CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS
DOMINION OBSERVATORIES

PUBLICATIONS

OF THE

Dominion Observatory

OTTAWA

VOLUME XXI No. 1

GRAVITY AND MAGNETIC INVESTIGATIONS ALONG THE ALASKA HIGHWAY

BY

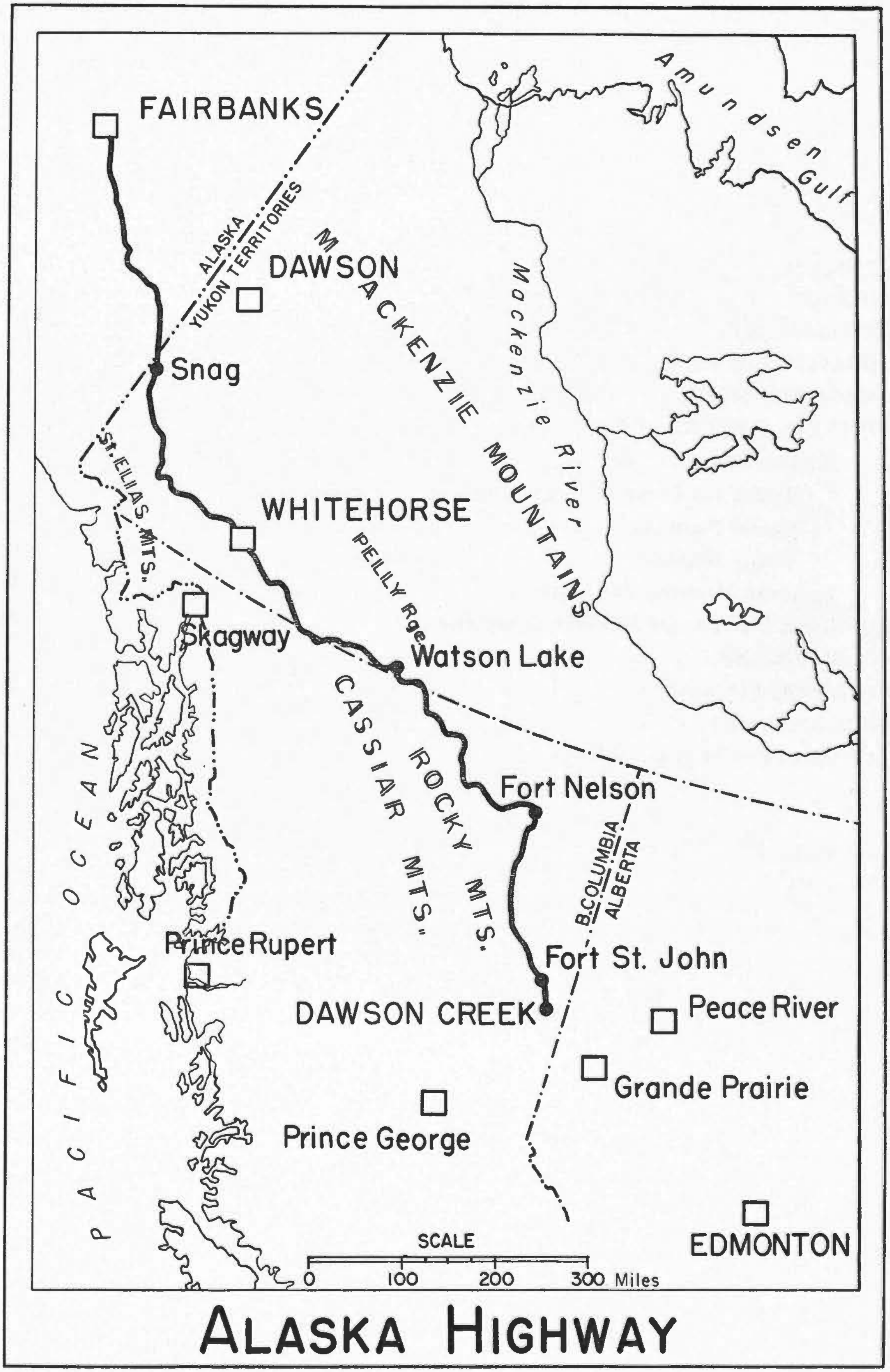
C. H. G. OLDHAM

EDMOND CLOUTIER, C.M.G., O.A., D.S.P.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1958

57658-7—1
600—1262—1958

CONTENTS

Illustrations



FIGHRE 1.—Location Map.

Gravity and Magnetic Investigations Along the Alaska Highway

BY

C. H. G. OLDHAM*

ABSTRACT

A gravity and magnetic survey was made along the Alaska Highway between Dawson Creek, Alberta, and Fairbanks, Alaska, and 296 gravimeter stations were occupied. Ties were made to 10 pendulum stations covering a gravity range of 1486 mgls., and a calibration factor of 0.246804 mgl., per scale division was derived for the gravimeters. A study of profiles of elevation, Bouguer anomaly, magnetic intensity and lithology leads to the following general interpretation. A 60-mgl. negative anomaly across the Rocky Mountains has been attributed to a 16,000-foot crustal downwarp, while an anomaly of similar magnitude but with steeper gradients across the Cassiar Mountains is considered to be due to a mass of low-density granite occurring within the mountain system.

INTRODUCTION

During the summer of 1953 officers of the Dominion Observatory used a long-range geodetic gravimeter to carry out a reconnaissance gravity survey along the Alaska Highway. The purpose of the measurements was threefold; (i) to establish a series of precise gravimeter bases between Lethbridge, Alberta, and Fairbanks, Alaska, to serve as control points for future regional surveys in the area; (ii) to assess the accuracy of the Cambridge pendulum measurements being carried out that summer between Lethbridge and Fairbanks, Alaska, which were to provide a suitable gravity standard for calibration purposes (Garland, 1955); (iii) to extend the gravity and magnetic coverage of Canada in an area where few measurements had previously been made, and to assess the geological implications of the results. In connection with the second objective, gravimeter ties were made between the pendulum sites and principal airports to facilitate future gravimeter calibration.

FIELD PROCEDURE

A long-range North American gravimeter (No. 137) was used to establish base stations at about 25-mile intervals between Lethbridge and Fairbanks. The gravity difference between adjacent base stations was measured using standard looping procedure to remove the effect of instrumental drift. Along the Canadian section of the Alaska Highway (*see* Figure 1) a vertical component Askania magnetic field balance was used to establish magnetic base stations. On the final southbound traverse, both gravity and magnetic stations were established at about 5-mile intervals between the International Boundary at mile 1200, and Dawson Creek at mile zero.†

All gravity readings were made near bench marks of either the Geodetic Survey of Canada or the United States Coast and Geodetic Survey; hence station elevations are not likely to be in error by more than one foot.

Rock samples for density determinations were collected from exposures in the vicinity of the gravity stations, but because of overburden and glacial drift, the sampling was unsatisfactory from the point of view of the gravity interpretation.

*Geophysicist, California Exploration Co., San Francisco, Calif., U.S.A.

†Most places along the Alaska Highway are referred to by their mileage from Dawson Creek, the start of the Highway.

GRAVITY RESULTS

To provide a reliable calibration of the gravimeter, observations were mad Cambridge pendulum stations (Garland, 1955) from Lethbridge, Alberta, to Fai Alaska, over a range of nearly 1500 mgls. It was assumed that the gravimeter b linearly over its entire range, and using a method of least squares the gravimeter were matched with those obtained by pendulum. The resulting calibration factor standard deviation is 0.246804 ± 0.000172 mgl. per scale division.

The relevant quantities used in the calibration are shown in Table I. Co gives the adjusted gravimeter values for the pendulum stations, and in colum differences with pendulum values are listed. The r.m.s. difference between pendul gravimeter results is ±0.9 mgl. and reflects errors in both the gravimeter and pe measurements.

Using this calibration constant and differences between bases, in scale di values of gravity have been obtained for all the base stations between Edmont Fairbanks, relative to the gravimeter values deduced for the Cambridge pendulum st Table I, column 5. Values of gravity for the detail stations, observed on the retu from Fairbanks, have been adjusted to these base station values.

TABLE I

Gravimeter Values at Pendulum Stations

1	2	3	4	5.	
	PENDULUM		GRAVIMETER		GRAV.
Station	g (cm/sec²)	Differences from Lethbridge (mgls.)	Differences in scale div.	Adjusted g (cm/sec²)	n
Lethbridge	980.7612	0	0	980.7617	
Red Deer	980.9988	237.6	961.3	980.9990	
Edmonton	981.1691	407.9	1645.5	981.1678	-
Grande Prairie	981.3195	558.3	2254.3	981.3181	-
Fort St. John	981.4077	646.5	2617.7	981.4078	
Fort Nelson*	981.6832	922.0	3771.0	981.6824	-
Watson Lake	981.7165	955.3	3873.9	981.7178	
Whitehorse	981.7502	989.0	4012.2	981.7519	
Snag†	981.9339	1172.7	4754.1	981.9351	
Fairbanks	982.2477	1486.5	6015.9	982.2465	-

*This station was not included in the least-squares solution because of uncertainty in connection to pendu

†This station was not included in the least-squares solution because it was not part of the looped net.

The principal facts for all stations are listed in the usual manner and appea Appendix. The latitudes and longitudes of the stations were measured from the scale maps available for the area. The error in their determination should not ±0.2 minutes or approximately ±0.3 mgls. in the gravity anomaly. No terrain tions were made; for the majority of stations the terrain effect was estimated to be le

Figure 2. Gravity, Magnetic and Elevation Profiles, Alaska Highway Trave

two-tenths of a milligal. For a few mountain stations it was probably much greater than this, but lack of detailed mapping precluded accurate determinations.

The free air and simple Bouguer anomalies shown in the tables are based upon the International Formula for gravity at sea level and a crustal density of 2.67 gms./cm^3.

MAGNETIC RESULTS

An Askania vertical component magnetometer was used to measure the variations in the vertical component of the earth's magnetic field. The observations were made along the 1,200-mile Canadian section of the Alaska Highway at the same locations as the gravity measurements.

The observations have been converted into gammas using a calibration factor determined prior to leaving Ottawa, with a Helmholtz coil. The results are shown in Figure 2 and are relative to the station at the Alaska-Canadian border.

INTERPRETATION

The combined results, gravity, magnetic and density, are illustrated in Figure 2. To assist in the interpretation the elevation profile and generalized geological section are also indicated. The elevation profile is based upon heights of stations and therefore is not necessarily indicative of the surrounding topography. For this reason mountainous areas are shown schematically in the diagram. The geology profile was compiled from available literature, which included publications of Bostock (1950, 1952); Hage (1944); Williams (1944); Lord (1944); McLean and Kindle (1950); Kindle (1952); Wheeler (1952); and Muller (1954).

Regional Gravity Anomalies

A study of the gravity profile (Figure 2) reveals that four main negative anomalies occur along the Canadian section of the highway. These anomalies, listed in order from Dawson Creek, are: the Trutch negative; the Rocky Mountain negative; the Cassiar Mountain negative; and the Kluane negative.

The Trutch and Rocky Mountain Anomalies

Although these are shown on the profile as two distinct negative anomalies, it appears likely that they are both part of the same anomaly. That this should be the case is more apparent from Figure 3 on which gravity anomalies and physiographic divisions (Bostock 1948) of this portion of the western Cordillera are shown.

For the most part this map is based on gravity data obtained along the highway, but probably represents a first approximation to the gravity field in the area. The Trutch 'negative' coincides with the closest approach of the highway to the Rocky Mountain foothills in the section between Fort St. John and Fort Nelson. Hence it would appear that the Trutch and Rocky Mountain anomalies are both part of the same "negative" and are related to the Rocky Mountains.

Three possible explanations of the negative anomaly associated with the Rockies were investigated. First, the anomaly may be due to a trough-like depression in the underlying Precambrian basement, the axis of the trough coinciding with the axis of the mountains.

Fairbanks Alaska
St. Elias Mountains
Shakwak Valley
Takhini Valley
Teslin Plateau
Cassiar Mountains
Liard Plain
Dease Plateau
Rocky Mountains
Rocky Mt Foothills
Interior Plains
FEET
Elevation
Density of rock sample collected in this locality
Gm/cc
Bouguer Gravity Anomaly
MILLIGALS
Vertical Magnetic Intensity
(Values relative to station at the International border)
(Values relative to station of the International border)
GAMMAS
ΔZ
GEOLOGICAL LEGEND
AGE: LITHOLOGY:
CRETACEOUS ... SANDSTONES, SHALES AND GRITS
CARBONIFEROUS-TRIASSIC ... CALCAREOUS SANDSTONES AND SHALES
MIDDLE SILURIAN-MIDDLE DEVONIAN .. LIMESTONE AND INTERBEDDED SANDSTONE
UPPER DEVONIAN AND CARBONIFEROUS .. SHALES, ARGILLITE, SOME SANDSTONE AND LIMESTONE
LOWER CAMBRIAN ... QUARTZITE
CAMBRIAN ... SANDSTONE
CARBONIFEROUS ... LIMESTONE AND DOLOMITE
JURASSIC OR LATER ... GRANITE
CARBONIFEROUS ... ARGILLITE, SLATE AND PHYLITE
TERTIARY ... BASALT
PRE-CARBONIFEROUS ... GNEISS AND SCHIST
JURASSIC ... TUFF, ANDESITE, ARGILLITE AND SCHIST
UPPER TRIASSIC ... LEWES RIVER GROUP AND METAMORPHOSED EQUIVALENTS, PARTLY SEDIMENTARY AND PARTLY VOLCANIC, GREENSTONES AND SCHISTS
CRETACEOUS AND TERTIARY ... MAINLY GRANODIORITE
PRE-CAMBRIAN ... YUKON GROUP - SCHISTS AND GNEISSES
CRETACEOUS AND YOUNGER ... ANDESITE, DIABASE OR BASALT
DRIFT
CHANGE IN ORIENTATION OF BASE LINE
International Border
White River
Burwash Landing
Kluane
Haines Junction
White Horse
Johnsons Crossing
Teslin
Rancheria
Watson Lake
Lower Post
Liard River Bridge
Muncho Lake
Toad River
Racing River
Summit Lake
Fort Nelson
Trutch
Sikanni Chief River
Fort St. John
Dawson Creek

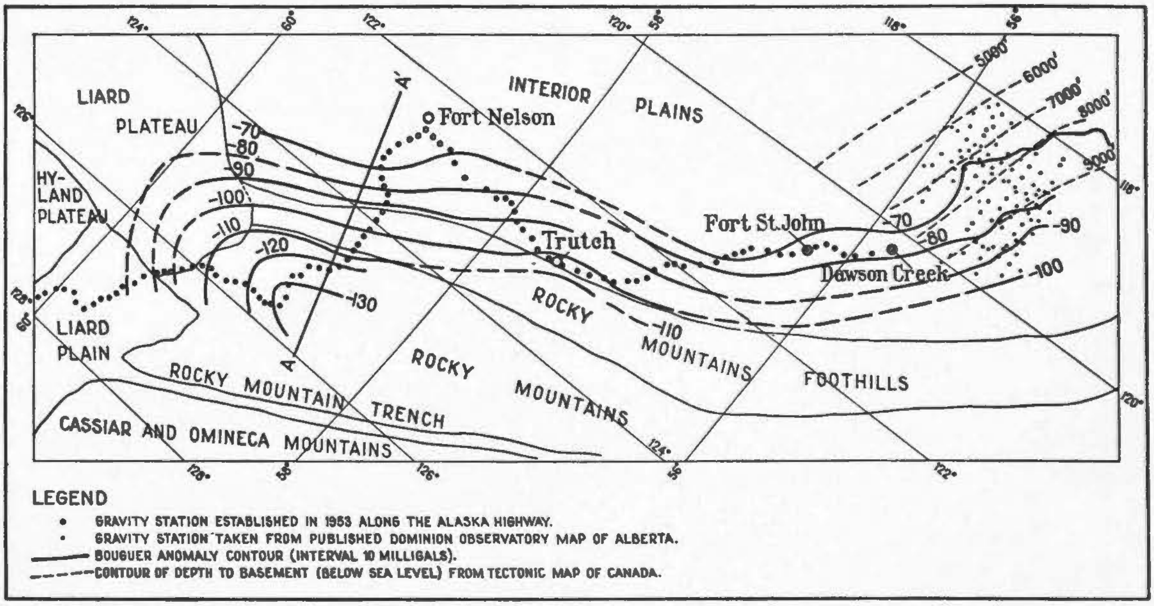


FIGURE 3.—Regional Gravity Map.

A negative anomaly would then occur if the average density of the limestones and other sediments constituting the Rockies were less than the average density of the basement; however, the average density of all the rocks collected from the Rocky Mountain area was 2.69 gm/cc., which is close to the average density usually assumed for basement rocks.

The second possible explanation is that the anomaly arises from a low-density granite core within the mountains. However, no granitic intrusions are known to exist within the Rocky Mountains. According to some geologists (Wilson, 1954) the Rocky Mountains form part of a secondary mountain arc, characteristically formed from great thicknesses of sedimentary rocks, unaccompanied by igneous activity.

A third possible explanation is that the anomaly reflects a thicker crust beneath the mountains. To test the plausibility of such an explanation, a gravity profile (Figure 4) was drawn along the line AA′ (Figure 3) perpendicular to the strike of the gravity contours. Densities of 2.7 gms/cc. and 3.3 gms/cc. were assumed for the crust and underlying mantle, respectively, and an average thickness of 20 miles was taken for the crust. It was found that an undulation having a maximum amplitude of 16,000 feet is sufficient to explain the anomaly. This is a reasonable result and is considered the most likely explanation of the Rocky Mountain anomaly.

The cause of the depression is a matter of interest. It may be due to the isostatic compensation of the Rocky Mountains; on the Airy hypothesis such a root would be expected. Alternatively the depression may be a legacy from the time when the area now occupied by the Rocky Mountains was a sedimentary basin. The association of crustal downwarps with such basins has been the subject of several reports (Glennie, 1932; Skeels, 1940; Woollard, 1940) and it would seem that this is part of the mechanism of their formation.

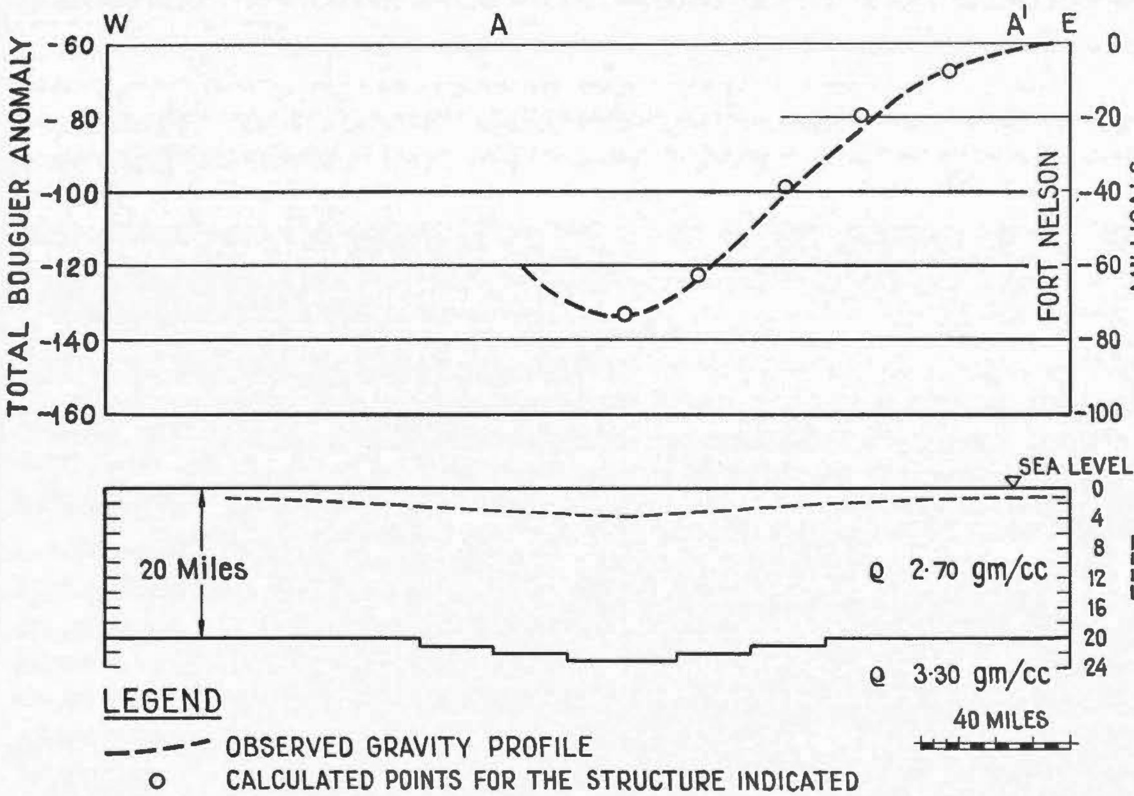


FIGURE 4.—Bouguer Gravity Anomalies across Northern Rocky Mountains, and Structural Interpretation.

The Cassiar Negative

A negative Bouguer anomaly, comparable in size to that encountered in the Rocky Mountain region, was discovered in crossing the Cassiar Mountains. The shapes of the profiles over the two mountain ranges are, however, quite different. The profile across the Rockies has gentle gradients, whereas that across the Cassiars is marked by quite steep gradients. Although the Rocky Mountain anomaly can be explained theoretically by either shallow or deep-seated disturbances, the steep gradient across the Cassiars demands a near-surface origin.

A comparison of the gravity profile with the lithology reveals that the minimum anomaly coincides with outcropping of granite, a part of the Cassiar batholith. Many examples have been reported (Bott, 1953) of granites having negative gravity anomalies associated with them. The densities of all the samples collected from the Cassiar batholith were low, 2.62 gms/cc. on the average. On the other hand, the rocks in contact with the granite, mainly limestones, dolomites and volcanic rocks, all had higher densities. The gravity profile across the Cassiar mountains together with the geological interpretation is shown in Figure 5.

In order to compute the shape of the batholith at depth, average densities were assigned to the two rock groups. The measured value of 2.62 gms/cc. was used for the granite and a value of 2.72 gms/cc. was used for the surrounding rocks. This latter value was based on measured values from field specimens, and a study of rocks of similar composition from other areas.

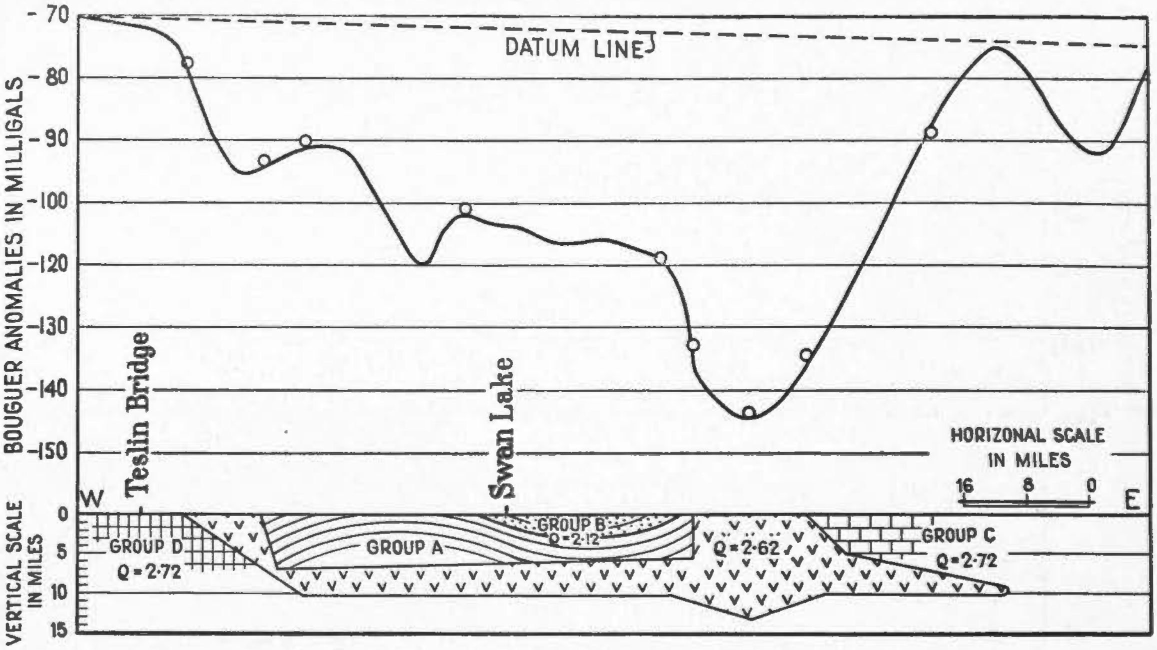


FIGURE 5.—Gravity Profile across Cassiar Mountains, and Geological Interpretation.

A two-dimensional chart (Gassman, 1951) was used in computing the shape of the body. The surface outcrops are known; the length was assumed to be considerably greater than the width and the anomaly variation to be entirely due to the low-density granite in the upper regions of the crust. Such a condition may be considered as a limiting case in which none of the anomaly is due to isostatic compensation and the negative load is supported by the strength of the crust.

The Kluane Negative

The final large negative anomaly along the Canadian section of the Alaska Highway occurs in the vicinity of Kluane Lake and the St. Elias Mountains. It is important in examining both the gravity and magnetic profiles to distinguish between the large local positive and the regional negative anomalies. The positive anomaly occurs where the highway skirts the southern shore of Kluane Lake and in so doing makes a short excursion into the western system of the Canadian Cordillera (Bostock, 1948). Here the western system consists predominately of the high-density volcanic rocks which make up the Kluane range. These rocks have been brought into contact with those of a predominantly granitic character by large scale faulting. A huge linear fault which has been traced the full length of the Shakwak Valley separates these two regions of contrasting lithology. The two stations with positive anomalies lie to the west of the fault and are associated with high-density volcanics. The regional negative anomaly, on the other hand, is more likely to be associated with the effects of the St. Elias mountain range.

The highway never crosses the St. Elias range, but approaches close to it and then diverges in a way similar to the close approach of the highway to the Rocky Mountains, in the section from Dawson Creek to Fort Nelson. In fact, the Kluane negative anomaly is associated with the St. Elias Mountains in much the same manner as is the Trutch anomaly with the Rocky Mountains. These anomalies, however, require different explanations. Whereas the Trutch negative seems best explained by crustal warping beneath the Rockies, the Kluane negative may reflect a granitic core within the St. Elias Mountains. These latter mountains, the highest in Canada, are known to contain an abundance of granite and granodiorite (Sharpe, 1943 and Muller, 1954). It is therefore probable that here, as in the Cassiar Mountains, at least a part of the anomaly is due to low density granitic rocks.

Regional Magnetic Anomalies

A study of the profile (Figure 2) of vertical magnetic intensity reveals many local anomalies superimposed upon a fairly well defined regional field. The main features are: (1) negative magnetic anomalies coinciding with the Trutch and Rocky Mountain negatives, (2) a fairly regular regional decrease from Liard River to about Kluane Lake, and (3) a flat portion of little or no change from Kluane to the International Boundary.

The correlation between gravity and magnetic anomalies at Trutch and across the Rocky Mountains suggests a common origin. However, a correlation also exists between the magnetic intensity profile and the orientation of the Alaska Highway as shown in Figure 1. Whenever the highway trends in a westerly direction, the magnetic intensity decreases; whenever the highway trends in a more northerly direction, the intensity remains approximately stationary. This suggests that the regional magnetic anomalies may be a consequence of the large-scale, world wide, geomagnetic variation (which probably bears little relation to the near-surface geology), and the meandering character of the highway. To further test this hypothesis, a profile was constructed along the line of the Alaska Highway from Vestine's (1947) world map of vertical magnetic intensity. This is shown as the solid line in Figure 6. The observed 1953 values, relative to the station at the International Boundary, are also shown on this figure. The agreement between the two is striking and suggests that the similarity between the gravity and magnetic profiles does not necessarily indicate a common origin for the anomalies.

Local Gravity and Magnetic Anomalies

The gravity and magnetic profiles can be divided into two parts based on the character of the local gravity and magnetic anomalies. From Dawson Creek to Liard River the local anomalies are all relatively small and have moderately gentle gradients. Beyond Liard River, the amplitudes and the gradients of the anomalies increase, suggesting a fundamental difference in the rock types underlying the two divisions. The rocks to the south and east of Liard River are apparently much more uniform and homogeneous than the rocks to the north and west.

It is interesting to note that this division coincides with Bostock's (1948) physiographic division of the Cordillera into a Central and an Eastern system, and also with Wilson's (1954) division into a metamorphosed median land, and a sedimentary secondary mountain arc. In many instances an excellent correlation can be found between the gravity, magnetic and lithology profiles. This correlation has been used in some cases to extend the geology into areas covered by drift, (*see* Figure 2) and to predict the underlying rock types.

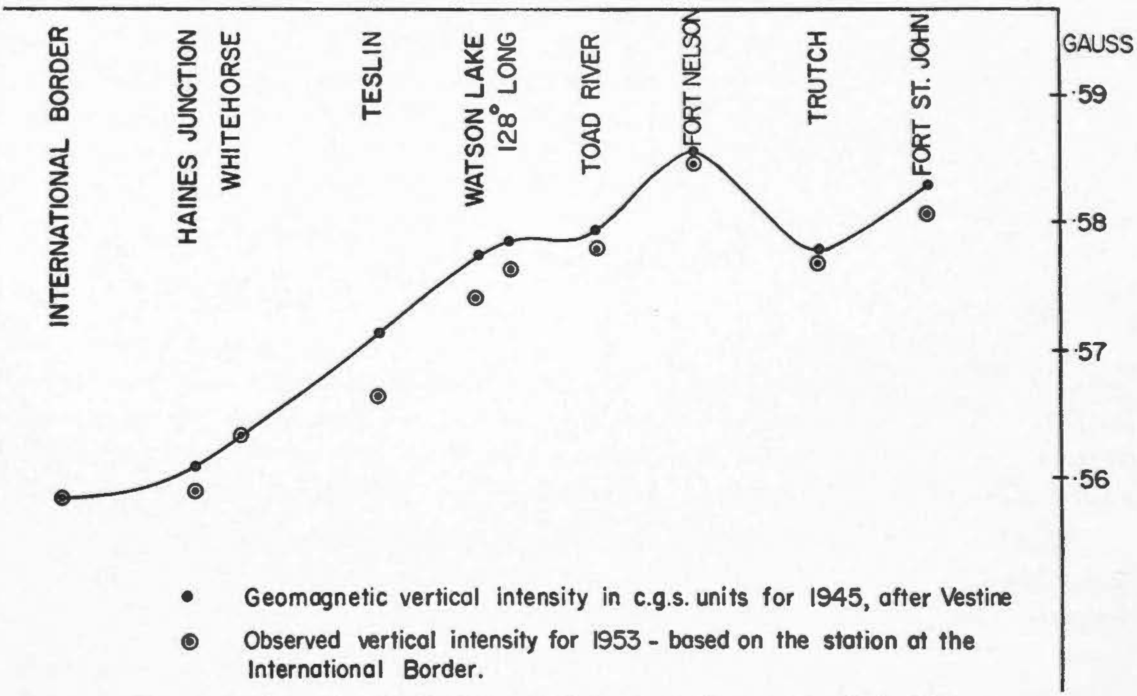


FIGURE 6.—Generalized Vertical Magnetic Intensity Profile along the Alaska Highway.

CONCLUSIONS

Conclusions based on the study of a single gravity and magnetic profile must be regarded as tentative. As more data become available and an areal picture of the gravity and magnetic fields becomes known, these may be changed. It is with this reservation that the following are stated.

The main conclusion to be drawn is that negative gravity anomalies found over mountain ranges may be due to two principal causes: crustal warping into the underlying mantle, or the presence of a low-density granitic core. The Rocky Mountains are thought to be an example of the former and the Cassiar and St. Elias Mountains examples of the latter.

Regional magnetic anomalies appear to be related to the large-scale geomagnetic variations and probably do not reflect the near-surface geology.

The smaller gravity and magnetic anomalies which show an excellent correlation with the known surface lithology provide a means for dividing the profiles into two parts. In the section to the south and east of Liard River, the anomalies have small amplitude and gentle gradients. To the north and west, the anomalies are generally larger in amplitude and have a steeper gradient. This division reflects a major difference in the geological history of the two areas.

ACKNOWLEDGEMENTS

The writer wishes to thank M. J. S. Innes, G. D. Garland, and N. Isenor of the Dominion Observatory, Ottawa, and Professor J. T. Wilson of the University of Toronto, for their assistance in different phases of the study.

The field work was carried out while the writer was a summer employee of the Observatory. The interpretation was made in the Geophysics Laboratory at the University of Toronto and was included as part of a Ph.D. thesis.

Financial assistance at the University of Toronto was received from scholarshisp given by the Worshipfull Company of Goldsmiths, and the Shell Oil Company, to whom grateful acknowledgment is made.

BIBLIOGRAPHY

BOSTOCK, H. S. (1948). Physiography of the Canadian Cordillera with special reference to the area north of the fifty-fifth parallel. *Geol. Surv., Canada*, Mem. 247.

——— (1950). Potential Mineral resources of Yukon Territory. *Geol. Surv., Canada*, Paper 50–14.

——— (1952). Geology of Northwest Shakwak Valley, Yukon Territory. *Geol. Surv., Canada*, Mem. 267.

BOTT, M. H. P. (1953). Negative gravity anomalies over acid intrusions and their relation to the structure of the earth's crust. *Geol. Mag.*, VXC, 4, 257–267.

GARLAND, G. D. (1955). Gravity measurements in North America with Cambridge Pendulum Apparatus II. *Proc. Roy. Soc. A.*, V. 233, 203–213.

GASSMAN, F. (1951). Graphical evaluation of the anomalies of gravity and of the magnetic field, caused by three dimensional bodies. *3rd World Petroleum Congress*, The Hague.

GLENNIE, E. A. (1932). Gravity anomalies and the structure of the earth's crust. *Prof. Paper, Survey India*, 27.

HAGE, C. O. (1944). Geology adjacent to the Alaska Highway between Fort St. John and Fort Nelson, B.C. *Geol. Surv., Canada*, Paper 44–30.

KINDLE, E. D. (1952). Dezadeash Map-area, Yukon Territory. *Geol. Surv., Canada*, Mem. 268.

LORD, C. S. (1944). Geological reconnaissance along the Alaska Highway between Watson Lake and Teslin River, Yukon and British Columbia. *Geol. Surv., Canada*, Paper 44–25.

MCLEAN, F. H. and E. D. KINDLE (1950). Geology of Northeastern British Columbia. *Geol. Surv., Canada*, Mem. 259.

MULLER, J. E. (1954). Preliminary Map, Kluane Lake (West half), Yukon Territory. *Geol. Surv., Canada*, Paper 53–20.

SHARPE, R. P. (1943). Geology of the Wolf Creek area, St. Elias Range, Yukon Territory, Canada. *Bull. Geol. Soc. Amer.* V. 54.

SKEELS, D. C. (1940). Gravity and sedimentary basins. *Trans. Am. Geophys. Union.* pp. 187–202.

VESTINE, E. H. (*et al.*) (1947). Description of the earth's main magnetic field and its secular change, 1905-1945. *Carnegie Institution of Washington*, Pub. 578.

WHEELER, J. O. (1952). Geology and mineral deposits of Whitehorse map-area, Yukon Territory. (Preliminary account). *Geol. Surv., Canada*, Paper 52–30.

WILLIAMS, H. Y. (1944). Geological reconnaissance along the Alaska Highway from Fort Nelson, B.C. to Watson Lake, Yukon. *Geol. Surv., Canada*, Paper 44–28.

WILSON, J. T. (1954). The development and structure of the crust. Ch. 4 of "The Earth as a Planet" edited by Kuiper, The Univ. Chicago Press.

WOOLLARD, G. P. (1940). Gravitational determination of deep-seated crustal structures of continental borders. *Trans. Am. Geophys. Union*, 808–815.

APPENDIX

The Principal Facts

Principal Facts for Gravity Stations

Alaska Highway Bases, Canada, 1953.

Station No.	Station Name	Longitude		Latitude		Elevation	Observed Gravity	Gravity Anomalies Free Air	Gravity Anomalies Bouguer
1	Edmonton	113°	31'.3	53°	31'.3	2197 ft.	981.1678	−.0134	−.0883
2	Legal		37.4		57.2	2290	.2035	−.0062	−.0842
3	Rochester		27.1	54	22.4	2000	.2691	−.0039	−.0720
4	Athabasca		15.9		43.2	1746	.3260	−.0005	−.0600
5	Lawrence Lake		37.0		59.7	2114	.3221	.0068	−.0652
6	Smith	114	02.4	55	09.8	1862	.3523	−.0010	−.0644
7	Slave Lake		46.5		17.0	1921	.3596	.0017	−.0637
8	Kinuso	115	25.1		20.2	1927	.3506	−.0113	−.0769
9	Joussard		55.7		22.7	1968	.3572	−.0043	−.0714
10	High Prairie	116	29.2		25.7	1956	.3564	−.0105	−.0771
11	MacLennan		54.1		42.6	2081	.3857	.0068	−.0641
12	Nampa	117	08.0	56	02.4	1885	.4224	−.0026	−.0668
13	Peace River Dom. Obs.		17.2		14.2	1065	.4875	−.0311	−.0674
14	Peace River (McCallum)		17.2		14.0	1065	.4872	−.0311	−.0674
15	Grimshaw	118	36.4		11.5	2001	.4285	.0017	−.0665
16	Fairview		22.9		03.9	2141	.4097	.0066	−.0663
17	Rycroft		42.6	55	45.4	1984	.3862	−.0057	−.0733
18	Grande Prairie (Woollard)		50.0		15.0	2163	.3176	−.0147	−.0884
19	Grande Prairie (Garland)		47.7		10.4	2149	.3181	−.0090	−.0822
20	Beaverlodge	119	25.6		12.6	2358	.2998	−.0108	−.0911
21	Dawson Creek	120	13.7		45.6	2196	.3655	−.0068	−.0816
22	B.M. 889J		37.9	56	00.9	2548	.3722	.0116	−.0752
23	B.M. 897J		47.6		13.1	2157	.4114	−.0030	−.0764
24	Fort St. John (BM. 898J) Garland		50.8		14.2	2209	.4102	−.0008	−.0751
25	Fort St. John (Airport)		44.1		14.3	2274	.4078	.0028	−.0747
26	Beaton River Road	121	15.0		32.5	2801	.4063	.0255	−.0699
27	B.M. 921J		50.6		44.6	3053	.3948	.0210	−.0830
28	B.M. 939J		34.6		05.1	3219	.4004	.0139	−.0957
29	Buckinghorse Bridge		50.5		23.1	3331	.4104	.0098	−.1037
30	Beaver Creek	122	52.1	57	47.9	2387	.5101	−.0131	−.0944
31	Indian Creek		42.6	58	06.3	1760	.5849	−.0223	−.0822
32	B.M. 990J		44.2		31.6	1570	.6359	−.0232	−.0767
33	Fort Nelson (Airport)		41.7		48.3	1360	.6925	−.0088	−.0551
34	B.M. 1002J		41.1		48.4	1348	.6827	−.0198	−.0657
35	B.M. 1010J	123	03.4		53.3	1480	.6833	−.0133	−.0638
36	Kledo River		30.3		49.8	1268	.6796	−.0329	−.0797
37	B.M. 1031J	124	00.2		40.4	2544	.5697	−.0096	−.0963
38	B.M. 1041J		40.5		38.7	4213	.4531	.0330	−.1105
39	B.M. 1055J	125	23.5		50.7	2371	.5629	−.0465	−.1272
40	B.M. 381F		45.6	59	00.1	2695	.5604	−.0310	−.1228
41	Liard Bridge	126	10.7		22.2	1422	.6873	−.0560	−.1044
42	(Smith)		28.6		33.4	1512	.7149	−.0319	−.0834
43	B.M. 339F	127	08.8		40.1	1695	.7157	−.0227	−.0804
44	B.M. 326F		27.7		55.8	2127	.7109	−.0074	−.0799
45	B.M. 318F		54.4	60	00.3	2226	.7115	−.0034	−.0792
46	B.M. 307F	128	29.7	59	55.5	1911	.7286	−.0097	−.0748
47	B.M. 298F		42.8	60	03.7	2300	.7127	.0003	−.0780
48	Watson Lake (Airport)	—		—		—	.7172	—	—

PRINCIPAL FACTS FOR GRAVITY STATIONS

Alaska Highway Bases, Canada, 1953.

Station No.	Station Name	Longitude	Latitude	Elevation	Observed Gravity	Gravity Anomalies Free Air	Gravity Anomalies Bouguer
49	Watson Lake (Pendulum)	128° 49.′1	60° 07.′0	2240 ft.	981.7178	−.0045	−.0808
50	B.M. 286F	129 23.2	05.1	2819	.6673	.0019	−.0941
51	B.M. 271F	130 19.4	06.4	2855	.6392	−.0245	−.1218
52	B.M. 258F	131 11.0	00.6	2923	.6434	−.0063	−.1059
53	B.M. 249F	40.7	59 56.5	2790	.6502	−.0067	−.1017
54	B.M. 240F	132 08.5	60 00.4	2611	.6772	−.0016	−.0906
55	B.M. 228F	44.6	10.2	2257	.7297	.0048	−.0721
56	B.M. 214F	133 17.2	29.0	2299	.7327	−.0127	−.0910
57	(Atlin)	58.1	20.3	2518	.7360	.0225	−.0632
58	Whitehorse Airport	135 03.6	60 42.9	2285	.7520	−.0126	−.0904
59	Whitehorse Airport (Pendulum)	03.5	42.8	2281	.7519	−.0129	−.0906
60		46.5	51.0	2213	.7792	−.0026	−.0779
61	Atlin	133 42.7	59 34.6	2215	.6734	−.0089	−.0843
62	B.M. 430E	40.9	38.2	2410	.6655	−.0031	−.0852
63	B.M. 427E	44.3	43.2	2455	.6652	−.0058	−.0894
64	B.M. 424E	48.1	48.6	2337	.6843	−.0049	−.0845
65	B.M. 421E	47.7	52.8	2362	.6759	−.0164	−.0969
66	B.M. 418E	47.0	56.5	2468	.6909	.0037	−.0803
67	B.M. 414E	48.5	60 03.4	2492	.6956	.0017	−.0832
68	B.M. 411E	52.2	07.6	2528	.6963	.0003	−.0858
69	B.M. 407E	54.5	13.5	2350	.7127	−.0075	−.0875
70	B.M. 404E	55.7	22.0	2435	.7181	−.0054	−.0883
71	B.M. 195F2	134 19.1	30.7	2133	.7535	−.0097	−.0823
72	B.M. E-7	136 28.7	47.2	2295	.7623	−.0069	−.0850
73	B.M. 461F	137 30.5	45.2	1962	.7796	−.0183	−.0852
74	Kluane Village	138 22.9	61 01.9	2575	.7234	−.0383	−.1260
75	B.M. N-10	35.3	09.8	2597	.7313	−.0384	−.1269
76	B.M. G-11	59.9	21.1	2620	.7548	−.0271	−.1163
77	B.M. N-12	139 38.9	37.5	2755	.7802	−.0097	−.1036
78	White River	140 33.4	59.5	2326	.8562	−.0017	−.0810
79	B.M. 214	41.2	62 14.2	2536	.8862	.0297	−.0567
80	Snag Airport	24.5	21.4	1902	.9347	.0096	−.0552
81	Alaska Border	58.0	36.2	1912	.9614	.0190	−.0462
82	Dawson City	139 24.6	64 03.4	1050	.1023	−.0267	−.0625

Alaska Highway Bases, U.S.A., 1953.

No.	Name	Longitude	Latitude	Elevation	Observed Gravity	Free Air	Bouguer
1		141° 06.′0	64° 41.′6	1994 ft.	981.9733	.0320	−.0360
2	Fairbanks (Rose Pend.)	147 47.8	51.5	450	982.2465	.0045	−.0108
3	Fairbanks (USCGS—Ladd Air Base)				.2486		
4	Fairbanks (GDG—Pendulum)	49.4	51.5	515	.2465	.0106	−.0069
5	Fairbanks (Univ. Alaska Gravimeter)	47.8	51.5	450	.2466	.0046	−.0107

Principal Facts for Gravity Stations

Alaska Highway Bases, U.S.A., 1953

Station No.	Station Name	Longitude	Latitude	Elevation	Observed Gravity	Gravity Anomalies Free Air	Gravity Anomalies Bouguer
6	Fairbanks—Airport	——	——	——	982.2463	——	——
7	Fairbanks (Eilson Air Base)	147° 04'.9	64° 38'.6	529 ft.	.2255	.0060	−.0120
8	Silver Fox Lodge	146 51.3	22.0	921	.1767	.0135	−.0178
9	Shaw Creek	144 05.6	15.7	922	.1552	−.0004	−.0318
10	Delta Junction	42.9	02.4	1157	.1209	.0031	−.0363
11	Big Gerstle River	54.0	63 49.0	1339	.0639	−.0208	−.0664
12	Dot Lake	02.2	39.1	1410	.0433	−.0229	−.0665
13		143 44.6	23.3	1558	.0062	−.0270	−.0801
14	Tok Junction	142 58.3	20.1	1632	.0076	−.0158	−.0715
15	Tetlin Junction	36.7	19.2	1765	.0015	−.0073	−.0674
16	Banks of Yukon				.1027		
17	Bitter Creek	05.5	09.7	1791	981.9959	.0011	−.0599
18	Northway Cutoff	141 46.4	00.6	1809	.9819	−.0002	−.0618

Alaska Highway Detailed Stations, Canada.

Station No.	Station Name	Longitude	Latitude	Elevation	Observed Gravity	Gravity Anomalies Free Air	Gravity Anomalies Bouguer
1	B.M. E-14	140° 58'.4	62° 31'.8	2057 ft.	981.9480	.0246	−.0454
2	B.M. J 14	51.9	29.7	2017	.9463	.0217	−.0470
3	B.M. Q14	52.5	22.9	2071	.9136	.0025	−.0680
4	B.M. V14	46.9	17.7	2396	.8957	.0217	−.0599
5	Snag—Pendulum	24.5	21.3	1898	.9351	.0097	−.0549
6		32.4	18.5	2123	.9140	.0133	−.0590
7	B.M. 452F	40.8	10.0	2362	.8866	.0189	−.0615
8	B.M. 450F	39.8	05.8	2296	.8712	.0026	−.0756
9	B.M. 448F	36.6	02.2	2421	.8542	.0018	−.0806
10	B.M. R-13	24.5	61 58.3	2215	.8599	−.0070	−.0824
11	B.M. N-13	17.5	55.5	2248	.8532	−.0071	−.0836
12	B.M. J-13	10.4	51.9	2293	.8455	−.0060	−.0841
13	B.M. D-13	03.4	48.3	2387	.8360	−.0021	−.0835
14	B.M. Y-12	139 56.0	45.0	2440	.8243	−.0047	−.0878
15	B.M. T-12	48.7	42.4	2517	.8050	−.0135	−.0992
16	B.M. J-12	31.5	36.3	2654	.7870	−.0109	−.1013
17	B.M. E-12	25.0	35.4	2373	.7979	−.0253	−.1062
18		22.0	33.7	2363	.7977	−.0243	−.1048
19	B.M. X-11	18.4	30.4	2638	.7663	−.0339	−.1237
20	B.M. S-11	14.1	27.0	2682	.7581	−.0254	−.1168
21	B.M. M-11	07.5	23.6	2792	.7524	−.0165	−.1117
22	B.M. B-11	138 52.5	17.8	2651	.7468	−.0280	−.1183
23	B.M. X-10	47.8	14.7	2628	.7375	−.0355	−.1250
24	B.M. T-10	42.2	12.3	2709	.7274	−.0349	−.1272
25	B.M. H-10	32.8	04.9	2577	.7289	−.0364	−.1242
26	B.M. C-10	29.8	01.2	2573	.7482	−.0128	−.1004
27	B.M. Z-9	29.2	60 58.9	2570	.7555	−.0280	−.0904
28	B.M. Q-9	14.6	61 00.0	2959	.7020	−.0211	−.1219
29	B.M. J-9	05.7	60 57.8	3114	.6954	−.0103	−.1164
30	B.M. D-9	137 55.5	55.7	2878	.7106	−.0146	−.1127

Principal Facts for Gravity Stations

Alaska Highway Detailed Stations, Canada.

Station		Longitude	Latitude	Elevation	Observed Gravity	Gravity Anomalies	
No.	Name					Free Air	Bouguer
31	B.M. B-9	137° 50'.3	60° 54'.3	3032 ft.	981.7056	−.0034	−.1066
32	B.M. W-8	45.7	50.2	2949	.7181	.0066	−.0939
33	B.M. S-8	40.4	47.7	2103	.7734	−.0145	−.0861
34	Haines	135 26.9	59 14.3	65	.8384	−.0193	−.0215
35		36.6	16.1	24	.8143	−.0496	−.0504
36		42.4	18.5	38	.7940	−.0718	−.0731
37		43.3	21.3	55	.7847	−.0832	−.0850
38		54.5	24.2	111	.7887	−.0777	−.0815
39		136 03.4	25.4	180	.7863	−.0752	−.0814
40		15.0	25.5	380	.7624	−.0805	−.0934
41		22.2	27.2	602	.7509	−.0733	−.0938
42		27.4	30.2	817	.7418	−.0661	−.0940
43		31.0	32.9	1226	.7102	−.0628	−.1046
44		27.6	38.4	2510	.6326	−.0269	−.1124
45		34.0	40.6	3036	.6153	.0024	−.1010
46		35.9	43.9	3212	.6166	.0158	−.0935
47		37.9	48.6	3312	.6294	.0319	−.0809
48		39.4	50.6	2898	.6688	.0298	−.0689
49		42.5	52.7	3117	.6571	.0359	−.0702
50		47.0	55.9	3012	.6717	.0365	−.0661
51		51.0	59.8	2755	.6784	.0139	−.0799
52		54.5	60 04.0	2958	.6610	.0101	−.0906
53		55.6	07.9	2883	.6694	.0064	−.0918
54		55.6	14.8	2301	.7052	−.0216	−.0999
55		137 00.2	17.4	2445	.7168	.0002	−.0831
56		01.4	23.8	2317	.7403	.0034	−.0755
57		01.8	28.7	2453	.7359	.0054	−.0781
58		06.9	32.0	2400	.7474	.0077	−.0741
59		13.0	34.5	2522	.7478	.0163	−.0696
60		22.1	41.2	2723	.7537	.0325	−.0602
61	B.M. H-8	25.6	48.6	2215	.7670	−.0115	−.0869
62		16.0	50.5	2243	.7683	−.0100	−.0864
63	B.M. R-M-2	06.2	51.4	2231	.7684	−.0122	−.0882
64	B.M. R-7	136 55.9	49.9	2302	.7561	−.0159	−.0943
65	B.M. N-7	48.5	48.8	2256	.7616	−.0133	−.0901
66		37.1	48.6	2422	.7587	−.0003	−.0828
67	B.M. A-7	19.8	47.3	2302	.7583	−.0103	−.0888
68	B.M. W-6	11.3	45.5	2294	.7641	−.0030	−.0811
69	B.M. S-6	02.0	48.6	2326	.7655	−.0026	−.0818
70	B.M. M-6	135 52.8	50.5	2349	.7600	−.0083	−.0883
71	B.M. F-6	36.8	51.1	2190	.7926	.0085	−.0661
72	B.M. X	25.8	51.1	2331	.7831	.0123	−.0671
73	B.M. R	18.9	48.9	2458	.7704	.0144	−.0694
74	B.M. K	09.7	46.9	2362	.7645	.0020	−.0784
75	B.M. E-1	134 59.7	37.9	2383	.7390	−.0099	−.0911
76		52.9	35.9	2405	.7423	−.0020	−.0839
77	B.M. 188F2	43.0	34.9	2342	.7465	−.0023	−.0821
78	B.M. 191F	32.1	33.9	2166	.7610	−.0032	−.0770
79	B.M. 193F	25.9	33.3	2164	.7743	.0107	−.0630
80	B.M. 198-F	11.6	25.9	2493	.7367	.0136	−.0713

Principal Facts for Gravity Stations

Alaska Highway Detailed Stations, Canada.

Station No.	Station Name	Longitude	Latitude	Elevation	Observed Gravity	Gravity Anomalies Free Air	Gravity Anomalies Bouguer
81	B.M. 200F	134° 06′.2	60° 22′.5	2491 ft.	981.7412	.0223	−.0625
82	B.M. 204F	133 50.8	22.3	2584	.7254	.0155	−.0725
83	B.M. 206F	43.4	24.4	2867	.7139	.0279	−.0697
84	B.M. 208F	36.9	26.6	2719	.7247	−.0220	−.0706
85	B.M. 210F	27.7	27.6	2726	.7231	−.0197	−.0731
86	B.M. 212F	25.1	29.7	2600	.7310	−.0131	−.0755
87	B.M. 216F	12.4	26.4	2481	.7224	−.0025	−.0742
88	B.M. 218F	08.2	23.3	2327	.7352	−.0001	−.0794
89	B.M. 221F	01.4	19.0	2349	.7333	.0056	−.0744
90	B.M. 223F	132 56.3	15.7	2348	.7307	.0072	−.0728
91	B.M. 226F	51.5	12.5	2367	.7213	−.0037	−.0769
92	B.M. 230 F	37.9	08.1	2800	.6948	.0237	−.0717
93	B.M. 232 F	31.0	06.8	2291	.7111	−.0062	−.0842
94	B.M. 235 F	21.5	05.4	2520	.6852	−.0087	−.0945
95	B.M. 237 F	17.8	02.5	2474	.6859	−.0092	−.0928
96	B.M. 243 F	03.0	59 58.0	2787	.6647	−.0056	−.0894
97	B.M. 245 F	131 56.1	56.3	2795	.6531	−.0031	−.0983
98	B.M. 247 F	48.9	56.6	2692	.6473	−.0189	−.1106
99	B.M. 252 F	27.8	56.2	2907	.6413	−.0042	−.1032
100	B.M. 254 F	20.1	55.5	2850	.6433	−.0067	−.1037
101	B.M. 256 F	13.5	58.2	2813	.6460	−.0110	−.1068
102	B.M. 260 F	01.3	60 02.4	3259	.6245	.0040	−.1070
103	B.M. 262 F	130 56.4	04.7	3288	.6228	.0020	−.1100
104	B.M. 263 F	51.0	04.7	3065	.6198	−.0219	−.1263
105	B.M. 264 F	46.6	05.1	3034	.6182	−.0270	−.1303
106	B.M. 266 F	39.5	05.7	2959	.6179	−.0351	−.1359
107	B.M. 268 F	31.1	04.2	2923	.6203	−.0341	−.1337
108	B.M. 273 F	13.1	08.6	2809	.6570	−.0139	−.1096
109	B.M. 275 F	08.1	11.1	2770	.6730	−.0048	−.0992
110	B.M. 277 F	129 58.1	11.9	2913	.6779	.0125	−.0867
111	B.M. 279 F	50.5	10.7	3002	.6797	.0242	−.0780
112	B.M. 281 F	42.6	09.5	2545	.7098	.0129	−.0738
113	B.M. 283 F	34.9	08.2	2630	.6950	.0078	−.0818
114	B.M. 288 F	17.2	04.1	2567	.6932	.0054	−.0820
115	B.M. 290 F	08.0	02.3	2480	.7056	.0120	−.0725
116	B.M. 292 F	128 59.6	02.5	2168	.7041	−.0191	−.0930
117	B.M. 296 F	51.1	04.3	2461	.6906	−.0074	−.0913
118	B.M. 303 F	36.0	01.9	2220	.7197	.0021	−.0735
119	B.M. 305 F	33.2	58.8	2085	.7218	−.0044	−.0754
120	B.M. 309 F	21.5	55.7	2143	.7165	−.0002	−.0732
121	B.M. 311 F	13.4	56.2	2119	.7119	−.0077	−.0799
122	B.M. 314 F	08.6	57.5	1953	.7356	−.0013	−.0680
123	B.M. 316 F	00.9	59 58.0	2337	.7104	.0089	−.0707
124	B.M. 320 F	127 48.8	60 00.4	2121	.7222	−.0027	−.0750
125	B.M. 322 F	42.9	59 59.9	2089	.7224	−.0049	−.0760
126	B.M. 324 F	33.7	58.8	2192	.7112	−.0050	−.0796
127	B.M. 328 F	24.1	52.0	1911	.7191	−.0146	−.0797
128	B.M. 330 F	28.9	49.3	2057	.7089	−.0075	−.0776
129	B.M. 332 F	28.4	45.4	2003	.7049	−.0115	−.0797
130	B.M. 335 F	22.6	43.1	2534	.6736	.0102	−.0761

Principal Facts for Gravity Stations

Alaska Highway Detailed Stations, Canada

Station No.	Station Name	Longitude	Latitude	Elevation	Observed Gravity	Gravity Anomalies Free Air	Gravity Anomalies Bouguer
131	B.M. 337 F	127° 15′.6	59° 43′.0	1676 ft.	981.7202	−.0238	−.0809
132	B.M. 341 F	02.3	38.4	1861	.7050	−.0155	−.0789
133	B.M. 343 F	126 53.7	39.2	1690	.7160	−.0217	−.0792
134	B.M. 346 F	46.1	36.7	1493	.7194	−.0335	−.0844
135	B.M. 347 F	39.8	35.8	1500	.7162	−.0349	−.0860
136	B.M. 360 F	24.2	32.5	1586	.7001	−.0385	−.0926
137	B.M. 362 F	28.6	29.2	1432	.6972	−.0516	−.1004
138	B.M. 364 F	24.1	26.3	1424	.6898	−.0559	−.1044
139	B.M. 369 F	10.7	22.2	1832	.6611	−.0408	−.1032
140	B.M. 371 F	04.7	19.0	1756	.6528	−.0520	−.1118
141	B.M. 373 F	125 57.4	15.6	1983	.6310	−.0480	−.1155
142	B.M. 375 F	55.9	12.0	2262	.6082	−.0398	−.1168
143	B.M. 377 F	52.1	08.9	2657	.5824	−.0243	−.1148
144	B.M. 379 F	48.3	04.8	2796	.5662	−.0220	−.1172
145	B.M. 384 F	45.6	55.9	2758	.5458	−.0341	−.1280
146	B.M. 1063 J	45.6	52.6	3442	.5014	−.0098	−.1270
147	B.M. 1062 J	42.8	49.3	3205	.5090	−.0201	−.1292
148	B.M. 1060 J	40.1	58 46.6	2606	.5314	−.0504	−.1391
149	B.M. 1057 J	28.6	48.6	2527	.5464	−.0455	−.1316
150	B.M. 1053 J	15.5	50.8	2330	.5660	−.0434	−.1241
151	B.M. 1051 J	07.3	49.5	2273	.5656	−.0514	−.1288
152	B.M. 1049 J	00.6	49.4	2356	.5624	−.0466	−.1269
153	B.M. 1047 J	124 58.5	46.6	2657	.5407	−.0363	−.1268
154	B.M. 1045 J	53.4	42.7	2983	.5188	−.0223	−.1239
155	B.M. 1043 J	47.7	40.9	3550	.4848	−.0006	−.1215
156	B.M. 1038 J	28.8	39.6	3356	.5057	.0038	−.1105
157	B.M. 1035 J	17.0	39.5	2769	.5456	−.0114	−.1057
158	B.M. 1033 J	09.4	39.1	2488	.5678	−.0151	−.0998
159	B.M. 1030 J	123 52.4	40.4	2626	.5672	−.0044	−.0939
160	B.M. 1027 J	44.3	41.0	3504	.5176	.0278	−.0916
161		——	——	——	.5691	——	——
162	B.M. 1024 J	40.1	42.1	2020	.6139	−.0170	−.0858
163	B.M. 1021 J	34.7	47.0	1340	.6663	−.0351	−.0807
164	B.M. 1017 J	26.8	52.1	1569	.6701	−.0166	−.0700
165	B.M. 1014 J	19.4	53.6	1323	.6917	−.0201	−.0652
166	B.M. 1012 J	11.0	54.0	1504	.6829	−.0124	−.0636
167	B.M. 1008 J	122 54.7	50.6	1424	.6827	−.0156	−.0641
168	B.M. 1006 J	48.0	49.6	1620	.6698	−.0087	−.0639
169	B.M. 99 J	40.0	45.2	1269	.6815	−.0242	−.0674
170	B.M. 996 J-2	40.5	40.0	1371	.6684	−.0207	−.0674
171	B.M. 993 J	39.1	35.4	1561	.6483	−.0168	−.0700
172	B.M. 985 J	49.3	22.4	1606	.6173	−.0261	−.0808
173	B.M. 982 J	50.1	18.2	1690	.6034	−.0264	−.0840
174	B.M. 979 J	47.0	13.0	1480	.6110	−.0316	−.0820
175	B.M. 977 J	46.0	11.0	1746	.5900	−.0248	−.0843
176	B.M. 971 J	42.6	01.3	1919	.5651	−.0204	−.0857
177	B.M. 969 J	43.4	57 59.9	1877	.5615	−.0260	−.0899
178	B.M. 967 J	49.8	55.6	2535	.5148	−.0050	−.0913
179	B.M. 965 J	50.5	51.8	2754	.4944	.0004	−.0934
180	B.M. 960 J	56.8	43.1	2850	.4719	−.0013	−.0983

Principal Facts for Gravity Stations

Alaska Highway Detailed Stations, Canada.

Station		Longitude	Latitude	Elevation	Observed Gravity	Gravity Anomalies	
No.	Name					Free Air	Bouguer
181	B.M. 957 J	122° 57'.6	57° 38'.9	3981 ft.	981.3928	.0317	−.1038
182	B.M. 955 J	55.4	34.7	3772	.3917	.0167	−.1118
183	B.M. 952 J	52.8	27.9	4132	.3683	.0365	−.1043
184	B.M. 947 J	46.6	17.8	3975	.3655	.0327	−.1027
185	B.M. 944 J	40.6	13.9	3116	.4119	.0037	−.1025
186	B.M. 942 J	40.4	10.1	3708	.3727	.0254	−.1009
187	B.M. 936 J	29.3	02.3	3604	.3765	.0301	−.0926
188	B.M. 933 J	21.0	56 59.9	3593	.3741	.0300	−.0924
189	B.M. 930 J	11.8	58.9	3372	.3877	.0242	−.0907
190	B.M. 928 J	05.3	57.4	3309	.3889	.0215	−.0912
191	B.M. 926 J	00.0	53.6	3203	.3920	.0199	−.0892
192	B.M. 925 J	121 59.2	51.2	3137	.3962	.0212	−.0857
193	B.M. 918 J	41.7	40.6	2876	.4060	.0211	−.0769
194	B.M. 915 J	34.2	37.7	2850	.4092	.0258	−.0712
195	B.M. 913 J	27.8	36.0	2744	.4150	.0240	−.0694
196	B.M. 910 J	21.7	33.2	2830	.4071	.0281	−.0683
197	B.M. 906 J	11.0	26.5	2829	.3959	.0261	−.0703
198	B.M. 904 J	06.6	22.3	2727	.3949	.0213	−.0715
199	B.M. 902 J	00.7	18.7	2660	.3928	.0179	−.0727
200	B.M. 894 J	120 41.2	09.5	1589	.4404	−.0244	−.0765
201	B.M. 891 J	38.6	05.2	2395	.3871	.0061	−.0754
202	B.M. 887 J	33.8	55 57.4	1979	.3877	−.0215	−.0889
203	B.M. 883 J	25.8	52.5	2636	.3502	.0096	−.0801