	wet	5	4	10	13
364	12	2	-	leaf	wet	4	3	13	12
365	14	4	-	bark	wet	4	3	2	2
366	8	5	+	twig	dry	5	3	12	3
368	11	3	-	twig	wet	5	4	12	5
370	9	4	+	bark	wet	4	2	5	2
371	4	2	+	bark	wet	3	3	3	1
372	15	5	-	twig	dry	4	2	7	9
373	17	3	-	leaf	wet	4	4	11	11
377	2	4	+	twig	wet	5	5	14	5
380	19	4	-	bark	dry	4	6	2	2
381	7	5	+	leaf	dry	4	4	11	4
382	17	5	-	bark	dry	3	4	2	2
383	6	2	+	leaf	wet	3	4	10	8
384	1	5	+	bark	dry	3	4	2	2
390	7	2	+	leaf	wet	4	4	8	6
392	11	2	-	bark	dry	3	4	3	1
393	4	3	+	bark	dry	3	4	3	2
394	10	5	+	twig	wet	5	4	21	3
395	3	5	+	leaf	dry	4	2	10	4
396	18	5	-	bark	dry	3	2	2	3
398	16	3	-	bark	dry	4	2	1	2
67031400	5	2	+	bark	dry	3	6	1	2

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031401	19	3	-	leaf	dry	4	4	7	10
403	20	5	-	twig	dry	4	2	11	7
405	7	2	+	twig	dry	4	4	13	3
407	9	5	+	twig	dry	5	2	15	3
408	9	4	+	leaf	dry	4	4	11	4
409	19	4	-	twig	dry	3	4	10	5
410	16	2	-	twig	wet	6	3	10	6
413	18	2	-	bark	wet	3	2	5	1
414	10	3	+	twig	dry	5	4	13	4
418	14	5	-	leaf	dry	4	2	6	4
419	2	3	+	bark	wet	4	2	8	2
422	20	4	-	bark	dry	4	3	2	1
426	6	2	+	twig	wet	7	4	17	6
429	4	3	+	bark	wet	4	4	3	2
430	5	2	+	twig	dry	5	3	9	4
433	7	3	+	bark	dry	4	6	4	1
434	11	1	-	twig	dry	3	2	11	2
435	4	4	+	twig	wet	9	5	24	4
436	1	2	+	bark	wet	3	3	3	2
437	16	5	-	bark	wet	4	2	3	3
438	2	5	+	bark	dry	7	4	9	3
440	13	2	-	leaf	wet	4	6	10	9
441	10	2	+	leaf	dry	5	2	11	3
442	20	4	-	bark	wet	3	2	2	1
443	10	2	+	bark	wet	3	3	3	2
444	15	3	-	twig	wet	6	2	16	5
447	15	5	-	bark	wet	3	3	4	2
448	12	5	-	bark	wet	2	2	3	2
450	12	2	-	bark	dry	2	3	3	2
451	17	4	-	bark	dry	4	4	4	2
452	14	2	-	twig	dry	6	3	18	6
454	5	5	+	leaf	dry	6	5	10	3
455	20	5	-	leaf	dry	4	2	10	7
456	9	2	+	bark	dry	5	3	3	1
457	4	5	+	leaf	dry	4	3	9	3
459	12	5	-	leaf	dry	4	2	10	9
461	15	5	-	leaf	dry	4	2	8	5
462	1	3	+	twig	wet	6	3	19	7
465	19	4	-	leaf	wet	3	3	9	9
467	20	3	-	twig	dry	4	1	8	6
468	17	2	-	leaf	wet	4	2	12	19
469	18	3	-	bark	dry	3	2	2	3
470	2	3	+	leaf	dry	5	3	11	4
473	20	3	-	twig	wet	6	3	14	9
474	8	2	+	leaf	wet	6	4	17	4
475	2	10	+	twig	dry	6	4	12	5
476	17	3	-	twig	wet	7	3	18	10
477	12	2	-	leaf	dry	3	3	8	4
479	4	5	+	bark	dry	3	4	1	1
480	1	2	+	twig	dry	6	4	16	7
481	11	2	-	twig	dry	3	3	12	5
482	11	2	-	leaf	wet	8	3	11	6
67031483	20	4	-	leaf	dry	3	2	7	4

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031484	4	3	+	twig	dry	6	4	12	5
485	13	4	-	leaf	dry	4	3	6	3
486	16	3	-	twig	dry	4	3	12	6
487	8	5	+	bark	dry	3	3	4	1
489	14	2	-	leaf	dry	6	4	11	11
490	3	2	+	bark	wet	3	4	4	2
491	19	5	-	leaf	wet	5	3	9	11
492	1	2	+	leaf	dry	7	4	17	6
493	8	4	+	twig	dry	4	4	11	3
494	15	4	-	bark	wet	3	3	3	2
497	14	2	-	twig	wet	4	3	19	9
498	19	2	-	leaf	wet	6	3	15	15
499	6	5	+	twig	wet	7	3	9	4
500	16	5	-	leaf	wet	5	3	10	17
501	6	2	+	twig	dry	7	4	18	4
502	9	5	+	bark	wet	2	3	2	1
504	13	2	-	leaf	dry	4	2	9	4
505	4	4	+	leaf	wet	4	2	14	5
507	11	3	-	leaf	wet	4	3	8	9
509	1	4	+	leaf	wet	4	3	13	6
510	5	2	+	twig	wet	6	3	18	6
511	1	3	+	leaf	wet	4	3	13	11
513	17	4	-	leaf	wet	3	2	12	12
514	13	3	-	bark	wet	3	3	2	1
515	9	5	+	leaf	wet	5	3	10	4
516	4	2	+	leaf	wet	5	4	13	7
517	2	3	+	twig	wet	5	2	23	7
518	15	3	-	leaf	dry	4	4	9	3
521	7	5	+	twig	dry	5	4	27	4
522	6	2	+	bark	wet	3	11	7	2
523	8	3	+	twig	dry	4	4	10	2
524	3	3	+	bark	dry	4	4	4	1
525	18	2	-	leaf	dry	6	2	8	9
526	8	4	+	leaf	dry	5	3	12	3
528	10	4	+	leaf	dry	5	2	7	2
536	15	2	-	leaf	dry	4	2	10	4
537	19	3	-	twig	wet	6	3	26	17
538	4	2	+	bark	dry	3	3	6	1
539	16	5	-	bark	dry	2	2	2	2
541	11	3	-	bark	wet	2	3	2	1
543	10	3	+	bark	dry	3	3	3	1
544	20	3	-	leaf	wet	5	3	11	13
552	8	5	+	twig	wet	5	3	21	2
553	11	1	-	twig	wet	5	5	19	6
554	2	4	+	leaf	dry	7	4	11	6
555	20	5	-	leaf	wet	4	2	8	13
556	2	3	+	bark	dry	3	3	6	2
559	19	2	-	bark	wet	3	2	2	2
560	9	5	+	twig	wet	6	3	30	3
561	6	5	+	leaf	wet	4	5	7	5
562	19	5	-	bark	dry	4	3	2	2
563	2	10	+	bark	wet	4	3	3	2
67031564	7	5	+	bark	dry	4	3	13	3

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031566	14	4	-	twig	wet	5	2	8	4
567	11	6	-	twig	wet	5	2	14	3
568	10	2	+	leaf	wet	6	4	12	5
571	1	3	+	twig	dry	8	3	9	9
572	17	2	-	bark	wet	5	2	3	3
573	1	5	+	leaf	wet	4	4	13	10
578	3	3	+	twig	dry	6	3	16	5
579	6	3	+	bark	dry	4	2	3	1
580	10	5	+	leaf	dry	6	5	10	5
581	6	5	+	bark	wet	6	4	3	2
582	8	5	+	leaf	wet	4	4	13	6
583	13	5	-	leaf	dry	5	6	7	5
584	9	2	+	leaf	wet	5	5	10	3
585	4	3	+	twig	wet	7	5	17	4
587	7	4	+	bark	wet	4	5	7	1
589	2	5	+	leaf	dry	6	4	13	9
590	8	5	+	bark	wet	4	3	5	2
591	6	4	+	bark	wet	3	2	2	3
594	5	3	+	bark	dry	5	2	27	5
595	10	5	+	bark	wet	2	2	4	1
596	7	4	+	twig	dry	5	3	13	3
597	18	5	-	twig	wet	4	3	13	6
598	10	3	+	leaf	wet	5	4	11	4
600	17	4	-	leaf	dry	3	2	13	8
603	11	1	-	leaf	wet	3	4	8	4
604	11	6	-	twig	dry	4	3	11	4
606	20	2	-	leaf	wet	3	4	8	10
607	8	2	+	bark	dry	2	2	5	2
610	16	4	-	leaf	dry	3	4	7	6
612	15	3	-	twig	dry	4	3	12	3
613	13	4	-	bark	wet	2	1	2	2
614	5	4	+	twig	dry	4	2	18	3
615	7	5	+	leaf	wet	4	4	15	5
616	19	5	-	leaf	dry	3	4	10	5
617	12	4	-	bark	wet	2	1	3	2
618	3	3	+	leaf	wet	3	4	11	5
619	4	4	+	leaf	dry	4	2	10	4
621	5	2	+	leaf	wet	8	6	22	8
622	6	4	+	twig	dry	4	2	8	2
624	8	4	+	twig	wet	7	4	25	3
625	15	3	-	bark	dry	3	0	2	2
626	11	6	-	leaf	wet	4	4	15	6
627	3	3	+	twig	wet	4	2	16	4
629	12	5	-	twig	wet	7	3	18	9
631	4	2	+	twig	dry	7	2	9	6
634	16	3	-	leaf	wet	4	2	9	9
636	12	3	-	bark	dry	13	12	10	17
637	8	2	+	bark	dry	3	6	10	3
638	13	3	-	bark	dry	4	2	2	3
641	2	5	+	twig	dry	6	3	12	5
642	7	4	+	twig	wet	10	6	20	3
67031643	4	5	+	leaf	wet	20	2	16	8

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031644	2	5	+	leaf	wet	9	7	18	8
645	10	4	+	bark	wet	3	1	3	2
648	6	5	+	leaf	dry	5	4	10	4
649	17	3	-	twig	dry	7	2	13	6
651	2	3	+	twig	dry	6	2	19	4
652	14	3	-	leaf	dry	6	3	7	4
654	13	2	-	twig	wet	5	2	19	7
657	17	5	-	leaf	dry	5	4	8	6
658	1	2	+	bark	dry	4	3	3	1
659	8	4	+	bark	dry	4	2	2	1
660	5	3	+	bark	wet	5	3	8	1
662	16	4	-	leaf	wet	7	2	6	10
663	17	2	-	leaf	dry	8	2	6	9
664	12	4	-	twig	wet	5	3	16	9
665	20	4	-	leaf	wet	4	2	9	11
666	3	3	+	leaf	dry	7	4	16	4
667	4	4	+	bark	dry	3	3	7	1
668	4	4	+	twig	dry	5	3	10	3
672	5	4	+	leaf	wet	5	2	10	5
673	10	5	+	twig	dry	5	2	12	2
674	5	4	+	leaf	dry	4	3	12	2
675	13	3	-	twig	wet	6	2	10	4
676	18	2	-	twig	wet	5	2	20	12
677	5	4	+	bark	dry	2	2	3	1
678	2	10	+	bark	dry	2	3	5	1
679	12	3	-	leaf	dry	4	2	9	4
681	1	4	+	bark	dry	2	4	2	2
682	11	1	-	bark	dry	3	2	4	2
683	20	2	-	bark	wet	3	2	4	3
684	16	4	-	twig	wet	6	1	12	6
685	20	4	-	twig	dry	4	2	8	5
686	6	3	+	twig	wet	7	2	21	5
687	19	3	-	leaf	wet	5	3	14	16
688	14	4	-	bark	dry	2	4	2	3
689	5	5	+	leaf	wet	4	2	13	10
690	13	5	-	twig	dry	4	2	9	3
695	19	2	-	twig	dry	6	2	22	8
696	13	3	-	leaf	wet	3	4	7	8
697	18	3	-	bark	wet	2	2	2	2
698	17	2	-	twig	wet	7	3	24	16
699	10	4	+	twig	dry	4	2	12	2
700	19	5	-	twig	wet	6	2	17	13
701	14	3	-	twig	wet	8	3	15	5
702	16	5	-	leaf	dry	4	3	10	8
703	16	5	-	twig	dry	4	1	13	6
704	7	2	+	leaf	dry	4	4	12	3
67031705	2	10	+	leaf	wet	5	4	10	10

Number	Traverse	Tree	Area	Sample	Season	Cu	Pb	Zn	Ni
67031706	20	3	-	leaf	dry	4	3	10	7
708	13	2	-	bark	wet	2	4	2	2
709	2	4	+	bark	dry	3	4	2	3
711	12	4	-	twig	dry	3	2	8	6
712	10	3	+	twig	wet	7	1	21	3
713	14	3	-	twig	dry	5	2	9	5
714	15	4	-	twig	dry	3	4	7	6
716	3	4	+	leaf	dry	5	3	13	7
721	12	2	-	twig	dry	4	2	15	6
722	16	4	-	bark	wet	2	2	2	2
724	14	4	-	leaf	dry	3	3	9	5
725	5	3	+	leaf	wet	3	3	12	5
726	3	5	+	twig	wet	3	3	18	5
728	16	2	-	leaf	dry	3	2	7	5
67031731	15	2	-	leaf	wet	4	4	15	8

ANALYSIS OF GEOBOTANICAL SURVEY SAMPLES FROM
WOODCUTTERS AREA, RUM JUNGLE

by

J. Ferguson

Twenty-one leaf, bark, and twig samples from mineralised and un-mineralised areas in the Woodcutters area, Rum Jungle, submitted by Dr W.R. Ridley, have been analysed for copper, lead, zinc, nickel, iron, manganese, cadmium, silver, cobalt and chromium by Atomic Absorption Spectroscopy.

The samples were prepared for analyses by crushing and drying at 105°C. Organic matter was destroyed by wet ashing with concentrated nitric acid followed by fuming with a perchloric acid - sulphuric acid mixture. All values are expressed in parts per million.

B.M.R. No.		Cu	Pb	Zn	Cd	Co	Ni	Ag	Fe	Mn
<u>Mineralised area</u>										
1000	leaf	8	5	19	<1	<2	10	<2	170	137
1002	"	7	<5	19	<1	<2	6	<2	67	253
1017	"	4	5	20	<1	<2	3	<2	114	190
	mean	6.1	5	19	-	-	5.8	-	132	193
1001	bark	6	170	275	<1	<2	3	<2	315	38
1008	"	2	14	34	<1	<2	2	<2	198	13
1019	"	5	11	16	<1	<2	3	<2	79	14
	mean	4.0	76	127	-	-	2.0	-	221	26
1004	twig	7	67	130	<1	<2	5	<2	90	243
1015	"	6	10	28	<1	<2	8	<2	77	215
1018	"	9	29	103	<1	<2	8	<2	84	297
	mean	7.0	34	87	-	-	7.0	-	84	252
<u>Unmineralised area</u>										
1009	leaf	4	5	23	<1	<2	14	<2	98	283
1011	"	4	5	15	<1	<2	13	<2	91	310
1013	"	5	<5	14	<1	<2	9	<2	102	190
1020	"	4	<5	19	<1	<2	21	<2	85	270
	mean	4.1	4	16	-	-	16.4	-	95	262
1003	bark	3	57	100	<1	<2	2	<2	126	69
1005	"	2	23	35	<1	<2	2	<2	122	17
1010	"	3	66	100	<1	<2	4	<2	223	22
1016	"	2	9	21	<1	<2	7	<2	95	17
	mean	2.5	37	64	-	-	3.9	-	144	33
1006	twig	5	23	65	<1	<2	7	<2	110	380
1007	"	5	21	59	<1	<2	10	<2	85	278
1012	"	6	39	106	<1	<2	11	<2	93	210
1014	"	6	12	32	<1	<2	10	<2	69	485
	mean	5.3	21	59	-	-	9.7	-	89	356

Locations

1000	Tra 8	Tree 3,	25'	east 204S, 40E
1001	Tra 7	Tree 3,	30'	west 208S, 40E
1002	Tra 9	Tree 3,	41'	south 200S, 40E
1003	Tra 2	Tree 1,	12'	north-west, 228S, 32E
1004	Tra 7	Tree 3,	30'	west, 208S, 40E
1005	Tra 2	Tree 8,	50'	north-west, 228S, 40E
1006	Tra 2	Tree 8,	50'	north-west, 228S, 40E
1007	Tra 2	Tree 2,	66'	east, 228S, 32E
1008	Tra 9	Tree 3,	41'	south, 200S, 40E
1009	Tra 2	Tree 8,	50'	north-west, 228S, 40E
1010	Tra 2	Tree 2,	66'	east, 228S, 32E
1011	Tra 2	Tree 1,	12'	north-west, 228S, 32E
1012	Tra 2	Tree 7,	15'	north-west, 228S, 39E
1013	Tra 2	Tree 7,	15'	north-west, 228S, 39E
1014	Tra 2	Tree 1,	12'	north-west, 228S, 32E
1015	Tra 8	Tree 3,	25'	east, 204S, 40E
1016	Tra 2	Tree 7,	15'	north-west, 228S, 39E
1017	Tra 7	Tree 3,	30'	west, 208S, 40E
1018	Tra 9	Tree 3,	41'	south, 200S, 40E
1019	Tra 8	Tree 3,	25'	east, 204S, 40E
1020	Tra 2	Tree 2,	66'	east, 228S, 32E

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by P.M. Rew and H.R. Lord

The following results were obtained for the analysis of six groundwater samples from Corin Dam, A.C.T. All values are expressed as parts per million unless otherwise stated.

Table 1

Sampling date: 13.12.68

	1	2	3	4	5	6
pH	4.0	4.5	6.3	5.6	6.2	5.8
Specific conductance at 23°C (micromho/cm)	635	163	153	88	83	54
Ca	47.2	8.0	11.0	2.8	4.8	1.2
Mg	43.2	9.3	10.5	7.1	5.2	3.2
SO ₄	465	73.7	41.2	23.7	7.0	0.8
Cl	4	1	3	2	2	5
Zn	0.7	0.2	nil	0.05	nil	nil

Table 2: Sampling points

- 1 Spring at toe of dam
- 2 Leakage in outlet tunnel at 520'
- 3 Leakage in outlet tunnel at 650'
- 4 Leakage in outlet tunnel at 770'
- 5 Leakage in outlet tunnel at 920'
- 6 Natural spring downstream of gauging weir

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by A.D. Haldane and H.R. Lord

The following results were obtained for the analysis of seven ground-water samples from Corin Dam, A.C.T. Samples were collected as part of an investigation of a suspected leak in Corin Dam. All values are expressed as parts per million unless otherwise stated.

Table 1

Sampling date 28.11.68

	1	2	3	4	5	6	7
pH	3.9	4.4	6.3	5.3	6.0	5.5	6.5
Specific conductance at 23°C (micromho/cm	910	200	170	110	80	50	30
Total dissolved solids at 180°C	812	130	103		45		
Ca	69	8	9	4	7	2	3
Mg	54	12	13	8	6	3	1
Na	6	3	5	3	5	4	2
K	2	<1	<1	<1	<1	<1	<1
HCO ₃	nil	nil	43	4	38	13	7
SO ₄	1100	172	49	64	4	3	4
Cl	4	2	1	1	1	6	1
Al	70	8	nil	nil	nil	nil	nil
Fe	0.2	nil	nil	nil	nil	0.2	nil
Mn	19	3	1	1	<0.1	<0.1	<0.1
Cu	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zn	1.1	0.4	0.02	0.09	0.05	<0.02	<0.02
Ni	0.5	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pb							
SiO ₂	21	9	14		13	4	3

Table 2: Sampling points

1	Spring at toe of dam
2	Leakage in outlet tunnel at 520'
3	Leakage in outlet tunnel at 650'
4	Leakage in outlet tunnel at 770'
5	Leakage in outlet tunnel at 920'
6	Natural spring downstream of gauging weir
7	Dam water

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by P.M. Rew & H.R. Lord

The following results were obtained for the analysis of five groundwater samples from Corin Dam, A.C.T. All values are expressed as parts per million unless otherwise stated.

Table 2

Sampling date 6.1.69

	1	2	3	4	5
pH	3.6	3.8	6.0	4.9	5.7
Specific conductance at 23°C (micromho/cm)	675	149	149	87	81
Ca	47	8	7	5	5
Mg	37	8	10	6	5
SO ₄	392	57	34	25	7
Cl	7	1	3	3	4
Zn	0.80	0.15	0.05	0.08	0.05

Table 2Sampling points

- 1 Spring at toe of dam
- 2 Leakage in outlet tunnel at 520'
- 3 Leakage in outlet tunnel at 650'
- 4 Leakage in outlet tunnel at 770'
- 5 Leakage in outlet tunnel at 920'
- 6 Natural spring downstream of gauging weir

ANALYSIS OF CARBONATE ROCKS FROM McARTHUR RIVER AREA, N.T.

by G.H. Miechels

The following results were obtained for the analysis of 103 carbonate rock samples from measured sections in the McArthur River area submitted by M.C. Brown.

After digestion with cold 2N HCl, Mg was determined by A.A.S., Ca + Mg by titration with E.D.T.A. (Ca being estimated by difference), and insoluble residue gravimetrically after ignition at 800°C.

Sample No.	% Ca	% Mg	Ca/Mg (Molar)	% Insoluble residue
2/41	17.6	9.08	1.17	23.2
2/40	21.9	11.7	1.13	4.9
2/39	22.0	12.2	1.09	5.4
2/38	21.4	11.8	1.09	7.6
2/37	21.5	11.8	1.11	7.4
2/35	20.8	10.8	1.11	14.4
2/34	25.3	5.1	3.00	21.5
2/33	15.3	9.1	1.03	33.4
2/31	0.24	0.27	0.54	97.3
2/30/2	16.1	5.3	1.85	41.1
2/30	13.5	0.23	35.9	63.6
2/29	13.7	7.9	1.06	36.5
2/28	11.4	7.14	0.97	42.6
2/27	0.12	0.094	0.80	97.1
2/26	7.27	4.26	1.04	65.0
2/25	5.57	3.37	1.00	72.4
2/24	6.13	2.69	1.38	73.8
2/23	11.4	6.73	1.03	46.5
2/22	13.5	7.1	1.15	39.9
2/21	11.3	6.3	1.08	46.7
2/20	13.2	6.5	1.23	46.3
2/19	10.6	5.7	1.13	51.5
2/18	16.2	8.6	1.15	28.4
2/17	15.3	8.6	1.09	28.6

Sample No.	% Ca	% Mg	Ca/Mg (Molar)	% Insoluble residue
2/16	12.2	6.9	1.08	42.3
2/15	6.1	3.4	1.07	42.4
2/14	8.0	3.8	1.28	62.3
2/13	8.9	4.9	1.09	54.8
2/12	8.9	5.4	1.01	56.7
2/11	8.2	3.9	1.08	58.9
2/10	4.3	2.4	1.12	77.2
2/9	5.6	3.2	1.07	72.4
2/8	10.0	3.6	1.68	59.8
2/7	5.5	3.0	1.10	73.0
2/6	12.9	7.4	1.05	37.5
2/5	16.1	9.9	0.99	23.4
2/4	9.3	5.7	1.00	55.8
2/3	15.8	10.5	0.91	22.9
2/2	19.4	13.1	0.90	4.8
2/1	19.3	12.9	0.91	6.0
3/22	19.1	12.6	0.92	7.0
3/21	19.3	12.6	0.93	6.7
3/20	19.6	12.0	0.99	8.2
3/17	2.6	0.07	2.17	93.7
3/16	19.5	12.4	0.95	8.1
3/14	3.2	2.0	0.96	83.2
3/13	19.0	12.1	0.95	9.0
3/12	19.1	12.2	0.95	8.9
3/11	18.7	12.5	0.91	7.9
3/10	19.2	11.1	1.05	14.9
3/9	29.1	6.8	2.60	5.8
3/8	20.1	11.8	1.03	8.5
3/7	20.0	13.3	0.91	11.9
3/6	14.7	9.9	0.90	27.7
3/5	19.6	13.0	0.91	4.2
3/4	18.0	11.6	0.94	14.4
3/3	19.9	13.1	0.92	3.6
3/2	18.7	12.2	0.92	9.7
3/1	20.0	13.3	0.91	2.5

Sample No.	%Ca	% Mg	Ca/Mg (Molar)	% Insoluble residue
4/46	19.9	13.1	0.92	3.6
4/45	17.4	14.8	0.71	3.1
4/44	21.7	12.9	1.02	0.79
4/43	27.5	9.1	1.84	0.66
4/42	30.1	7.4	2.47	1.7
4/41	17.4	14.2	0.74	4.2
4/40	22.4	12.3	1.11	0.89
4/39	20.4	11.1	1.11	10.1
4/38	22.2	11.0	1.23	5.2
4/37	0.28	0.11	1.55	97.1
4/36	22.4	12.3	1.11	1.8
4/35	24.3	11.5	1.28	0.93
4/34	21.8	11.1	1.19	6.9
4/33	14.8	8.4	1.07	32.0
4/32	1.95	1.03	1.15	91.0
4/31	22.8	11.6	1.19	2.30
4/30	22.3	12.1	1.12	3.4
4/29	23.9	10.8	1.34	4.3
4/28	21.9	9.5	1.39	13.3
4/27	17.0	9.4	1.10	24.0
4/26	4.2	2.8	0.90	78.7
4/25	21.0	12.4	1.03	4.4
4/24	19.7	12.1	0.99	6.0
4/23	6.2	4.1	0.92	68.8
4/22	20.9	11.8	1.08	4.3
4/21	16.7	11.0	0.92	18.1
4/19	11.0	7.0	0.95	47.1
4/18	9.14	6.6	0.87	51.6
4/17	20.1	10.4	1.17	13.3
4/16	16.4	9.8	1.02	23.5
4/15	3.0	1.9	0.93	84.6
4/14	20.5	10.9	1.15	9.7
4/13	12.3	7.6	0.98	40.8

Sample No.	% Ca	% Mg	Ca/Mg (Molar)	% Insoluble residue
4/12	20.0	12.9	0.94	2.8
4/11	17.5	10.4	1.02	18.6
4/9	1.7	1.03	0.99	90.8
4/8	21.1	10.9	1.17	7.1
4/7	21.8	11.6	1.14	4.1
4/6	18.6	10.8	1.05	14.8
4/5	8.9	4.4	1.23	61.2
4/4	13.2	8.0	1.00	37.4
4/3	14.8	8.3	1.08	30.8
4/2	12.5	7.1	1.06	42.6
4/1	10.6	4.3	1.49	55.7

Section 2 is in the top of the Emerugga Dolomite, the Barney Creek Formation, and (?) Reward Dolomite.

Section 4 is in the top of the Tooganinnie Formation and the lower and middle parts of the Emerugga.

Section 3 is in the upper part of the Emerugga Dolomite.

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by P.M. Rew and H.R. Lord

The following results were obtained for the analysis of six groundwater samples from Corin Dam, A.C.T. All values are expressed as parts per million unless otherwise stated.

Table 1

Sampling date 3rd February, 1969

	1	2	3	4	5	6
pH	3.8	4.4	6.7	5.9	6.6	6.4
Specific conductance at 23°C (micromho/cm)	587	143	140	83	86	61
Ca	35	10	8	5	5	3
Mg	34	7	9	5	5	3
SO ₄	335	57	31	22	10	2
Cl	6	1	4	4	4	8
Zn	0.65	0.15	<0.05	0.05	<0.05	<0.05

Table 2

Sampling points

- | | |
|---|---|
| 1 | Spring at toe of dam |
| 2 | Leakage in outlet tunnel at 520' |
| 3 | Leakage in outlet tunnel at 650' |
| 4 | Leakage in outlet tunnel at 770' |
| 5 | Leakage in outlet tunnel at 920' |
| 6 | Natural spring downstream of gauging weir |

Laboratory report no. 9

4th February, 1969

ANALYSIS OF WATER FROM LAKE GEORGE, N.S.W.

by

A.D. Haldane

Specific conductance at 22°C
(micromho/cm)

1	16,200
2	11,600
3	5,220
4	11,600
5	12,700

ANALYSIS OF ANTRIM PLATEAU VOLCANICS

by T. I. Slezak

Sixty-five samples of Antrim Plateau Volcanics, submitted by C.M. Morgan and I.P. Sweet, were analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for the following elements: Cu, Fe, Mg, Mn, Cr, Co, Ni, V, Mo, Ca, Ti, Sr, Ba, Sc, Y, La, and Zr. The values for Fe, Mg, Mn, Ca, and Ti are given in per centum, whereas all others are in parts per million.

The analyses were requested so that a preliminary review of the compositional variations could be used as a basis for discussing the type of alteration undergone by the Antrim Plateau Volcanics, and for evaluating whether or not more detailed chemical study is warranted as an aid to mapping and to understanding the petrogenesis of the volcanic province.

The samples were crushed in a 4" jaw crusher and the resulting chips reduced to -120 mesh in a Siebtechnik mill using a Tungsten carbide vessel. This type of vessel introduces W and some Co as metallic contaminants to the sample, and thus it is possible that the Co values obtained for hard rocks are high.

The analytical method used was adapted from Ahrens and Taylor ("Spectrochemical Analysis", 1961, p. 189, Addison-Wesley Publishing Company). One part of sample was mixed with two parts of graphite (National Carbon Company Type L4160 Grade SP-2). The mix was loaded into a preformed graphite electrode (National Carbon Company Type L4260) and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal standard and rock standard control were used. On previous experience with this method for the analysis of similar materials it is estimated that the values given for elements are within 10% of the true values.

The results show that many of the samples are extensively altered from their original compositions, though their basaltic nature is indicated by normal values obtained for V and Sc.

Laboratory Report No. 10:

Laboratory No.	Sample No.	Cr ppm	Fe %	Mg %	Mn %	Cu ppm	Co ppm	Ni ppm	V ppm	Mo ppm	Ca %	Ti %	Sp ppm	Ba ppm	Se ppm	Y ppm	La ppm	Zr ppm
69-1	E106	26	+10.0	1.6	0.07	26	65	33	200	-10	4.2	0.65	140	380	38	47	110	220
69-2	E133	23	+10.0	0.1	0.38	45	27	30	170	15	0.5	0.38	40	170	40	88	175	230
69-3	E153/4	17	+10.0	1.9	0.08	68	54	23	180	-10	3.7	0.66	150	475	35	40	84	185
69-4	E160(b)	22	+10.0	3.1	0.28	52	45	36	155	-10	0.7	0.60	40	370	29	29	50	210
69-5	E160(c)	25	3.5	2.7	0.11	72	73	72	300	-10	4.7	0.78	260	400	39	31	50	150
69-6	E176	18	7.0	-0.1	0.01	79	24	-10	170	-10	0.2	0.78	50	520	36	20	-50	200
69-7	E185	23	4.4	1.0	0.07	96	+200	+200	155	-10	0.2	0.49	80	1420	32	50	71	125
69-8	E200	11	6.4	0.9	0.01	96	57	150	320	-10	0.2	0.78	66	560	38	23	-50	145
69-9	E301	33	+10.0	3.3	0.09	130	82	76	220	-10	4.5	0.58	220	600	41	30	50	150
69-10	H4	35	+10.0	2.3	0.10	62	63	44	270	-10	4.3	0.80	135	250	37	32	64	170
69-11	H14	28	+10.0	0.2	0.04	165	35	28	225	-10	0.4	0.80	193	1600	29	35	105	195
69-12	H17	23	+10.0	2.4	0.08	60	50	51	160	-10	2.3	0.64	102	330	30	38	71	195
69-13	S73	58	+10.0	2.7	0.10	54	73	41	280	-10	5.4	0.68	148	255	37	28	-50	145
69-14	S100	25	8.4	3.0	0.12	68	74	46	340	-10	6.6	0.70	174	275	40	26	50	125
69-15	S263A	48	8.2	2.4	0.10	50	89	38	280	-10	5.0	0.66	145	255	37	29	56	150
69-16	W156B	17	6.0	2.8	0.03	70	62	50	130	-10	0.4	0.52	40	720	26	42	72	180
69-17	W189	57	+10.0	3.0	0.12	134	66	45	205	-10	6.5	0.95	183	96	25	27	58	-100
69-18	W302	29	+10.0	2.8	0.11	56	60	39	230	-10	4.6	0.66	128	330	39	35	80	150
69-19	W305	90	+10.0	3.2	0.10	72	68	54	200	-10	4.7	0.56	255	365	38	25	-50	140
69-20	W315	47	+10.0	3.9	0.07	107	56	61	225	-10	4.7	0.56	220	255	40	30	-50	145
69-21	X2	27	+10.0	1.9	0.10	18	49	28	200	-10	3.0	0.67	120	420	34	34	57	205
69-22	X9	23	+10.0	2.1	0.09	22	54	29	190	-10	3.7	0.64	185	430	33	40	80	200
69-23	X10	35	+10.0	2.2	0.08	22	48	31	145	-10	3.0	0.65	145	480	35	36	94	190
69-24	X18	21	+10.0	2.6	0.10	31	60	38	200	-10	5.0	0.65	180	470	45	51	90	220
69-25	X22	31	+10.0	1.8	0.11	19	49	21	220	-10	3.2	0.65	160	600	36	26	72	170
69-26	X25	31	+10.0	2.6	0.10	50	62	22	230	-10	3.6	0.66	103	370	37	28	-50	160
69-27	X30	23	+10.0	2.6	0.13	17	55	22	200	-10	3.0	0.67	86	470	34	33	66	170
69-28	X31	19	+10.0	1.9	0.11	21	51	26	200	-10	3.7	0.62	135	390	34	33	66	200
69-29	X34	49	+10.0	2.9	0.13	45	62	48	220	-10	4.7	0.54	125	120	37	30	55	150
69-30	X38	20	+10.0	3.1	0.09	80	60	49	220	-10	4.7	0.59	270	260	40	35	55	140
69-31	X39C	42	+10.0	2.4	0.06	45	45	38	260	-10	1.5	0.59	115	480	35	37	76	160
69-32	X52	28	+10.0	2.7	0.11	56	66	44	280	-10	4.4	0.72	150	330	40	32	-50	160
69-33	X74	25	+10.0	3.3	0.11	108	68	70	250	-10	5.3	0.60	145	250	40	30	-50	140
69-34	X96A	470	3.4	+5.0	0.03	67	42	40	330	-10	1.8	0.76	140	260	41	31	96	160
69-35	X96B	27	+10.0	3.1	0.09	52	55	48	250	-10	3.5	0.66	105	260	36	25	-50	150
69-36	X98	23	+10.0	3.1	0.09	45	50	30	290	-10	2.7	0.72	180	370	37	29	50	170
69-37	X102	17	+10.0	2.7	0.11	19	58	21	260	-10	4.7	0.78	150	350	37	28	55	190
69-38	X103	18	7.3	2.5	0.12	68	47	43	190	-10	4.3	0.61	130	350	33	27	69	170
69-39	X117	22	+10.0	1.7	0.09	70	48	30	180	-10	2.8	0.72	140	410	36	40	79	200
69-40	X150	26	+10.0	2.3	0.10	60	52	52	150	-10	3.7	0.59	130	330	35	37	56	190
69-41	X150(b)	47	7.0	2.1	0.10	50	73	37	140	-10	3.7	0.53	115	370	31	36	68	200
69-42	X160	42	+10.0	1.9	0.09	52	45	47	150	-10	4.0	0.58	130	360	31	35	60	210
69-43	X216	20	+10.0	1.9	0.09	21	56	30	210	-10	3.6	0.67	145	300	36	37	61	200
69-44	X258	30	+10.0	2.4	0.09	65	55	51	230	-10	3.8	0.66	130	330	34	28	-50	160
69-45	X265	130	+10.0	3.5	0.10	260	63	120	160	-10	5.0	0.42	125	230	42	27	-50	120
69-46	X275	29	+10.0	2.8	0.08	54	33	50	150	-10	0.9	0.57	105	360	30	40	74	230
69-47	Y27B	19	+10.0	+5.0	0.10	240	64	66	150	-10	3.2	0.46	62	600	31	31	-50	140
69-48	Y29	17	+10.0	3.8	0.07	230	52	80	155	-10	5.1	0.45	110	210	36	25	-50	140
69-49	Y48	18	+10.0	2.5	0.10	66	49	54	160	-10	3.2	0.53	100	350	35	32	55	160
69-50	Y52A	23	+10.0	1.7	0.12	15	29	24	250	-10	2.9	0.98	150	370	39	39	78	220
69-51	Y53A	22	+10.0	2.2	0.10	56	46	41	160	-10	4.1	0.59	140	320	29	32	60	180
69-52	Y53B	30	+10.0	3.0	0.09	270	30	60	155	-10	4.3	0.43	180	290	31	20	-50	115
69-53	Y55	39	+10.0	4.1	0.12	22	24	24	210	-10	2.7	0.95	130	240	34	32	56	200
69-54	Y67A	30	+10.0	1.8	0.09	340	33	40	150	-10	+10.0	0.39	45	90	34	24	64	120

69-55	Y67B	22	+10.0	3.8	0.14	250	45	60	180	-10	5.1	0.49	240	140	34	23	50	120
69-56	Y70	37	+10.0	2.2	0.11	55	54	45	160	-10	4.0	0.58	180	420	32	39	58	205
69-57	Y72	23	+10.0	0.7	0.15	32	31	48	140	-10	2.6	0.68	110	490	35	39	76	220
69-58	Y75	31	+10.0	3.3	0.16	70	57	53	230	-10	5.0	0.61	120	280	37	35	-50	160
69-59	Y116	27	+10.0	2.6	0.08	68	56	50	200	-10	3.8	0.60	170	290	33	32	-50	190
69-60	Y133	25	+10.0	3.0	0.04	50	40	51	140	-10	0.5	0.49	58	460	32	32	54	190
69-61	Y169A	14	+10.0	3.3	0.10	330	50	79	200	-10	4.4	0.49	210	370	34	23	-50	130
69-62	Y169B	66	+10.0	1.3	0.15	18	52	16	260	-10	5.1	1.00	160	660	30	47	74	280
69-63	Y222A	30	+10.0	1.5	0.02	43	29	23	120	-10	0.6	0.46	44	460	23	27	-50	180
69-64	Y222B	21	+10.0	2.5	0.09	62	62	65	240	-10	4.7	0.62	180	310	39	30	50	150
69-65	Y237	80	+10.0	2.2	0.04	61	35	50	140	-10	1.1	0.54	80	430	28	43	78	200

ANALYSIS OF ORIENTATION SAMPLES FROM
McARTHUR RIVER AREA, N.T.

by

D. W. Bennett

The following results were obtained for the analysis of 36 carbonate rock samples from the McArthur River area, N.T., submitted by M.C. Brown.

After digestion with cold 2N HCl Mg was determined by A.A.S., Ca+Mg by titration with EDTA (Ca being estimated by difference), and insoluble residue gravimetrically after ignition at 800°C. Cu, Pb, Zn, Co, Ni, Mn and Fe were determined by A.A.S. after digestion with concentrated HCl. Phosphate was determined colorimetrically after digestion with perchloric acid.

Reg. No.	%Ca	%Mg	Ca/Mg (molar)	% Insoluble residue
677800002	15.1	9.3	0.98	28.1
05	17.8	10.0	1.08	20.1
09	13.6	7.5	1.10	37.7
09B	20.9	12.2	1.71	4.3
10A	20.0	12.0	1.01	2.4
10B	20.7	12.0	1.05	2.6
13	10.6	6.5	0.99	49.3
15	17.0	10.0	1.03	20.7
16	11.6	6.5	1.08	45.1
18				
19	4.8	2.25	1.29	78.2
21	17.9	10.5	1.03	18.8
21B	17.6	10.4	1.03	22.0
23	14.0	9.0	0.95	33.9
24	5.4	3.3	0.98	74.6
25	0.11	0.066	1.01	96.5
26	15.4	8.8	1.06	32.6
29	8.8	5.5	0.97	58.0
31	0.082	0.049	1.02	98.3
34	0.57	0.30	1.15	96.5
40	17.6	11.0	0.97	18.1
677857103B	14.7	8.5	1.05	34.4
108A	21.0	13.5	0.94	1.7
108C	15.4	10.0	0.93	26.9
111	11.0	7.5	0.89	43.6
111B	12.5	8.0	0.95	39.0
112A	20.6	13.0	0.96	4.9
113	8.6	6.5	0.80	54.3
115	15.8	10.3	0.93	25.4

Reg. No.	%Ca	%Mg	Ca/Mg (molar)	% Insoluble residue
677857108A	21.0	13.5	0.94	1.7
108C	15.4	10.0	0.93	26.9
111	11.0	7.5	0.89	43.6
111B	12.5	8.0	0.95	39.0
112A	20.6	13.0	0.96	4.9
113	8.6	6.5	0.80	54.3
115	15.8	10.3	0.93	25.4
120A	10.7	8.5	0.76	41.9
121B	16.2	11.0	0.89	22.2
122A	9.3	6.5	0.87	50.7
122B	9.8	6.5	0.92	49.0
123	19.2	13.5	0.86	5.7
124	18.1	12.5	0.88	11.8
125	19.7	14.3	0.84	1.9

Parts per million								
Reg. No.	Cu	Pb	Zn	Co	Ni	Mn	Fe	P ₂ O ₅
677800002	67	<10	20	3	<3	640	9,300	540
05	50	25	14	3	3	950	12,800	1,010
09	20	25	20	3	7	900	20,000	690
09B	2	10	30	<3	<3	770	7,200	260
10A	2	10	12	<3	<3	2,300	26,000	175
10B	8	2,800	38	<3	<3	1,900	18,200	125
13	35	25	24	<3	3	480	10,000	890
15	38	25	45	<3	7	900	28,200	7,400
16	12	25	54	<3	3	2,800	14,000	1,110
18	3,500	72,000	180,000	8	7	710	23,000	1,170
19	10	25	70	<3	5	820	5,800	1,190
21	5	<10	11	<3	<3	550	2,800	375
21B	4	<10	5	<3	<3	560	3,500	62
23	10	50	65	<3	3	560	7,250	490
24	17	<10	15	<3	3	1,250	11,750	890
25	17	25	14	<3	6	175	23,500	1,000
26	5	<10	10	<3	<3	1,000	6,000	410
29	10	12	30	<3	6	1,000	5,750	630
31	8	<10	14	3	6	1,370	19,000	1,100
34	7	<10	20	3	3	560	2,500	820
40	6	<10	6	<3	<3	940	6,000	450
677857103B	10	<10	9	3	3	770	5,000	790
108A	4	<10	14	<3	<3	550	3,500	75
108C	10	<10	5	<3	<3	310	3,250	200
111	7	<10	11	3	3	1,900	10,250	870
111B	11	<10	10	3	3	2,600	11,250	760
112A	<2	<10	6	<3	<3	390	4,250	400
113	11	<10	8	3	3	520	3,250	670
115	4	<10	5	<3	<3	550	3,500	1,950
120A	10	40	65	<3	3	570	7,250	710
121B	16	<10	15	<3	3	1,250	11,750	240
122A	14	25	80	<3	6	175	23,500	2,000
122B	5	25	10	<3	3	1,020	6,500	1,120
123	10	18	30	3	6	1,020	6,000	160
124	10	12	16	<3	6	125	19,900	400
125	5	<10	20	<3	<3	520	2,100	140

ANALYSIS OF CANADIAN SHIELD MATERIAL

by

K.R. Walker, T.I. Slezak, R.E. Moon

One hundred and fifty-five samples from the Canadian Shield, submitted by Dr K.E. Eade, were analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for the following elements: Cu, Fe, Mg, Mn, Cr, Co, Ni, V, Ca, Ti, Sr, Ba, Sc, Y, La, and Zr. The values for Fe, Mg, Mn, Ca, and Ti are given in per centum, whereas all others are in parts per million.

The rocks are from northern Quebec; by selection from a semi-systematic array they represent about 200,000 square miles of the Canadian Shield. They have been the subject of various chemical investigations (see references below) by Canadian geologists, but have not been analysed previously for most of the trace elements now reported. These new data are primarily intended to be used in evaluating the composition of a large portion of the earth's crust, and in discussing the implications of the chemical differences between amphibolite and granulite facies rocks in terms of shield development. Interpretation of these new data will be done by the Canadians in continuation of their earlier studies. In addition, their results will be of particular interest in evaluating the success of the sampling procedure used, and the degree of compositional variations to be expected in regional geochemical investigations of shield areas.

The samples were received as powders. Further grinding was necessary to reduce them to -120 mesh, and this was done by hand in an agate mortar. They were homogenized in a Pica mill before analysis. The analytical method used was adopted from Ahrens and Taylor ("Spectrochemical Analysis", 1961, p 189, Addison - Wesley Publishing Company). One part of sample was mixed with two parts of graphite (National Carbon Company Type L4160, Grade SP-2). The mix was loaded into a pre-formed graphite electrode (National Carbon Company Type L4260), and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal and rock standard control were used. From previous experience with this method for the analysis of similar materials it is estimated that the values given for the elements are within 10% of the true value.

References:

1. K.E. EADE, W.F. FAHRIG, J.A. MAXWELL, Nature, 211, 5055, p 1245-49 (1966)
2. W.F. FAHRIG, K.E. EADE, J.A.S. ADAMS, Nature, 214, 5092, p 1002-3 (1967)
3. W.F. FAHRIG, K.E. EADE, Canadian Jour. Earth Sci. 5, 5 p 1247-52 (1968)

Results marked + more than
- less than

Sample	Cu ppm	Fe %	Mg %	Mn %	Cr ppm	Co ppm	Ni ppm	V ppm	Ca %	Ti %	Sr ppm	Ba ppm	Sc ppm	Y ppm	La ppm	Zr ppm
21-63	36	6.1	1.8	0.05	160	23	84	97	1.2	0.31	75	285	18	19	- 50	110
22-63	19	5.2	1.7	0.03	77	14	28	64	2.4	0.29	370	700	11	16	- 50	133
23-63	27	5.2	2.6	0.06	383	23	200	60	2.5	0.26	390	680	14	16	- 50	138
24-63	13	3.0	1.3	0.05	50	- 10	16	46	1.8	0.24	420	1000	-10	15	56	200
25-63	26	6.0	+ 5.0	0.09	+ 1000	105	+ 1000	43	1.4	0.07	40	50	12	15	- 50	- 100
26-63	10	2.4	1.3	0.06	38	- 10	12	37	1.8	0.13	110	740	- 10	18	- 50	280
27-63	13	0.9	+ 5.0	0.05	25	12	16	20	7.0	0.09	61	940	- 10	30	76	370
28-63	80	+ 10.0	+ 5.0	0.12	105	66	77	250	6.5	0.66	210	750	39	27	74	130
29-63	37	7.7	1.7	0.08	83	25	42	90	2.7	1.37	305	870	17	18	66	180
30-63	58	6.4	2.2	0.08	225	35	103	139	3.9	0.41	195	216	25	25	- 50	125
31-63	12	3.6	2.9	0.05	247	21	190	69	3.6	0.23	348	330	14	16	- 50	115
32-63	32	2.4	1.0	0.03	94	- 10	28	41	1.4	0.19	268	465	- 10	15	- 50	- 100
33-63	6	0.4	0.1	- 0.02	11	- 10	- 10	- 10	0.7	0.04	261	256	- 10	- 15	- 50	- 100
34-63	16	3.3	1.7	0.05	76	13	26	59	2.8	0.26	573	875	11	- 15	- 50	130
35-63	22	3.5	2.1	0.04	145	15	37	61	3.2	0.27	655	925	14	- 15	- 50	145
36-63	9	0.3	0.2	0.02	10	- 10	13	12	0.3	0.05	40	90	- 10	20	84	210
37-63	43	8.2	+ 5.0	0.10	110	47	74	230	5.0	0.66	200	275	33	23	- 50	130
38-63	37	7.1	3.1	0.07	124	41	42	183	4.9	0.66	500	290	23	20	- 50	120
39-63	32	3.8	1.7	0.05	85	16	33	60	2.5	0.27	300	650	12	17	57	158
40-63	25	3.7	1.6	0.05	75	13	20	65	2.3	0.29	450	890	11	16	- 50	163
41-63	10	2.7	1.9	0.05	33	- 10	12	46	1.7	0.17	80	440	- 10	- 15	- 50	170
42-63	74	7.9	+ 5.0	0.12	345	55	170	270	5.8	0.50	135	280	33	23	74	100
43-63	68	8.2	+ 5.0	0.14	485	53	300	170	6.1	0.41	221	263	31	23	- 50	108
44-63	37	7.0	3.4	0.12	295	36	140	148	5.0	0.38	270	346	27	22	60	120
45-63	25	3.2	1.5	0.07	155	13	45	50	1.8	0.22	365	720	11	15	- 50	118
46-63	21	1.9	0.8	0.05	39	- 10	14	27	1.4	0.14	370	732	- 10	- 15	- 50	100
47-63	17	3.2	1.6	0.04	138	14	52	44	2.3	0.23	333	560	10	16	- 50	125
48-63	13	3.9	1.5	0.07	195	16	71	66	2.0	0.27	268	304	14	19	50	125
49-63	15	1.5	0.4	0.02	17	- 10	- 10	18	1.0	0.12	248	715	- 10	15	- 50	120
50-63	24	7.4	+ 5.0	0.08	+ 1000	125	+ 1000	45	1.0	0.14	124	50	15	17	- 50	- 100
51-63	11	0.4	- 0.1	- 0.02	21	- 10	12	13	0.3	0.05	40	240	- 10	29	85	100
52-63	78	+ 10.0	3.7	0.13	550	47	84	180	4.2	0.92	210	460	76	23	- 50	140
53-63	78	8.1	+ 5.0	0.11	960	74	+ 1000	100	3.6	0.25	145	204	27	24	56	100
54-63	37	5.5	2.6	0.06	257	24	103	86	2.3	0.38	310	711	23	20	52	150
55-63	33	4.0	2.2	0.06	173	17	70	59	2.3	0.25	356	640	-12	17	53	165
56-63	36	3.1	1.3	0.04	95	12	28	54	1.8	0.27	360	991	10	15	57	120
57-63	16	2.6	1.2	0.04	106	- 10	23	44	1.6	0.23	400	905	- 10	15	52	143
58-63	32	0.2	- 0.1	- 0.02	17	- 10	12	14	0.4	0.03	40	180	- 10	30	96	- 100
59-63	92	8.0	+ 5.0	0.12	330	56	710	190	4.9	0.65	140	180	27	20	53	120
60-63	70	8.5	+ 5.0	0.21	795	70	860	163	5.5	0.47	120	75	30	23	50	- 100
61-63	35	4.4	2.7	0.07	410	24	178	70	3.0	0.23	250	568	15	16	- 50	123
62-63	19	4.0	1.5	0.05	255	19	93	83	2.3	0.35	315	711	13	18	58	157
63-63	21	3.5	1.2	0.06	87	12	34	49	1.5	0.24	350	741	11	17	- 50	142
64-63	20	4.8	2.0	0.07	73	15	28	70	3.0	0.39	435	+ 1000	13	16	- 50	135
65-63	24	3.8	1.5	0.05	118	13	32	66	1.9	0.29	405	792	12	15	51	143
66-63	13	2.2	0.6	0.04	41	- 10	14	28	1.5	0.28	406	1000	- 10	19	75	245
67-63	89	6.5	+ 5.0	0.10	950	66	800	118	5.1	0.38	153	115	22	16	- 50	- 100
68-63	14	3.0	+ 5.0	0.20	370	22	21	33	+ 10.0	0.05	88	120	14	56	195	120
69-63	14	5.2	1.4	0.24	64	12	19	78	1.7	0.52	310	+ 1000	14	20	60	320
70-63	24	6.2	2.1	0.30	150	14	14	74	3.5	0.78	400	+ 1000	24	26	66	300
71-63	9	0.4	0.3	- 0.02	22	- 10	11	19	0.3	0.06	40	280	- 10	24	60	130
72-63	206	8.5	4.0	0.09	143	58	81	240	4.7	0.90	178	210	34	26	66	130
73-63	64	7.0	3.5	0.10	140	51	175	180	5.6	0.54	195	130	29	20	50	- 100

74-63	23	4.9	2.8	0.10	59	21	62	71	4.6	0.48	442	+ 1000	16	22	68	158
75-63	36	5.2	1.7	0.10	72	20	33	107	2.6	0.64	244	829	19	26	64	260
76-63	33	3.5	1.2	0.07	36	12	16	59	2.0	0.37	359	+ 1000	11	21	77	163
660-63	14	3.5	0.7	0.08	18	- 10	- 10	38	1.5	0.45	397	+ 1000	- 10	26	113	655
661-63	16	4.8	1.2	0.10	43	11	16	58	3.2	0.60	501	+ 1000	15	21	89	375
662-63	19	4.6	1.3	0.06	20	13	20	37	5.5	0.52	688	+ 1000	16	21	- 50	190
663-63	61	7.1	+ 5.0	0.12	260	50	230	145	6.3	0.47	346	381	29	19	- 50	100
664-63	23	4.0	1.1	0.06	36	11	16	57	2.5	0.67	458	+ 1000	10	23	73	245
665-63	10	0.3	0.1	0.02	16	- 10	- 10	11	0.4	0.59	36	290	- 10	29	50	115
666-63	13	4.2	1.1	0.05	29	- 10	16	45	1.8	0.48	298	888	10	29	85	340
667-63	12	3.9	0.7	0.05	17	- 10	10	39	1.8	0.49	350	+ 1000	10	25	57	355
668-63	6	2.3	- 0.1	0.03	10	- 10	- 10	10	0.7	0.14	96	665	- 10	79	260	295
669-63	17	+ 10.0	2.0	0.15	11	32	- 10	150	5.1	1.50	548	805	19	47	124	180
670-63	105	5.4	4.1	0.08	135	34	128	95	4.7	0.67	266	207	18	16	- 50	- 100
671-63	31	8.5	+ 5.0	0.14	197	70	310	87	3.8	0.31	154	165	25	22	50	- 100
672-63	21	6.2	1.8	0.08	110	19	35	96	3.2	0.40	325	872	15	24	105	188
673-63	19	3.5	1.2	0.04	38	13	32	42	2.5	0.24	299	770	10	18	65	170
674-63	18	1.9	0.6	0.03	26	- 10	12	31	1.2	0.19	240	+ 1000	- 10	15	58	120
675-63	23	4.1	1.3	0.06	74	17	37	66	3.1	0.32	315	742	14	20	58	200
676-63	11	+ 10.0	1.2	0.14	24	26	19	120	2.3	0.47	285	+ 1000	20	28	52	110
677-63	31	5.8	2.3	0.10	150	29	58	125	4.6	0.33	195	438	26	22	- 50	100
678-63	22	3.9	1.5	0.06	99	17	37	70	3.0	0.28	285	561	15	17	- 50	205
679-63	160	+ 10.0	2.8	0.15	110	62	98	270	6.7	0.70	190	110	40	33	64	160
680-63	18	2.6	0.9	0.04	39	- 10	14	43	1.6	0.21	389	936	- 10	18	59	150
681-63	22	3.6	1.4	0.05	61	13	24	57	2.1	0.24	388	943	11	17	58	140
682-63	21	3.8	0.9	0.05	48	11	20	53	2.3	0.36	400	+ 1000	- 10	18	65	205
683-63	13	2.4	0.7	0.03	31	10	17	32	2.2	0.24	342	610	- 10	15	78	130
684-63	17	2.4	1.1	0.04	28	- 10	14	48	2.3	0.31	442	955	- 10	15	67	163
685-63	33	5.4	1.6	0.05	74	20	46	93	3.4	0.44	411	752	12	19	50	150
686-63	15	5.6	+ 5.0	0.14	+ 1000	71	780	95	5.5	0.18	200	285	24	25	80	100
687-63	49	6.5	+ 5.0	0.12	+ 1000	80	620	98	5.2	0.14	215	240	33	32	97	120
688-63	11	4.1	1.2	0.05	43	13	13	63	2.3	0.39	404	+ 1000	14	16	- 50	133
689-63	20	4.7	1.5	0.06	64	18	24	105	3.0	0.40	428	980	16	22	73	188
690-63	17	1.1	1.2	0.05	31	- 10	17	21	7.5	0.09	170	271	- 10	20	55	155
691-63	17	3.5	1.2	0.06	51	13	17	61	2.8	0.32	380	+ 1000	13	19	58	200
692-63	14	3.6	1.0	0.05	22	11	11	52	2.5	0.38	420	+ 1000	14	22	107	230
693-63	95	+ 10.0	2.6	0.10	69	54	49	325	4.9	0.70	400	345	27	28	78	198
694-63	39	7.3	1.9	0.09	109	23	42	108	2.9	0.42	360	722	17	21	43	157
695-63	10	4.3	1.8	0.06	110	14	25	67	3.6	0.33	490	993	15	21	- 50	197
696-63	26	5.4	2.2	0.08	133	19	48	92	3.1	0.40	353	702	14	17	53	137
697-63	13	3.7	1.2	0.06	39	13	16	51	2.3	0.32	350	976	12	23	89	180
698-63	15	3.7	0.8	0.05	21	- 10	13	50	2.1	0.29	460	+ 1000	11	19	85	203
699-63	145	+ 10.0	+ 5.0	0.18	148	115	122	+ 1000	4.7	0.94	94	95	59	34	85	100
700-63	250	+ 10.0	2.8	0.16	54	66	50	170	4.7	0.93	190	250	44	97	260	390
701-63	210	6.5	3.0	0.11	125	32	58	130	5.7	0.49	554	662	26	28	82	163
702-63	17	2.0	+ 5.0	0.06	52	20	30	34	10.0	0.14	170	+ 1000	16	30	120	150
703-63	50	6.0	2.6	0.09	203	23	80	92	2.7	0.42	446	984	18	23	82	155
704-63	19	7.4	2.9	0.14	207	29	120	127	4.5	0.52	245	455	22	32	145	190
705-63	18	4.1	1.1	0.06	35	13	20	55	2.3	0.40	428	945	11	20	80	163
706-63	14	5.4	1.3	0.05	138	16	43	92	1.5	0.38	287	458	14	16	65	165
707-63	51	10.0	4.7	0.16	180	63	78	700	7.0	0.65	100	96	45	32	- 50	110
708-63	33	9.0	1.8	0.13	42	43	26	200	3.9	1.55	420	+ 1000	31	35	140	290
709-63	25	5.9	1.5	0.10	242	22	108	81	1.9	0.28	219	439	16	22	55	135
710-63	50	2.8	0.4	0.04	36	11	17	28	7.8	0.13	130	440	- 10	48	88	150
711-63	6	0.1	0.1	0.02	15	- 10	12	12	0.3	0.04	40	95	- 10	21	68	198
712-63	21	4.0	3.4	0.08	70	20	27	69	5.8	0.33	270	+ 1000	17	41	110	220
713-63	60	3.8	1.0	0.05	50	15	21	51	2.1	0.34	386	+ 1000	14	27	101	185

714-63	138	10.0	2.4	0.14	55	47	47	225	4.8	1.10	355	411	27	41	97	230
715-63	49	+ 10.0	+ 5.0	0.45	800	76	+ 1000	77	2.4	0.14	120	170	26	95	220	230
716-63	12	2.5	1.1	0.04	90	11	24	40	2.0	0.23	390	920	11	19	- 50	110
717-63	14	0.4	- 0.1	0.02	29	12	14	14	0.3	0.04	- 40	360	- 10	26	78	143
718-63	22	4.6	1.9	0.06	180	20	77	70	2.7	0.31	360	640	14	20	56	160
719-63	13	2.8	1.0	0.04	43	11	17	43	2.3	0.27	384	912	- 10	18	87	165
720-63	14	2.7	0.4	0.04	18	11	10	27	1.4	0.29	279	980	- 10	23	115	395
721-63	43	7.9	+ 5.0	0.14	+ 1000	106	+ 1000	108	4.9	0.22	89	150	26	47	105	125
722-63	150	10.0	+ 5.0	0.13	540	63	650	180	5.7	0.58	260	280	33	47	110	250
1057-64	29	3.8	1.4	0.07	97	16	28	69	2.9	0.38	450	887	15	23	85	165
1058-64	15	3.5	1.1	0.06	89	13	30	59	2.5	0.27	352	819	12	19	57	160
1059-64	22	2.9	0.8	0.05	23	10	13	42	1.9	0.36	338	990	10	20	94	215
1060-64	20	2.9	0.9	0.05	45	12	19	50	2.3	0.29	420	832	10	17	55	143
1061-64	21	4.8	1.8	0.08	130	17	37	85	3.3	0.41	475	923	15	20	75	158
1062-64	29	4.6	1.5	0.07	70	17	26	76	3.6	0.41	433	882	15	20	61	145
1063-64	80	7.6	3.3	0.11	240	43	151	160	4.9	0.46	250	185	26	22	60	120
1064-64	19	2.7	1.2	0.05	45	11	14	59	2.4	0.32	456	995	11	16	63	138
1065-64	20	3.0	1.1	0.04	63	13	20	57	2.6	0.28	395	790	10	17	94	145
1066-64	22	3.2	0.9	0.05	28	13	13	61	2.4	0.32	354	988	12	19	61	188
1067-64	18	2.1	0.5	0.03	32	10	15	34	2.1	0.20	459	791	- 10	15	52	- 100
1068-64	26	3.8	1.8	0.06	205	20	54	76	3.3	0.32	537	+ 1000	14	17	58	110
1069-64	23	3.8	1.4	0.06	65	16	24	80	3.6	0.36	448	753	13	18	61	210
1070-64	64	8.0	4.5	0.10	380	60	100	165	4.6	0.32	150	240	35	23	- 50	105
1071-64	40	4.3	1.7	0.06	57	19	30	115	4.0	0.49	400	754	16	21	79	170
1072-64	24	3.6	1.6	0.07	114	18	42	76	3.0	0.28	357	824	15	17	50	135
1073-64	34	2.6	1.5	0.05	210	15	42	57	3.0	0.27	472	+ 1000	11	15	- 50	125
1074-64	33	3.6	1.7	0.06	92	17	30	86	3.2	0.31	355	865	15	18	69	150
1075-64	79	+ 10.0	2.0	0.12	125	25	66	70	2.1	0.13	268	+ 1000	20	22	- 50	105
1076-64	16	2.7	0.9	0.04	20	10	10	47	1.4	0.33	359	+ 1000	- 10	21	168	215
1077-64	20	3.1	1.3	0.07	50	13	16	67	4.2	0.31	535	+ 1000	11	16	71	163
1078-64	17	3.0	1.8	0.07	260	13	32	52	4.0	0.27	394	933	30	16	- 50	133
1079-64	26	5.2	1.9	0.08	68	21	26	79	3.4	0.31	446	550	17	20	- 50	110
1080-64	29	3.0	1.6	0.04	28	16	18	87	3.1	0.39	530	+ 1000	13	17	78	140
1081-64	20	3.7	1.4	0.07	77	17	30	38	3.5	0.33	467	741	13	19	62	165
1082-64	25	3.4	1.2	0.05	38	13	24	50	2.7	0.35	476	945	10	15	62	155
1083-64	30	3.6	1.3	0.06	66	15	21	62	2.9	0.32	553	885	10	17	82	133
1084-64	28	5.4	2.2	0.09	100	37	70	120	4.8	0.41	350	560	24	42	115	140
1085-64	25	3.2	1.3	0.05	110	14	38	57	2.4	0.29	384	882	11	16	51	185
1086-64	36	3.8	1.5	0.06	84	18	32	93	3.1	0.32	323	675	15	16	- 50	127
1087-64	23	5.6	2.2	0.08	66	26	35	125	5.0	0.60	470	875	18	19	71	138
1088-64	29	4.0	1.6	0.05	94	18	38	71	3.6	0.30	350	752	14	18	- 50	105
1089-64	18	3.0	1.1	0.04	105	13	30	48	2.7	0.25	440	712	- 10	15	- 50	110
315-65	28	4.0	1.3	0.08	50	13	26	57	2.5	0.45	434	+ 1000	13	22	70	200
316-65	22	4.1	1.3	0.06	68	15	25	69	2.4	0.38	369	936	13	22	72	220
317-65	29	3.6	1.6	0.06	128	16	37	66	2.7	0.28	446	900	12	18	54	170

ANALYSIS OF WATER SAMPLES FROM CORIN DAM
A.C.T.

by

H.R. Lord

The following results were obtained for the analysis of six groundwater samples from Corin Dam, A.C.T. All values are expressed as parts per million unless otherwise stated.

Table 1

Sampling Date 4.2.69.

	1	2	3	4	5	6	7
pH	4.2	4.7	6.3	5.5	6.1	5.9	4.5
Specific conductance at 23°C (micro mho/cm)	683	145	130	85	85	63	412
Ca	44	5	8	4	4	4	26
Mg	34	7	9	6	6	3	20
SO ₄	390	45	22	20	4	0.2	208
Cl	1	2	2	2	2	8	2
Zn	0.74	0.15	<0.05	<0.05	<0.05	<0.05	0.38
Fe	0.2	0.1	0.1	0.1	0.1	0.9	0.4

Sampling Points

Table 2

1. Spring at toe of dam.
2. Leakage in outlet tunnel at 520 feet.
3. Leakage in outlet tunnel at 650 feet.
4. Leakage in outlet tunnel at 770 feet.
5. Leakage in outlet tunnel at 920 feet.
6. Natural spring downstream of gauging weir.
7. Cotter river gauging weir.

ANALYSIS OF WATER SAMPLES FROM CORIN DAM,
A.C.T.

by

A.D. Haldane & H.R.Lord

The following results were obtained for the analysis of 44 (forty four) water samples from Corin Dam, A.C.T. All values are expressed as parts per million unless otherwise stated.

<u>Dam</u>					<u>Abutment</u>			
Chainage (feet)	pH	Sp.cond. (Micromho/cm at 23°C)	Mg	Zn	pH	Sp.cond. (Micromho/cm at 23°C)	Mg.	Zn
340	5.8	67	2.4	0.04	-	-	-	-
375	5.7	46	2.5	0.03	5.6	31	2.0	0.01
425	8.9	204	8.2	0.01	5.2	86	5.0	0.09
470	4.5	168	6.8	0.21	-	-	-	-
485	-	-	-	-	5.0	134	6.9	0.13
520	4.7	145	7.1	0.15	5.3	65	4.1	0.06
560	5.6	65	4.1	0.06	6.1	43	2.2	0.01
575	6.2	138	8.9	0.11	6.2	60	3.4	0.03
590	6.1	146	8.3	0.11	6.4	128	6.9	0.07
647	6.3	109	7.7	0.02	6.3	130	8.5	0.01
678	6.7	106	6.4	0.01	-	-	-	-
725	6.4	123	8.5	<0.01	5.7	62	4.2	<0.01
747	-	-	-	-	6.3	51	3.5	<0.01
770	6.6	129	6.8	<0.01	5.5	85	5.7	0.04
825	6.5	132	7.0	0.01	6.2	93	5.6	0.03
870	6.7	130	6.6	nil	-	-	-	-
920	6.5	128	6.8	<0.01	6.1	85	5.6	0.01
970	6.9	188	8.8	nil	7.2	217	8.3	<0.01
1020	7.1	180	8.2	<0.01	6.8	153	7.5	<0.01
1055	7.2	173	7.9	0.01	7.0	180	8.2	<0.01
1100	7.0	216	9.7	0.02	7.2	226	9.9	0.01
1120	-	-	-	-	7.9	246	10.6	0.01
1153	6.9	196	8.2	<0.01	6.9	180	7.8	<0.01
1210	6.4	114	6.5	0.01	6.4	108	5.6	nil
1270	6.4	104	5.6	nil	6.1	55	3.4	0.01
1340	6.5	77	4.9	<0.01	-	-	-	-

Sampling date 4/2/69.

ZINC CONTENT OF MOLONGLO RIVER WATER

by

H.R. Lord

The following results were obtained for the determination of the zinc content of nine water samples from the Molonglo and Queanbeyan Rivers collected on 4/2/69, and submitted by Mr. M. Elliott of the Department of the Interior.

Location	p.p.m. Zinc Total
A	0.03
B	31
C	55
D	15.3
D2	0.58
E	0.04
F	0.49
G	0.03
H	0.02

The sampling points are as follows:

- A. Molonglo River 5 miles upstream from Lake George Mine.
- B. Molonglo River immediately downstream from Lake George Mine
- C. Molonglo River at Hoskinstown-Bungendore Road turnoff.
- D. Molonglo River at the 11 mile turnoff.
- D2. Molonglo River at Burbong Bridge.
- E. Queanbeyan River at Queanbeyan.
- F. Molonglo River at Sutton - Queanbeyan Road Bridge,
- G. Molonglo River at Duntroon Bridge.
- H. Lake Burley Griffin.

PHOSPHORUS CONTENT OF SHELF SEDIMENTS, NORTH WESTERN
AUSTRALIA

by A.D. Haldane and P.M. Rew

The following results were obtained for the determination of P_2O_5 and trace elements on sediment samples from the North West Shelf of Australia. The samples were submitted by H.A. Jones.

Phosphorus was determined by the vanadomolybdate method after hydrofluoric/perchloric acid digestion. Trace elements were determined by atomic absorption spectrophotometry.

Table 1

Sample Number	Latitude	Longitude	P_2O_5 %
K67 113A	13° 16'S	123° 37'E	2.1
114	13 22.5	123 46	2.4
129	13 32	123 51	2.3
133	13 45	123 32	2.4
141	17 51	121 45	0.2
142	17 37	121 40	0.5
156	15 33	122 23	0.5
157	15 23	122 32	0.2
173	14 07	123 12	0.4
174	14 13	122 59	0.1
177	14 46	123 15	0.1
183	14 01	123 02	0.4
184	14 07	122 52	0.3
206	14 59	121 45	0.8
218	15 24	121 11	0.6
227	16 16	120 45	0.5
229	16 29	120 59	0.5
230	16 46	121 03	0.2
232	17 20	121 11	0.2
244	17 51	119 11	1.4
246	17 27	120 53	0.3
247	17 13	120 50	0.7
248	16 58	120 47	0.3
252	17 34	120 22	0.3
* 253	17 54	120 28	0.2
259	17 41	119 26	0.6
261	17 42	119 47	3.0
264	17 22	120 14	3.0
271	14 44	122 16	0.1
274	14 00	123 24	0.2
275	13 32	123 40	1.6
* 256	18 16	119 59	0.2

ANALYSIS OF SAMPLES FROM THE GEORGINA BASIN

by

P.M. Rew and H.R. Lord

The following results were obtained for the determination of P_2O_5 and trace elements on samples from the Georgina Basin, submitted by F.de Keyser.

Phosphorus was determined by the vanado-molybdate method after hydrofluoric/perchloric acid digestion. Trace elements were determined by atomic absorption spectrophotometry. Values are expressed as parts per million unless otherwise stated.

Sample	$P_2O_5\%$	Ni	Co	Cu	Cr	Mn	Zn	Cd	Pb
GP 72	37.4	88	15	15	33	2750	300	7	185
74A	29.3	13	3	10	28	355	600	3	80
74C	3.0	90	58	15	10	55,000	2,100	7	nil
74D	34.8	5	3	10	13	300	975	5	25
75A	15.2	5	3	3	45	150	123	1	25
75B	10.7	13	5	18	28	380	213	1	30
75C	4.7	110	270	130	210	24,250	2,500	11	10
90	32.2	48	15	15	40	770	150	1	25
93	26.0	18	3	45	50	490	143	11	470
95	34.3	8	3	15	38	670	38	nil	5
97A	37.9	30	10	3	28	2,630	150	nil	15
97B	28.5	40	10	3	40	1,320	200	1	55
120A	36.2	38	18	48	15	3,700	400	2	115
120B	36.4	10	5	10	20	580	190	1	120
121	0.5	30	40	153	55	350	300	1	15
143	35.2	25	10	8	13	3,700	775	1	25
Mt.O ₂	31.5	23	13	5	13	3,400	200	2	120

Alroy B.M.R. 1.

85'-90' 3.6

200-205' 0.2.

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by H. R. Lord

The following results were obtained for the analysis of four groundwater samples from Corin Dam, A.C.T. All values expressed as parts per million unless otherwise stated.

Table 1

Sampling date 7-2-69

	1	2	3	4
pH	6.1	6.7	6.0	6.0
Specific conductance at 23°C (micromho/cm)	48	155	73	130
Ca	4.6	16.5	3.6	1.3
Mg	1.9	7.7	2.9	4.5
SO ₄	11	14	6	9
Cl	2	2	7	11
Zn	Nil	Nil	Nil	Nil
Fe	Nil	0.7	1.1	Nil

Table 2: Sampling points

1. Leakage in outlet tunnel at 560' - abutment
2. Leakage in outlet tunnel at 1055' - dam
3. Natural spring downstream of gauging weir
4. Quartzite spring

ANALYSIS OF VARIOUS WATER SAMPLES

by H. R. Lord

The following results were obtained for the analysis of two water samples from Lake McKenzie and Lake Windemere (A.C.T.) submitted by G.M. Burton and one water sample from Kimberley Research Station, submitted by Dr P.C. Owen.

	Lake Windemere		Lake McKenzie		Kimberley Research Station	
pH	5.8		6.0		8.0	
Specific conductance at 23°C (micromho/cm)	181		243		1260	
Total dissolved solids at 180°C	94 ppm		129 ppm		775 ppm	
	ppm	me/lt	ppm	me/lt	ppm	me/lt
Ca	1.2	0.059	7.1	0.353	4.4	2.198
Mg	4	0.301	5	0.407	28	2.320
Na	32	1.390	37	1.610	180	7.840
K	0.8	0.021	2.6	0.067	2.2	0.057
Total cations		1.771		2.437		12.415
HCO ₃		0.086		0.138		8.96
CO ₃		-		-		-
Cl	49	1.38	64	1.80	115	3.21
SO ₄	5.2	0.108	9.1	0.188	27.2	0.566
SiO ₂	8		9		79	
Total anions		1.574		2.126		12.736

Zn/Cu CONTENT OF SOILS FROM THE CANBERRA AREA.

by

H.R. Lord.

The following results were obtained for the analysis of fourteen (14) soil samples from Canberra area. Samples were submitted by Mr. Russell, Department of the Interior.

Cu and Zn contents were determined by atomic absorption spectrophotometry following -

- (1) digestion with concentrated HCl, and
- (2) equilibration for one week with 1% ammonium citrate at pH7.

Table 1.

	Total		Citrate extractable.	
	Zn ppm.	Cu ppm.	Zn ppm.	Cu ppm.
1.	54	14	7	3
2.	55	17	6	3
3.	35	9	6	5
4.	37	9	8	5
5.	94	14	8	3
6.	114	12	9	5
7.	29	9	5	3
8.	323	34	42	5
9.	214	40	13	5
10.	178	41	58	8
11.	3280	174	280	20
12.	256	77	61	8
13.	1390	34	285	3
14.	48	15	7	3

Table 2. Sample localities.

1. Yarralumla Nursery.
2. Yarralumla Nursery
3. Royal Canberra Golf Course.
4. Piallago Nursery ridge top (sand.)
5. Piallago Nursery hollow (silt).
6. Lucerne paddock, Piallago.
7. Cotter plot, Cotter road.
8. Site A above Captains Flat.
9. Site B of Captains Flat.
10. Site C, Bungendore-Hoskinstown Bridge.
11. Foxlow plain.
12. Low level bridge, Hoskinstown Road.
13. Burbong Bridge.
14. Lyons.

ZINC CONTENT OF MOLONGLO RIVER WATER

by

H.R. Lord

The following results were obtained for the determination of the zinc content of nine water samples from the Molonglo and Queanbeyan Rivers, collected on 6/3/69, and submitted by Mr. M. Elliott of the Department of the Interior.

<u>Location</u>	<u>ppm. Zinc(Total)</u>
A	0.02
B	15
C	20
D	46
D2	12
E	0.02
F	0.21
G	0.02
H	0.02

The sampling points are as follows:

- A. Molonglo River 5 miles upstream from Lake George Mine.
- B. Molonglo River immediately downstream from Lake George Mine.
- C. Molonglo River at Hoskinstown-Bungendore Road turnoff.
- D. Molonglo River at the 11-mile turnoff.
- D2. Molonglo River at Burbong Bridge.
- E. Queanbeyan River at Queanbeyan.
- F. Molonglo River at Sutton-Queanbeyan Road Bridge.
- G. Molonglo River at Duntroon Bridge.
- H. Lake Burley Griffin.

MINERAL IDENTIFICATION - RINGWOOD No.3.

by

G. Berryman

Nine (9) samples from the B.M.R. Ringwood No.3 stratigraphic hole, Alice Springs, were submitted by A.J. Stewart for mineral identification.

The samples were analysed by X-Ray Diffraction, using the Philips P.W. 1051 equipment. Table 1 gives the relative intensities of the minerals identified.

Table 1. Order of intensities by X.R.D.

Sample No.	Depth	1st	2nd	3rd	4th
69110002	556'6"	Anhydrite	-	-	-
69110003	560'0"	Quartz	Dolomite	-	-
69110004	560'0"	Anhydrite	Quartz	Dolomite	Gypsum
69110005	635'0"	Anhydrite	Gypsum	Quartz(tr)	-
69110006	653'11"	Anhydrite	Dolomite	Quartz	-
69110007	759'3"	Quartz	Dolomite	Gypsum	Anhydrite (tr).
69110008	763'0"	Dolomite	Gypsum	Quartz	-
69110009	763'0"	Anhydrite	Gypsum	-	-
69110010	814'9"	Anhydrite	Dolomite	Quartz (tr.)	-

ANALYSIS OF WATER SAMPLES FROM
CORIN DAM, A.C.T.

by
H.R. Lord

The following results were obtained for the analysis of 58 water samples from Corin Dam.
All values are expressed as parts per million unless otherwise stated.

Table 1

Sampling date 13.2.69

	1	2	3	4	5	6
pH	3.3	3.6	5.6	5.8	7.0	5.9
Sp.cond.at 23°C (micromho/cm)	2020	1200	64	125	376	71
Ca	108	79	2.5	2.7	64	-
Mg	87	49	3.2	5.1	11	1
Na	5.2	5.0	4.4	17.1	-	-
Cl	5	3.6	7.1	11.1	7.2	10.3
SO ₄	1330	848	7	12.7	72	7
HCO ₃	Nil	Nil	18.3	45.5	-	-
Fe	18.9	6.2	1.2	-	0.2	1.6
Mn	51.4	29.2	0.1	-	0.2	0.1
Zn	4.68	2.50	-	-	0.02	-

Table 2

Sampling points.

1	Site 1 - spring at toe of dam
2	Cotter river water
3	Site 6 - spring below gauging weir
4	Quartzite spring
5	Spring A - toe of spoil fill
6	Spring B - 100 ft downstream of Site 6.

Table 3

Corin Dam Outlet Tunnel.

Leakage along eastern wall, sampled 13.2.69

Chainage	pH	Sp. Cond	Ca	Mg	Na	Cl	SO ₄	HCO ₃	Fe	Mn	Zn
340					No sample						
377	5.2	31	2	2	2	2	1	14	Nil	Nil	0.02
390					No sample						
424	5.4	86	13	5	2	2	25	26	Nil	0.8	0.13
470					No sample						
485	4.9	117	8	7	3	3	43	1	Nil	1.3	0.13

Table 3 (contd)

2

Chainage	pH	Sp. Cond	Ca	Mg	Na	Cl	SO ₄	HCO ₃	Fe	Mn	Zn
527	5.1	64	4	4	2	2	20	3	Nil	0.5	0.06
560	6.0	51	4	3	2	2	12	8	Nil	0.3	0.04
575	5.5	56	4	3	2	2	13	9	Nil	0.3	0.04
590	5.5	94	9	5	2	2	34	2	Nil	1.3	0.11
645	6.2	121	11	7	4	2	27	39	Nil	0.3	0.01
678				No		sample					
724	5.4	75	8	5	2	2	20	9	Nil	0.3	0.04
745	5.7	55	4	4	2	2	10	17	Nil	0.1	0.06
770	5.4	95	6	7	2	2	29	11	Nil	0.7	0.08
818	5.9	103	9	7	4	2	24	28	Nil	0.4	0.06
868	6.4	91	15	3	2	2	6	49	Nil	Nil	0.04
925	6.0	78	11	4	4	2	7	39	Nil	Nil	0.02
970	7.2	201	23	8	11	2	13	120	0.5	0.1	0.02
1018	6.6	139	9	7	8	2	14	72	0.1	0.1	0.01
1056	6.8	177	11	9	17	3	10	101	1.2	0.2	0.01
1098	6.8	221	13	10	22	3	11	135	1.4	0.1	0.01
1153	6.7	172	14	8	12	3	10	94	0.5	0.1	0.01
1215	6.1	114	11	6	6	2	15	57	0.1	0.1	0.02
1266	5.9	55	6	4	2	2	9	26	Nil	Nil	0.01
1330				No		sample					

Table 4

Corin Dam Outlet Tunnel.

Leakage along western wall, sampled 13.2.69

Chainage	pH	Sp. Cond	Ca	Mg	Na	Cl	SO ₄	HCO ₃	Fe	Mn	Zn
340	5.7	47	6	2	2	2	6	20	Nil	0.1	0.04
377	5.3	43	5	2	1	2	8	10	Nil	0.1	0.03
390	5.5	40	6	3	2	2	3	19	Nil	Nil	0.02
424	5.5	110	9	6	3	2	37	9	Nil	0.9	0.08
470	4.3	147	7	6	3	2	63	Nil	Nil	2.4	0.20
485				No		sample					
527	4.6	128	4	7	3	4	49	Nil	Nil	1.8	0.16
560	5.2	63	4	4	2	2	22	2	Nil	0.6	0.05
575	5.3	117	7	8	2	2	44	2	Nil	1.3	0.11
590	5.5	128	12	6	2	2	51	1	Nil	1.9	0.14
645	5.9	98	9	6	3	2	22	29	Nil	0.1	0.02
678	6.0	111	12	5	3	2	28	28	Nil	0.2	0.04
724	6.0	118	10	6	5	2	24	42	Nil	0.1	0.02
745				No		sample					
770	6.4	164	13	7	11	2	20	79	Nil	0.1	0.02
818	5.9	174	12	11	7	4	44	40	Nil	0.8	0.11
868	6.5	94	14	7	8	2	9	72	Nil	Nil	0.01
925	6.3	127	20	5	9	3	9	70	Nil	Nil	0.03
970	6.7	180	13	9	14	3	13	101	0.5	0.1	0.02
1018	6.7	171	9	8	17	2	11	99	0.9	0.2	Nil
1056	6.6	168	10	9	15	3	11	101	2.1	0.2	Nil
1098	6.9	210	13	10	20	3	13	121	2.0	0.1	Nil
1153	6.7	189	11	8	19	3	10	112	1.0	0.1	0.01
1215	6.2	106	8	7	6	2	14	52	Nil	0.1	0.01
1266	6.2	99	6	6	7	2	15	46	0.05	Nil	0.05
1330	5.9	76	5	5	4	2	13	30	Nil	Nil	0.02

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by

H.R. Lord

The following results were obtained for the analysis of ten groundwater samples from Corin Dam, A.C.T. All values are in parts per million unless otherwise stated.

Table 1.

Sampling date 6/3/69

	1	2	3	4	5	6	7	8	9	10
pH	3.8	4.6	6.5	5.7	6.4	6.1	6.8	6.2	6.7	4.5
Specific conductance at 23°C (micromho/cm)	725	115	124	79	76	65	163	118	116	463
Ca	59.0	11.0	9.0	5.8	11.2	4.0	13.6	4.6	8.0	40.0
Mg	26.1	4.0	7.2	4.3	3.6	2.5	5.6	4.1	4.5	18.6
Na	8.2	2.8	4.5	2.8	5.0	5.2	16.9	17.1	8.6	6.5
Cl	2	1	2	1	2	7	2	11	2	2
SO ₄	317	48.2	28.0	24.5	7.0	4.3	10.5	10.7	18.7	262
HCO ₃	nil	nil	46.0	13.4	41.5	24.4	99.7	48.8	47.1	nil
Fe	0.7	nil	nil	nil	nil	1.3	0.5	nil	0.3	0.7
Mn	18.5	1.9	0.2	0.3	nil	nil	0.1	nil	0.3	9.6
Zn	0.96	0.13	nil	0.10	0.02	<0.02	nil	0.04	<0.02	0.57

Table 2. Sampling points

1. Spring at toe of dam
2. Outlet tunnel 527' W
3. Outlet tunnel 645' E
4. Outlet tunnel 770' E
5. Outlet tunnel 925' E
6. Spring below weir
7. Outlet tunnel 1018' W
8. Quartzite spring
9. Tunnel outlet
10. Cotter River at weir

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by

H.R. Lord

The following results were obtained for the analysis of three groundwater samples from Corin Dam, A.C.T. All values are in parts per million unless otherwise stated.

Table 1.

Sampling date 14/3/69

	1	2	3
pH	3.7	6.6	4.4
Specific conductance at 23°C (micromho/cm)	640	114	424
Ca	30.6	8.6	24.6
Mg	39.0	6.7	24.5
Na	5.4	8.0	5.8
Cl	3.0	2.7	2.7
SO ₄	393	23.2	207
HCO ₃	nil	47.2	nil
Fe	0.3	0.4	0.4
Mn	14.5	0.4	8.5
Zn	3.70	0.01	2.35

Table 2. Sampling points

1. Spring at toe of dam
2. Tunnel outlet
3. Gauging weir

ANALYSIS OF MISCELLANEOUS PHOSPHATE SAMPLES

by

H.R. Lord

The following results were obtained for the analysis of four phosphate samples, submitted by F. de Keyser. P_2O_5 was determined by phospho-vanadomolybdate method after digestion with perchloric acid.

Samples	% P_2O_5
1. Duchess area (repeat test)	37.7
2. Alroy B.M.R. No. 3	7.1
3. Ranken No. 1 150' - 155'	1.3
4. Tomakin Point, Narooma district N.S.W. 19	

ZINC CONTENT OF MOLONGLO RIVER WATER

by

H.R. Lord

The following results were obtained for the determination of the zinc content of nine water samples from the Molonglo and Queanbeyan Rivers collected on 2/4/69, and submitted by Mr. M. Elliott of the Department of the Interior.

<u>Location</u>	<u>ppm Zinc (total)</u>
A	<0.02
B	13
C	15
D	25
D ₂	10
E	0.02
F	0.16
G	0.03
H	0.02

The sampling points are as follows :-

- A Molonglo River 5 miles upstream from Lake George Mine
- B Molonglo River immediately downstream from Lake George Mine
- C Molonglo River at Hoskintown-Bungendore Rd. turnoff
- D Molonglo River at the 11 mile turnoff
- D₂ Molonglo River at Burbong Bridge
- E Queanbeyan River at Queanbeyan
- F Molonglo River at Sutton-Queanbeyan Rd bridge
- G Molonglo River at Duntroon bridge
- H Lake Burley Griffin

SPECTROGRAPHIC ANALYSIS OF SAMPLES FROM EVAPORITE
DRILLING AT RINGWOOD DOME, ALICE SPRINGS, N.T.

by

J. Weekes

Samples submitted by D.J. Foreman on 15/1/69. Semi-quantitative analysis for K and B.

	K	B
68090 175	< 0.5%	50 ppm
176	1.0 - 0.5%	1600 ppm
177	< 0.5%	50
178	< 0.5%	50
179	< 0.5%	100
180	< 0.5%	30
181	< 0.5%	50
182	< 0.5%	30
183	< 0.5%	50
184	< 0.5%	30
185	< 0.5%	50
186	< 0.5%	16
187	< 0.5%	50
188	< 0.5%	100
189	< 0.5%	160
190	< 0.5%	300
191	< 0.5%	50
192	< 0.5%	100
193	< 0.5%	500
194	< 0.5%	160
195	< 0.5%	100
196	< 0.5%	160
197	< 0.5%	50
198	< 0.5%	< 16
68090 199	< 0.5%	50

Small white deposits in some samples were high in Ca - presumably gypsum.

ANALYSIS OF CARBONATE ROCKS FROM THE
VICTORIA RIVER AREA, WESTERN AUSTRALIA

by

H.R. Lord

The following results were obtained for the analysis of 40 (forty) carbonate rock samples from Victoria River Area, submitted by I. Sweet.

After digestion with cold 2N HCl, Mg was determined by atomic absorption spectrophotometry, Ca + Mg by titration with E.D.T.A., and insoluble residue gravimetrically after ignition at 800°C.

Fe, Cu, Ni, Pb, Zn, Mn, were determined by atomic absorption spectrophotometry after digestion with concentrated HCl.

Table 1

Sample	% Ca	% Mg	Ca/Mg	% insoluble residue	% FeCO ₃
68770225	21.5	11.2	1.16	7.5	
0219	22.0	10.7	1.25	9.7	
0220	7.8	12.5	0.38	20.5	8.3
0217	21.8	10.7	1.24	8.9	
0073D	11.5	11.7	0.59	21.8	6.2
0231	30.8	1.9	10.1	16.5	
0228A	22.2	10.6	1.27	7.9	
0232	20.5	7.5	1.67	12.6	6.4
0934B	9.6	5.1	1.14	57.3	
0213	36.2	1.1	36.2	6.7	
0214	21.6	11.1	1.19	7.9	
0068	6.7	2.7	1.57	74.7	
0218B	23.2	11.4	1.24	2.5	
0229	23.9	10.1	1.44	7.4	
0221	12.2	6.2	1.19	48.2	
0234A	11.3	5.5	1.24	52.4	
0238	35.5	2.8	7.9	1.5	
0233	18.0	8.7	1.22	24.8	
0235	19.2	11.3	1.03	9.2	
0073B	19.7	9.3	1.29	17.4	
0230A	25.8	1.7	9.3	28.7	
0222	17.9	11.1	1.32	3.1	

Table 1 (Cont.)

Sample	% Ca	% Mg	Ca/Mg	% Insoluble residue	% FeCO ₃
68770064	6.8	2.9	1.43	71.8	
0228B	39.1	0.5	120.0	2.2	
0212	21.3	10.7	1.20	10.1	
0223	18.7	11.0	1.03	11.0	
0239	20.1	7.5	1.53	25.5	3.0
0215	19.4	10.8	1.09	14.2	
0224	23.3	11.2	1.26	5.0	
0218A	22.5	10.7	1.28	8.7	
0230	32.9	0.8	27	15.7	
0230B	25.3	0.4	41	34.3	
0216	20.9	10.1	1.31	9.8	
0070	21.2	9.2	1.39	8.9	7.1
0237	7.9	4.1	1.18	66.8	
0226	23.3	10.7	1.35	6.1	
0067	10.6	5.8	1.26	55.6	
0227	25.1	10.6	1.44	7.4	
0230D	14.2	8.2	1.23	29.2	
0236	30.3	0.6	32	22.6	

%FeCO₃ soluble in 2N HCl does not represent the total Fe content of the sample.

Trace element analysis.

Sample	Fe %	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Mn ppm
68770225	0.475	8	20	8	27	575
0219	0.688	8	0	8	11	625
0220	10.3	8	20	10	9	5320
0217	0.363	13	15	3	22	663
0073	11.8	10	8	30	18	5800
0231	0.725	10	8	10	13	550
0228A	1.215	8	5	20	10	600
0232	5.38	5	3	0	8	2513
0934B	0.99	8	8	13	15	300
0213	0.25	8	3	18	5	100
0214	0.525	8	5	8	9	263
0068	1.325	8	15	15	21	650
0218B	0.562	18	13	0	11	313

Trace element analysis:(Cont.)

Sample	Fe %	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Mu ppm
68770229	1.525	10	0	23	15	1260
0221	0.588	5	13	0	10	150
0234A	0.562	5	10	0	12	300
0238	0.300	5	13	5	57	275
0233	1.425	20	10	3	52	700
0235	0.225	3	3	3	7	375
0073	1.85	8	10	3	22	1975
0230A	1.79	8	13	126	19	625
0222	0.475	5	5	10	4	198
0064	1.085	133	13	15	14	1090
0228B	0.188	5	10	13	9	213
0212	0.50	5	8	8	9	263
0223	0.88	10	5	3	33	525
0239	2.00	5	8	5	21	3080
0215	0.40	3	0	5	9	263
0224	0.75	10	3	0	39	663
0218A	0.463	10	5	13	8	313
0230	0.40	5	3	3	18	2750
0230B	0.875	8	5	33	39	500
0216	0.475	8	10	3	14	563
0070	6.62	5	13	0	13	4825
0237	0.89	5	10	5	13	238
0226	0.338	5	18	18	23	350
0067	0.914	5	20	0	78	213
0227	1.40	10	0	30	60	413
0230D	0.50	5	25	10	10	213
0236	0.764	5	15	8	11	625

QUALITATIVE ELECTRON PROBE INVESTIGATION OF
FOUR PHOSPHATE SAMPLES FROM THE DUCHESS AREA,
QUEENSLAND.

by

R.N. England

Four polished thin sections of phosphate rock were submitted by F.de Keyser for identification of two unknown minerals and for the investigation of zoning and composition of phosphate pellets.

Determination of Unknown Minerals

Sample 68631077:

The mineral in question is optically positive with moderate birefringence and appears to be replacing phosphate pellets in optically continuous ovoid grains. The major elements are Ca and P with a very small amount of Fe and no Al, K, S, or heavy elements.

The Ca and P concentrations in this mineral are almost identical to those in the isotropic pellets. Both have 5-10% less Ca and P than igneous apatites.

Sample 68631075:

The unknown mineral has a low birefringence, two good cleavages and a high electron backscattering power, indicating a high mean Z. It is present as a cement between pellets in some regions. The major elements are Ba and S with minor amounts of Ca. It is almost certainly barite.

Zoned Pellets

Sample 68631075

Some pellets can be divided into two zones, a brown central one, usually with numerous dark inclusions, and an outer transparent zone.

Zoning was investigated by scanning the electron beam across a pellet. The pellet examined was elliptical in section with major and minor axes about 60 to 40 microns.

Distribution of elements:

Fe is present in small concentrations in the central zone and is probably confined to the inclusions. It is also confined to the central zone and is distributed irregularly through it. It is present in probably higher concentrations than Fe. Only the comparatively rare pellets with this distinct zonal structure contain measurable amounts of Fe and Al.

P has an irregular distribution within the pellet but has a distinctly higher concentration in the outer rim.

Si is present in this grain only in inclusions.

Sample 6863a080:

Many zoned spherical bodies in this specimen are composed of cryptocrystalline or amorphous material with holocrystalline cores and rims. The cores and rims appear to be the same mineral, with moderately high relief and moderate birefringence. Those grains in the core are high in Al, P and Fe, while those in the rim are high in P and Al and low in Fe. They could be different members of a solid solution series. In the amorphous or cryptocrystalline region between the core and the rim there are patches with high P and Al and a few small patches with high Ca. Fe decreases from core to rim, with relatively large amounts in the core, quite small amounts in the cryptocrystalline or amorphous region, and even smaller amounts in the rim.

Sample 68631078:

The isotropic pellets contain small amounts of Fe with moderate amounts of Al and Si, moderately large amounts of P and no Ca. They have a significantly lower refractive index than the chert matrix.

PHOSPHATE ANALYSIS OF IRON OXIDE DEPOSITS
IN THE CORIN DAM TUNNEL

by

C.W. Claxton

Samples of iron oxide deposits in the Corin Dam tunnel were submitted on 11th April, 1969, by A.D. Haldane, to determine the phosphate content.

Phosphate as P_2O_5 was determined on the solutions obtained from the perchloric acid digestion of the dried material by the ammonium vanadate-molybdate colormetric method.

<u>Location</u>	<u>% P_2O_5</u>
590 feet W.	3.6
645 " W	0.8
970 " W	5.0
1018 " W	9.7
1056 " W	8.0
1100 " W	6.7
1120 " W	5.9
1153 " E	4.5

ANALYSIS OF WATER SAMPLES FROM CORIN DAM,
A.C.T.

by

H.R. Lord

The following results were obtained for the analyses of ten (10) groundwater samples from Corin Dam, A.C.T. All values are in parts per million unless otherwise stated.

Table 1. Sampling date 2.4.69.

	1	2	3	4	5	6	7	8	9	10
pH	3.6	4.6	6.1	5.3	5.6	5.9	6.2	5.6	5.9	5.8
specific conductance at 23°C (micromho/cm)	1058	117	114	95	105	74	160	62	118	85
Ca	35	11	6	6	9	5	12	3	5	4
Mg	61	7	9	7	8	6	8	4	6	4
Na	5	2	4	2	5	4	16	6	19	12
Cl	2	1	1	2	2	2	2	13	9	9
SO ₄	810	50	24	32	29	8	10	4	9	7
HCO ₃	nil	nil	42	12	31	40	92	21	51	35
Fe	1.5	0.4	nil	nil	nil	nil	0.4	1.3	0.2	1.7
Mn	28.0	2.2	0.6	1.1	1.2	nil	0.3	0.3	nil	1.1
Zn	2.1	0.15	0.03	0.10	0.06	0.01	nil	0.01	nil	nil

Table 2. Sampling Points

1. Spring at toe of dam
2. Outlet tunnel 527 feet W.
3. Outlet tunnel 645 feet W.
4. Outlet tunnel 770 feet E.
5. Outlet tunnel 818 feet E.
6. Outlet tunnel 925 feet E.
7. Outlet tunnel 1056 feet W.
8. Spring below weir.
- 9 and 10. Quartzite spring.

Table 3. milli-equivalents per litre

	1	2	3	4	5	6	7	8	9	10
Ca	1.74	0.54	0.32	0.29	0.47	0.26	0.58	0.13	0.27	0.18
Mg	5.02	0.54	0.75	0.59	0.64	0.49	0.66	0.30	0.48	0.32
Na	0.22	0.07	0.16	0.10	0.20	0.19	0.70	0.26	0.80	0.52
Total cations	6.98	1.15	1.23	0.98	1.31	0.94	1.94	0.69	1.55	1.02
Cl	0.06	0.03	0.03	0.07	0.07	0.05	0.07	0.37	0.27	0.25
SO ₄	16.90	1.04	0.50	0.67	0.60	0.17	0.21	0.09	0.19	0.15
HCO ₃	nil	nil	0.68	0.20	0.50	0.65	1.52	0.34	0.84	0.58
Total anions	16.96	1.07	1.21	0.94	1.17	0.87	1.80	0.80	1.30	0.98

PHOSPHATE ANALYSIS OF ROCK SAMPLES FROM
MOUNT O'CONNOR AND ALEXANDRIA HOMESTEAD
AREAS, WESTERN AUSTRALIA AND NORTHERN TERRITORY

by

C.W. Claxton

The following samples were submitted by F. deKeyser on 11th and 22nd April, 1969, for phosphate analysis.

Phosphate as P_2O_5 was determined on the solutions obtained from the perchloric acid digestion of the crushed material by the ammonium vanadate-molybdate colorimetric method.

<u>Sample No.</u>	<u>Location</u>	<u>% P_2O_5</u>
G.P. 126	East of Ridge Pole Copper prospects, halfway between Lawn Hill and Northern Territory Border Water Hole, Mount O'Connor Area.	0.3
121	Mount O'Connor Area	0.6
106	Area north of Alexandria Homestead, Northern Territory.	0.4

MINERAL IDENTIFICATION

by

G. Berryman

One sample from Mollymook. N.S.W. was submitted by J. N. Casey for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cu K α
R.M. 4	Mult. 1	T.C. 4
Chartspeed 1°	20/min	Disc Ch. 12
Slits $\frac{1}{4}$ ° & 1°	div. $\frac{1}{4}$ & 1°	rec-filter Ni

The determination was made by comparing the unknown pattern with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
1	Quartz	Kaolinite	Chlorite	Muscovite		

MINERAL IDENTIFICATION

by

G. Berryman

Fifteen (15) samples from Bloods Range, N.T., were submitted by D.J. Forman for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube CuK α
R.M. 2 & 4	Mult 1	T.C. 4
Chart speed 1° 20/min		Disc. Ch. 12
Slits $\frac{1}{4}$ ° & 1°	div. $\frac{1}{4}$ ° & 1°	rec-filter Ni.

The determinations were made by comparing the unknown pattern with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
BR. 202.68090031	Hematite	Quartz				
" 202. " 31B	Quartz	Chlorite	Muscovite			
" 210. " 13	Quartz	Hematite	Muscovite			
" 210. " 13B	Quartz	Hematite				
" 212A " 9	Quartz	Muscovite	Hematite			
" 212A " 9H	Quartz	Hematite	Muscovite			
" 212A " 9LA	Quartz	Hematite	Muscovite			
" 213. " 3	Quartz	Muscovite	Kyanite	Chlorite		
" 215. " 43	Quartz					
" 216. " 42	Quartz					
" 217. " 41	Quartz	Hematite	Tourmaline			
" 218. " 45	Hematite	Quartz				
" 218. " 45B	Quartz	Hematite	Tourmaline			
" 221. " 40	Quartz					
" 222A " 38	Quartz	Muscovite				

MINERAL IDENTIFICATION

by

G. Berryman

Nine (9) samples from Ayers Rock, Northern Territory, were submitted by D.J. Forman for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube CuK α
R.M. 2 & 4	Mult. 1	T.C. 4
Chartspeed 1°20/min.		Disc. Ch. 12
Slits $\frac{1}{4}$ ° & 1°, div. $\frac{1}{4}$ ° & 1°		Rec-filter. Ni

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
AR.160.68090048	Quartz	Muscovite	Hematite			
AR.160. " 48B	Hematite	Quartz	Muscovite			
" 161. " 49	Muscovite	Quartz				
" 162. " 50	Muscovite	Quartz				
" 162. " 50B	Hematite	Muscovite				
" 162. " 51	Quartz	Kyanite	Hematite	Muscovite		
" 162 " 51	Quartz	Hematite				
" 163 " 52	Muscovite	Quartz				
" 163 " 52B	Hematite	Quartz				

MINERAL IDENTIFICATION

by

C. Berryman

Fifty-two (52) samples from the Petermann Ranges, N.T. were submitted by D.J. Forman for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Phillips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube CuK α
R.M. 2 & 4	Mult 1	T.C. 4
Chartspeed 1°20/min		Disc. Ch. 12
Slits $\frac{1}{4}$ ° & 1°, Div. $\frac{1}{4}$ ° & 1°, rec-filter Ni		

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
PR 34	Muscovite	Quartz				
"101.68090024	Quartz	Muscovite	Kyanite			
PR102. " 25	Quartz	Muscovite	Hematite	Kyanite	Pyrophyllite	Kaolinite
"110. " 01	Quartz	Muscovite	Chlorite			
"114. " 30	Quartz	Muscovite	Hematite			
"123. " 12	Quartz	Kyanite	Hematite			
"124. " 02	Quartz	Kyanite	Hematite	Muscovite		
"126. " 04	Quartz	Muscovite	Pyrophyllite	Kyanite	Hematite	Tourmaline
"126. " 04	Hematite					
"134. " 58	Muscovite	Quartz				
"138. " 60	Quartz	Muscovite	Chlorite			
"141. " 61	Quartz					
"144. " 62	Quartz	Muscovite	Hematite			
"145. " 64A	Quartz	Muscovite				
"145. " 64B	Quartz	Muscovite	Hematite			
"145. " 64C	Hematite	Muscovite	Zircon			
"147. " 65	Muscovite	Quartz				
"147. " 55B	Hematite	Quartz				
"150. " 67	Muscovite	Quartz	Chlorite			
"151. " 65	Muscovite	Quartz				
"153. " 69	Phlogopite	Quartz				
"153. " 69	Muscovite	Quartz				
"154. " 70	Quartz	Muscovite	Hematite			
"154. " 70	Hematite	Kyanite	Quartz			
"156. " 71A	Quartz	Muscovite	Tourmaline	Hematite		
"156. " 71	Quartz	Hematite	Kyanite	Muscovite		
"156. " 71	Quartz	Tourmaline	Muscovite	Hematite		
"156. " 71	Hematite	Quartz	Tourmaline			
"157. " 27	Quartz					
"159. " 74	Muscovite	Quartz	Kyanite	Chlorite		
"160. " 15	Quartz	Kyanite	Hematite	Tourmaline		
"162. " 16X	Quartz	Chlorite				

Sample No.		1	2	3	4	5	6
PR164.68090075		Muscovite	Quartz	Chlorite	Kyanite		
"165.	" 77	Quartz	Muscovite	Chlorite			
"165.	" 77	Quartz	Muscovite	Chlorite			
"166.	" 78	Quartz	Muscovite				
"166.	" 79A	Quartz	Staurolite	Muscovite			
"166.	" 79B	Quartz	Muscovite	Staurolite			
"166.	" 79C	Staurolite	Quartz				
"166.	" 79D	Quartz	Staurolite	Tourmaline			
"168.	" 82	Muscovite					
"169.	" 83B	Quartz	Hematite	Muscovite			
"169.	" 83X	Quartz	Muscovite	Hematite			
"169.	" 84	Quartz	Muscovite	Tourmaline			
"169.	" 84	Muscovite	Tourmaline	Quartz			
"170.	" 85	Muscovite	Quartz				
"170.	" 86	Hematite	Quartz				
"170.	" 86X	Quartz	Kyanite	Hematite	Muscovite	Tourmaline	
"171.	" 81	Quartz	Tourmaline				
"172.	" 88	Muscovite	Quartz	Chlorite			
"172.	" 88	Hematite	Quartz				
"173.	" 32	Muscovite	Quartz	Chlorite	Tourmaline		

ANALYSES OF SHALES AND SILTSTONESFROM EAST KIMBERLEY

by

T.I. Slezak

One hundred and eighty samples of shales and siltstones from East Kimberley, submitted by T. Quinlan, were analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for the following elements: Cu, Mn, Cr, Ni, V, Ti, Sr, Ba, Sc, Y, and La.

The samples were received as chips ex 4" jaw-crusher, and reduced to -120 mesh in a Siebtechnik mill using a tungsten carbide vessel. This type of vessel introduces W and some Co as metallic contaminants to the samples.

The analytical method used was adapted from Ahrens and Taylor ("Spectrochemical Analysis", 1961, p. 189, Addison-Wesley Publishing Company). One part of sample was mixed with two parts of graphite (National Carbon Company Type L4160 Grade SP-2). The mix was loaded into a preformed graphite electrode (National Carbon Company Type L4260) and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal standard and rock standard control were used. On previous experience with this method for the analysis of similar materials it is estimated that the values given for elements are within 10% of the true values.

Sample No.	Ba ppm	Sc ppm	Y ppm	La ppm
67990001	335	16	50	125
2	345	17	35	100
3	62	10	25	76
4	580	22	51	120
5	380	14	47	135
6	600	19	34	120
7	590	16	34	80
8	460	15	40	107
9	490	17	44	104
10	440	14	45	108
11	460	16	43	109
12	420	19	50	123
13	510	20	50	144
14	310	15	40	100
15	1200	15	60	145
16	380	19	33	90
17	590	15	53	120
18	440	17	38	116
19	640	17	37	105
20	420	20	54	138
21	320	17	42	105
22	1100	17	70	92

Lab. Report No. 39 (cont.)

Sample No.	Ba ppm	Sc ppm	Y ppm	La ppm
67990023	420	12	37	75
24	320	13	38	105
25	300	12	36	84
26	180	12	33	85
27	490	19	70	160
28	860	20	47	185
29	105	18	36	100
30	680	16	38	100
31	600	19	38	137
32	260	15	38	110
33	290	16	36	85
34	400	14	33	95
35	320	12	34	100
36	320	14	42	135
37	520	15	38	94
38	430	16	39	110
39	450	22	52	140
40	460	18	39	105
41	620	17	39	110
42	270	18	37	93
43	245	15	57	145
44	385	16	36	105
45	545	19	47	140
46	300	14	45	120
47	710	23	46	205
48	360	16	38	115
49	270	15	43	115
50	390	15	48	140
51	590	21	55	218
52	570	20	62	184
53	310	13	39	105
54	350	14	33	77
55	310	12	33	80
56	600	92	60	70
57	450	17	34	97
58	390	19	42	126
59	490	17	42	103
60	660	16	38	99
61	450	17	29	88
62	470	18	32	100
63	360	12	21	61
64	640	17	40	105
65	360	11	34	82
66	430	15	37	88
67	290	13	37	100
68	560	14	37	90
69	350	15	35	75
70	470	17	38	94

Lab. Report No. 39 (cont.)

Sample No.	Ba ppm	Sc ppm	Y ppm	La ppm
67990071	650	17	35	75
72	350	17	39	103
73	580	19	34	83
74	480	16	41	103
75	620	16	29	76
76	480	11	38	87
77	500	16	38	90
78	310	21	44	110
79	500	24	47	130
80	580	17	34	90
81	500	15	33	66
82	340	11	42	110
83	420	15	38	98
84	260	10	32	72
85	550	14	40	98
86	1700	11	48	110
87	440	13	53	110
88	420	18	42	110
89	430	17	44	120
90	570	15	44	100
91	580	16	40	110
92	580	16	48	105
93	480	18	56	145
94	550	18	41	130
95	420	16	52	127
96	660	20	43	150
97	470	16	44	115
98	520	20	80	125
99	640	19	45	97
100	580	18	45	108
101	580	18	44	110
102	650	19	48	130
103	510	16	39	105
104	340	14	53	127
105	460	15	40	100
106	230	19	42	128
107	840	16	43	135
108	540	17	52	138
109	660	20	53	140
110	370	17	57	150
111	450	16	40	130
112	440	16	31	82
113	380	14	37	94
114	600	20	50	180

Lab.Report No.39 (Cont.).

Sample No.	Ba ppm	Sc ppm	Y ppm	La ppm
67990115	470	17	34	98
116	420	16	45	105
117	460	17	38	106
118	210	13	40	96
119	680	17	31	77
120	580	17	34	85
121	470	11	50	130
122	420	17	40	118
123	590	14	55	129
124	440	16	41	102
125	340	11	38	80
126	410	15	43	108
127	700	20	38	125
128	400	16	36	82
129	970	13	49	120
130	600	16	38	90
131	300	11	35	80
132	450	18	31	84
133	480	17	43	105
134	470	15	53	125
135	470	20	48	155
136	430	18	45	130
137	450	16	46	120
138	610	17	55	140
139	680	18	48	130
140	440	16	40	110
141	600	20	56	140
142	640	19	40	145
143	450	18	40	110
144	480	15	32	98
145	140	11	34	97
146	1000	13	33	70
147	360	17	37	82
148	460	16	35	108
149	320	12	38	96
150	220	11	31	85
151	550	17	33	94
152	590	18	33	112

Lab. Report No. 39 (cont.)

Sample No.	Ba ppm	Sc ppm	Y ppm	La ppm
153	500	12	58	125
154	730	17	38	96
155	600	11	36	80
156	410	13	31	73
157	1220	10	39	95
158	700	16	48	115
159	520	16	33	76
160	530	16	36	84
161	430	17	35	99
162	700	18	40	95
163	780	20	42	110
164	800	14	40	100
165	630	18	45	123
166	420	14	34	85
167	580	19	38	140
168	510	21	40	125
169	680	18	37	113
170	400	16	38	108
171	580	18	33	110
172	370	13	46	110
173	400	14	39	88
174	740	15	47	120
175	420	15	37	100
76990176	490	18	44	122
177	480	15	40	110
178	640	18	45	115
179	470	16	35	120
180	290	12	36	92

Sample No.	Cu ppm	Mn %	Cr ppm	Ni ppm	V ppm	Ti %	Sr ppm
67990001	85	0.04	60	33	65	0.34	365
2	51	0.05	92	29	109	0.48	65
3	-10	0.02	24	13	53	0.11	49
4	-10	0.04	120	32	135	0.61	247
5	-10	0.02	51	23	53	0.29	91
6	58	0.02	117	31	103	0.40	90
7	16	0.02	87	28	88	0.48	62
8	30	0.03	75	28	82	0.39	78
9	57	0.04	74	30	74	0.39	61
10	55	0.02	60	26	62	0.38	-40
11	10	0.02	70	32	70	0.41	75
12	94	0.02	92	43	100	0.45	182
13	62	0.04	106	37	113	0.48	110
14	20	-0.02	70	35	66	0.39	-40
15	41	0.02	55	30	50	0.32	96
16	12	0.04	88	36	91	0.45	76
17	21	0.19	46	24	56	0.28	54
18	45	0.10	85	32	92	0.49	58
19	49	0.05	92	32	112	0.47	60
20	55	0.03	103	37	100	0.45	90
21	20	-0.02	66	22	65	0.34	-40
22	17	0.02	64	31	67	0.33	88
23	-10	-0.02	33	22	42	0.22	40
24	13	-0.02	48	12	51	0.32	56
25	-10	-0.02	56	22	60	0.35	56
26	-10	0.06	32	13	41	0.12	230
27	32	0.13	58	24	67	0.22	205
28	59	0.04	90	31	98	0.42	98
29	19	-0.02	58	20	260	0.22	-40
30	15	0.20	82	26	98	0.38	63
31	45	0.02	105	27	103	0.40	34
32	46	0.02	60	32	57	0.29	-40
33	54	0.02	70	25	97	0.38	112
34	18	0.02	78	30	88	0.38	80
35	28	0.03	82	26	62	0.28	69
36	-10	0.03	53	28	56	0.32	58
37	59	0.02	79	30	78	0.42	-40
38	28	0.05	96	34	120	0.58	44
39	16	0.02	108	33	116	0.56	64
40	25	0.04	83	31	84	0.39	84
41	15	0.04	84	32	78	0.44	50
42	38	-0.02	84	37	130	0.41	86
43	-10	0.03	60	31	51	0.31	92
44	25	0.05	86	31	77	0.49	70
45	36	0.03	92	34	94	0.48	64
46	56	0.02	53	24	51	0.41	42
47	-10	0.03	165	29	140	0.71	48
48	38	0.03	80	30	82	0.49	46

Sample No.	Cu ppm	Mn %	Cr ppm	Ni ppm	V ppm	Ti %	Sr ppm
67990049	19	0.03	66	27	64	0.39	-40
50	19	0.02	78	17	70	0.44	48
51	32	0.02	120	36	100	0.46	94
52	23	0.03	105	42	120	0.45	-40
53	60	0.02	42	22	44	0.28	48
54	23	-0.02	65	28	67	0.38	-40
55	-10	0.05	54	23	64	0.32	42
56	-10	0.02	27	13	50	0.11	47
57	52	0.02	97	31	99	0.44	78
58	58	0.06	92	29	110	0.47	68
59	-10	0.03	80	30	94	0.37	58
60	34	0.05	80	24	100	0.40	110
61	49	0.02	96	33	78	0.34	60
62	47	0.02	92	29	87	0.38	64
63	37	0.02	76	25	67	0.31	70
64	45	0.15	80	29	100	0.42	68
65	-10	-0.02	48	18	49	0.31	72
66	39	0.04	74	29	76	0.41	78
67	27	0.03	62	23	62	0.34	-40
68	19	0.03	70	30	62	0.38	62
69	36	0.04	100	41	86	0.41	53
70	-10	-0.02	80	28	90	0.46	115
71	49	0.03	76	30	94	0.35	-40
72	20	0.04	80	30	86	0.36	58
73	52	-0.02	100	27	140	0.45	-40
74	28	0.14	72	30	64	0.39	47
75	53	0.03	82	32	104	0.39	40
76	62	-0.02	44	20	45	0.25	52
77	40	0.02	82	47	92	0.38	66
78	23	0.02	55	38	57	0.27	53
79	10	0.02	44	30	43	0.25	86
80	52	-0.02	150	40	146	0.44	40
81	-10	0.02	74	26	82	0.38	66
82	-10	-0.02	45	22	46	0.30	59
83	15	0.03	66	18	70	0.36	52
84	19	-0.02	53	18	54	0.29	45
85	-10	-0.02	65	28	62	0.39	72
86	-10	-0.02	42	20	39	0.33	76
87	14	-0.02	56	38	51	0.35	82
88	45	0.10	86	30	87	0.50	60
89	38	0.05	76	30	92	0.44	64
90	13	-0.02	58	34	60	0.33	40
91	47	0.02	85	30	94	0.46	50
92	53	0.05	68	28	91	0.40	47
93	41	0.07	68	32	70	0.34	50
94	46	-0.02	110	36	81	0.36	74
95	41	0.08	62	28	65	0.36	40
96	49	0.02	120	32	91	0.41	90
97	20	0.02	65	30	43	0.38	52
98	34	0.03	98	20	180	0.47	200

Sample No	C ppm	Mn %	Cr ppm	Ni ppm	V ppm	Ti %	Sr ppm
67990099	34	0.02	100	36	103	0.40	60
100	33	0.02	90	32	91	0.42	40
101	16	0.03	82	32	84	0.46	56
102	48	0.03	93	32	92	0.45	62
103	17	0.03	65	30	75	0.35	41
104	55	-0.02	57	26	52	0.42	-40
105	43	0.03	60	30	62	0.40	45
106	51	-0.02	57	23	98	0.28	-40
107	22	0.02	78	26	67	0.45	88
108	84	0.02	90	34	90	0.36	65
109	42	0.02	100	41	94	0.50	66
110	41	0.04	72	31	67	0.40	40
111	41	0.02	84	30	76	0.34	78
112	108	-0.02	78	29	84	0.35	45
113	15	0.02	58	25	65	0.36	40
114	62	0.02	98	34	83	0.33	70
115	14	0.04	80	29	85	0.38	90
116	-10	0.02	66	25	71	0.41	88
117	18	0.02	90	32	41	0.41	90
118	-10	0.02	47	23	47	0.32	42
119	57	0.04	81	32	102	0.41	-40
120	50	0.04	82	31	102	0.44	42
121	10	-0.02	47	24	42	0.34	78
122	45	0.03	78	31	100	0.42	58
123	-10	-0.02	46	22	42	0.26	53
124	14	0.02	65	30	62	0.34	60
125	-10	0.02	41	30	43	0.25	57
126	28	0.02	68	25	64	0.35	-40
127	34	0.02	105	32	105	0.42	95
128	14	0.02	87	30	115	0.38	96
129	-10	0.02	55	19	53	0.43	98
130	30	0.02	78	28	84	0.38	62
131	17	0.02	49	25	48	0.31	-40
132	11	-0.02	106	31	101	0.49	400
133	70	0.03	82	22	78	0.40	40
134	17	-0.02	70	14	68	0.49	78
135	28	0.04	105	33	115	0.40	110
136	21	0.05	108	33	82	0.44	60
137	27	0.02	83	17	83	0.45	78
138	55	0.04	74	32	70	0.39	74
139	19	0.03	92	38	87	0.42	110
140	11	0.03	75	28	87	0.45	44
141	16	0.02	103	35	83	0.38	90
142	54	0.02	102	30	100	0.41	66
143	21	-0.02	98	31	105	0.60	42
144	25	0.02	80	27	74	0.44	-40
145	11	-0.02	34	20	73	0.20	-40
146	33	0.03	75	27	90	0.30	76
147	92	0.02	80	39	98	0.40	120
148	19	0.02	74	32	81	0.38	-40
149	-10	-0.02	60	26	67	0.39	54
150	10	0.06	32	32	44	0.14	260
151	56	0.02	100	30	105	0.42	70
152	62	0.02	110	32	95	0.38	71
153	11	0.02	52	34	45	0.34	84

Sample No.	Cu ppm	Mn %	Cr ppm	Ni ppm	V ppm	Ti %	Sr ppm
67990154	12	0.02	80	30	90	0.46	70
155	33	-0.02	42	17	44	0.37	78
156	17	0.02	62	25	75	0.37	44
157	-10	-0.02	40	17	72	0.40	76
158	25	0.02	82	34	72	0.43	120
159	45	-0.02	86	28	80	0.43	54
160	14	0.02	87	30	84	0.43	66
161	53	0.03	89	31	110	0.46	63
162	-10	0.02	84	30	87	0.44	72
163	37	0.02	98	32	98	0.42	76
164	37	-0.02	54	13	57	0.34	80
165	80	0.03	92	34	92	0.44	74
166	18	0.02	68	27	76	0.38	50
167	49	0.03	96	35	113	0.45	68
168	14	0.02	72	27	100	0.45	400
169	53	0.05	103	35	118	0.49	67
170	41	0.05	75	30	83	0.39	57
171	58	0.02	104	36	87	0.36	68
172	19	0.02	60	31	56	0.37	-40
173	-10	0.06	69	24	71	0.39	48
174	40	0.02	60	28	54	0.38	-40
175	68	0.02	78	31	76	0.41	-40
176	27	0.02	92	32	87	0.46	-40
177	-10	0.02	66	25	67	0.47	50
178	84	0.02	86	33	86	0.43	63
179	18	0.02	78	32	100	0.42	90
180	-10	0.02	51	24	52	0.31	53

MINERAL IDENTIFICATION

by

G. Berryman

Seven (7) samples from Victoria River, Northern Territory, were submitted by I. Sweet, for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

KV 40	mA. 24	Geiger Tube. CuK α
R.M. 4	Mult. 1	T.C. 4
Chartspeed 1°20/min.		Disc. Ch. 12
Slits 1°, div. 1°		Rec-filter. Ni

The determinations were made by comparing the unknown pattern with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identifies follows.

Sample No.	1	2	3	4	5	6
Y213 - 0225	Dolomite	Quartz				
W68 - 0220	Magnesite	Dolomite	Quartz			
W69d - 0073	Dolomite	Magnesite	Quartz	Goethite		
W9a - 0214	Dolomite	Quartz				
W69 - 0073	Dolomite	Quartz	Magnesite	Calcite		
Y22 - 0239	Dolomite	Quartz	Calcite			
W4CB - 0070	Dolomite	Magnesite	Quartz			

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MINERAL IDENTIFICATION

by

G. Berryman

Eight (8) samples from Mount Isa, Queensland were submitted by S.E. Smith for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube CuK α
R.M. 2 & 4	Mult 1	T.C. 4
Chartspeed 1°20'/min.		Disc. Ch. 12
Slits $\frac{1}{4}$ ° & 1°	div. $\frac{1}{4}$ ° & 1°	rec-filter. Ni.

Chart range 5° - 80°

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
1354	Dolomite	Quartz	Muscovite			
1363	Siderite	Quartz	Pyrite	Sphalerite		
1428	Dolomite	Quartz	Muscovite			
1786*	B-Lead	Diopside	Quartz	Hematite		
2050	Dolomite	Quartz	Muscovite	Chlorite		
2067	Chlorite	Talc	Quartz			
2071	Quartz	Muscovite	Chlorite			
2121	Quartz	Talc	Chlorite			

* Sample ignited.

MINERAL IDENTIFICATION.

by

G. Berryman

Six (6) samples from Narooma, N.S.W., were submitted by F. De Keyser for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows:-

kV 40	mA 24	Geiger Tube	CuK α
R.M. 2 & 4	Mult 1	T.C. 4	
Chartspeed 1°20'/min		Disc. Ch. 12	
Slits $\frac{1}{4}^\circ$ & 1° , div. $\frac{1}{4}^\circ$ & 1° , rec-filter Ni			

Chart range $5^\circ - 80^\circ$

The determinations were made by comparing the unknown pattern with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
3A	Quartz	Muscovite	Kaolinite	Celadinite		
3B	Quartz	Muscovite				
4D	Muscovite	Celadinite	Quartz			
Grey	} A Quartz	Wavellite	Fluorapatite			
Phosphatic		Quartz	Fluorapatite			
Silt-stone		Quartz	Wavellite			

MINERAL IDENTIFICATION

by

G. Berryman

Eighteen (18) samples from Zeta Prospect, $\frac{3}{2}$ miles WNW Batchelor N.T. were submitted by P. Crohn for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube	CuK α
R.M. 4	Mult. 1	T.C. 4	
Chartspeed	1°20'/min	Disc Ch. 12	
Slits 1°,	div. 1°,	rec-filter Ni.	
Chart range 5° - 80°			

The determinations were made by comparing the unknown pattern with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
69120301	Dolomite	Magnesite		
02	Magnesite	Dolomite		
03	Magnesite	Dolomite		
04	Magnesite	Dolomite	Chlorite	
05	Magnesite	Dolomite	Chlorite	
06	Dolomite	Magnesite	Chlorite	
07	Magnesite	Quartz	Dolomite	Chlorite
08	Magnesite	Quartz	Calcite	Dolomite
09	Magnesite	Chlorite		
10	Magnesite	Dolomite		
11	Magnesite	Hydroxyapatite	Dolomite	Chlorite
12	Magnesite	Dolomite	Chlorite	
13	Dolomite	Magnesite	Chlorite	
14	Magnesite	Dolomite		
15	Magnesite	Dolomite		
16	Dolomite	Magnesite	Quartz	Chlorite
17	Dolomite	Hematite	Magnesite	
18	Magnesite	Hematite	Dolomite	

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from McClarty No. 1. Canning Basin W.A. was submitted by K.G. Smith for mineral identification by X-Ray Diffraction.

The analyses was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40 mA 24 Geiger Tube CuK α
R.M. 4 Mult. 1 T.C. 4
Chartspeed 1020/min Disc Ch. 12
Slits 1 $^{\circ}$ Div. 1 $^{\circ}$ rec-filter NL.
Chart range 5 $^{\circ}$ - 80 $^{\circ}$

The determination was made by comparing the unknown pattern with standard A:S.T.M. index patterns and standard patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
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No. 1. Halite.
4235'-3"-4235'-9"

Identification of rutile

by

G.H. Berryman

One (1) sample from the Bowen Basin Queensland was submitted by P. Alcock for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV	40	mA	24	Geiger Tube	Cu.k. alpha
R.M	4	Mult.	1	T.C.	4
Chartspeed	1°	- 2θ/min		Disc. Ch.	12
Slits	1°	div. 0.2mm		rec-filter	Ni

Chart range 10° - 80°

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3
6801	Rutile	Anatase	Quartz (tr)

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from McArthur River, N.T. was submitted by I. Lambert for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40 mA 24 Geiger Tube CuK α
R.M. 2&4 Mult. 1 T.C. 4
Chartspeed 1°-2 θ /min Disc. Ch. 12
Slits $\frac{1}{4}$ ° & 1° div. $\frac{1}{4}$ ° & 1° rec-filter Ni
Chart Range 5 - 80°

The determinations were made by comparing the unknown pattern with standard A:S.T.M. index patterns and standard mineral patterns

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
A	Galena	Sphalerite	Pyrite	Quartz	Chlorite	Calcite

MINERAL IDENTIFICATION

by

G.H. Berryman

Two (2) samples from Antarctica were submitted by J. Bain for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows:

kV 40	mA 24	Geiger Tube Cuk α
R.M. 2 & 4	Mult.1	T.C. 4
Chartspeed 1° - 20 / min.	Disc. Ch. 12	
Slits $\frac{1}{4}$ ° & 1° div. $\frac{1}{4}$ ° & 1°	rec-filter Ni	
Chart range 5° - 80°		

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified are as follows:

Sample No.	1	2	3	4	5
69280045	Anorthite	Quartz	Sr.Apatite	Albite	Spessartite
69280070	Quartz	Sanidine	Albite	Pyrpoe	

MINERAL IDENTIFICATION

by

G.H. Berryman

Two samples from Sedan Crater, Nevada Testing Grounds, U.S.A., were submitted by A. Glikson for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cuk α
R.M. 2 & 4	Mult. 1	T.C. 4
Chartspeed 1° - 20 / min.		Disc. Ch. 12
Slits $\frac{1}{4}$ ° & 1°	div. $\frac{1}{4}$ ° & 1°	rec-filter Ni

Chart range 5° - 80°

The determinations were made by comparing ^{the} unknown patterns with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows:

Both samples gave a typical glassy or non crystalline pattern; the only minerals to be identified were -

Sample A. Quartz,

Sample B. Quartz. Albite.

MINERAL IDENTIFICATION

by

G.H. Berryman

One sample from Broken Hill was submitted by T. Nicholas for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cuk α
R.M. 4	Mult. 1	T.C. 4
Chart speed 1° 2 ϕ / min.		Disc. Ch. 12.
Slits 1°	div. 1°	rec-filter Ni
Chart range 10° - 80°.		

The determination was made by comparing the unknown patterns with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2
1.	Calcite	Rhodochrosite

ZINC CONTENT OF MOLONGLO RIVER WATER

by

H.R. Lord

The following results were obtained for the determination of the zinc content of nine water samples from the Molonglo and Queanbeyan Rivers, collected on 7th May, 1969 and submitted by Mr. M. Elliott of the Department of Interior.

<u>Location</u>	ppm	Zn (total)
A		<0.02
B		7.5
C		7.4
D		6.3
D ₂		6.3
E		<0.02
F		3.9
G		0.39
H		0.03

The sampling points are as follows:-

- A Molonglo River 5 miles upstream from Lake George Mine.
- B Molonglo River immediately downstream from Lake George Mine.
- C Molonglo River at Hoskinstown-Bungendore Road turnoff.
- D Molonglo River at the 11-mile turnoff.
- D₂ Molonglo River at Burbong Bridge.
- E Queanbeyan River at Queanbeyan.
- F Molonglo River at Sutton-Queanbeyan Road bridge.
- G Molonglo River at Duntroon bridge.
- H Lake Burley Griffin.

Analysis of Carbonate Samples from
the McArthur River Area, N.T.

by

H.R. Lord.

The following results were obtained for the analysis of Carbonate rocks for seven trace elements. The samples, which were submitted by M. Brown, form part of an investigation of the geochemistry of the precambrian rocks of northern Australia.

The trace element content was determined by atomic absorption spectrophotometry, following digestion with 5N HCl.

Sample No.	Ni ppm	Zn ppm	Cu ppm	Pb ppm	Mn ppm	Fe %	Co ppm
2/1	4	13	3	3	240	0.40	3-
2/2	6	6.5	3	3-	310	0.38	3-
2/3	3	11	10	3-	360	0.45	3-
2/4	9	22	19	4	130	0.55	3-
2/5	5	8	4	3-	440	0.64	3-
2/6	13	18	13	19	825	2.70	8
2/7	9	26	9	3	290	0.95	3-
2/8	4	15	8	10	315	1.53	4
2/9	9	18	8	3-	310	1.28	3-
2/10	15	17	20	3-	325	1.90	4
2/11	8	19	19	5	500	1.63	3-
2/12	18	21	11	8	1250	1.72	3-
2/13	8	18	13	5	6500	1.46	3-
2/14	8	12	13	8	4450	1.65	3
2/15	10	11	6	5	3550	1.17	3-
2/16	13	13	10	3-	6000	1.55	3-
2/17	8	17	14	11	3060	1.24	3-
2/18	4	14	9	4	2150	1.05	3-

Sample No.	Ni ppm	Zn ppm	Cu ppm	Pb ppm	Mn ppm	Fe %	Co ppm
2/19	5	24	10	3-	1780	1.23	5
2/20	4	13	5	5	810	0.83	3-
2/21	4	15	10	3-	1650	1.15	3
2/22	9	24	6	3-	1250	0.93	3-
2/23	9	12	5	3	1110	0.84	3-
2/24	15	10	10	89	730	4.45	3-
2/25	6	14	30	3	1380	0.80	3-
2/26	8	9.5	19	3-	1600	0.81	3-
2/27	8	12	10	11	240	2.72	3-
2/28	4	16	13	5	1025	1.50	3-
2/29	3	9	5	5	990	1.35	3-
2/30	31	60	6	3-	540	1.28	3-
2/30/2	11	32	6	3-	775	1.18	4
2/31	23	47	26	20	650	2.10	3-
2/33	3	10	6	3-	320	0.70	3-
2/34	3-	7.0	91	5	425	0.53	3-
2/35	6	8.5	5	14	400	0.60	3-
2/37	6	8.3	5	3	450	0.30	3-
2/38	4	6.8	3-	3-	270	0.28	3-
2/39	6	9.0	3	3-	330	0.41	3-
2/40	3	7.8	4	8	330	0.44	3-
2/41	3	9.5	3	4	280	0.44	3-
3/1	3	9.0	3	3-	140	0.23	3-
3/2	3	10	9	3-	190	0.28	3-
3/3	8	9.0	3-	9	180	0.25	3-
3/4	5	6.3	3	3-	150	0.33	3-
3/5	5	8.0	3	3-	280	0.38	3-
3/6	9	12	3	6	180	0.31	3-
3/7	9	7.5	3-	3-	190	0.28	3-
3/8	3-	8.0	3	3	260	0.34	3-
3/9	3	10	3	15	190	0.29	3-

Sample No.	Ni ppm	Zn ppm	Cu ppm	Pb ppm	Mn ppm	Fe %	Co ppm
3/10	5	14	3	3-	190	0.31	3-
3/11	3	8.8	4	4	170	0.25	3-
3/12	3	7.0	5	3-	280	0.40	3-
3/13	5	9.3	3	3-	270	0.48	3-
3/14	8	12	3	5	120	0.17	3-
3/16	3-	12	3	6	300	0.44	3-
3/17	16	21	14	11	35	1.13	3-
3/20	4	8.3	3	8	320	0.45	3-
3/21	3	13	3	8	310	0.44	3-
3/22	5	10	8	3-	480	0.53	3-
4/1	8	18	3-	3-	225	1.73	3-
4/2	6	6.0	4	3-	315	0.53	3-
4/3	4	5.3	5	3-	345	0.65	3-
4/4	4	8.5	3-	3-	325	1.28	3-
4/5	6	11	5	3-	200	1.68	5
4/6	3	5.3	4	18	275	0.60	3-
4/7	3	8.5	5	3-	265	0.68	3-
4/8	3-	5.8	3-	3-	235	0.50	3-
4/9	6	14	5	5	325	0.45	3
4/11	3-	6.3	3	3-	185	0.31	3-
4/12	3-	8.5	3-	3-	235	0.43	3-
4/13	4	12	5	18	190	0.60	3-
4/14	3	4.3	4	3-	180	0.55	3-
4/15	6	7.5	4	13	170	0.38	3-
4/16	4	4.8	4	10	190	0.50	3-
4/17	5	4.8	12	23	210	0.60	3
4/18	6	6.8	10	23	160	0.68	4
4/19	4	6.3	4	3-	170	0.40	3-
4/21	4	10	3-	3-	175	0.35	3-
4/22	3	8.8	3-	3-	220	0.35	3-
4/23	9	6.3	15	3-	155	0.45	3-
4/24	3-	4.8	3-	3-	175	0.55	3-

Sample No.	Ni ppm	Zn ppm	Cu ppm	Pb ppm	Mn ppm	Fe%	Co ppm
4/25	3-	3.8	4	3-	115	0.28	3-
4/26	9	5.3	4	3-	90	0.33	6
4/27	3	13	7	3-	200	0.30	3-
4/28	3-	8.8	3	3-	200	0.28	9
4/29	3-	5.0	3	3-	3350	0.75	3-
4/30	3-	4.5	3-	3-	185	0.20	3-
4/31	3-	3.0	8	3-	210	0.25	3-
4/32	8	4.3	5	3-	95	0.40	6
4/33	3	4.0	3-	3-	325	0.24	3-
4/34	3	4.0	3-	3-	260	0.24	3-
4/35	3-	5.3	3-	13	235	0.28	3-
4/36	5	5.0	3-	8	195	0.23	3-
4/37	13	6.3	2.8	3-	650	0.75	9
4/38	3-	3.8	3-	3-	500	0.48	3-
4/39	3	4.8	6.5	3-	260	0.29	3-
4/40	3-	4.0	3-	3-	170	0.18	3-
4/41	3	3.3	3-	3-	815	0.95	3-
4/42	3	3.8	3-	3-	210	0.40	3-
4/43	3-	3.3	3-	3-	190	0.27	3-
4/44	3	4.0	3-	3-	180	0.16	3-
4/45	3-	3.3	3-	10	175	0.16	3-
4/46	3	3.3	3-	3-	215	0.25	3-
5/1	6	19	10	10	500	2.10	4
5/2	10	19	5	3	475	2.20	3
5/3	9	14	15	13	450	1.53	3
5/4	13	16	19	9	310	1.65	3
5/5	3-	14	4	3-	650	190	3
5/6	3-	11	29	10	650	1.78	3-
5/7	3	8.3	6	3	650	1.90	4
5/8	3	13	68	5	315	1.50	3
5/9	3-	4.3	8	3-	525	1.50	3
5/10	9	15	9	5	400	1.15	3-

Sample No.	Ni ppm	Zn ppm	Cu ppm	Pb ppm	Mn ppm	Fe%	Co ppm
5/11	9	13	18	3	300	1.58	3-
5/12	3-	9	4	5	725	1.80	3-
5/13	10	12	13	3-	400	1.73	3-
5/14	3-	14	10	3-	700	1.50	3-
5/15	10	9.3	44	5	275	0.80	6
5/16	3-	11	8	5	450	1.45	3-
8/1	3	3.0	5	11	265	0.30	3-
8/2	8	10	9	21	380	0.49	3
8/3	3	4.5	8	30	245	0.48	3
8/4	3-	4.5	4	3	250	0.40	3-
8/5	3-	4.5	3-	3-	235	0.26	3-
8/6	3-	6.5	5	3-	205	0.19	3-
8/7	3-	4.0	3	3-	285	0.23	3-
8/8	4	5.5	3-	3-	245	0.26	3-
8/9	3-	2.8	3	3-	280	0.22	3-
8/10	5	3.0	4	19	310	0.31	3-
8/11	5	2.3	4	3-	315	0.31	6
8/12	3	11	3	3-	280	0.27	3-
8/13	3	4.5	6	6	235	0.42	9
8/14	3-	2.5	3-	3-	485	0.39	3-
8/15	5	4.0	9	13	390	0.63	3
8/16	3-	8.8	8	5	390	0.42	3-
8/17	3-	1.7	3-	3-	370	0.30	3-
8/18	3-	2.0	3	3-	580	0.48	3-
8/19	3-	2.5	3	3-	580	0.57	3-
8/20	3-	2.0	3-	3-	595	0.57	3-
8/21	3-	3.0	3-	3-	320	0.30	3-
8/22	5	8.5	4	3-	275	0.45	3-
8/23	3	2.5	5	3-	425	0.57	3-
8/23/A	5	1.5	3	3-	285	0.62	3-
8/24	5	7.8	4	8	610	1.00	3-

Sample No.	Ni ppm	Zn ppm	Cu ppm	Pb ppm	Mn ppm	Fe %	Co ppm
8/25	4	2.8	58	18	1700	2.47	25
8/26	3	2.8	16	8	500	0.95	3-
8/27	3	55	16	5	910	0.62	3-
8/28	5	18	15	18	3750	0.85	3-
8/29	5	3.8	6	8	530	0.87	3-
8/30	5	71	8	10	1050	0.87	3-
8/31	20	5.5	10	40	975	1.55	13
8/32	4	23	9	3-	860	1.00	3-
8/32/A	3-	21	3-	13	1000	0.64	3-
8/33	3	30	8	8	745	0.70	3-
8/34	3-	4.8	5	3-	745	0.73	3-
8/35	6	5.3	9	30	370	1.58	3-
8/36	5	3.3	10	13	515	0.80	3
8/37	3-	2.0	6	5	535	0.54	3
8/39	5	3.3	10	13	650	0.90	3
8/40	3	1.5	3-	13	530	0.47	3-
8/41	3-	1.0	3-	3-	485	0.45	3
8/42	3-	3.0	3-	3-	515	0.53	3-
8/44	3	75	11	53	515	0.95	3-
8/45	5	23	8	8	665	1.28	3-
8/46	3-	2.0	4	13	685	0.73	3-
8/47	9	3.0	4	3-	650	0.63	3-
M234	3	6.3	5	3-	625	0.43	4
P89b	3-	4.0	3-	3-	1225	1.63	3-
P121d	3-	6.5	3-	3-	825	2.67	3
P126	8	18	4	3-	510	0.88	4
P156d	3-	11	3	3-	700	0.43	3-
P156n	3-	7.5	3-	3-	535	0.58	3-
P172	4	13	3	3-	650	0.42	3-
P315b	3-	8.8	560	3-	800	0.14	3
P318b	8	13	5	5	950	0.90	4

Sample No.	Ni ppm	Zn ppm	Cu ppm	Pb ppm	Mn ppm	Fe %	Co ppm
P349b	13	6.5	140	3-	950	0.62	3
P355a	3	2.8	3	3-	185	0.43	3-
P355c	5	5.3	3	3-	280	0.52	3-
P356	3-	3.0	3-	3-	265	0.35	3-
P382e	3-	3.5	3-	3-	245	0.28	3-
P390d	3	6.5	4	3-	295	0.48	6
S67a	3	5.0	3-	13	1730	1.00	3-
S676	5	4.5	4	3-	1150	2.30	3
S99	8	9.5	4	3-	625	0.62	4
S155a	3	15	9	3-	625	0.60	3-
S155b	5	10	3	3-	215	0.39	3-
S197c	10	5.0	13	11	1025	1.12	9
S201e	18	9.5	4	3-	435	2.10	6
S203	8	4.5	3	6	975	0.85	6

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from Rum Jungle, Northern Territory, was submitted by Y. Miezitis for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube CuK
R.M. 2 & 4	Mult. 1	T.C. 4
Chartspeed 1° -20/min		Disc. Ch. 12
Slits $\frac{1}{4}^{\circ}$ & 1°	div. $\frac{1}{4}^{\circ}$ & 1°	rec-filter Ni
Chart range 2° -80 $^{\circ}$		

The determinations were made by comparing the unknown pattern with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3
68126097	Osarizawaite	- Beaverite	- Quartz

IDENTIFICATION OF MINERALS IN PIGMENTS FROM
TERRITORY OF PAPUA- NEW GUINEA.

by

G.H. Berryman

(Eight) samples from various localities in the T.P.N.G. were submitted by Mr. Ian Hughes, Department of Human Geography, A.N.U., for mineral identification by X-Ray Diffraction. Descriptions of the samples are given in Appendix I and are based on information supplied by Mr. Hughes.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cuka alpha
R.M. 2 & 4.	Mult 1.	T.C. 4
Chart speed $1^{\circ} 20'$ / min.		Disc. Ch. 12.
Slits $\frac{1}{4}^{\circ}$ and 1° div. $\frac{1}{4}^{\circ}$ and 1°		rec-filter Ni
Chart range $5^{\circ} - 80^{\circ}$		

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows:

Sample No.	1	2	3	4	5
Pigment A	Quartz	Gibbsite	Chlorite	Albite	Muscovite
" B	Vivianite	Hematite	Quartz		
" C	Quartz	Oligoclase	Mg Chamosite *	Spangolite	
" D	Albite	Chlorite	Quartz		
" E	Quartz	Hematite	Chlorite	Muscovite	
" F	Hematite	Muscovite	Quartz		
" G	Albite	Hematite	Quartz		
" H	Quartz	Kaolinite	Hematite		

* Magnesium Chamosite and/or chlorite.

APPENDIX I.

Pigment A:

Location: Yandera, Bundi sub-district, Madang District

Colour: White

Use: Medicine for pigs. It is mixed with cooked sweet potato and fed to the pigs to make them grow large and fat.

Mode of Occurrence: Not known.

Remarks: This material is available from only one source, an old woman called Anatuma. It is believed that she collects it from the leaves of her taro plants on which it appears magically during nocturnal earth tremors which are accompanied by strange noises like pigs grunting in the forest. Legend has it that the substance first occurred some generations ago as a white deposit in and around a hole in the ground. This hole had appeared suddenly during one of the periods of nocturnal earth tremors.

A python with two tails was found in the hole and the substance was referred to as snake's faeces. The site of the hole is well known though the hole no longer exists.

Pigment B:

Location: Near Nogar, Gena area, Kerowagi sub-district, Chimbu District. Stream called Danigl.

Colour: Blue.

Use: Pigment

Mode of Occurrence: The material occurs as blue, pale blue, and white encrustations on swamp "wood" found in banded clays. The pigment may also occur in the clays without any swamp "wood" associated with it.

Remarks: The small deposits of the pale blue and the white pigments associated with the highly prized blue pigment are said to turn blue if tied in a piece of banana leaf and left in water for a week or so.

Pigment C:

Location: Denggru Creek, Yandera, Bundi sub-district, Madang District.

Colour: Pale green.

Use: Pigment.

Mode of Occurrence: The substance occurs as a deposit on the surface of rock walls and boulders in Denggru Creek. It is bright green when wet but dries to a pale green. It appears to have been deposited by water flowing over the rock surfaces.

Pigment D.

Location: Anganggoi, Koronigl Valley, Kerowangi sub-district, Chimbu District.

Colour: Pale green

Use: Pigment.

Mode of occurrence: This material occurs as layers in clay and weathered shales..

Pigment E.

Location: Near Yandera, Bundi sub-district, Madang District.

Colour: Shiney black.

Use: Pigment.

Mode of Occurrence: This material is found in joints in rocks.

Pigment F.

Location: Yandera. Bundi sub-district, Madang District.

Colour: Shiney Red

Use: Pigment

Mode of Occurrence: As for "E".

Remarks: This pigment lacks the lustre of "E".

Pigment G.

Location: Upper Chimbu Valley, near Bomkan, Chimbu District.

Colour: Shiney Black.

Use: Pigment.

Mode of Occurrence: This material occurs as small lenses in weathered rock, thought to be granodiorite.

Remarks: It is said to increase in lustre if immersed in water for ten days with vegetable peelings.

Pigment H.

Location: Near Nogar, Kerowagi sub-district, Chimbu District.

Colour: Red.

Use: Pigment.

Mode of Occurrence: The sample was collected from a bed of sandstone occurring between two outcrops of Chim Limestone.

Remarks: It is said the colour is improved when the material is heated in an open fire.

Laboratory Report No. 54

9th June, 1969.

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from Mt. Pyroclast near Gosses Bluff, N.T., was submitted by A. Glikson for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV	40	mA	24	Geiger Tube	CuK alpha
R.M.	2 & 4	Mult.	1	T.C.	4
Chartspeed	1°-20/min.			Disc. Ch.	12
Slits	1/4° & 1° div. 1/4° & 1°			rec-filter	Ni
Chart range	5° - 80°				

The determinations were made by comparing the unknown pattern with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
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A Heulandite Quartz

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from Narooma area, New South Wales, was submitted by Mr. J.M. Rayner for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cuk alpha
R.M. 4	Mult. 1	T.C. 4
Chartspeed 1° - 2ϕ / min.		Disc. Ch. 12
Slits 1°	div. 1°	rec-filter Ni
Chart range 10° - 80°		

The determinations were made by comparing the unknown pattern with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2
1	Turquoise	Quartz (tr.)

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from Ridge N.M.S., 148.5 miles West of Beaver Lake, Antarctica, was submitted by D.J. Grainger for mineral identification by X-ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cuk alpha
R.M. 2 & 4	Mult. 1	T.C. 4.
Chartspeed 1° - 2ϕ / min.		Disc. Ch. 12.
Slits $\frac{1}{4}^{\circ}$ and 1°	div. $\frac{1}{4}^{\circ}$ & 1°	rec-filter Ni
Chart range. 5° - 80°		

The determination was made by comparing the unknown patterns with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows:

Sample No.	1	2
D.G. 52	Gypsum	Thenardite

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from Eastern Bolingen Islands, Antarctica, was submitted by I.R. McLeod for mineral identification by X-ray Diffraction.

The analysis was carried out using a Philip P.W. 1051 X-ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cuk α
R.M. 2 & 4	Mult. 1	T.C. 4
Chartspeed $1^{\circ} 20'$ / min.		Disc. Ch. 12.
Slits $\frac{1}{4}^{\circ}$ & 1°	div $\frac{1}{4}^{\circ}$ & 1°	rec-filter Ni
Chart range 5° - 80°		

The determination was made by comparing the unknown patterns with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensity of the minerals identified follows:

Sample No.	1.
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I.R. 124	Cordierite
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MINERAL IDENTIFICATION

by

G.H. Berryman

Two (2) nodules from Mount Pyroclast, 2 miles south of Gosses Bluff, Northern Territory, were submitted for mineral identification by X-ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cuk alpha
R.M. 2 & 4	Mult. 1	T.C. 4
Chartspeed 1° - 2ϕ /min		Disc. Ch. 12.
Slits $\frac{1}{4}^{\circ}$ & 1°	div. $\frac{1}{4}^{\circ}$ & 1°	rec-filter Ni
Chart range 5° 80°		

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows:

Sample No.	1	2	3	4	5.
<u>Nodule No.1.</u>					
Sect. 1.	Ankerite	Quartz	Heulandite	High Sanidine	
" 2.	Quartz	Heulandite	High Sanidine		
" 3.	Quartz	Heulandite	High Sanidine		
<u>Nodule No.1a.</u>					
Sect. 1.	High Sanidine	Quartz	Ankerite (tr.)	Hematite (tr.)	
" 2.	Quartz	High Sanidine	Hematite (tr.)		
" 3.	High Sanidine	Quartz	Heulandite	Hematite (tr.)	
				Dolomite (tr.)	

ANALYSIS OF PHOSPHATE SAMPLES FROM
THE AUSTRALIAN CONTINENTAL SHELF.

by

H.R. Lord

The following results were obtained for the analyses of four samples, submitted by H.A. Jones.

P_2O_5 content was determined, following digestion with 5N HNO_3 , by phosphovanadomolybdate reaction.

Sample	% P_2O_5
YOM 1	0.7
YOM 2	<0.5
WT 7	6.5
WT 102	21.8

PHOSPHATE DETERMINATION OF SAMPLES FROM
THE COOMALIE DOLOMITE, NORTHERN TERRITORY.

by

H.R. Lord

The following results were obtained for phosphate analysis of eighteen (18) samples from the Coomalie Dolomite, Northern Territory, submitted by C.E. Prichard. P_2O_5 content was determined by the phospho-vanadomolybdate reaction following digestion with 5N HNO_3 .

Registered Number	% P_2O_5
69120301	<0.5
" 302	<0.5
" 303	<0.5
" 304	<0.5
" 305	<0.5
" 306	<0.5
" 307	<0.5
" 308	<0.5
" 309	<0.5
" 310	<0.5
" 311	27.7
" 312	<0.5
" 313	<0.5
" 314	<0.5
" 315	<0.5
" 316	<0.5
" 317	<0.5
" 318	<0.5

MINERAL IDENTIFICATION

by

G.H. Berryman

One (1) sample from Murray Island was submitted by D. Palfreyman for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operation conditions as follows.

kV 40	mA 24	Geiger Tube Cuk alpha
R.M. 2 & 4	Mult. 1	T.C. 4.
Chartspeed 1°	$= 2\phi / \text{min.}$	Disc. Ch. 12.
Slits $\frac{1}{4}^{\circ}$ and 1°	div. $\frac{1}{4}^{\circ}$ & 1°	rec-filter Ni
	Chart range. 5°	$- 80^{\circ}$

The determinations were made by comparing the unknown pattern with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1.	2
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1.	Diopside	Forsterite.
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MINERAL IDENTIFICATION

by

G.H. Berryman

Ten (10) samples from Marine Slate area, Cloncurry, Qld, were submitted by G. Derrick for mineral identification by X-ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cu. K alpha.
R.M. 2&4	Mult. 1	T.C. 4.
Chartspeed 1°-20° / min.		Disc. Ch. 12.
Slits 1° & 1°	div. 1° & 1°	rec-filter Ni
Chart range. 5°-80°		

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1.	2.	3.	4.
L4. 76.29.	Quartz	Chalcedony	Muscovite (tr)	
L5. 30.30.	Malachite	Quartz	Chrysocolla	
L7. 58.66.	Barite			
L7. 63.2.	Magnesite			
L7. 62.8.	Dolomite			
L3. 61.2.	Albite *	Calcite (tr)		
L3. 61.2a.	Ripidolite	Quartz	Microcline	
L6. 49.6a.	Crandallite	Millisite	Goethite (tr.)	
L4. 80.4a.	Muscovite	Quartz	Anorthoclase	
L4. 80.4b.	Quartz	Muscovite	Anorthoclase	Goethite (tr)
* L3. 61.2.	also has some unidentifiable peaks.			

MINERAL IDENTIFICATION

by

G.H. Berryman

Fourteen (14) samples from Christmas Island were submitted by D. Haldane for mineral identification by X-ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows:

kV 40	mA 24	Geiger Tube Cu.K. alpha
R.M. 4	Mult. 1.	T.C. 4.
Chartspeed 1° - 20°/min.		Disc. Ch. 12.
Slits 1°	div. 1°	rec.filter Ni
Chart Range 10° - 5'7°		

The determinations were made by comparing the unknown patterns with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows:

Sample No.	1	2
210207 W.	Fluorapatite	
210208 W.	Fluorapatite	Millisite
210209 W.	Fluorapatite	
210234 W.	Calcite	
210239 W.	Fluorapatite	
210271 W.	Fluorapatite	
210273 W.	Calcite	Fluorapatite
210274 W.	Calcite	
210275 W.	Fluorapatite	
210276 W.	Fluorapatite	
210208 B.	Crandallite	Millisite
210209 B.	Crandallite	Millisite
210273 B.	Crandallite	Millisite
210274 B.	Crandallite	Millisite

1969/151
PEZ

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

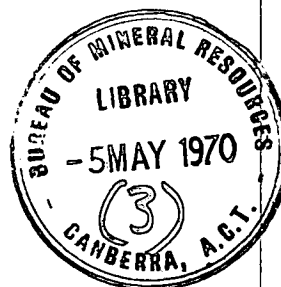
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Miscellaneous Investigations
carried out in the
Geological Laboratory
Part 2. July to December, 1969

Compiled by

H.R. Lord



PART 2

of 2

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PEZ

MISCELLANEOUS CHEMICAL, PETROGRAPHIC AND MINERAGRAPHIC
INVESTIGATIONS CARRIED OUT IN THE GEOLOGICAL LABORATORY

Compiled by

H.R. Lord

PART II

JULY - DECEMBER, 1969.

RECORDS 1969/151

This Record is composed of reports on minor chemical, petrographic, and mineragraphic investigations, carried out in the Geological Laboratory, Bureau of Mineral Resources, during the period January 1969 to December, 1969. The Record is divided into two parts; the first deals with reports covering the period January - June, 1969; the second part deals with reports covering the period July to December, 1969. In each part the reports are in chronological order.

The information contained in this report has been obtained by the Department of National Development as part of the policy of the Commonwealth Government to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus or statement without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

MISCELLANEOUS CHEMICAL, PETROGRAPHIC AND MINERAGRAPHIC
INVESTIGATIONS CARRIED OUT IN THE GEOLOGICAL LABORATORY

PART II.

JULY TO DECEMBER, 1969.

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ZINC CONTENT OF MOLONGLO RIVER WATER

by

H.R. Lord

The following results were obtained for the determination of the zinc content of nine water samples from the Molonglo and Queanbeyan Rivers, collected on 12-6-69 and submitted by Mr. M. Elliot of the Department of the Interior.

<u>Location</u>	<u>ppm Zn (total)</u>
A	0.02
B	7.7
C	5.3
D	6.2
D ²	7.8
E ²	0.02
F	6.3
G	0.75
H	0.07

The sampling points are as follows:-

- A Molonglo River 5 miles upstream from Lake George Mine
- B Molonglo River immediately downstream from Lake George Mine
- C Molonglo River at Hoskinstown - Bungendore Rd. turn off
- D Molonglo River at the 11-mile turn off
- D² Molonglo River at Burbong Bridge
- E² Queanbeyan River at Queanbeyan
- F Molonglo River at Sutton - Queanbeyan Rd. bridge
- G Molonglo River at Duntroon bridge
- H Lake Burley Griffin

ANALYSIS OF WATER SAMPLES FROMLACROSSE NO.1 WELL

by

A.D. Haldane

The following results were obtained on four water samples from drill stem test No. 1 of the Lacrosse No. 1 well, Bonaparte Gulf.

All the samples contained a considerable amount of dispersed clay and were heavily coloured by organic matter.

Samples were preheated with hydrogen peroxide to bleach organic matter and filtered to remove suspended matter prior to analysis.

The determination of carbonate alkalinity and total hardness was precluded by interference from the organic matter and its oxidation products.

	122' off bottom	5624'-5770'	5624'-5770'	5624'-5770'
	C.L. 49,000	No.1	No.2	No.3
pH	5.1	6.3	6.1	6.5
Sp. Cond.	108,300	20,900	11,300	24,800
	parts per million			
Mg	274	13	21	61
Na	24,800	7,520	3,160	6,520
K	620	270	190	360
Cl	16,900	6,400	2,860	6,910
SO ₄	1,450	1,800	1,060	2,160

Zinc Content of Molonglo River Water

by

H.R. Lord

The following results were obtained for the determination of the zinc content of nine water samples from the Molonglo and Queanbeyan Rivers collected on 4th July, 1969, and submitted by Mr. M. Elliott of the Department of the Interior.

Location	ppm Zinc (total)
A	< 0.02
B	6.4
C	3.9
D	2.1
D ₂	2.6
E	< 0.02
F	2.7
G	0.6
H	0.05

The sampling points are as follows:

- A Molonglo River 5 miles upstream from Lake George Mine
- B Molonglo River immediately down stream from Lake George Mine
- C Molonglo River at Hoskinstown-Bungendore Rd. turnoff
- D Molonglo River at the 11 mile turnoff
- D₂ Molonglo River at Burbong Bridge
- E Queanbeyan River at Queanbeyan
- F Molonglo River at Sutton-Queanbeyan Road Bridge
- G Molonglo River at Duntroon bridge
- H Lake Burley Griffin

Mineral Identification

by

G.H. Berryman

Thirteen (13) samples from the Duchess area, N.W. Qld. were submitted by F. de Keyser for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cu. K. alpha
R.M. 4	Mult. 1	T.C. 4
Chartspeed 1° 20/min.		Disc. Ch. 12
Slits 1°	div. 1°	rec-filter Ni
Chart range 10°-80°		

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3
1003.	Quartz	Variscite	Meta Variscite (tr)
260d.	Quartz	Fluorapatite	Goethite
268a.	Goethite	Fluorapatite	Quartz (tr)
268b.	Goethite	Fluorapatite	Quartz (tr)
275a.	Fluorapatite	Quartz (tr)	
275b.	Fluorapatite	Quartz	Kaolinite (tr)
275c.	Fluorapatite	Quartz (tr)	
277	Quartz		
279	Fluorapatite	Quartz (tr)	
281a.	Fluorapatite	Kaolinite (tr)	
281b.	Fluorapatite	Goethite (tr)	Kaolinite (tr)
286a.	Quartz	Muscovite (tr)	
405	Quartz	Kaolinite (tr)	Muscovite (tr)

Mineral Identification

by

G.H. Berryman

Five (5) samples from Hillary Creek area, N.W. Qld. were submitted by F. de Keyser for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cu. K. alpha
R.M. 4	Mult. 1	T.C. 4
Chartspeed 1° 20/min.		Disc. Ch. 12
Slits 1°	div. 1°	rec-filter Ni
Chart range 8°-80°		

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
74a.	Fluorapatite	Quartz (tr)		
74c.	Goethite	Pyrolusite	Quartz (tr)	
74d.	Fluorapatite	Quartz (tr)		
75b.	Quartz	Fluorapatite	Chlorite	Muscovite (tr)
75c.	Pyrolusite	Quartz (tr)		

Mineral Identification

by

G.H. Berryman

Forty one (41) samples from the Camooweal area. N.W. Q'ld, were submitted by F. de Keyser for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV	40	mA	24	Geiger Tube	Cu K. alpha
R.M.	4	Mult.	1	T.C.	4
Chartspeed	1° - 20/min.			Disc. Ch.	12
Slits	1°			rec-filter	Nil
Chart Range 8°-80°					

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
1010	Quartz	Calcite	Dolomite	Fluorapatite
1011	Quartz	Fluorapatite	Calcite (tr)	
1012a	Quartz	Fluorapatite	Calcite (tr)	
1012b	Quartz	Fluorapatite	Calcite (tr)	
1013	Fluorapatite	Quartz (tr)		
1014a	Quartz	Fluorapatite (tr)		
1014b	Quartz			
1016	Fluorapatite	Quartz (tr)		
1017	Fluorapatite			
1018	Calcite	Quartz (tr)		
1019	Calcite	Quartz		
1020	Dolomite	Quartz	Calcite (tr)	
1021a	Quartz	Fluorapatite (tr)		
1021b	Quartz			
1022	Calcite	Quartz		
1023	Quartz	Kaolinite	Muscovite (tr)	

Lab. Report No. 69 (cont.)

Sample No.	1	2	3
1024	Quartz	Kaolinite (tr)	
1025	Dolomite	Calcite (tr)	
1026	Dolomite	Quartz (tr)	
1027	Dolomite	Quartz	
1028	Quartz		
1029	Quartz		
1032	Quartz	Fluorapatite	
1033	Quartz	Fluorapatite	
1034a	Quartz		
1034b	Quartz		
1035	Fluorapatite	Goethite	
1036	Quartz		
1037	Fluorapatite	Quartz (tr)	
1040	Quartz	Dolomite	Calcite (tr)
1041	Quartz	Fluorapatite	Goethite
1042	Quartz		
1043	Quartz	Fluorapatite	Chlorite
1044	Fluorapatite	Quartz (tr)	
1045	Quartz	Kaolinite	Muscovite
1046	Quartz	Goethite	Fluorapatite
1047	Quartz	Fluorapatite (tr)	
1050	Quartz	Fluorapatite (tr)	
1051	Quartz	Kaolinite	
1052	Quartz		
1053	Quartz	Gypsum (tr)	Kaolinite (tr)

Mineral Identification

by

G.H. Berryman

Twenty seven (27) samples from Milne Bay, T.P.N.G. were submitted by D. Jongsma for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cu. K. alpha
R.M. 2 & 4	Mult. 1	T.C. 4
Chartspeed 1° = 20/min.		Disc. Ch. 12
Slits 1/4° & 1°	div. 1/4° & 1°	rec-filter Ni
Chart range 5° - 80°		

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5	6
302	Albite	Halite	Chlorite	Quartz	Calcite	Muscovite
303	Albite	Halite	Calcite	Quartz	Muscovite	
304	Halite	Calcite	Albite	Quartz		
305	Calcite	Albite	Halite	Quartz	Aragonite (tr)	
306	Halite	Calcite	Albite	Quartz		
307	Calcite	Halite	Albite	Quartz	Chlorite	
309	Calcite	Halite	Albite	Quartz	Aragonite	
310	Albite	Aragonite	Halite	Quartz (tr)		
311	Aragonite	Calcite	Halite	Quartz (tr)	Albite (tr)	
312	Calcite	Aragonite	Quartz	Albite (tr)	Halite (tr)	
313	Calcite	Aragonite	Halite	Albite	Quartz (tr)	
314	Calcite	Aragonite	Halite	Quartz (tr)	Albite (tr)	
315	Calcite	Aragonite	Halite	Albite (tr)		
316	Calcite	Aragonite	Halite	Albite (tr)		

Order of relative intensities. cont.

Sample No.	1	2	3	4	5	6
318	Calcite	Aragonite	Quartz(tr)	Halite(tr)	Chlorite(tr)	
319	Calcite	Aragonite				
320	Calcite	Aragonite	Halite	Quartz(tr)		
321	Calcite	Aragonite	Halite			
322	Aragonite	Calcite	Quartz	Halite	Albite(tr)	
324	Calcite	Aragonite	Halite	Albite(tr)		
326	Aragonite	Calcite	Halite			
327	Calcite	Aragonite	Halite	Quartz	Albite	
328	Calcite	Halite	Albite	Quartz	Aragonite	
329	Calcite	Halite	Alagonite	Quartz	Albite	
331	Calcite	Albite	Quartz	Aragonite	Muscovite(tr)	Chlorite(tr)
332	Halite	Calcite	Albite	Quartz	Aragonite	Chlorite(tr)
333	Calcite	Halite	Quartz	Aragonite	Albite	

Analyses of Cape Nelson Volcanics
from Eastern Papua

by
T.I. Slezak

Thirty-four samples of Cape Nelson Volcanics from Eastern Papua, submitted by I.E. Smith, were analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for Ba, Ca, Cr, Cu, La, Mg, Mn, Sc, Sr, Ti, V, Y, and Zr.

The analytical method used was adapted from Ahrens and Taylor ("Spectrochemical Analysis", 1961, p. 189 Addison - Wesley Publishing Company). One part of sample was mixed with two parts of graphite (National Carbon Company Type L4160 Grade 8P-2). The mix was loaded into a preformed graphite electrode (National Carbon Company Type L4260) and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal standard and rock standard control were used. On previous experience with this method for the analysis of similar materials it is estimated that the values given for elements are within 10% of the true values.

	Ba ppm	Ca. %	Cr ppm	Cu ppm	Fe. %	La ppm	Mg %
3500A	920	5.2	220	20	3.6	52	2.4
3500B	820	5.4	220	23	3.3	- 40	3.1
3501B	620	6.8	370	37	4.8	47	4.2
3501C	990	5.2	140	15	4.1	- 40	2.5
3502B	920	6.5	210	42	5.2	51	4.1
3504	600	7.8	300	26	4.7	- 40	3.6
3508	740	5.5	250	32	4.1	- 40	3.0
3512C	- 30	14.5	1100	-7	2.5	- 40	6.0
3513	1000	5.6	210	20	3.9	- 40	3.0
3514	1000	5.8	280	13	4.4	51	3.0
3525A	800	5.0	51	11	4.0	- 40	1.6
3526A	700	6.8	500	22	5.6	58	4.0
3526B	980	4.8	135	14	3.1	50	2.1
3527A	640	5.8	850	59	6.2	50	5.7
3527B	540	6.2	365	49	6.6	50	4.0
3528	600	7.5	350	17	6.6	52	4.3
3530	1500	4.3	170	36	4.3	60	1.5
3536	1100	4.8	150	11	3.5	170	1.5
3543	830	4.6	130	15	4.6	80	2.7
3544	400	8.8	360	34	6.0	205	5.4
3545	610	8.1	160	18	5.4	- 40	3.3

	Ba ppm	Ca. %	Cr ppm	Cu ppm	Fe%	La ppm	Mg %
3547	560	6.0	280	21	4.1	- 40	3.4
3548	700	5.2	160	17	3.7	65	2.9
3553	1500	6.6	440	125	4.8	60	5.4
3555	1230	2.2	115	12	3.0	55	1.1
6503A	30	12.0	480	-7	3.9	- 40	6.6
6504	850	4.5	100	9	2.8	- 40	2.1
6505C	1000	5.6	205	36	5.2	62	4.7
6505F	840	9.2	380	39	4.9	54	4.7
6511	940	3.8	150	24	3.3	- 40	2.7
6513	670	5.4	320	67	5.2	70	3.8
6514	1150	8.0	300	80	5.6	73	4.3
6516	550	6.1	450	33	6.0	- 40	4.3
6518	1020	4.4	120	12	3.1	56	2.4

	Mn %	Ni ppm	Sc ppm	Sr ppm	Ti%	V ppm	Y ppm	Zr ppm
3500A	0.07	32	16	720	0.42	120	30	160
3500B	0.06	44	21	570	0.42	116	20	150
3501B	0.08	72	28	540	0.50	168	32	155
3501C	0.08	22	16	830	0.48	115	-20	140
3502B	0.09	32	24	750	0.72	190	28	250
3504	0.09	52	24	600	0.50	185	45	125
3508	0.07	32	17	640	0.55	120	-20	170
3512C	0.07	270	40	31	0.04	105	-20	50
3513	0.07	35	16	700	0.45	98	-20	180
3514	0.08	35	16	800	0.54	118	-20	180
3525A	0.06	10	14	550	0.70	120	-20	190
3526A	0.07	260	20	580	0.72	135	-20	170
3526B	0.06	28	19	680	0.43	81	-20	140
3527A	0.08	540	22	500	0.41	140	-20	150
3527B	0.09	100	26	700	0.61	165	40	140
3528	0.09	125	25	470	0.90	180	45	145
3530	0.06	23	13	940	0.74	145	20	360
3536	0.06	27	22	820	0.50	105	50	250
3543	0.09	23	18	530	0.60	108	116	180
3544	0.14	150	31	450	0.68	216	250	130
3545	0.10	46	20	630	0.70	155	30	200
3547	0.08	56	19	480	0.52	120	40	160
3548	0.07	37	16	520	0.47	108	-20	200
3553	0.08	140	20	880	0.73	205	-20	450
3555	0.03	29	11	950	0.38	68	25	280
6503A	0.09	480	34	48	0.03	76	-20	50
6504	0.07	21	11	760	0.42	82	-20	140
6505C	0.08	43	21	750	0.64	150	-20	200
6505F	0.10	47	24	900	0.66	190	28	185
6511	0.06	35	13	700	0.42	90	66	195
6513	0.09	150	19	580	0.66	117	30	200
6514	0.09	54	24	980	0.54	86	27	220
6516	0.08	200	22	540	0.96	143	30	195
6518	0.06	27	14	610	0.39	88	20	160

Analyses of Iron Ore Concentratesfrom W. Kimberley, W.A.

by

T.I. Slezak

Twenty iron ore concentrates from W. Kimberley W.A., submitted by D. Gellatly, were analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for Cu, Co, Cr, Mn, Ni, Ti, and V.

The analytical method was as follows:

Two parts of sample were mixed with one part of granite and six parts of graphite (National Carbon Company Type L4160 Grade SP-2). The mix was loaded into a preformed graphite electrode (National Carbon Company Type L4260) and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal standard and rock standard control were used. On previous experience with this method for the analysis of similar materials it is estimated that the values given for elements are within 10% of the true values.

Sample No.	Cu ppm	Co ppm	Cr ppm	Mn %	Ni ppm	Ti %	Vppm
1053	586	94	26	0.03	52	0.03	50
2137	25	16	26	-0.02	42	0.18	31
2138	24	18	30	0.02	39	0.13	44
2139	19	-10	20	-0.02	15	0.15	29
2140	58	31	9	-0.02	12	0.07	18
2141	30	-10	44	-0.02	30	0.07	26
2142	31	-10	5	-0.02	18	0.13	32
2243	43	22	52	-0.02	39	0.02	34
2144	54	22	258	0.02	38	0.03	281
2145	107	10	220	0.02	25	1.10	2192
2146	1933	74	77	0.12	81	0.21	311
2147	71	103	438	0.03	300	0.08	536
2148	58	223	272	0.03	630	0.05	806
2149	39	97	446	-0.02	372	0.03	146
2150	586	1276	84	0.11	1790	0.09	63
2152	407	139	452	0.03	420	0.05	1732
2153	82	26	85	-0.02	66	0.11	251
2154	23	-10	127	-0.02	15	0.02	33
4038	30	-10	708	-0.02	36	0.02	22
4039	25	-10	53	-0.02	21	0.02	23

Mineral Identification

by

G.H. Berryman

Two (2) samples from Cloncurry area. N.W. Qld, were submitted by G. Derrick for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube Cu. K. alpha
R.M. 4	Mult. 1	T.C. 4
Chartspeed 1°-20/min.		Disc. Ch. 12
Slits 1°	div. 1°	rec-filter Ni
Chart range 8° - 80°		

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3
L7.56.4	Quartz	Brochantite	Chalcocite
C12a 36.10	Dolomite	Fluor? Edenite	Calcite

Mineral Identification

by

G.H. Berryman

One (1) sample from South Coast N.S.W. beach sands was submitted by W.B. Dallwitz for Mr. G.F. Clarke for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV	40	mA	24	Geiger Tube	Cu K. alpha
R.M.	4	Mult.	1	T.C.	4
Chartspeed	1°2θ/min			Disc. Ch.	12
Slits	1°	div.	1°	rec-filter	Ni

Chart range 8°-80°

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.

1

2

1

Ilmenite

Zircon

Mineral Identification

by

G.H. Berryman

One (1) sample from "Red Sandstone Cliff" Coen Area, Queensland, was submitted by D. Palfreyman for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows:

kV	40	mA	24	Geiger Tube	Cu K. alpha
R.M.	4	Mult	1	T.C.	4.
Chartspeed	1°	2θ/min.		Disc. Ch.	12
Slits	1°	div. 1°		rec-filter	Ni

Chart range 8° - 80°

The determinations were made by comparing the unknown pattern with standard A: S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified are as follows.

Sample No.	1	2	3
67480551	Idocrase	Albite	Diopside

BEACH SAND SAMPLE - SOUTH COAST OF N.S.W.

(Near Narooma)

by

W.B. Dallwitz

Mr. G.F. Clarke collected a sample of "black sand" from the south coast near Narooma, and it was examined optically and by X-Ray diffraction.

The heavy minerals amount to 64.7% by weight.

So far as can be ascertained from optical examination, the heavy fraction of the sample consists of about 75% opaque minerals. The most abundant of the remaining constituents is zircon. Other minerals present are tourmaline, rutile, epidote, garnet, andalusite, topaz, spinel, corundum, and (?) monazite. A little magnetite was detected with a strong hand magnet.

The only minerals to show up on an X-Ray diffraction chart prepared by G.H. Berryman were ilmenite and zircon. The others were completely masked, partly because some of their strong peaks coincided, or almost coincided, with peaks from ilmenite and zircon.

The heavy fraction of the sample may contain about 75 percent ilmenite, 12 percent zircon, and 2 or 3 percent rutile. J. Ward advises that this is not typical of southern N.S.W. sands, which normally contain about 40 percent rutile, 35 percent zircon, and 25 percent ilmenite and other heavy minerals.

The sand may have come from a river, or some typical pocket fed by a source rich in ilmenite. The economics of this deposit would, because of its large ilmenite and low rutile content (and always assuming adequate tonnage to warrant capitalization), almost certainly depend on the ilmenite having a low enough Cr_2O_3 content to be usable.

HEAVY MINERAL CONCENTRATES FROM NEAR PALAWAN, PHILIPPINE ISLANDS

by

W.B. Dallwitz

Three samples of heavy mineral concentrates from near Palawan, Philippine Islands, submitted by E. Macdonald through L.C. Noakes, have been studied by X-Ray diffraction, electron microprobe, direct-reading optical spectrograph, and petrographic and mineragraphic methods. Three polished thin sections were prepared. Those taking part in the work were S.E. Smith, R.N. England, G.H. Berryman, T. Zapasnik, and W.B. Dallwitz.

Macroscopically all three samples consist of black minerals and a yellowish mineral. The yellowish mineral in sample P1 is appreciably darker than that in samples P2 and P3. Furthermore, samples P2 and P3 are appreciably coarser than P1.

Volume percentage mineral compositions, estimated from microscopic observations and X-Ray diffraction results, are tabulated below:

<u>Sample</u>	<u>Allanite</u>	<u>Monazite</u>	<u>Sphene</u>	<u>Ilmenite</u>	<u>Zircon</u>	<u>Topaz</u>
P1	60	24	2	12	2	-
P2	80	1+	15	2	tr	2
P3	80	1+	15	3	tr	1

Allanite is the most abundant mineral in all three samples. It is pleochroic from strong brownish red to pale buff, and commonly shows multiple and simple twinning. Zoning is conspicuous in quite a few grains. Interference figures from suitably oriented grains showed that the allanite can be either biaxial positive or biaxial negative with a high optic axial angle. One zoned grain was found to be optically positive in the centre; the zone immediately outside the core was optically negative with a high optic axial angle, and the outermost zone was optically negative but with a somewhat smaller optic axial angle.

Sphene in samples P2 and P3 is mostly pale yellow to almost colourless in thin section, but a few grains are grey, light brown, or golden brown and pleochroic. These darker varieties are also present in sample P1, and probably account for about half the sphene in that sample.

Topaz is colourless and biaxial positive, and was not found in sample P1.

The coarsest sample is P2, and the finest, P1. Grains in all samples, especially P2, show little sign of rounding, and have obviously not been transported far. Allanite and sphene sometimes show good crystal shapes. Grain sizes are very uneven, especially in P2, and this makes visual estimation of percentages difficult; micrometric analysis would be much more satisfactory.

Electron microprobe results for some of the minerals are set out below:

<u>Mineral</u>	<u>Element</u>	<u>Radiation</u>	<u>Count rate per second</u>
<u>Allanite</u>	Ca	K α	520
	Ce	L α 1	250
	Fe	K α	480
	Si	K α	625
	Al	K α	180
<u>Sphene</u>	Ca	K α	400
	Ti	K α	1000
	Si	K α	300
<u>Zircon</u>	Zr	L α	560
	Hf	L α	30
<u>Monazite</u>	Ce	L α 1	1000
<u>Ilmenite</u>	Ti	K α	2400

Counts for Al and Si on topaz were slightly less than those obtained for these elements on a kyanite standard, as would be expected from the presence of OH and F in topaz.

Gamma-ray and secondary X-Ray activity for the whole sample is small, but corresponds to a Th + U of about 2%.

Mineral Identification

by

G.H. Berryman

Three (3) nodular samples from the Pacific and Southern Oceans were submitted by L.C. Noakes and J.N. Casey for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV	40	mA	24	Geiger Tube	Cu K. alpha
R.M.	4	Mult.	1	T.C.	4
Chartspeed	1°-20/min			Disc. Ch.	12
Slits	1°	div.	1°	rec-filter	Ni

Chart range 8°-80°

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.			1	2	3
Nodule No.	1	inside	Quartz	Muscovite	Zeolite (tr)
"	"	1 outside	Quartz	Zeolite(tr)	
"	"	2 inside	Quartz	Zeolite(tr)	Plagioclase (tr)
"	"	2 outside	Quartz	Zeolite(tr)	
"	"	2 in/outside	Quartz	Zeolite(tr)	
"	"	3 inside	Zeolite (species P). Zeolite (type K-H)		
"	"	3 outside	non crystalline structure		

Mineral Identification for Cape York Party

by

G.H. Berryman

Three (3) samples from the Coen area North Queensland were submitted by W.F. Willmott for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV	40	mA	24	Geiger Tube	Cu. K. alpha
R.M.	4	Mult.	1	T.C.	4
Chartspeed	1°-20/min			Disc. Ch.	12
Slits	1°	div.	1°	rec-filter	Ni

Chart Range 7°-80°

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
No 66480333	Tremolite	Chlorite	Albite	Quartz
67480339	Quartz	Biotite	Almandite	
67480060	Dolomite	Calcite		

GOSSAN ANALYSIS

by

T.I. Slezak, J. Weekes and C. Robison.

Mr. D.G. Campbell of 44 Cockburn Street, Curtin, submitted a gossan sample from a linear outcrop, measuring about 50 feet in length, on his property in the Yass District. All the element determinations were made by optical emission spectroscopy, except for Zn; this was determined by atomic absorption spectroscopy. The following element values, in p.p.m., were obtained:

Cu (700), Zn (180), Pb (100), Cr (about 150), Co (45), Ni (75), V (35), Ti (500), and Mn (1000). In addition, the following elements were sought but not detected: - Ba, Ca, La, Mg, Mo, Sc, Sn, Sr, Y, and Zr.

Mineral Identification of Boron bearing rockin B.M.R. Alice Springs, No 3.

by

G.H. Berryman

Three (3) samples from B.M.R. Alice Springs No 3, were submitted by A.T. Wells for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

KV	40	mA	24	Geiger Tube	Cu.K. alpha
R.M.	4	Mult.	1	T.C.	4
Chartspeed	1°20/min			Disc. Ch.	12
Slits	1°	div.	1°	rec-filter	Ni

Chart range 8°-80°

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	* 4
69660500	Gypsum	Dolomite	Quartz(tr)	*
69660501	Gypsum	Dolomite	Quartz(tr)	*
69660502	Gypsum	Dolomite	Quartz	*

* Probably Pentahydroborite (tr)

* Positive identification of this mineral could not be made as peak intensities were small and some lines were obscured by those of the other minerals present.

Mineral Identification of Kunkar like
concretionary rock from Gosses Bluff

by

G.H. Berryman

One (1) sample from the outer rim N.W. of Gosses Bluff N.T. was submitted for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube	Cu.K. alpha
R.M. 4	Mult. 1	T.C.	4
Chartspeed 1°-20/min		Disc. Ch.	12
Slits 1°	div. 1°	rec-filter	Ni

Chart range 8°-80°

The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3
G. 26	Magnesite	Quartz(tr)	Chlorite(tr)

ANALYSIS OF OCEAN-FLOOR MANGANESE NODULES

by

T.I. Slezak

Three manganese nodules from the Southern and Pacific Oceans, submitted by L.C. Noakes, were analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for Ba, Ca, Co, Cr, Cu, Fe, Mn, Ni, Sr, Ti, and V.

The nodules were dried at 105°C for three hours. The outer zone of each was separated from the core of the nodule. Some difficulty was experienced in obtaining satisfactory samples for analysis as, in some cases, complete separation was not achieved. However, the samples obtained are reasonably representative of core and of crust. Each sample was ground in an agate mortar to pass 120 mesh sieve.

It was necessary to dilute the samples to obtain satisfactory results. Except for 1A which was analysed undiluted, the cores were diluted 1 : 10 with B.M.R. granite D52/4/3, and the crusts 1 : 20 with the same material. Graphite (National Carbon Company Type L.4160, Grade SP-2) was mixed with the diluted sample in the proportions of two parts graphite : 1 part sample. The mix was loaded into a pre-formed graphite electrode (National Carbon Company Type L.4260) and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal standard and rock standard control were used.

The samples analysed and their element contents are as follows:

- 1A. stony core from rough nodule from Southern Ocean.
- 1B. black crust around 1A.
- 2A. yellow core from rough dredge sample from Southern Ocean
- 2B. black crust around 2A
- 2C. black core and black crust from same locality as 2A
- 3A. yellow core from big nodule from Pacific Ocean
- 3B. black crust.

	Ba	Ca	Co	Cr	Cu	Fe	Mn	Ni	Sr	Ti	V
	ppm	%	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm
1A.	1194	0.65	75	39	82	1.9	0.37	153	60	0.15	54
1B.	3540	4.32	2485	147	1618	17.9	17.66	5546	1420	1.14	323
2A.	230	1.53	139	73	594	13.2	0.35	546	76	0.64	74
2B.	2847	3.27	2527	84	1303	17.9	24.17	12350	790	0.72	449
2C.	4800	4.11	5698	126	1471	15.8	21.86	9200	1084	0.72	365
3A.	1587	2.20	910	168	820	11.6	4.01	2480	475	0.51	197
3B.	3288	3.27	13195	42	1660	24.2	27.32	5420	1315	1.35	659

The values obtained for the elements are in reasonable agreement with those quoted by other analysts for similar materials, see Mero, 1962; Bonatti and Joensuu, 1966; Gager, 1968; Skoruyakova and Andrushchenko, 1968; Johnson and Glasby, 1969.

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Zn Content of Molonglo River Water

by

H.R. Lord

The following results were obtained for the determination of the Zinc content of nine water samples from the Molonglo and Queanbeyan Rivers, collected 6th August, 1969 and submitted by Mr M. Elliott of the Department of the Interior.

Location	ppm Zn (total)
A	0.03
B	8.0
C	5.1
D	1.87
D ₂	2.28
E ²	0.02
F	2.11
G	0.30
H	0.15

The sampling points are as follows:-

- A Molonglo River 5 miles upstream from Lake George Mine
- B Molonglo River immediately downstream from Lake George Mine
- C Molonglo River at Hoskinstown - Bungendore Rd. turn off
- D Molonglo River at the 11-mile turn off
- D₂ Molonglo River at Burbong Bridge
- E² Queanbeyan River at Queanbeyan
- F Molonglo River at Sutton - Queanbeyan Road, Bridge.
- G Molonglo River at Duntroon bridge
- H Lake Burley Griffin

IDENTIFICATION OF MINERALS IN WEATHERED
LIMESTONES AND SANDSTONES FROM GOSSES BLUFF,
NORTHERN TERRITORY.

by

G.H. Berryman

Twenty-two (22) samples from Gosses Bluff, Northern Territory, were analysed by X-Ray Diffraction, the analyses being carried out with a Philips P.W. 1051 X-Ray Diffractometer, using the following operating conditions.

kV 40 mA 24 Geiger Tube Cu.K. alpha
R.M. 2 & 4. Mult 1. T.C. 4.
Chart speed 1° 20' /min. Disc. Ch. 12.
Slits $\frac{1}{4}$ ° & 1° div. 0.02 mm. rec-filter Ni.
Chart Range 5° - 80°

The determinations were made by comparing the unknown patterns with standard A: S.T.M. index patterns and standard mineral patterns.

The results obtained, with the minerals identified in order of relative intensities are as follows.

Sample A:

Location: Slopes of low Pertnjara outcrop, North of Bluff.
Description: Heavy, pale pinkish-brown to white.
Minerals: Magnesite. Quartz (tr.).

Sample B:

Location: Approximately 2 miles east of Bluff, near landing strip.
Description: Speckled, brown to white, fine-grained and porous.
Minerals: Dolomite, calcite (tr), quartz (tr.).

Sample C:

Location: Pertnjara outcrop, North of Bluff, south of Areyonga road.
Description: Heavy, white to yellowish.
Minerals: Magnesite, dolomite (tr.).

Sample D:

Location: Pertnjara outcrop, near Mount Pyroclast.
Description: Greyish-brown, with white to yellowish veining.
Minerals: Calcite, quartz (tr), dolomite (tr).

Sample E:

Location: Road into Gosses Bluff, near landing strip.
Description: Yellowish-white to pinkish-grey, fine grained sandstone.
Minerals: Quartz, calcite, dolomite.

Sample F:

Location: Road into Gosses Bluff, near outer wall.
Description: White to reddish-brown, many sand-sized grains.
Minerals: Quartz, dolomite, calcite, hematite (tr.).

Sample G:

Location: 1-mile East of Bluff, South of road in.
Description: White to buff, fine grained sandstone.
Minerals: Quartz, kaolinite (tr.).

Sample H:

Location: Inside Bluff, half mile West of 1967 base camp.
Description: White to buff coloured.
Minerals: Calcite, quartz, dolomite (tr.).

Sample I:

Location: North West of Bluff, near Areyonga road, between Bluff and outer rim.
Description: Heavy, white to creamy-yellow.
Minerals: Magnesite, calcite.

Sample J:

Location: Slope of Mount Pyroclast.
Description: White to yellow cryptocrystalline chert.
Mineral: Quartz.

Sample K:

Location: Outer rim, South West of Bluff, near Mount Pyroclast.
Description: Grey to reddish-brown sandstone.
Minerals: Quartz, calcite.

Sample L:

Location: Creek crossing on Areyonga road, North of Bluff.
Description: Heavy, white to yellow, iron stained.
Minerals: Magnesite, hematite (tr.).

Sample M.

Location: Inner south wall of Bluff.
Description: Red ferruginous sandstone.
Minerals: Quartz, hematite (tr.).

Sample N:

Location: Inside Bluff "Water Hole " area.
Description: Partly fused, powdery white sandstone.
Mineral: Quartz.

Sample O:

Location: Approximately half mile East of 1967 base camp.
Description: Pale yellowish-brown fine grained sediment with ferruginised jointing.
Minerals: (1 Rock) - Calcite, dolomite, quartz (tr), goethite (tr.).
(2 Jointing) - Goethite, quartz, calcite, dolomite (tr.).

Sample P:

Location: Inside Bluff, North side fossil beds.
Description: Reddish fossiliferous limestone containing "Orthis Leviensis".
Minerals: Dolomite, calcite, quartz (tr.).

Samples, Q, R, S.

Location: Mount Pyroclast
Description: Similar to "J" but not as granular.
Mineral: Quartz.

Samples T, U.

Location: Pertnjara outcrop North of Bluff, North of Areyonga road.
Description: Heavy, white to creamy-yellow.
Mineral: Magnesite.

Previous analyses of materials from this area are the subject of B.M.R. Laboratory Reports Nos. 54, 58, and 82, issued 1969.

COPPER ANALYSIS OF ORES FROM OVERHANG
AND MARRABA SIDING, QUEENSLAND.

by

C.W. Claxton

Samples of copper bearing material from the vicinity of Overhang and Marraba Siding, Queensland, were submitted on July 5th, 1969, by G. Derrick, to determine the copper content.

The solutions. obtained from the hydrochloric acid digestion, were analysed by atomic absorption spectroscopy yielding the following results: -

<u>Sample No.</u>	<u>% Cu.</u>
6. 56. 4	38. 0
6. 56. 30a	38. 0
6. 57. 22a	38. 5
6. 57. 32	45. 5
6. 57. 32a	20. 0

Identification of minerals inChristmas Island Phosphates

by

G.H. Berryman

Thirty - (30) samples from Christmas Island were submitted by H. Lord for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer, with the operating conditions as follows.

kV 40	mA 24	Geiger Tube	Cu.K. alpha
R.M. 4	Mult. 1	T.C.	4
Chartspeed 1°	-2θ/min	Disc. Ch.	12
Slits 1°	div. 0.02mm	rec-filter	Ni

Chart range 10°-45°

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
205	Fluorapatite - Millisite - Crandallite			
207	Fluorapatite - Crandallite - Millisite			*
208	Crandallite - Millisite - Fluorapatite			
209	Crandallite - Millisite Fluorapatite (tr)			*
211	Crandallite - Millisite			*
220	Crandallite - Millisite			*
228	Crandallite - Millisite			*
229	Fluorapatite Crandallite Millisite			
230	Fluorapatite Crandallite(tr) Millisite (tr)			
233	Fluorapatite			
234	Fluorapatite Crandallite Millisite Calcite (tr)			*
236	Fluorapatite Crandallite Millisite			
238	Fluorapatite Millisite Crandallite Calcite (tr)			*

Order of relative intensities cont.

Sample No.	1	2	3	4
240	Crandallite	Millisite	*	
244	Crandallite	Millisite	Fluorapatite(tr)	
250	Crandallite	Millisite	Fluorapatite(tr)	
259	Crandallite	Millisite	Fluorapatite(tr)	
260	Fluorapatite	Crandallite	Millisite	
265	Fluorapatite			
270	Fluorapatite	Calcite		
271	Fluorapatite	Calcite	Millisite	Crandallite *
272	Crandallite	Millisite	Fluorapatite	Calcite(tr) *
273	Crandallite	Millisite	Fluorapatite	*
274	Crandallite	Fluorapatite	Millisite	*
275	Fluorapatite	Crandallite	Millisite	*
276	Fluorapatite	Millisite	Crandallite	*
277	Fluorapatite	Crandallite	Millisite	
282	Fluorapatite			
288	Fluorapatite	Calcite(tr)		
296	Fluorapatite	Calcite		

* denotes possible presence of Dolomite.

Analyses of Lateritic soils
from Western Samoa

by

T.I. Slezak

Five samples (5) from Western Samoa, submitted by Mr. Leo Stach, Chief, Mineral Resources Development Section, U.N.E.C.A.F.E., were analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for Ba, Ca, Co, Cr, Cu, Fe, La, Mg, Mn, Ni, Sc, Sr, Ti, V, Y, and Zr.

Two aliquots were taken from each sample and reduced to -120 mesh using a Siebtechnik mill. One aliquot was ground in a tungsten carbide vessel, the other in a chrome-plated one. Each was analysed for the above elements, but the values for Co in the aliquots ground in the tungsten carbide were vessel disregarded, as were those for Cr from the chrome-plated one.

The samples were dried at 105°C for 4 hours and ignited at 900°C for 5 hours. The analytical method used was adapted from Ahrens and Taylor ("Spectrochemical Analysis", 1961 p. 189). One part of sample was mixed with two parts of graphite (National Carbon Company Type L4160 Grade SP-2). The mix was loaded into a preformed graphite electrode (National Carbon Company Type L4260) and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal and rock standards were used. It was necessary to dilute the samples to obtain satisfactory results for Fe, Cr, Ni, and Ti. The samples were diluted 1:9 with B.M.R. granite D52/4/3, and mixed with graphite in the proportion 1 part diluted sample: 2 parts graphite, and arced as described above.

- | | |
|--------------|--|
| Sample No. 1 | Laterite from Fagaloa Pass, 2 miles west of inner end of Fagaloa Harbour, Upolu Island. |
| Sample No. 2 | Laterite soil from roadside cut about 6' high, taken about $\frac{1}{2}$ mile N of sample 1. |
| Sample No. 3 | Salani Laterite in Roadside cut about 20' high, approximately 1 mile off south of transmission station south of Apia. Sample taken 6' from top of cutting on eastern side of road. |
| Sample No. 4 | Salani Laterite, location as for example 3. Sample taken 12' from top of cutting. |
| Sample No. 5 | Salani Laterite, location as for sample 3. Sample taken 15' from top of cutting. |

Sample	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	La ppm	Mg %
1	200	-0.30	112	658	135	+20	250	0.50
2	430	-0.30	90	597	125	+20	180	1.20
3	80	-0.30	71	1400	140	+20	185	0.25
4	190	-0.30	130	1600	160	+20	135	0.80
5	350	-0.30	194	1200	150	+20	210	0.60

	Mn %	Ni ppm	Sc ppm	Sr ppm	Ti %	V ppm	Y ppm	Zr ppm
1	0.24	1700	42	80	3.3	475	40	560
2	0.13	400	40	230	4.3	330	70	630
3	0.10	635	62	-30	3.9	660	46	470
4	0.12	1500	51	-30	3.6	520	54	400
5	0.21	1900	50	-30	2.7	435	75	310

Loss on ignition (105°C - 900°C)

1	12.50%
2	11.60%
3	17.50%
4	15.20%
5	13.40%

ANALYSES OF RECENT SEDIMENTS FROM MILNE BAY, T.P.N.G.

by

T.I. Slezak

Thirty one samples from Milne Bay, T.P.N.G., submitted by D. Jongsma, were reduced to -120 mesh in an agate mortar and analysed by optical emission spectroscopy on the Hilger and Watts 3 metre Polychromator for Ba, Ca, Co, Cr, Cu, Fe, Mg, Mn, Ni, Sc, Sr, Ti, V, Y, and Zr.

The analytical method used was adapted from Ahrens and Taylor ("Spectrochemical Analysis", 1961, p.189, Addison-Wesley Publishing Company). One part of sample was mixed with two parts of graphite (National Carbon Type L4160 Grade SP-2). The mix was loaded into a preformed graphite electrode (National Carbon Company Type L4260) and arced as the anode in a constant current (8 amps) D.C. arc for 130 seconds. Both internal standard and rock standard control were used.

Lab. No.	Sample No.	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	Mg %
320	302	225	4.5	45	320	88	6.8	2.3
321	303	120	4.0	50	200	110	8.2	2.1
322	304	110	5.8	100	230	115	9.7	2.0
323	305	60	7.6	55	155	95	7.0	2.2
324	306	40	4.1	40	170	100	8.2	2.2
325	207	120	5.6	80	190	95	7.3	2.1
326	309	100	6.8	50	180	80	5.9	2.0
327	310	160	+10.0	28	170	24	3.3	2.5
328	311	- 40	+10.0	15	56	14	1.1	2.2
329	312	- 40	+10.0	12	62	21	1.6	1.9
330	313	80	+10.0	17	77	60	2.1	2.1
331	314	100	+10.0	13	64	26	1.7	1.9
332	315	52	+10.0	16	62	16	1.5	1.7
333	316	150	+10.0	18	60	21	1.4	1.3
334	318	- 40	+10.0	20	50	34	1.0	2.0
335	319	140	+10.0	25	54	30	1.0	2.1
336	320	110	+10.0	27	50	16	0.8	1.9
337	321	- 40	+10.0	19	55	15	1.7	1.7
338	322	- 40	+10.0	13	100	12	1.0	2.3
339	324	100	+10.0	25	60	14	2.4	2.2
340	326	- 40	+10.0	11	35	8	0.3	2.3
341	327	120	+10.0	32	130	50	4.3	2.2
342	328	180	9.0	58	165	90	7.1	2.2
343	329	120	+10.0	25	97	37	3.7	2.1
344	331	210	+10.0	16	86	40	3.5	1.9
345	332	110	9.0	43	150	75	5.8	1.9
346	333	240	9.0	57	170	78	3.0	1.8
347	E567	70	+10.0	16	30	20	0.3	1.2
348	E603	80	+10.0	15	30	13	-0.2	1.2
349	E653	70	+10.0	11	37	12	0.3	1.2
350	E694	110	+10.0	20	40	18	0.3	1.2

<u>Lab.</u> <u>No.</u>	<u>Sample</u> <u>No.</u>	Mn %	Ni ppm	Sc ppm	Sr ppm	Tl %	V ppm	Y ppm	Zr ppm
320	342	0.08	235	36	300	0.56	130	43	140
321	303	0.11	140	40	180	0.58	150	48	180
322	304	0.10	200	54	290	0.60	170	100	220
323	305	0.10	100	44	320	0.55	180	250	160
324	306	0.12	90	40	190	0.54	220	31	200
325	307	0.12	145	56	280	0.60	215	44	280
326	309	0.33	120	37	400	0.44	160	60	260
327	310	0.05	33	37	1150	0.42	96	50	130
328	311	0.03	19	17	1300	0.14	46	31	-100
329	312	0.07	33	16	1100	0.18	52	22	-100
330	313	0.07	33	19	1250	0.19	54	30	-100
331	314	0.05	34	20	1300	0.19	52	33	-100
332	315	0.05	31	18	1200	0.17	52	31	-100
333	316	0.05	30	17	1200	0.13	48	37	-100
334	318	0.05	23	20	1650	0.07	42	48	-100
335	319	0.04	29	20	1500	0.12	46	43	-100
336	320	0.03	34	21	1400	0.13	51	34	-100
337	321	0.05	26	18	1220	0.08	39	34	-100
738	322	0.03	25	21	1500	0.13	54	35	-100
339	324	0.05	27	20	1200	0.08	42	43	-100
340	326	0.02	10	15	1500	0.05	29	25	-100
341	327	0.27	70	23	900	0.37	120	25	-100
342	328	0.25	110	39	640	0.43	160	84	210
343	329	0.12	56	23	800	0.32	85	28	100
344	331	0.14	64	16	600	0.30	78	33	280
345	332	0.20	100	35	540	0.46	160	40	130
346	333	0.22	120	41	520	0.43	160	120	220
347	E567	0.03	18	18	1300	0.06	32	46	-100
348	E603	0.03	16	16	1200	0.07	36	28	100
349	E653	0.02	13	17	1200	0.04	37	37	-100
350	E694	0.03	24	19	1200	0.07	41	40	100

Analysis of Water Samplesfrom Kimberley ResearchStation, W.A.

by H.R. Lord

The following results were obtained for the analysis of two water samples from Kimberley Research Station, submitted by Dr P.C. Owen.

Sample No.	24 Top dam site		5 Channel water	
pH		7.8		8.3
Specific conductance at 23°C (micromho/cm)		1105		548
	ppm	me/lt	ppm	me/lt
Ca	23	1.15	19	0.93
Mg	32	2.61	25	2.10
Na	171	7.44	68	2.96
K	7	0.17	42	0.03
Total cations	2.33	11.37	113	6.02
HCO ₃	224	3.68	264	4.00
CO ₃	nil	nil	nil	nil
Cl ₃	268	7.58	76	2.14
SO ₄	20	0.42	9	0.20
Total anions	512	11.68	349	6.34

Identification of minerals in stones and paintsused by the natives of the Gadio area, South Sepik region, N.G.

by

G.H. Berryman

Twelve (12) samples from the South Sepik district, T.P.N.G. were submitted by J. Bain on behalf of Mr. Mark Dornstreich, Department of Anthropology, University of Columbia, U.S.A., for mineral identification by X-Ray Diffraction. Descriptions of the samples and their localities, based on information supplied by Mr. Dornstreich and Mr. Bain are given in Appendix I.

The analyses were carried out on a Philips P.W. 1010 generator source with ancillary Philips counting and supply modules using the following operating conditions. Cu.K alpha radiation, at 40 K.V., 24 mA, 1° Slits and Ni filter, Goniometer speed being 1°-20/min.

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.

1.	Quartz,	Oligoclase,	Chlorite,	Muscovite.
5.	Quartz,	Hematite (tr),		
14.	Hematite,	Goethite,	Chlorite (tr),	
15.	Quartz,	Hematite (tr),		
16.	Quartz,	Albite,	Hematite (tr) Chlorite (tr).	
17.	Calcite,	Quartz (tr)		
20.	Gibbsite,	Hematite,		
23.	Quartz,	Chlorite,	Illite	
25.	Quartz,	Chlorite,	Gibbsite,	Illite
32.	Oligoclase,	Hematite		
49.	Quartz,	Oligoclase (tr) Chlorite (tr) Illite (tr)		
57.	Oligoclase, Quartz,	Chlorite,	Hematite (tr)	

APPENDIX I

General location of the sample area is the headwaters of the Wagupmeri River, approximately 75 km. south east of Ambunti, in the South Sepik district. Ambunti 1.250,000 sheet area.

- Sample 1. A flat grey river stone, used by a Gadio man to sharpen his steel axe.
- Sample 5. Reddish-brown flint stone, found at the Momboyiotyo living site. People - Gadio.
- Sample 14. Ferruginous paint stone, crushed and mixed with water then used for body paint, called "Humangiri".
- Sample 15. Dark brown flint stone, same locality as 5.
- Sample 16. Powdery orange coloured sand stone, same use as 14.
- Sample 17. Soft grey stone, crumbles easily, from the Upper Korosmeri River. The Gadio people use it to make the lime eaten with betel nut.
- Sample 20. A soft dark red paint stone, used as for 14 and 16. Obtained from the Upper Korosmeri River, near Yafe Creek.
- Sample 23. Yellowish grey clay pebble. The natives nibble on these pebbles with a consequent loss of appetite.
- Sample 25. Soft whitish clay like material. Used as a body paint, or for whitening arrows and other objects. Called Khaveni.
- Sample 26. Flat reddish brown "griddle" stones, used for frying sago. The Gadio women collect these stones from an outcrop on the Khabaris Creek.
- Sample 49. Grey flint like stone from the Momboyiotyo living site, less common than 5 and 15.
- Sample 57. Flat white to reddish brown "griddle" stone. Used as for 32.

Zinc content of Molonglo River Water

by
H.R. Lord

The following results were obtained for the determination of the Zinc content of nine water samples from the Molonglo and Queanbeyan Rivers collected on 2nd October, 1969 and submitted by Mr M. Elliott of the Department of the Interior.

Location	Zn ppm (total)
A	<0.02
B	5.9
C	5.7
D	1.32
D ₂	1.20
E ²	0.05
F	0.89
G	0.10
H	0.16

The sampling points are as follows:-

- A Molonglo River 5 miles upstream from Lake George Mine
- B Molonglo River immediately downstream from Lake George Mine
- C Molonglo River at Hoskinstown - Bungendore Rd. turn off
- D Molonglo River at the 11 mile turn off
- D₂ Molonglo River at Burbong Bridge
- E² Queanbeyan River at Queanbeyan
- F Molonglo River at Sutton - Queanbeyan Rd. bridge
- H Lake Burley Griffin

ANALYSIS OF CHIP SAMPLES FROM
CAMERON RIVER, CLONCURRY, QUEENSLAND

by

A.D. Haldane

The following results were obtained for the determination of copper in twenty seven samples from the Cameron River, Cloncurry. The samples were submitted by G. Derrick.

Following digestion with 5N HCl, Cu was determined by atomic absorption spectrophotometry.

<u>Sample</u>	<u>Cu %</u>
69200110	0.13
111	0.35
112	32.1
113	28.0

<u>Sample</u>	<u>Cu ppm</u>	<u>Sample</u>	<u>Cu ppm</u>
69070052	45 ppm	69070063	180
69070053	50	69070064	90
69070054	55	69070065	95
69070055	95	69070066	40
69070056	60	69070067	80
69070057	60	69070068	315
69070058	26	69070069	145
69070059	50	69070070	35
69070060	145	69070071	55
69070061	1320	69070072	50
69070062	670	69070073	52
		69070074	37

ANALYSIS OF STREAM SEDIMENTS FROM NEW BRITAIN

by

J. Weekes

Forty one samples of stream sediments submitted by R.J. Ryburn of the New Britain Party were examined spectrographically, principally for Cu, Ag and Au.

The following results were obtained. (ppm)

Sample No.	Ni	Cu	Pb	Ag	Au	Sn	V
54 NG 0001	10	50	<10	<0.03	<10	<3	200
0008	20	180	"	"	"	"	300
0016	20	60	"	"	"	"	200
0030	10	60	"	"	"	"	200
0036	50	60	"	"	"	"	300
0038	20	60	"	"	"	"	200
0045	10	60	"	"	"	"	200
0049	30	30	"	"	"	"	200
0521	20	60	"	"	"	"	200
0523 B	10	60	"	"	"	"	300
0527 B	20	60	"	"	"	"	200
0550	20	20	"	"	"	"	300
0551	20	30	"	"	"	"	300
1004	20	30	"	"	"	"	200
1007	20	30	"	"	"	"	200
1009	20	30	"	"	"	"	200
1011	30	30	"	"	"	"	200
1013	20	5	"	"	"	"	200
1024	20	30	"	"	"	"	200
1028	20	60	"	"	"	"	200
1029	30	60	"	"	"	"	300
1036	20	60	"	"	"	"	200
1054	20	30	"	"	"	"	200
1060	20	20	"	"	"	"	200
1062	10	60	"	"	"	"	200
1065	10	60	"	"	"	"	200
54 Ng 1507	10	60	< 10	<0.03	<10	< 3	200
1516	10	30	"	"	"	"	200
1517	20	30	"	"	"	"	200
1518	20	30	"	"	"	"	200
1521	10	60	"	"	"	"	300
2535	30	60	"	"	"	"	300
2538	30	60	"	"	"	"	300
2540	30	60	"	"	"	"	300
2541	30	60	"	"	"	"	300
51 NG 0502	10	60	"	"	"	"	300
0515	10	180	"	"	"	"	200
0516	20	60	"	"	"	"	200
1034	10	60	"	"	"	"	200
2005	10	100	"	"	"	"	300
52 NG 0500	10	30	"	"	"	"	200

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ANALYSIS OF COPPER-BEARING ROCK FROM

PEKO MINE, N.T.

by

A.D. Haldane

The following results were obtained for the trace element analysis of a sample from 980 level, 1300 ft E of main shaft, Peko Mine, Tennant Creek, N.T. submitted by J. Casey.

Following acid digestion, Cu, Ni, Co, Mn Zn were determined by atomic absorption spectrophotometry. Mo and V were determined by the semi-quantitative spectrographic procedure.

<u>Sample No.</u>	<u>69070200</u>
Cu	2.8 %
Ni	80 ppm
Co	60 ppm
Mn	90 ppm
Zn	55 ppm
Mo	100 ppm
V	30 ppm

Spectrographic examination of a panmed concentrate of the sulphide phase showed the presence of the following elements in trace amounts Co, Ag, Mo, Pb, Ni, V, Ti, Mn.

Analysis of Water Samples from Corin Dam, A.C.T.

by

H.R. Lord

The following results were obtained for the analysis of eight water samples from Corin Dam.

Sampling date: 23-7-69

Sample	1	2	3	4
pH	3.5	4.7	6.2	5.3
specific conductance at 23°C (micromho/cm)	695	82	101	68
	ppm me/l	ppm me/l	ppm me/l	ppm me/l
Ca + Mn	1.01	0.10	6.4 0.32	0.15
Mg	31.9 2.63	4.2 0.35	7.7 0.63	4.8 0.40
Na	4.4 0.19	2.2 0.10	3.7 0.16	2.4 0.11
K	< 4 0.1	< 4 0.1	< 4 0.1	< 4 0.1
Σ cations		0.55	1.11	0.66
Cl	2 0.07	2 0.06	2 0.05	2 0.05
HCO ₃	nil	nil	32 0.52	16 0.26
SO ₄	450 9.4	30 0.63	19.5 0.41	19.0 0.40
Σ anions		0.69	0.98	0.71
P ₂ O ₅	2	1	< 0.2	< 0.2
NO ₃	7.3	3.0	< 1	< 1
R ₂ O ₃	132			
Fe	nd	nd	nd	nd
Mn	12.0 0.44	1.0 0.04	nd	0.2
Zn	1.17	0.10	nd	0.02
Cu	0.3	nd	nd	nd
Ni	0.2	nd	nd	nd
Co	0.5	0.2	nd	nd

Sample	5		6		7		8	
pH	5.7		5.6		5.7		6.2	
Specific conductance at 23°C (micromho/cm)	58		63		107		65	
	ppm	me/l	ppm	me/l	ppm	me/l	ppm	me/l
Ca	1.8	0.09	1.2	0.06	0.8	0.04	2.2	0.11
Mg	5.4	0.45	3.6	0.30	5.8	0.48	2.9	0.24
Na	2.5	0.11	6.2	0.27	13.2	0.58	5.1	0.22
K	< 4	0.1	< 4	0.1	< 4	0.1	< 4	0.1
Σ cations	0.65		0.63		1.10		0.55	
Cl	2	0.06	7	0.19	7	0.21	6	0.17
HCO ₃	32	0.52	21	0.34	70	1.14	26	0.42
SO ₄	7	0.15	10	0.21	11	0.23	4.5	0.09
Σ anions	0.73		0.74		1.58		0.68	
P ₂ O ₅	< 0.2		< 0.2		< 0.2		< 0.2	
NO ₃	< 1		< 1		< 1		2.5	
R ₂ O ₃	nd		nd		nd		nd	
Fe	nd		nd		nd		1.0	
Mn	nd		nd		nd		nd	
Zn	0.02		nd		nd		nd	
Cu	nd		nd		nd		nd	
Ni	nd		nd		nd		nd	
Co	0.2		nd		nd		nd	

Sampling points:

- 1 Spring at base of rock spoil adjacent to tunnel outlet portal - Site 1
- 2 Outlet tunnel 527'W - Site 2
- 3 " " 645'E - Site 3
- 4 " " 770'E - Site 4
- 5 " " 925'E - Site 5
- 6 Spring on West bank of Cotter River 200 feet downstream of gauging weir - Site 6
- 7 Spring at base of quartzite outcrop 200 feet downstream of gauging weir - Site 7.
- 8 Spring adjacent to gauging weir on West bank of Cotter River.

Laboratory Report No. 97

15th October, 1969.

ANALYSIS OF A WATER SAMPLE FROM ANTARCTICA

by

H.R. Lord

The following is an analysis of a water sample from the meltwater lakes in the middle part of "Wood point" (Beaver Lake). Sample submitted by A. Medvecky.

pH 6.5
specific cond. 18,520
at 23°C (micromho/cm)

T.D.S. 180°C 15,570

	ppm	me/lt
Ca	900	45
Mg	1390	159
Na	2125	92.5
K	222	5.68
Fe	not detected	
Mn	not detected	
Zn	0.04	

R ₂ O ₃	nil
SiO ₂	70

Cl	6680	188.3
HCO ₃		
SO ₄	1850	38.5

Day book entry 11/06/69

ANALYSIS OF THERMAL WATERS FROM THE TERRITORY NEW GUINEA

by

H.R. Lord

The following results were obtained for the analysis of 6 thermal water samples from, islands in the Territory of New Guinea. submitted by T. Taylor

Sample	1	2	3	4	5	6
Temperature °C		95°C	98°C	88°C	45°C	101°C
pH	6.9	6.2	6.7	2.0	5.5	7.0
Specific conductance at 23°C (micromho/cm)	4,290	4,740	12,150	3,430	17,280	7,090
T.D.S. 180°C (ppm)	3,480	3,450	9,910	1,285	12,460	5,470
	1	2	3	4	5	6
	ppm me/lt	ppm me/lt	ppm me/lt	ppm me/lt	ppm me/lt	ppm me/lt
Ca	337 16.8	40 2.0	80 4.0	8 0.4	232 11.6	10 0.5
Mg	54 4.4	3 0.3	12 1.0	nd	300 24.6	nd
Na	725 31.6	1150 50.4	3075 134	2 0.1	3750 163.0	1925 83.7
K	12 0.3	49 1.3	336 8.6	8 0.2	131 3.4	154 3.9
Fe	n.d.	1.1	n.d.	13.4 0.7	n.d.	n.d.
Al	n.d.	n.d.	n.d.	4.8 0.5	n.d.	n.d.
Mn	n.d.	n.d.	0.5	n.d.	0.6	n.d.
Zn	n.d.	n.d.	0.02	0.01	0.05	n.d.
Σ cations	53.1	54.0	148	2	203	88.1
Cl	1200 33.8	1300 36.7	2990 84.5	7 0.2	6560 185	2170 61.2
HCO ₃	123 2.0	265 4.4	260 4.3	nil	460 7.6	54 0.9
SO ₄	930 19.4	634 13.2	3080 64.1	930 19.4	800 16.7	1260 26.2
Σ anions	55.2	54.4	153	19.6	210	88.3
Σ ions	3200	3687	12,284	1275	11,839	5,767
SiO ₂	119	164	161	282	168	80
R ₂ O ₃	< L2	< L2	< L2	26	< L2	< L2

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Sample locations

- 1 Sambuari Bay, Tatau Island, Tabar Island group.
- 2 Nis Nis Anir Island
- 3 Luise Harbour, (Sample A), Lihir Island
- 4 Luise Harbour, (Sample B), Lihir Island
- 5 Malendok Island, Tanga Island group.
- 6 Waramung, Ambitle Island, Feni Island group.

Laboratory Report No. 99

14th October, 1969

ANALYSIS OF BRINES FROM NW CONTINENTAL SHELF

by

H.R. Lord

The following results were obtained for the analysis of 5 bottom water samples from NW continental shelf, submitted by R. Geijskes.

Sample	1		2		3		4		5	
Depth (metres)	70		325warm		18		182		347	
pH	6.6		6.8		6.5		6.5		6.7	
conductance at 23°C (u mho/cm)	46200		45300		46500		46500		46200	
T.D.S. 180°C (ppm)	37092ppm		36,884		37216		37174		36912	
	ppm	me/l	ppm	me/l	ppm	me/l	ppm	me/l	ppm	me/l
Ca	680	34.2	790	39.5	750	37.5	760	38.2	770	38.5
Mg	1152	94.8	1112	91.5	1136	93.5	1152	94.8	1136	93.5
Na	11750	510	11750	510	11750	510	11750	510	11750	510
K	216	5.5	216	5.5	210	5.4	210	5.4	216	5.5
Fe	nd		nd		nd		nd		nd	
Mn	nd		nd		nd		nd		nd	
Zn	0.14		0.31		0.20		0.05		0.07	
Co	nd		nd		nd		nd		nd	
Ni	nd		nd		nd		nd		nd	
Cu	< 0.1		< 0.1		< 0.1		< 0.1		< 0.1	
Cl	19800	558	19600	553	20200	570	20000	564	19800	558
HCO ₃										
SO ₄	2750	57.3	2840	59.2	2775	57.8	2692	56.1	2745	57.2
P ₂ O ₅	nd		nd		nd		nd		nd	
Density (25°C)	1.0267		1.0265		1.0268		1.0266		1.0264	

nd = not detected

Day book entry 3220

Laboratory Report No. 99

Bottom water samples NW continental shelf. Samples taken
6-8 inches above bottom surface.

	Sample No.	Longitude	Latitude	Depth (metres)
1	E68 - 561	118°55'E	19°17'S	70
2	- 567	118°09'E	18°11'S	325 warm
3	- 648	115°48'E	20°47'S	18
4	- 653	115°49'E	19°32'S	182
5	- 656	115°53'E	19°08'S	347

Laboratory Report No. 100

16th October, 1969.

ANALYSIS OF WATER SAMPLES FROM CORIN DAM, A.C.T.

by

H.R. Lord

The following results were obtained for the analysis of two water samples from Corin Dam.

Sampling date: 2/10/69

	1	2
pH	7.2	8.2
specific conductance at 23°C (micromho/cm)	35	126
	ppm me/lt	ppm me/lt
Ca	3 0.15	25 1.22
Mg	1.1 0.09	0.7 0.06
Na	2.6 0.115	2.3 0.10
K	nil	nil
Σ cations	0.36	1.38
Cl	1 0.028	2 0.064
HCO ₃	18 0.290	71 1.17
SO ₄	3 0.065	8 0.174
Σ cations	0.38	1.41

Sampling points:

1. Drain at base of dam spillway.
2. Drain midway along spillway.

Analysis of Water Samples fromLake George, N.S.W.

by

H.R. Lord

The following results were obtained for the analysis of three water samples from Lake George, N.S.W. Samples submitted by G.M. Burton.

	<u>69270013</u>	<u>69270014</u>	<u>69270015</u>
pH	8.8	8.8	9.0
Specific conductance at 23°C (micromho/cm)	9,610	9,060	10,580
T.D.S. at 180°C (ppm)	6060	5880	7040
	ppm me/l	ppm me/l	ppm me/l
Ca	45 2.24	43 2.15	32 1.61
Mg	112 5.2	110 9.05	138 11.35
Na	2150 95.0	2150 93.5	2440 106
K	7.5 0.19	7.5 0.19	10 0.26
Σ cations	105.1	104.9	
Cl	3025 85.2	2970 83.7	3550 100
SO ₄	358 7.5	317 6.6	457 9.5
HCO ₃	870 14.3	840 13.8	
CO ₃	72 2.4	72 2.4	
P ₂ O ₅	0.65	0.60	
Σ anions	109.4	106.5	
R ₂ O ₃	Nil	Nil	Nil

Analysis of Cement Test SpecimenFrom Corin Dam, A.C.T.

The following results were obtained for the analysis of the outer zone of softening of a cement briquette, that had resulted from immersion of the briquette in water leaking into the outlet tunnel of the Corin Dam, A.C.T.

A number of cement briquettes had been placed in leakage water along the tunnel to determine the effects if any of immersion of concrete in the leakage water. The specimen analysed was No. 25 from chainage 700 feet east wall.

	% air dry
SiO ₂	24.2
Al ₂ O ₃	20.7
Fe ₂ O ₃	9.2
MnO	0.7
CaO	14.8
MgO	1.3
Na ₂ O	0.03
K ₂ O	<0.02
ZnO	0.2
Loss at 950°C	13.2
H ₂ O at 105°C	<u>14.8</u>
	<u>99.3</u>

Carbonaceous Rock from the Albert Hall

Underpass, Acton.

by

C.W. Claxton

A sample of Limestone bearing material taken from the Pedestrian Underpass, Commonwealth Ave, Acton was submitted by D. Purcell on October 10th, 1969, for calcium carbonate determination.

The solution, obtained from the hydrochloric acid digestion, was analysed by double oxalate precipitation.

Sample No.
69360136

73.15% Acid Insoluble
23.25% CaCO_3

5th November, 1969.

Identification of Minerals in Pascoe River siltstones.

by

G.H. Berryman

4 samples from Pascoe River area, Cape York, Qld, were submitted by D. Palfreyman for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips X-Ray Diffractometer. The determinations were made by comparing the unknown patterns with standard A:S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
67480245	Quartz	Muscovite	Chlorite	
67480246	Quartz	Muscovite	Plagioclase	Hematite (tr)
67480407	Quartz	Muscovite		
67480411	Quartz	Muscovite	Albite	

Analysis of Laterites

by

H.R. Lord

The following results were obtained for the analyses of 2 samples from the Victoria River Area. Samples were submitted by I.P. Sweet.

Following digestion with 5N HCl, R_2O_3 and SiO_2 were determined by precipitation and trace elements by atomic absorption spectrophotometry.

	W282	E161
Fe_2O_3	30%	79%
Al_2O_3	9.3%	6.6%
SiO_2	52.2%	11.6%
Cu	2.5 ppm	15 ppm
Co	6.8	8.8
Cd	0.5	1.8
Cr	350	100
Mn	12.5	5000
Pb	10	108
Zn	9.8	640
Ni	3	193
Fe	21%	55%

Identification of Minerals from the Cloncurry area.

by

G.H. Berryman

12 samples from the Cloncurry-Mary Kathleen area N.W. Qld, were submitted by R. Hill for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips P.W. 1051 X-Ray Diffractometer.

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3
69200114	Muscovite	Microcline	Scapolite
69200115	Sphene	Scapolite	
69200116	Pyrrhotite		
69200117	Diopside		
69200118	Anatase	Hematite	
69200119	Scapolite	Quartz	
69200120	Garnet		
69200121	Albite	Malachite	Quartz
69200122	Microcline		
69200123	Spessartite	Quartz	
69200124*	Quartz	Spessartite	Graphite (?)
69200125	Hydroxyapatite		

* Sample 69200124 possibly contains graphite, positive identification difficult due to interference by quartz lines.

Zinc Content of Molonglo River Water

by

H.R. Lord

The following results were obtained for the determination of the Zinc content of 9 water samples from the Molonglo River and Queanbeyan River collected on 3rd November, 1969, and submitted by Mr. M. Elliott of the Department of the Interior.

Location	Zn (ppm) total
A	0.02
B	3.82
C	1.26
D	0.87
D ₂	0.75
E	0.02
F	0.68
G	0.23
H	0.16

The sampling points are as follows :-

- A Molonglo River 5 miles upstream from Lake George Mine
- B Molonglo River immediately downstream from Lake George Mine
- C Molonglo River at Hoskinstown - Bungendore Rd. turn-off
- D Molonglo River at the 11 mile turn-off
- D₂ Molonglo River at Burbong Bridge
- E Queanbeyan River at Queanbeyan
- F Molonglo River at Sutton - Queanbeyan Rd. bridge
- G Molonglo River at Duntroon bridge
- H Lake Burley Griffin

ZINC CONTENT OF MOLONGLO RIVER WATER

by

H.R. Lord

The following results were obtained for the determination of the Zinc content of nine water samples from the Molonglo and Queanbeyan Rivers collected on 4th December 1969, and submitted by Mr M. Elliot of the Department of the Interior.

Location	ppm Zn (Total)
A	<0.02
B	5.8
C	4.7
D	0.46
D ₂	0.44
E	0.03
F	0.43
G	0.06
H	0.13

The sampling points are as follows:

- A Molonglo River 5 miles upstream from Lake George Mine
- B Molonglo River immediately downstream from Lake George Mine
- C Molonglo River at Hoskinstown - Bungendore Rd. turnoff
- D Molonglo River at the 11 mile turn off
- D₂ Molonglo River at Burbong Bridge
- E Queanbeyan River at Queanbeyan
- F Molonglo River at Sutton-Queanbeyan Rd. Bridge
- G Molonglo River at Duntroon Bridge
- H Lake Burley Griffin

IMPURITIES IN ILMENITE CONCENTRATES SHIPPED TO JAPAN IN OCTOBER, 1969

by

B. Labonne

Eight samples of ilmenite concentrates submitted by the Department of Supply, Brisbane, through the Department of National Development, Canberra, have been examined, and impurities in them determined by grain-counting. The samples were taken by the Department of Customs and Excise from a shipment sent from Brisbane to Japan in October, 1969; four of them represent 5000 tons of dry concentrate, and four 5000 tons of wet concentrate.

The following percentage compositions were obtained:

Dry Concentrate

Sample	A	B	C	D	Mean
"Ilmenite"	93.5	91.7	92.6	93.7	92.9
Rutile	3.8	5.6	3.8	3.9	4.3
Anatase	1.2	1.1	1.1	0.5	1.0
Monazite	0.3	0.2	0.2	0.1	0.2
Zircon	0.35	0.4	tr.	0.1	0.2
Cassiterite	0.1	0.1	tr.	-	tr.
Shell fragments	0.75	0.9	2.3	1.7	1.4

Wet Concentrate

Sample	I	II	III	IV	Mean
"Ilmenite"	91.4	91.6	92.3	92.1	91.9
Rutile	2.0	1.7	1.1	2.0	1.7
Anatase	0.4	0.5	tr.	0.2	0.3
Monazite	0.2	0.4	1.2	0.7	0.6
Zircon	2.7	2.7	1.7	2.7	2.5
Cassiterite	0.3	0.5	-	-	0.2
Quartz	2.9	2.5	1.7	1.1	2.0
Shell fragments	0.1	0.1	0.5	0.5	0.3
Corundum	tr.	tr.	tr.	tr.	tr.
Tourmaline	tr.	tr.	0.6	0.6	0.3
Epidote	-	tr.	0.4	-	0.1
Garnet	-	-	0.4	-	0.1
Augite	-	-	0.1	0.1	tr.
Staurolite	-	-	tr.	-	tr.
Hornblende	-	-	tr.	tr.	tr.

The shell fragments were completely dissolved on treating the samples with HCl.

Material counted as "ilmenite" comprises ilmenite and minor quantities of leucoxene, hematite, and possible chromite. Leucoxene mostly forms thin incomplete coatings on ilmenite grains, and it seems likely that few, if any, grains consist entirely of leucoxene. Hematite can be distinguished by a reddish colour in reflected light; some leucoxene coatings have a reddish tinge owing to admixed iron oxide. Any chromite that may be present would be indistinguishable from ilmenite without examination in polished section. Observations on one grain-mount showed that 10.5 percent of the opaque grains are partly coated with leucoxene, or may consist entirely of leucoxene.

ANALYSES OF PHOSPHORITES FROM GEORGINA BASIN
QUEENSLAND.

by

H.R. Lord

The following results were obtained from the analysis of 31 (thirty one) samples from Georgina Basin, Queensland, which were submitted by F. de Keyser.

P₂O₅ content was determined colorimetrically following acid digestion with hydrofluoric/perchloric acids. Trace elements were determined by atomic absorption spectrophotometry, after digestion with hydrofluoric/perchloric/hydrochloric acids.

Sample	P ₂ O ₅ %	Cr ppm	Co ppm	Cd ppm	Na ppm	Fe %	Mn ppm	Zn ppm	Cu ppm	Pb ppm
GP75	2.6	85	2-	0.3-	5	0.25	110	55.5	6.3	10
Mt M _a	29.7	90	2-	1.0	22.5	0.75	306	34.5	45	27.5
D640 ^d	20.4	135	2-	1.8	21.3	0.20	62.5	45.5	32.5	5-
Ardm	32.3	98	6	0.8	22.5	0.69	92.5	68.8	50	50
Phos.Hill	29.2	73	11	0.3-	41.3	2.13	2550	130	42.5	35
GP20	21.6	30	6	2.5	20	0.34	500	1040	20	7.5
Monast. Ck.	8.3	280	7.5	0.8	20	0.49	238	92.5	70	7.5
PC - 1	8.5	35	93	8.3	103	7.0	2400	512	14.8	1300
SC - 2	1.9	175	325	24.5	588	30.8	5780	796	57.5	2120
QP 11	32.3	7.5	21	8.3	50	6.0	2230	1200	47.5	56.7
GP29 - 1	31.2	85	15	15.8	47.5	0.64	10300	1240	45	323
GP29 - 2	31.0	20	9	16.5	20	0.67	552	1155	15	425
GP 90	37.6	98	10	0.3-	32.5	1.28	700	63.2	40	40
GP 97	17.0	73	775	3.4	497	8.0	33200	725	30	243
GP 120	21.2	85	179	6.3	114	7.9	63000	890	45	150
GP 141	31.0	80	18	0.3-	55.8	3.63	875	145	27.5	87.5
GP 228	21.8	75	78	3.4	228	20.6	2460	41.3	45	97.5
GP 293	26.0	0	16	5.5	32.5	4.7	675	568	20	77.5
eQP	38.3	90	2-	1.2	3-	0.44	258	15.5	15	42.5
3b	14.8	55	183	5.5	108	28.2	41300	3430	45	578
3c	0	110	152	8.3	134	14.9	202000	2580	355	263
3d	3.3	63	21	9.2	57.5	3.33	1380	455	135	145
4a ₁	5.1	48	5	0.8	20	0.49	130	56.3	12.5	37.5
4a ₁	27.8	103	10	1.5	18.8	0.38	315	107	12.5	57.5
4b	2.8	2.5	93	1.8	168	36.2	4730	718	105	22.5
4c	22.7	98	5	2.8	21.3	1.98	575	213	40	120
5a	21.5	63	31	0.3-	134	1.43	575	475	42.5	138
5b	34.0	20	7.5	1.0	67.5	1.72	2040	675	10	5-
1127A	7.9	48	2-	1.8	15.	0.51	268	658	32.5	5-
1127B	9.6	140	11	0.8	72.5	1.03	500	72.5	40	5-
1127C	15.2	128	5	0.8	22.5	0.94	275	73.8	45	5-

Samples of Phosphate Rocks submitted for
Trace Element Analyses.

- GP 75. Grey-white microsporite, Hilary Creek, Lady Annie area.
- Mt. M. Pelletal phosphorite. Mount Murray, Duchess district.
- D.640^d Pelletal phosphorite, much Si(± Ca) matrix. 2 miles north of Mount Murray.
- Ardm. Pelletal phosphorite, typical. Ardmore outlier.
- Phos.Hill. Pelletal phosphorite, possibly "-creted" in part. Phosphate Hill, Duchess.
- GP.20 Pelletal phosphorite, probably remanie deposit in Inca Fpr., D-Tree area.
- Monas Creek Siliceous pelletal phosphorite with thin chert laminae, Monastery Creek, Duchess area.
- 8^c-1 Phosphorite rock from palaeo-weathering zone; yellowish and cream.
- 8^c-2 Ibid., dull earthy brown. Both from Galah Creek. Section above Precambrian. D-Tree area.
- QP 11 Phoscrete with small ferruginous spots.
- GP.29-1 Light yellow-brown phoscrete. North bank of Galah Creek.
- GP.29-2 Pale brown phoscrete. Ibid.
- GP.90 Brown phoscrete, disconformity plane over Cmt, West of Thorntonina.
- GP.97 Laminated secondary phosphorite, leached?, yellow S.E. of Thorntonina.
- GP.120 Yellow phoscrete (intermediate stage), slightly Mn-stained. Mount O'Connor.
- GP.141 Brown phoscrete, rubble over Cmt (cf. GP.90), W. of Thorntonina.
- GP.228 Pelletal phosphorite: pellets in Fe₂ matrix. Bean Tree Bore area.
- Gp.293 Weathered leached? pelletal phosphorite, light creamy yellow Yelvertoft area.
- e.QB Partly "phoscreted" pelletal phosphorite, Blazen Creek area.
- 3^b Ochrous microsporite or phosphatic siltstone. Locality GP.11 cf. GP 28. North bank, Galah Creek, Thorntonina region.
- 3^c Manganiferous (?) zone, in microsporite profile.
- 3^d Ochrous or white microsporite and phosphatic sandy siltstone. Possibly directly overlying Precambrian.
- 4^a Microsporite. Outcrop in deep trench, north of D-tree camp. Thorntonina region, at I.M.C's drill hole 141.
- 4^{a1} Sandy layer in above microsporite.
- 4^b Irregular ferruginised patches in the microsporite.
- 4^c Microsporite
- 5^a Microsporite in deep trench, at I.M.C's drill hole 145.
- 5^b Phosphatised chert?
- 1127A Original calcareous phosphorite (nodular remnant)
- 1127B Intermediate, partly leached zone.
- 1127C Silicified bed = siliceous phosphorite.

Identification of minerals in oolites from recent marine sediments.

by

G.H. Berryman.

One sample from the N.W. Continental Shelf, 82m water depth was submitted by Dr. H.A. Jones for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips X-Ray Diffractometer.

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2
68630204	Aragonite	Calcite

Identification of minerals in phosphate rocks,
Cloncurry area, N.W. Qld.

by

G.H. Berryman

Twelve samples from the Thornton district were submitted by F. de Keyser for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips X-Ray Diffractometer.

The determination were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4	5
3.b.	Fluorapatite	Goethite			
3.c.	Quartz	Pyrolusite	Goethite		
3.d.	Quartz	Fluorapatite			
4.a.	Quartz	Fluorapatite	Muscovite	Chlorite	
4.a.I.	Fluorapatite	Quartz	Chlorite	Muscovite	
4.b.	Quartz	Goethite			
4.c.	Fluorapatite	Quartz	Chlorite	Muscovite	
5.e.	Quartz	Fluorapatite	Crandallite		
5.e.I	Quartz.	Fluorapatite	Chlorite	Crandallite	Muscovite
5.e.2	Crandallite	Quartz			
Q.P. 337.a.	Crandallite	Quartz			
Q.P. 337.b.	Crandallite	Quartz			

Identification of minerals in Pre Cambrian rocksfrom the northern margin of the Ngalia Basin.

by

G.H. Berryman

Twelve samples from various localities in the Ngalia Basin. N.T. were submitted by A.T. Wells for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips X-Ray Diffractometer.

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
69660665.1.	*	Magnetite	Calcite (tr)	
69660665.d.	*	Chlorite	Magnetite	Calcite
69660665.e.	*	Muscovite		
69660662.e.	Magnesite	Muscovite (tr)	Chlorite (tr)	
69660665.o.	Magnesite	Calcite		
69660642.B.	Amphibole	(var not determined)		
69660653.	Feldspar	(probably Microcline)		
69660661.	Quartz.	Tourmaline		
69660669.	Dolomite	Quartz	Malachite	
69660669.1.	Magnesite	Calcite (tr)		
69660669.2.	Quartz	Dolomite	Calcite	Muscovite (tr)
69660679.	Magnesite	Calcite (tr)		

* Amphibole = probably Edenite.

Identification of minerals in permatites
from the Barrow-Ok area.

by

G.H. Berryman

Two samples from the Resident Geologist, Alice Springs were submitted by A.T. Wells for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips X-Ray Diffractometer.

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.

69660674 a. Columbite-Tantalite

69660674 b. Columbite-Tantalite

Mineral Identification in partly silicifiedfine grained sandstone

by

G.H. Berryman

1 (one) sample from the Bowen Basin, Queensland was submitted by P. Alcock for mineral identification by X-Ray Diffraction.

The analysis was carried out using a Philips X-Ray Diffractometer. The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1.	2	3
D.A. 45/G	Quartz	Natrojarosite	Chlorite (tr)

Mineral Identification in Beach Sand
from Whicher Range, W.A.

by

Beatrice Labonne

A sample of mineral separated from a beach sand of the Whicher Range was submitted by Mr. Krajtsowitz, Cores and Cuttings Laboratory, Fyshwick, for identification.

Insufficient material was provided to make a positive identification by microscope. The sample was determined by X-ray powder diffraction, and the pattern obtained is in close agreement with that given by Rozenite, $\text{FeSO}_4(\text{H}_2\text{O})_4$ (Jambor and Traill, 1963). Chemical tests for solubility and for the presence of sulphate confirm this X-ray result.

Reference

Jambor, J.L., and Traill, R.J., 1963: On Rozenite and Sider.
Jour. Min. Ass. of Canada V.7, pl. 5, p. 75.

ANALYSIS OF CHRISTMAS ISLAND PHOSPHATES

by

H.R. Lord

The following results were obtained for the analysis of 93 bore-hole samples of rock phosphate from Christmas Island, Field 5. Samples were submitted by M. Hill of B.P.C.

Following acid digestion with perchloric/hydrochloric acids, trace elements were determined by atomic absorption spectrophotometry.

Sample No.	P ₂ O ₅ %	Co ppm	Mn ppm	Cr ppm	Ni ppm	Cu ppm	Pb ppm	Zn ppm	Fe %	Cd ppm
210204	30.5	10	850	305	32.5	72.5	27.5	463	4.95	37.5
205	34.0	7.5	165	188	12.5	35	5	208	2.08	16.3
206	33.5	5	180	220	12.5	40	20	335	2.55	20.2
207	31.8	7.5	775	278	22.5	60	20	423	4.40	34.8
208	28.5	27.5	2680	305	52.5	92.5	32.5	493	6.08	49.3
209	27.0	30	3060	288	55	92.5	40	478	6.37	49.3
210	28.5	30	2950	295	62.5	90	47.5	493	6.80	47.8
211	28.5	30	2850	343	70	97.5	45	518	8.60	46.3
212	28.6	27.5	2700	343	75	97.5	47.5	518	8.35	45
213	28.4	30	2850	330	75	102.5	42.5	530	8.60	45
214	28.4	27.5	2550	330	75	102.5	40	530	8.60	43.8
215	28.5	22.5	2580	320	81.3	100	35	505	8.35	41.3
216	28.5	25	2630	343	90	132.5	35	530	8.35	43.8
217	28.4	22.5	2280	330	83.8	100	35	518	8.48	42.5
218	28.3	22.5	2280	330	85	105	40	518	8.35	41.3
219	28.2	25	2630	350	93.8	107.5	40	518	8.60	42.5
220	28.5	25	2550	343	83.8	108	40	505	8.23	42.5
221	28.4	25	2330	343	83.8	108	45	518	8.35	41.3
222	28.4	25	2250	330	75	95	35	488	8.35	39.3
223	28.5	20	1200	370	73.8	90	37.5	475	8.23	32.8
224	28.5	15	1100	383	70	90	42.5	475	8.35	32.5
225	28.5	7.5	550	480	73.8	85	45	445	8.23	28.8
226	28.4	7.5	500	495	67.5	85	40	433	8.35	27.5
227	28.4	10	550	480	68.8	90	52.5	433	8.13	27.5
228	26.5	7.5	400	420	66.3	90	55	405	8.13	26.8
229	31.6	27.5	600	412	40	70	52.5	320	4.73	38.5
230	37.6	7.5	328	213	2.5	30	0	308	1.48	31
231	37.6	7.5	450	188	25	27.5	0	448	1.15	55.5
232	37.5	5	475	135	35	30	0	670	0.88	53
233	36.4	5	185	57.5	5	22.5	0	625	0.50	58.3

Sample No.	P ₂ O ₅ %	Co ppm	Mn ppm	Cr ppm	Ni ppm	Cu ppm	Pb ppm	Zn ppm	Fe %	Cd ppm
210234	27.7	7.5	725	318	30	70	25	448	4.83	35.8
235	34.7	7.5	273	233	17.5	47.5	20	335	3.28	26.5
236	35.0	7.5	208	203	15	40	0	230	2.63	18
237	35.4	7.5	25	265	12.5	45	12.5	405	2.68	25.3
238	30.0	20	1540	308	45	82.5	17.5	460	5.15	37.8
239	27.5	25	2850	290	52.5	85	32.5	475	5.90	50
240	27.2	25	2970	258	52.5	85	17.5	475	5.90	50
241	27.5	30	3230	290	67.5	103	37.5	480	7.72	45
242	27.7	27.5	3480	298	67.5	100	35	475	7.50	43
243	27.5	27.5	3150	298	65	95	37.5	473	7.40	40
244	27.5	27.5	2850	298	67.5	95	42.5	473	7.72	37.5
245	27.6	25	2150	298	65	87.5	37.5	450	7.50	35
246	28.2	25	2050	315	65	92.5	40	458	7.40	35
247	27.2	25	2150	313	62.5	90	37.5	473	7.63	37.5
248	27.4	25	2580	298	70	92.5	30	458	7.30	37.5
249	27.2	47.5	6470	338	123	115	42.5	543	7.62	55
250	27.2	25	2200	305	67.5	97.5	32.5	458	7.50	32.5
251	27.3	27.5	3050	313	77.5	100	30	473	7.86	37.5
252	27.5	20	2060	330	67.5	97	37.5	458	7.63	30
253	27.5	15	1450	330	65	87.5	32.5	445	7.50	25
254	27.5	15	1300	395	62.5	85	30	438	7.30	22.5
255	27.5	17.5	1300	375	65	87.5	32.5	430	7.70	22.5
256	27.5	20	1380	330	65	90	37.5	445	7.87	27.5
257	27.9	20	1400	313	67.5	87.5	37.5	430	7.50	25
258	27.6	20	1330	325	65	87.5	25	445	7.63	25
259	28.7	22.5	500	378	35	70	25	373	5.75	33.3
260	36.2	7.5	650	225	42.5	50	17.5	604	3.10	48.8
261	37.5	5	375	110	5	30	0	625	1.13	50
262	38.0	5	265	90	22.5	22.5	0	605	0.55	50
263	38.3	5	375	100	15	25	7.5	552	0.53	45.5
264	37.5	0	135	77.5	12.5	20	0	475	0.21	42.5
265	35.4	5	148	77.5	17.5	20	0	475	0.23	40.5
266	35.6	0	75	22.5	2.5	20	0	45.0	0.08	5.0
267	37.0	0	185	60	17.5	20	0	540	0.18	42.3
268	36.5	0	225	67.5	17.5	20	0	640	0.21	38.5
269	36.2	0	190	50	17.5	20	0	490	0.20	31
270	34.5	7.5	183	60	17.5	20	0	510	0.18	27

Sample No.	P ₂ O ₅ %	Co ppm	Mn ppm	Cr ppm	Ni ppm	Cu ppm	Pb ppm	Zn ppm	Fe %	Cd ppm
210271	29.0	2.5	725	273	35	57.5	25	290	3.88	23.8
272	28.2	15	1225	308	52.5	65	17.5	337	4.60	31
273	28.5	22.5	1725	250	47.5	75	17.5	365	5.75	36
274	29.6	12.5	750	380	52.5	72.5	25	365	4.88	33.5
275	31.0	5	550	330	37.5	62.5	27.5	288	4.60	28.8
276	34.5	2.5	333	263	25	47.5	20	223	3.30	22.5
277	35.5	0	140	160	15	35	5	148	1.88	25
278	36.0	0	108	93	10	27.5	0	98	1.00	9.5
279	36.5	2.5	67.5	135	2.5	22.5	47.5	80.5	0.99	8.8
280	36.6	7.5	123	135	5	25	7.5	82.5	0.99	8.8
281	38.0	5	70	87.5	0	17.5	0	52.2	0.49	5.8
282	37.5	7.5	600	85	15	30	0	110	1.47	12
283	38.3	2.5	95	70	2.5	15	0	37.5	0.35	4.8
284	38.5	2.5	150	82.5	10	17.5	0	50.3	0.55	6.8
285	37.5	0	65	75	7.5	15	0	41.8	0.33	4.8
286	38.5	0	92.5	52.5	5.0	12.5	0	32	0.20	3.8
287	38.0	2.5	118	92.5	7.5	20	0	44.5	0.54	2.8
288	38.0	5	325	85	25	20	0	650	0.52	48
289	37.6	2.5	113	65	7.5	20	0	44	0.40	9.8
290	38.0	0	45	27.5	7.5	12.5	0	33.5	0.09	7.8
291	38.1	2.5	168	110	17.5	17.5	0	498	0.28	25
292	37.8	0	60	27.5	7.5	12.5	0	32.5	0.06	5.8
293	37.2	2.5	65	37.5	7.5	15	0	28	0.12	2.8
294	36.5	2.5	65	32.5	5	17.5	0	33	0.15	2.8
295	35.5	2.5	115	42.5	7.5	20	0	35.3	0.30	2.8
296	32.5	0	82.5	17.5	10	12.5	0	26.5	0.11	2.8

Values for % P₂O₅ were supplied by British Phosphate Commissioners.

Identification of minerals
from the Corella formation

by

G.H. Berryman.

Seven samples from the Cloncurry area, N.W. Qld. were submitted by G.E. Derrick for mineral identification by X-Ray Diffraction.

The analyses were carried out using a Philips X-Ray Diffractometer.

The determinations were made by comparing the unknown patterns with standard A.S.T.M. index patterns and standard mineral patterns.

The order of relative intensities of the minerals identified follows.

Sample No.	1	2	3	4
69209002	Calcite	Quartz	Dolomite	Chlorite (tr).
69209003	Quartz			
69209004	Quartz	(Sample mainly amorphous)		
69209005	Sphene			
69209006	Baryte			
69209007	Dolomite	Calcite		
69209008	Calcite			

Analysis of Water Samples fromLake George, N.S.W.

by

H.R. Lord

The following results were obtained for the analysis of fifteen water samples from Lake George. The samples were submitted by G. Burton.

Sample No.	pH	Specific conductance at 23°C (micro mho/cm)	T.D.S. 180°C (ppm)
69270016	7.4	5210	3190
69270017	8.5	9000	6040
69270018	8.6	9000	6060
69270019	8.6	9100	
69270020	8.5	9260	6070
69270021	8.6	9000	6080
69270022	8.3	9150	6080
69270023	8.4	9310	6110
69270024	8.3	7940	5170
69270025	8.4	8900	5810
69270026	8.4	6300	4240
69270027	7.1	1760	
69270028	7.4	3800	
69270029	8.1	4940	

(cont'd)

Sample	0016		0017		0018		0020		0021	
	ppm	me/l	ppm	me/l	ppm	me/l	ppm	me/l	ppm	me/l
Na	1140	49.6	2190	95.2	2190	95.2	2190	95.2	2190	95.2
K	5	0.13	7	0.18	7	0.18	5	0.13	7	0.18
Ca	40	2.0	62	3.1	66	3.3	60	3.0	64	3.2
Mg	61	5.04	103	8.50	103	8.50	105	8.66	103	8.50
Sr	0.8		1.1		1.1		1.1		1.1	
Cu		less than detection limit					0.07 ppm			
Mn		less than detection limit					0.05 ppm			
Zn		less than detection limit					0.02 ppm			
Co		less than detection limit					0.17 ppm			
Total cations		56.77		106.98		107.18		106.99		107.08
Cl	1572	44.3	3060	86.4	3072	86.8	3090	87.3	3044	85.8
SO ₄	184	3.83	316	6.58	316	6.58	326	6.79	316	6.58
{ HCO ₃		9.76		16.17		16.34		16.40		16.47
{ CO ₃										
P ₂ O ₅	0.2		0.7		0.7		0.7		0.7	
F	0.7		1.2		1.2		1.2		1.2	
NO ₃	10		6		8		8		4	
Total anions		57.89		109.15		109.72		110.49		108.85

(cont'd)

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Sample	0022		0023		0024		0025		0026	
	ppm	me/l	ppm	me/l	ppm	me/l	ppm	me/l	ppm	me/l
Na	2220	96.5	2190	95.2	1860	80.8	2040	88.7	1510	66.7
K	10	0.26	10	0.26	10	0.26	5	0.13	5	0.13
Ca	64	3.20	60	3.0	54	2.7	60	3.0	46	2.3
Mg	103	8.50	105	8.66	91	7.51	100	8.25	75	6.19
Sr	1.3		1.3		1.1		1.3		1.1	
Cu		less than detection limit					0.07	ppm		
Mn		less than detection limit					0.05	ppm		
Zn		less than detection limit					0.02	ppm		
Co		less than detection limit					0.17	ppm		
Total cations		108.46		107.12		90.27		100.08		75.32
Cl	3052	86.0	3068	86.5	2614	73.5	2910	82.0	2130	60.2
SO ₄	328	6.83	318	6.62	288	6.00	308	6.42	242	5.04
HCO ₃		16.47		16.34		11.52		15.60		11.52
CO ₃										
P ₂ O ₅	0.8		0.7		0.4		0.6		0.2	
F	1.2		1.3		1.0		1.2		0.8	
NO ₃	8		9		5		5		4	
Total anions		109.30		109.46		91.02		104.02		76.76

ANALYSIS OF WATER SAMPLES
FROM CORIN DAM, A.C.T.

by

H.R. Lord

The following results were obtained for the analysis of six water samples from Corin Dam.

	1.	2.	3.	4.	5.	6.
Sampling date	28/10	31/10	3/11	5/11	10/11	17/11
pH	3.6	3.6	3.1	3.1	3.1	3.3
Specific conductance at 23°C (micro mho/cm)	608	619	1900	1730	1360	1000
NO ₃ (ppm)	20	10	30	28	30	16
P ₂ O ₅ (ppm)	0.02	0.08	0.26	0.10	0.06	0.04
F (ppm)	0.35	0.78	0.84	0.90	0.76	0.63