COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1966/123

REGIONAL GRAVITY TRAVERSES, NORTHERN AUSTRALIA, 1959 - 1963

by

W.J. LANGRON

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CONTENTS

ILLUSTRATION

SUMMARY

Observed gravity values (and elevations where available) are given for stations along eight regional gravity traverses in parts of the Northern Territory and north-western Queensland that have been, or will be (up to the end of 1967), covered by helicopter gravity surveys.

The work was undertaken primarily to assist in the adjustment of the regional gravity network and in some instances to provide some information for the planning of geological or helicopter surveys.

Completion of the reduction of the data will be carried out either when the stations concerned are included in the helicopter gravity programme or when accurate station positions (and in some instances elevations) otherwise become available.

1. INTRODUCTION

This Record discusses the results of regional gravity traverses primarily from the viewpoint of control for, and incorporation in, existing helicopter gravity coverage and helicopter gravity work programmed up to end of 1967. The traverses are shown in Plate 1.

For much of this work, accurate station locations and elevations are not yet available and it may be some time before this information comes to hand. However, all of the gravity data have been reduced to the 'observed gravity' stage. When the stations are included in the areas of helicopter coverage, they are spotted on airphotos - hence accurate station positions (as well as elevations) become available and the reduction to free-air and Bouguer anomaly values can be completed. There seems little point in reducing the observed gravity values to free air and Bouguer anomaly values until these accurate positions become known. In addition to this, reduction of the regional (and other) stations using a density factor of 2.67 g/cm^3 can be accommodated in the computer programme during the general reduction of the helicopter gravity survey data. Therefore for this reason, only 'observed gravity' values are listed in this report.

Since the initial reductions were carried out, the data have been adjusted on the basis of the 1962 revised values at pendulum stations (Dooley, 1965) and more recently on the 'May 1965 Isogal' values (Barlow, in preparation). In the case of the quartz-type meters, all calibration factors have been adjusted on the basis of calibration ranges established by Barlow (1965a).

2. FIELD WORK

Gravity readings were taken along eight traverses in Queensland and the Northern Territory between 1959 and 1963. Descriptions of each traverse are given below; the results are listed in eight appendices.

Wyndham to Newcastle Waters (Appendix A)

The traverse was read in September 1960 by A. Douglas of the Darwin Uranium Group of the BMR. The preliminary reduction used a tie made by Radeski (Neumann, 1964) between Newcastle Waters (station L128) and Daly Waters pendulum station (P.S.) No. 33. Further work by M. Helfer (pers. comm.) of the Scripps Institution of Oceanography and A. Douglas in 1960 strengthened the gravity tie between L128 and Daly Waters.

Worden gravity meter No. 260 with a revised calibration factor of 0.10850 milligal per scale division was used for the work.

In 1962, the traverse was spirit levelled by surveyors from the Commonwealth Department of the Interior. However, it has not been possible to finalise the reduction of the gravity data because of the lack of accurate base-maps for some of the 4-mile areas that were traversed.

Alice Springs to Tennant Creek (Appendix B)

This traverse was read in October 1960 by A. Douglas (unpublished data) using Worden gravity meter No. 260 with a revised calibration factor of 0.10868 milligal per scale division.

Douglas occupied stations at the original ('old') 5-mile pegs along the Stuart Highway between the 5-mile post (near Alice Springs) and

the 325-mile post (near Tennant Creek). The only exceptions are that readings were not taken at the 'old' 155-mile post and 165-mile post; instead, readings were taken at the 'new' 800-mile post and the 'old' 164-mile bench-mark.

Helfer (pers. comm.), using La Coste gravity meter No. 1, occupied P.S. No. 35 and P.S. No. 34 and stations at Aileron, Barrow Creek, and Wauchope during a single run. Barlow (1965b) took readings at Department of the Interior bench-marks between Alice Springs and the Strangways Range turnoff. These data are not given in this Record.

Stations along the southern portion of the traverse have been incorporated in the results of the helicopter gravity surveys to date, e.g. Langron (1962) and Lonsdale and Flavelle (1963). Stations along the northern part of the traverse are being incorporated in the results of the 1965 contract helicopter survey (Flavelle, in preparation). It is still necessary, however, to spot several stations on airphotos to obtain accurate positionings.

Tennant Creek to Darwin (Appendix C)

Douglas and Helfer read this traverse using conventional looping procedures in October 1960. Douglas used Worden gravity meter No. 260, with a revised calibration factor of 0.10850 milligal per scale division. Helfer (pers. comm.) used the La Coste meter No. 1.

Between Tennant Creek and Adelaide River the 'new' 5-mile posts from the 625-mile post to the 75-mile post were occupied. Exceptions occurred over the section between station L-128 and Daly Waters, where the bench-marks of Traverse 71 (L-128 to 71-17) and B.M. 72-1 were used, and over the section between Fountain Head Siding turn-off and Daly River turn-off, where existing gravity stations D 44, 105-mile post, D 38, and D 36 (Stott & Langron, 1959), were re-occupied. The 110-mile post and the 100-mile post were omitted.

Between Adelaide River and Darwin, Lands and Survey Branch bench-marks were occupied. For these, accurate elevations (but not positions on base-maps) are known.

Five additional ties were made to the gravity survey along the Darwin - Katherine railway line (Stott & Langron, 1959). Some stations read by other observers, e.g. Muckenfuss, Laudon, and Bonini (Woollard & Rose, 1963), were also re-occupied.

Stations north of Tennant Creek are being incorporated in the results of the helicopter gravity coverage and some Bouguer anomaly maps are now available.

Tennant Creek to Newcastle Waters (Appendix D)

This traverse was read by J. van Son (unpublished data) in November 1963, using La Coste gravity meter No. G-20. Readings were taken at bench-marks, levelled by the Department of the Interior, but the bench-marks do not coincide with the 'new' mile posts occupied by Douglas and Helfer on their traverse from Tennant Creek to Darwin.

Accurate station locations are to hand and the gravity data are being incorporated with the final maps of the 1965 contract helicopter gravity survey (Flavelle, in preparation).

Richmond to Tennant Creek (Appendix E)

This traverse was read by J. van Son (unpublished data) in October 1963, using La Coste gravity meter No. G-20. In general, readings were taken at bench-marks, levelled by the Department of the Interior, but stations in the 1963 contract helicopter area (Flavelle, 1964) were also re-occupied.

A short traverse was read between Cloncurry P.S. No. 55 and a railway bench-mark at Kajabbi for the purpose of providing a datum for a semi-detailed gravity survey being made by the BMR in the Kajabbi - Dobbyn area (Smith, 1966).

Elevations are available for this work but accurate locations for most stations are awaited from the 1965 helicopter survey contractor. The results of the regional traverses (with the exception of stations in the Julia Creek and Richmond 1,250,000 map areas) are being included in the 1965 contract helicopter gravity results.

Tennant Creek to Anthony Lagoon (Appendix F)

This traverse was read by J. van Son (unpublished data) in November 1963 using La Coste gravity meter No. G-20. Readings were taken at bench-marks levelled by the Department of the Interior. Because of the onset of the wet season, the northern portion of the traverse could not be completed. However, some stations were re-occupied during the return trip to the Barkly Highway, and because of the additional drift checks that were obtained in this way it is considered that the values given for the observed gravity are reliable.

Here also reduction of the data cannot be completed until accurate plots of the station positions come to hand. These data are being incorporated in the results of the 1965 contract helicopter survey.

Normanton to Newcastle Waters (Appendix G)

This traverse was read by A. Radeski (Neumann, 1964) in November 1959 using Heiland gravity meter No. 58. Readings were taken at bench-marks levelled by the Department of the Interior.

Because of the history of the meter which was used for this traverse, it is not considered that the values of observed gravity along this traverse are as reliable as those given for the traverses already discussed. The values should therefore be treated with some caution; it could well be that they should be replaced by the adjusted helicopter values based on the 'May 1965 Isogal' values of stations within the helicopter survey area when these become available.

In the readjustment of the gravity readings along this traverse, no revision of the gravity meter calibration factor (of 0.1104 milligal per scale division) was made because in the author's opinion any such adjustment would still leave a high degree of uncertainty in the adjustment of the readings.

It is recommended that the data given here should be critically examined before incorporation in the results of the 1965 contract helicopter survey.

Daly Waters to Nutwood Downs (Appendix H)

This traverse was read in September 1960 by A. Douglas (Lonsdale, 1963) using Worden gravity meter No. 260 (revised calibration factor of 0.10850 milligal per scale division).

Some accurate station locations are available from the 1965 contract helicopter survey.

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APPENDIX A

Newcastle Waters to Wyndham Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
L-128	5907.3128		978,439.57	Newcastle Waters
73-1	6007.7001	691.4	435.32	
2	.7002	693.5	431.94	
3	.7003	700.4	428.89	
4	.7004	712.8	419.30	
5	.7005	723.9	419.36	
6	.7006	736.9	420.82	
7	.7007	743.1	411.77	
8	.7008	747.1	411.72	
9	.7009	748.1	411.81	
10	.7010	753.8	411.12	
11	.7011	840.7	408.19	
12	.7012	839.8	411.09	
13	.7013	843.8	411.40	
14	.7014	800.0	415.16	
15	.7015	796.8	417.77	
16	.7016	814.2	416.32	
17	.7017	887.1	412.12	
18	.7018	828.0	417.43	
19	.7019	921.8	409.42	
20	.7020	892.5	409.92	
21	.7021	895.3	408.14	
22	.7022	846.9	411.45	
23	.7023	865.9	410.54	
24	.7024	906.8	403.71	
25	.7025	922.2	400.04	
26	.7026	717.8	411.75	
27	.7027	722.7	410.06	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
73-28	6007.7028	688.1	978,411.74	
29	.7029	630.2	414.08	
30A	.7030	569.3	415.58	
31	.7031	569.6	416.19	
32A	.7032	590.0	413.04	
33	.7033	602.2	408.72	
34	.7034	562.0	407.71	
35	.7035	501.8	407.08	
36	.7036	507.2	403.07	
37	.7037	479.4	403.06	
38	.7038	350.3	409.55	
39	.7039	375.6	409.39	
40	.7040	397.7	409.91	
41	.7041	328.3	415.96	
42	.7042	291.5	416.29	
43	.7043	293.0	414.91	
44	.7044	240.1	415.41	
45	.7045	279.9	421.57	
46	.7046	288.3	423.00	
P.S. No. 31	5099.9931		424.38	Victoria River Downs
73-47	6007.7047	326.1	413.95	
48	.7048	-	400.38	
49	.7049	454.9	395.04	
50	.7050	-	400.41	
51	.7051	280.1	405.87	
52	.7052	306.8	408.71	
53	.7053	320.8	407.66	
54	.7054	380.5	403.58	
55	.7055	452.7	397.96	
56	.7056	403.4	401.90	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
73-57	6007.7057	291.9	978,407.40	
58	.7058	317.4	396.55	
59	.7059	194.0	396.76	
60	.7060	107.3	397.39	
61	.7061	46.0	395.11	
62	.7062	37.3	393.76	
63	.7063	87.9	394.11	
64	.7064	52.7	399.63	
65	.7065	99.9	403.46	
66	.7066	84.2	403.62	
67	.7067	46.9	416.94	
68	.7068	117.8	413.65	
69	.7069	90.0	414.07	
70	.7070	77.4	411.79	
71	.7071	59.6	410.67	
72	.7072	77.9	403.55	
73	.7073	81.9	404.78	
74	.7074	79.5	409.00	
75	.7075	124.8	404.87	
76	.7076	169.2	401.07	
77	.7077	215.3	398.28	
78	.7078	263.0	391.90	
79	.7079	342.2	382.40	
80	.7080	325.2	382.25	
81	.7081	309.0	382.39	
82	.7082	308.9	382.67	
83	.7083	344.4	381.74	
84	.7084	356.9	381.76	
85	.7085	316.1	384.42	
86	.7086	339.6	383.70	
87	.7087	371.6	382.20	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
73-88	6007.7088	343.8	978,385.03	
89	.7089	298.3	388.13	
90	.7090	282.5	389.66	
91	.7091	259.6	393.87	
92	.7092	271.3	393.90	
93	.7093	319.7	394.11	
94	.7094	-	389.46	
95	.7095	407.6	380.90	
96	.7096	428.7	380.06	
97	.7097	335.9	380.44	
98	.7098	309.0	375.85	
99	.7099	284.4	376.16	
100	.7100	306.7	376.27	
101	.7101	271.7	383.07	
102	.7102	253(approx)	384.42	
103	.7103	202.4	387.54	
104	.7104	164.5	397.84	
105	.7105	147.2	403.55	
106	.7106	141.1	407.01	
107	.7107	136(approx)	407.90	
108	.7108	124(approx)	409.66	
109	.7109	116.7	412.03	
110	.7110	112.3	411.47	
111	.7111	92.0	404.41	
112	.7112	99.3	406.35	
113	.7113	97.7	413.92	
114	.7114	139.4	412.36	
115	.7115	71.6	418.33	
116	.7116	60.9	419.45	
117	.7117	50.0	419.95	
118	.7118	41.9	419.23	
119	.7119	47.1	418.83	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
73-120	6007.7120	40.3	978,417.65	
121	.7121	29.6	416.72	
122	.7122	26.8	416.05	
123	.7123	24.2	415.49	
124	.7124	23.4	414.05	
125	.7125	28.3	411.86	
126	.7126	20.4	413.60	
127	.7127	26.5	413.65	
128	.7128	24.6	413.94	
129	.7129	20.6	414.58	
130	.7130	33.8	415.82	
131	.7131	23.8	415.87	
132	.7132	30.1	414.10	
133	.7133	17.6	414.32	
P.S. No. 30	5099.9930		414.63	Wyndham
73-134	6007.7134	26.4	413.99	
135	.7135	36.6	413.40	
136	.7136	12.9	414.08	
137	.7137	20.6	413.47	

APPENDIX B

Alice Springs to Tennant Creek Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
P.S. No. 35	5099.9935		978,654.03	Alice Springs
Alice Springs P.O.	6007.0000		644.81	
M.P. 5	.0005		641.35	
10	.0010		639.84	
15	.0015		649.89	
20	.0020		681.22	
25	.0025		692.22	
30	.0030		686.55	
35	.0035		685.46	
40	.0040		680.76	
45	.0045		679.30	
50	.0050		680.73	
55	.0055		694.63	
60	.0060		695.11	
65	.0065		676.34	
70	.0070		652.74	
75	.0075		631.49	
80	.0080		605.54	
85	.0085		593.49	
89	.0089		588.14	
95	.0095		591.38	
100	.0100		599.63	
105	.0105		604.03	
110	.0110		606.23	
115	.0115		613.71	
120	.0120		623.13	
125	.0125		624.72	
130	.0130		625.76	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
M.P.135	6007.0135		978,629.15	
140	.1040		623.42	
145	.0145		617.53	
150	.0150		614.07	
'New' M.P.800	.6800		618.52	
M.P.160	.0160		621.51	
164	.0164		621.25	
170	.0170		615.34	
175	.0175		604.21	
180	.0180		613.07	
185	.0185		618.13	
190	.0190		620.94	
195	.0195		611.31	
200	.0200		602.50	
205	.0205		596.32	
210	.0210		598.04	
215	.0125		594.77	
220	.0220		586.43	
225	.0225		585.57	
230	.0230		590.00	
235	.0235		593.41	
240	.0240		583.94	
245	.0245		578.84	
250	.0250		562.88	
255	.0255		562.83	
260	.0260		569.14	
265	.0265		566.74	
270	.0270		567.96	
275	.0275		563.71	
280	.0280		554.86	
285	.0285		556.72	
290	.0290		557.60	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
M.P.295	6007.0295		978,559.65	
300	.0300		556.71	
305	.0305		547.06	
310	.0310		535.34	
315	.0315		532.58	
P.S. No. 34	5099.9934		528.92	Tennant Creek

APPENDIX C

Tennant Creek to Darwin Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal) (A. Douglas)	(M. Helfer)	Remarks
P.S. No. 34	5099.9934		978,528.92	978,528.92	Tennant Creek
Muckenfuss Station	6491.0134		528.91	528.85	
M.P.320 (B.M.XXXII)	6007.0320		521.98	521.90	
M.P.325	.0325		514.58	514.41	
625	.6625		519.48	519.30	
620	.6620		517.90	517.76	
615	.6615		528.50	528.45	
610	.6610		531.40	531.29	
605	.6605		530.74	530.56	
600	.6600		516.94	516.81	
595	.6595		517.30	517.11	
590	.6590		513.51	513.35	
585	.6585		511.90	511.73	
580	.6580		501.59	501.50	
575	.6575		502.19	502.15	
570	.6570		497.98	497.93	
565	.6565		498.09	497.99	
560	.6560		491.24	491.17	
555	.6555		485.90	485.84	
550	.6550		480.83	480.79	
545	.6545		476.70	476.70	
540	.6540		482.91	482.86	
535	.6535		476.74	476.68	
530	.6530		469.10	469.13	
525	.6525		467.48	467.46	
520	.6520		463.60	463.59	
515	.6515		460.58	460.57	
510	.6510		463.41	463.37	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal) (A. Douglas)	(M. Helfer)	Remarks
M.P.505	6007.6505		978,455.64	978,455.58	
500	.6500		453.12	453.08	
495	.6495		445.65	445.61	
490	.6490		441.53	441.50	
485	.6485		440.72	440.68	
480	.6480		441.60	441.56	
Road Mk 475	-		439.54	-	
M.P.475	.6475		439.90	439.92	
470	.6470		440.44	440.45	
71-1	5907.7101	783.7	434.67	434.62	
L-128	.3128		439.60	439.51	
71-2	.7102	688.2	429.99	429.92	
3	.7103	722.1	416.72	416.71	
4	.7104	737.1	410.77	410.82	
5	.7105	779.1	404.85	404.98	
(NMC 16) 71-6	.7106	782.2	403.74	403.91	
7	.7107	792.8	403.23	403.31	
8	.7108	769.0	403.92	404.03	
9	.7109	770.9	402.26	402.39	
10	.7110	748.7	402.12	402.26	
11	.7111	783.1	397.45	397.55	
12	.7112	871.5	392.32	392.38	
13	.7113	905.4	383.85	383.93	
14	.7114	870.3	380.36	380.43	
15	.7115	789.1	382.40	382.33	
16	.7116	723.7	386.06	386.06	
17	.7117	689.3	387.02	387.14	
Daly Waters P.O.	6007.2500		389.67	389.73	
Daly Waters Muckenfuss	-		389.19	389.18	

Station	BMR Station No.	Elevated (feet)	Observed gravity (mgal) (A. Douglas)	(M. Helfer)	Remarks
P.S. No. 33	5099.9933		978,389.08	978,389.08	Daly Waters
M.P. 380	6007.6380		386.98	387.00	
375	.6375		384.83	384.84	
370	.6370		383.31	383.28	
365	.6365		383.02	382.99	
360	.6360		382.27	382.25	
355	.6355		379.25	379.22	
350	.6350		373.89	373.88	
345	.6345		371.76	371.73	
340	.6340		368.20	368.23	
335	.6335		361.04	361.14	
330	.6330		356.92	356.98	
325	.6325		355.87	355.92	
320	.6320		347.28	347.36	
315	.6315		344.31	344.42	
310	.6310		345.63	345.72	
305	.6305		351.25	351.30	
300	.6300		361.25	361.33	
295	.6295		348.44	348.49	
290	.6290		350.69	350.72	
285	.6285		364.63	364.60	
280	.6280		361.54	361.53	
275	.6275		359.32	359.27	
270	.6270		351.96	352.00	
265	.6265		347.76	347.81	
260	.6260		345.87	345.90	
255	.6255		336.69	336.70	
250	.6250		328.79	328.80	
245	.6245		325.70	325.74	
240	.6240		324.80	324.93	
235	.6235		338.83	338.91	
230	.6230		341.53	341.66	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal) (A. Douglas)	(M. Helfer)	Remarks
M.P.225	6007.6225		978,341.40	978,341.52	
220	.6220		343.48	343.60	
215	.6215		345.26	345.31	
210	.6210		343.38	343.41	
205	.6205		337.90	337.90	
200	.6200		330.85	330.88	
Railway M.P.200	5706.0194		345.72	345.82	
M.P.195	6007.6195		329.13	329.16	
190	.6190		328.45	328.50	
185	.6185		331.53	331.57	
180	.6180		330.03	330.09	
Railway M.P.180	5706.0186		331.71	331.81	
M.P.175	6007.6175		329.04	329.11	
170	.6170		329.32	329.33	
165	.6165		329.52	329.59	
160	.6160		325.93	326.00	
Railway M.P.162	5706.0181		334.30	334.33	
M.P.155	6007.6155		321.74	321.82	
150	.6150		321.16	321.20	
145	.6145		322.95	323.07	
Pine Creek R.S. Sign Post	5706.0173		325.78	325.83	
M.P.140	6007.6140		324.37	324.39	
135	.6135		322.40	322.43	
130	.6130		310.43	310.41	
125	.6125		314.22	314.17	
120	.6120		322.85	322.85	
115	.6115		331.68	331.67	
D44	5706.0444		330.76	330.74	
M.P.105	6007.6105		320.19	320.14	
D40	5706.0440		323.53	323.42	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal) (A. Douglas)	(M. Helfer)	Remarks
D38	5706.0438		978,314.62	978,314.55	
M.P.95	6007.6095		317.60	317.55	
90	.6090		313.63	313.56	
85	.6085		320.62	320.63	
80	.6080		322.65	322.62	
D36	5706.0436		321.14	321.01	
M.P.75	6007.6075		327.09	327.02	
Northern Territory Survey					
S.H.70	.5070		329.33	329.23	
64	.5064		322.32	322.25	
60	.5060		322.92	322.83	
55	.5055		322.03	321.92	
50	.5050		315.94	315.83	
45	.5045		319.74	319.64	
40	.5040		322.38	322.30	
35	.5035		319.16	319.12	
30	.5030		324.05	324.00	
25	.5025		329.68	329.55	
20	.5020		322.88	322.82	
Railway					
M.P.22	5706.0110		325.99	325.96	
N.T.S.					
S.H.13	6007.5013		316.98	316.87	
10	.5010		317.49	317.38	
P.S. No. 32	5099.9932		316.31	316.31	Darwin
BMR Office	6491.0532		313.96	313.96	Darwin

APPENDIX D

Tennant Creek to Newcastle Waters Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
P.S. No. 34	5099.9934		978,528.92	Tennant Creek
"Old" M.P. 320	6007.0320		521.96	
"Old" M.P. 325	.0325		514.59	
88 - 36	6305.8836	1076.0	517.76	
35	.8835	1019.3	519.51	
34	.8834	983.2	528.45	
33	.8833	1054.6	530.18	
32	.8832	1010.5	530.04	
31	.8831	979.6	528.18	
30	.8830	1052.8	516.79	
29	.8829	962.8	516.83	
28	.8828	1029.4	512.87	
27	.8827	986.3	510.69	
26	.8826	980.2	504.61	
25	.8825	973.2	504.74	
24	.8824	999.0	501.65	
23	.8823	1010.1	498.57	
22	.8822	993.7	496.09	
21	.8821	1001.8	491.84	
20	.8820	965.0	488.17	
19	.8819	958.3	485.78	
18	.8818	1024.6	478.19	
17	.8817	910.6	482.71	
16	.8816	853.2	482.09	
15	.8815	868.2	476.78	
14	.8814	965.0	469.95	
13	.8813	941.1	467.38	
12	.8812	864.4	467.58	
11	.8811	896.2	461.41	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
88 - 10	6305.8810	822.5	978,461.73	
9	.8809	814.9	458.37	
8	.8808	735.2	455.89	
7	.8807	852.3	446.10	
6	.8806	844.6	441.75	
5	.8805	785.4	439.10	
4	.8804	724.2	441.34	
3	.8803	751.3	442.90	
2	.8802	793.1	439.79	
1	.8801	702.6	442.75	
L-128	5907.3128	686.1	439.57	Newcastle Waters

APPENDIX E

Richmond to Tennant Creek Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
57 - 33	6491.1045	703.0	978,615.91	QBM68 Richmond
Y - 1	6305.2301	684.0	618.07	
2	.2302	622.0	624.74	
3	.2303		633.55	
4	.2304	558.0	630.55	
5	.2305	534.1	627.14	
6	.2306	520.0	629.16	
7	.2307	499.8	626.98	
33 - 46	6306.0146		636.62	
Y - 8	6305.2308	476.0	639.97	
9	.2309	500.0	634.22	
10	.2310	433.6	648.85	
11	.2311	410.0	652.80	
12	.2312	409.2	652.87	QBM62 Julia Creek
13	.2313	410.7	654.83	
14	.2314	318.0	663.96	
15	.2315	410.0	661.38	
16	.2316	398.0	662.16	
17	.2317	369.0	666.96	
18	.2318	404.0	661.99	
18A	.2385	447.0	668.52	
19	.2319	416.0	662.54	
33 - 1	6306.0101		668.08	
Y - 20	6305.2320	445.0	661.81	
21	.2321		658.14	
22	.2322		661.84	
23	.2323		666.53	
24	.2324		658.99	
25	.2325		656.78	
P.S. No. 55	5099.9955		651.94	Cloncurry

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
Y - 25	6305.2325		978,656.79	
26	.2326		655.02	
27	.2327	797.8	654.02	
28	.2328	975.0	649.47	
29	.2329	938.8	647.95	
30	.2330	992.4	662.17	
31	.2331	1123.4	652.87	
32	.2332		633.03	
33	.2333		641.38	
34	.2334	1098.0	629.42	
35	.2335	1177.7	630.75	
8 - 7	6491.0262	1157.3	617.74	Mt. Isa
Y - 36	6305.2336	1134.6	614.16	
37	.2337	1205.0	610.79	
38	.2338	1312.7	600.28	
39	.2339	1300.9	587.39	
40	.2340	1237.3	590.49	
41	.2341	1183.6	598.14	
42	.2342	1144.0	589.27	
43	.2343	1049.9	588.16	
44	.2344	990.3	588.87	
45	.2345	958.0	592.04	
46	.2346	954.7	590.15	
47	.2347	925.82	589.75	
48	.2348	1024.88	577.25	
49	.2349	1056.23	573.40	
50	.2350	1088.38	566.60	
51	.2351	1006.53	562.58	
52	.2352	931.98	559.43	
53	.2353	853.16	564.40	
54	.2354	805.98	563.93	
55	.2355	802.51	566.81	
56	.2356	772.6	567.76	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
Y - 57	6305.2357	839.5	978,567.13	
58	.2358	793.9	577.63	
59	.2359	802.9	579.43	
60	.2360	787.1	572.25	
61	.2361	772.6	593.82	
62	.2362	804.9	592.19	
63	.2363	969.2	587.52	
64	.2364	894.6	566.58	
65	.2365	810.8	566.84	
66	.2366	784.8	575.29	
67	.2367	803.7	573.83	
68	.2368	773.2	572.69	
69	.2369	768.9	565.70	
70	.2370	755.8	565.68	
71	.2371	741.9	558.34	
72	.2372	748.9	548.50	
73	.2373		543.65	
74	.2374	783.6	531.73	
89 - 12	.8912	799.0	531.37	
P.S. No. 34	5099.9934		528.92	Tennant Creek
Y - 25	6305.2325		656.78	Near Cloncurry
25A	.2374		642.90	
25B	.2375		640.96	
25C	.2377		643.06	
25D	.2378		652.61	
25E	.2379		651.57	
25F	.2380		256.06	
25G	.2381		642.62	
26H	.2382	507.6	638.31	Railway B.M. Kajabbi

APPENDIX F

Tennant Creek to Anthony Lagoon Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
P.S. No. 34	5099.9934		978,528.92	Tennant Creek
"old" M.P.320	6007.0320		521.96	
"old" M.P.325	.0325		514.59	
88 - 36	6305.8836	1076.0	517.76	
89 - 1	.8901	1051.9	519.72	
2	.8902	1091.4	518.61	
3	.8903	1014.2	530.35	
4	.8904	913.0	530.19	
5	.8905	888.2	525.19	
6	.8906	853.9	527.73	
7	.8907	842.4	530.62	
8	.8908	803.5	531.07	
9	.8909	842.9	529.81	
10	.8910	820.6	530.42	
11	.8911	824.9	531.38	
12	.8912	799.0	531.37	
90 - 1	.9001	793.0	530.20	
2	.9002	779.1	528.39	
3	.9003	766.2	529.65	
4	.9004	731.4	529.97	
5	6491.1055		529.75	Rockhampton Downs HS
6	6305.9006	740.0	526.44	
7	.9007	704.8	527.68	
8	.9008	712.4	513.45	
9	.9009	692.4	512.19	
10	.9010	689.1	509.18	
11	.9011	678.7	510.30	
12	.9012	697.9	506.49	
13	.9013	715.8	499.03	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
90 - 14	6305.9014	696.4	978,497.55	
15	.9015	727.4	492.95	
16	.9016	766.4	485.86	
17	.9017	733.6	484.60	
18	.9018	718.9	485.59	
19	.9019	721.0	478.90	
20	.9020	712.0	474.01	
21	.9021	706.1	474.08	Anthony Lagoon HS

APPENDIX G

Normanton to Newcastle Waters Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
B.M.70	6491.0263	31.2	978,518.84	Normanton
C – 19	5907.1019	–	520.33	
G.S. 3	.2003	31.5	531.67	
4	.2004	50.6	535.21	
5	.2005	21.6	546.81	
6	.2006	26.4	547.69	
7	.2007	10.9	545.53	
8	.2008	41.7	554.58	
9	.2009	50.2	566.03	
10	.2010	63.4	567.12	
11	.2011	74.0	570.93	
12	.2012	117.1	560.92	
13	.2013	105.5	565.27	
14	.2014	77.3	564.04	
16	.2016	56.6	576.66	
17	.2017	62.2	576.52	
19	.2019	55.9	583.72	
20	.2020	45.8	578.78	
21	.2021	50.9	584.14	
22	.2022	43.8	576.14	
23	.2023	32.2	570.59	
24	.2024	17.8	564.35	
25	.2025	22.9	563.38	
26	.2026	20.4	552.57	
27	.2027	9.8	544.87	
B.M.71	6491.1052	17.8	546.31	Burketown
L – 1	5907-3001	13.9	–	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
L - 2	5907.3002	26.6	978,542.70	
3	.3003	36.8	548.30	
4	.3004	41.0	552.90	
C - 12 Army Astro	.0500	51.0	553.22	
L - 5	.3005	51.2	552.88	
6	.3006	57.2	550.64	
7	.3007	72.6	547.52	
8	.3008	80.4	545.91	
9	.3009	89.8	-	
10	.3010	107.6	-	
11	.3011	121.9	-	
12	.3012	136.4	-	
12A	.3512	138.7	539.90	
C-16/L-13	.3013	153.3	541.34	
L - 14	.3014	164.9	541.76	
15	.3015	187.8	538.44	
16	.3016	191.0	-	
17	.3017	237.9	530.65	
18	.3018	243.9	529.80	
19	.3019	236.0	-	
20	.3020	226.8	517.33	
21	.3021	208.5	502.63	
B - 29 Army Astro	-	208.1	-	
L - 22	.3022	213.7	496.03	
23	.3023	235.8	491.45	
24	.3024	273.1	486.39	
25	.3025	222.6	484.48	
26	.3026	184.8	489.98	
27	.3027	177.9	487.35	
28	.3028	163.4	484.99	
29	.3029	165.4	481.59	
30	.3030	173.4	478.01	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
L - 31	5907.3031	186.5	978,474.93	
32	.3032	211.5	474.60	
33	.3033	269.3	469.90	
34	.3034	629.1	445.62	
35	.3035	687.5	440.37	
36	.3036	635.8	440.72	
37	.3037	595.4	441.18	
38	.3038	709.0	434.90	
39	.3039	492.9	448.87	
L - 40	.3040	530.1	446.33	
NMH41/L-41	.3041	610.7	441.64	
L - 42	.3042	623.2	437.70	
43	.3043	473.6	445.76	
44	.3044	548.9	437.91	
45	.3045	590.6	433.89	
46	.3046	509.6	437.24	
47	.3047	461.9	437.53	
48	.3048	449.7	436.97	
49	.3049	342.8	441.46	
50	.3050	255.8	443.93	
51	.3051	190.8	446.57	
52	.3052	205.6	445.42	
53	.3053	293.1	442.17	
54	.3054	178.2	448.70	
55	.3055	164.6	449.05	
56	.3056	147.0	650.50	
57	.3057	118.4	455.08	
58	.3058	103.7	458.24	
59	.3059	86.8	461.53	
60	.3060	75.5	463.04	
61	.3061	79.2	458.90	
62	.3062	31.5	457.02	
63	.3063	47.2	451.43	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
L - 64	5907.3064	97.0	978,446.82	
65	.3065	76.0	443.49	
66	.3066	40.2	444.10	
67	.3067	101.2	438.90	
68	.3068	42.4	444.68	
69	.3069	49.2	444.02	
70	.3070	57.9	445.14	
71	.3071	72.8	446.07	
72	.3072	137.4	444.71	
73	.3073	146.1	446.15	
74	.3074	195.4	443.93	
75	.3075	184.6	446.72	
76	.3076	205.6	449.14	
77	.3077	107.8	463.60	
78	.3078	105.4	462.16	
79	.3079	140.9	462.27	
80	.3080	154.3	462.30	
81	.3081	192.0	457.22	
82	.3082	192.8	455.52	
83	.3083	227.3	445.78	
84	.3084	257.6	437.58	
85	.3085	272.9	437.03	
86	.3086	304.6	444.28	
87	.3087	352.4	445.37	
88	.3088	404.6	443.25	
89	.3089	526.5	433.57	
90	.3090	517.1	431.57	
91	.3091	589.7	417.97	
92	.3092	566.3	419.95	
93	.3093	615.5	411.60	
94	.3094	594.7	410.83	
95	.3095	630.3	408.86	
96	.3096	671.3	408.07	

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
L - 97	5907.3097	621.2	978,406.26	
98	.3098	634.2	404.27	
99	.3099	681.6	400.32	
100	.3100	734.3	398.96	
101	.3101	778.6	398.98	
102	.3102	829.9	393.26	
103	.3103	867.2	399.51	
104	.3104	818.3	406.24	
105	.3105	809.6	408.54	
106	.3106	791.8	412.04	
107	.3107	782.5	415.30	
108	.3108	777.7	418.37	
109	.3109	756.0	423.24	
110	.3110	749.7	425.26	
111	.3111	744.8	425.46	
112	.3112	733.8	426.44	
113	.3113	726.7	425.39	
114	.3114	728.1	420.58	
115	.3115	720.4	415.59	
116	.3116	721.8	411.71	
117	.3117	719.3	407.27	
118	.3118	712.3	404.71	
119	.3119	708.7	405.41	
120	.3120	713.4	405.62	
121	.3121	716.5	408.35	
122	.3122	710.7	413.51	
123	.3123	704.2	416.21	
124	.3124	698.9	418.41	
125	.3125	701.1	419.30	
126	.3126	694.8	426.88	
127	.3127	715.7	433.45	
128	.3128	686.1	439.57	Newcastle Waters

APPENDIX H

Daly Waters to Nutwood Downs Traverse

Station	BMR Station No.	Elevation (feet)	Observed gravity (mgal)	Remarks
P.S. No. 33	5099.9933		978,389.08	Daly Waters
71 - 17	5907.7117	689.3	387.02	
72 - 1	6007.6201	1677.0	388.77	
2	.7202	1713.3	384.79	
3	.7203	1621.0	380.94	
4	.7204	1598.3	377.24	
5	.7205	1502.0	375.00	
6	.7206	1470.4	369.17	
7	.7207	1447.0	370.20	
8	.7208	1382.8	358.05	
9	.7209	1331.9	374.35	
10	.7210	1341.8	376.51	
11	.7211	1421.7	376.11	
12	.7212	1494.2	378.74	
13	.7213	1434.5	381.06	
14	.7214	1340.5	387.35	
15	.7215	1377.5	388.12	Nutwood Downs HS
16	.7216	1353.4	382.87	
17	.7217	1407.3	387.56	
18	.7218	1466.7	387.70	
19	.7219	1408.9	387.04	

PLATE I

C 52 | C 53 | C 54

BATHURST ISLAND 15 | MELVILLE ISLAND 16 | COBOURG PENINSULA 13 | JUNCTION BAY 14 | WESSEL ISLANDS 15 | TRUANT ISLAND 16 | TORRES STRAIT 12

FOG BAY 3 | DARWIN 4 | ALLIGATOR RIVER 1 | MILINGIMBI 2 | ARNHEM BAY 3 | GOVE 4 | JARDINE RIVER 15 | ORFORD BAY 16

CAPE SCOTT 7 | PINE CREEK | MT EVELYN 5 | MT MARUMBA 6 | BLUE MUD BAY 7 | PORT LANGDON 8 | WEIPA 3 | CAPE WEYMOUTH 4

D 52 | D 53 | D 54

MEDUSA BANKS 10 | PORT KEATS 11 | FERGUSSON RIVER 12 | KATHERINE 9 | URAPUNGA 10 | ROPER RIVER 11 | CAPE BEATRICE 12 | AURUKUN 7 | COEN 8

Wyndham | Darwin | Adelaide River | Pine Creek | Katherine | Mataranka

Wyndham 14 | AUVERGNE 15 | DELAMERE 16 | LARRIMAH 13 | HODGSON DOWNS 14 | MT YOUNG 15 | PELLEW 16 | HOLROYD 11 | EBAGOOLA 12

CAMBRIDGE GULF | 73 | 72 | Nutwood Downs

Daly Waters | Victoria River Downs

LISSADELL 2 | WATERLOO 3 | DALY WATERS 1 | TANUMBIRINI 2 | BAUHINIA DOWNS 3 | ROBINSON RIVER 4 | MORNINGTON 1 | CAPE VAN DIEMEN 2 | GALBRAITH 3 | WALSH 4 | RUTLAND PLAINS 15 | HANN RIVER 16

4

DIXON RANGE 6 | LIMBUNYA 7 | WAVE HILL 8 | BEETALOO 6 | WALLHALLOW 7 | CALVERT HILLS 8 | WEST-MORELAND 5 | BURKETOWN 6 | NORMANTON 7 | RED RIVER 8

Newcastle Waters | Anthonys Lagoon | Burketown | Normanton

E 52 | E 53 | E 54

5

GORDON DOWNS 10 | BIRRINDUDU 11 | WINNECKE CREEK 12 | SOUTH LAKE WOODS 9 | HELEN SPRINGS 10 | BRUNETTE DOWNS 11 | MT DRUMMOND 12 | LAWN HILL 9 | DONORS HILL 10 | CROYDON 11 | GEORGETOWN 12

88 | 90 | Rockhampton Downs

BILLILUNA 14 | TANAMI 15 | TANAMI EAST 16 | GREEN SWAMP WELL 13 | ALROY 15 | RANKEN 16 | CAMOOWEAL 13 | DOBBYN 14 | MILLUNGERA 15 | GILBERTON 16

88 | 89 | Tennant Creek

14

LUCAS 2 | THE GRANITES 3 | MT SOLITAIRE 4 | LANDER RIVER 1 | BONNEY WELL 2 | FREW RIVER 3 | AVON DOWNS 4 | MT ISA 1 | CLONCURRY 2 | JULIA CREEK 3 | RICHMOND 4

D1 | Wauchope | 89 | Mt Isa | Cloncurry | Julia Creek | Richmond

STANSMORE 6 | HIGHLAND ROCKS 7 | MT THEO 8 | MT PEAKE 5 | Barrow Creek | ELKEDRA 7 | SANDOVER RIVER 8 | URANDANGI 5 | DUCHESS 6 | MC KINLAY 7 | MANUKA 8

F 52 | F 53 | F 54

BARROW CREEK 6

WEBB 10 | LAKE MACKAY 11 | MT DOREEN 12 | NAPPERBY 9 | ALCOOTA 10 | HUCKITTA 11 | TOBERMORY 12 | GLENORMISTON 9 | BOULIA 10 | MACKUNDA 11 | WINTON 12

Aileron | D1

MACDONALD 14 | MT RENNIE 15 | MT LIEBIG 16 | HERMANNSBURG 13 | ALICE SPRINGS 4 | ILLOGWA CREEK 15 | HAY RIVER 16 | MT WHELAN 13 | SPRINGVALE 14 | BRIGHTON DOWNS 15 | MANEROO 16

Alice Springs

SCALE

100 0 100 200 300 MILES

REGIONAL GRAVITY TRAVERSES, NORTHERN AUSTRALIA 1959 – 1963

LOCALITY MAP SHOWING TRAVERSES

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics **NT/B2–1**

TO ACCOMPANY RECORD No. 1966/123