UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Principal facts for six gravity profiles across the midcontinent gravity high in Iowa and Nebraska

by

Elizabeth R. King and Robert E. Mattick

Open-File Report 82-1072

1982

Introduction

Six detailed gravity profiles were made across the midcontinent gravity high in Iowa and southeastern Nebraska during the summer of 1963. The midcontinent gravity high, a spectacular feature caused by a linear belt of dense Keweenawan volcanic rocks filling a rift in the older Precambrian basement, extends more than 1,000 km from outcrops around Lake Superior to Kansas where it is covered by more than 4 km of Phanerozoic sedimentary rocks. The midcontinent gravity high was delineated by gravity surveys by Woollard (1943, 1951), Thiel (1956), Lyons (1950, 1959), and Craddock and others (1963); it reaches a maximum Bouguer anomaly of +60 mgal in Iowa where it is flanked by a low of -100 mgal.

This positive gravity anomaly, which averages about 60 km in width, has associated gravity lows on both flanks and is locally modified by lows of 10 to 20 mgal along its crest. The gravity lows are inferred to be caused by basins of Keweenawan clastic rocks lying on and along the flanks of the volcanic rocks, as indicated by limited outcrops in Minnesota, a few drill holes farther south, and the associated magnetic pattern delineated by detailed aeromagnetic surveys by the U.S. Geological Survey (Henderson and Vargo, 1965; Sims and Zietz, 1967; U.S. Geological Survey, 1973; King and Zietz, 1971).

The aeromagnetic maps, which delineate the configuration of the volcanic rocks and outline the basins on the crest and flanks by the conspicuous contrast between their smooth magnetic signature and the very intricate magnetic pattern of the volcanic rocks, were used to select the optimum location of the six gravity profiles. These profiles were oriented normal to the main structural trends and were located over several of the larger axial basins in order to obtain precise data on the amplitude of the positive and negative anomalies associated with the volcanic and clastic rocks, respectively.

Data Collection

The gravity measurements, which were made by Robert E. Mattick, consisted of 530 measurements along 6 profiles (Fig. 1). The work was completed in the period from July 9 to August 15, 1963. Station locations were along roads, mostly at road intersections, and spacing was as close to 1 mile as possible. Stations in most of Iowa were located on county road maps, scale 1 inch equals 1 mile; in Nebraska and in some parts of Iowa, they were located on U.S. Geological Survey topographic maps, scale 1:24,000 (1 inch equals 2,000 feet).

All stations were tied to Woollard's base WA37 at the Omaha, Nebraska airport (Behrendt and Woollard, 1961) which had an absolute value of 980.2143 gal and subsequently has been adjusted to a new value of 980.19977 gal as U.S. Department of Defense station #443-0 (or IGB 15414) which is part of the 1981 International Geodetic System (information provided by the Gravity Services Division, Defense Mapping Agency, Aerospace Center, St. Louis, Mo. See also Morelli, 1974). A gravity loop was made to tie local base stations near the midpoints of each profile to the reference base. The local base stations were read at the beginning, middle, and end of each day's work to determine the

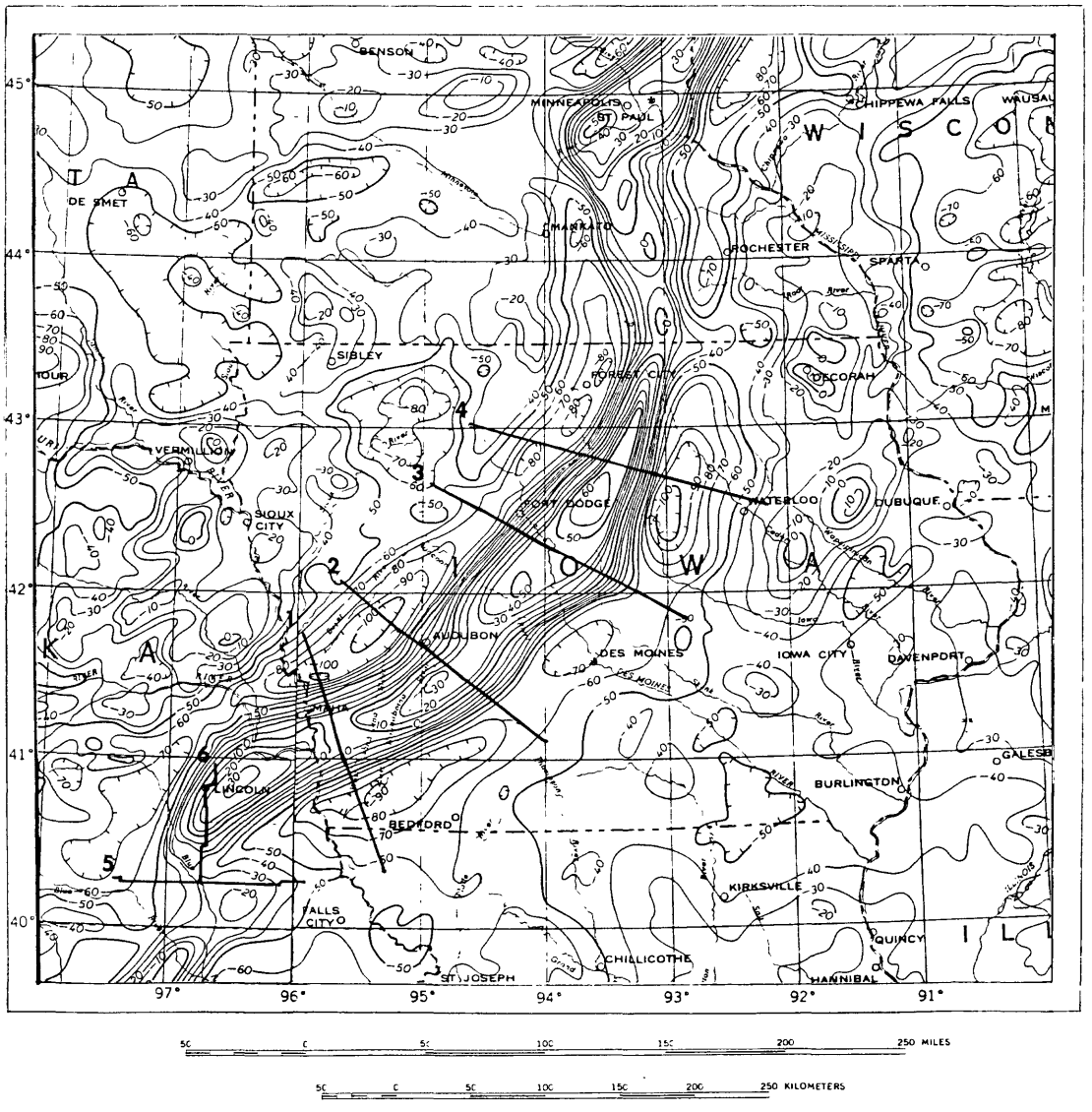

Figure 1. Bouguer gravity map of part of the midcontinent gravity high (from Bouguer gravity anomaly map of the United States, Am. Geophys. Union, 1964) showing locations of the 6 gravity profiles. Contour interval is 10 mgal.

combined drift and Earth tide correction. The gravity measurements were all made with a temperature-compensated Worden Master gravity meter #570.

Elevations of gravity stations were estimated by altimeter measurements. Two Wallace and Tiernan altimeters were used--a base altimeter located at a point between two known elevations (bench marks spaced 20 to 30 miles apart), which was read every 5 minutes, and a roving altimeter, which was read at the bench marks and at all the intervening gravity stations. Local changes in atmospheric pressure were determined by reoccupying stations along the traverse with the roving altimeter. Elevation errors were minimized by using data obtained during periods when the pressure gradients recorded by both meters were nearly equal. The quality of the elevation control is the limiting factor in determining the accuracy of the gravity anomaly values. In areas where 1:24,000 maps were available, spot elevations at road intersections were used. These elevations have an estimated error of less than $\pm$ 2 feet, which will result in a possible error of approximately 0.1 mgal. Where elevations were determined in altimetry, the possible error is considerbly larger, although the absence of small one-station anomalies on the Bouguer gravity profiles indicates that errors in the elevation determinations are small. At most stations, the estimated error of the altimeter elevations is less than $\pm$ 20 feet, which will cause errors of less than $\pm$ 1.2 mgal in the calculated anomalies.

Data Reduction

Theoretical gravity values were computed from the 1967 formula of the Geodetic Reference System (Internat. Assoc. Geodesy, 1971). The free-air anomalies and simple Bouguer anomalies for densities of 2.67 and 2.50 gm/cc were obtained and are given in the table listing the principal facts. No terrain corrections were made because of the relatively low topographic relief along the profiles.

References Cited

Amer. Geophys. Union, Spec. Committee for the Geophysical and Geological Study of the Continents, 1964, Bouguer gravity anomaly map of the United States (exclusive of Alaska and Hawaii): Washington, D.C., U.S. Geol. Survey, 2 sheets, scale 1:2,500,000.

Behrendt, J. C., and Woollard, G. P., 1961, An evaluation of the gravity control network in North America: Geophysics, v. 26, no. 1, p. 57-76.

Craddock, Campbell, Thiel, E. C., and Gross, Barton, 1963, A gravity investigation of the Precambrian of southeastern Minnesota and western Wisconsin: Jour. Geophys. Research, v. 68, no. 21, p. 6015-6032.

Henderson, J. R., and Vargo, J. L., 1965, Aeromagnetic map of central Iowa: U.S. Geol. Survey Geophys. Inv. Map GP-476, scale 1:316,800.

International Assoc. of Geodesy, 1971, Geodetic reference system 1967: International Association of Geodesy Special Publication 3, 74 p.

King, Elizabeth R. and Zietz, Isidore, 1971, Aeromagnetic study of the midcontinent gravity high of central United States: Geol. Soc. Amer. Bull., v. 82, p. 2187-2208.

Lyons, Paul L., 1950, A gravity map of the U.S.: Tulsa Geol. Soc. Digest v. 18, p. 35-43.

Lyons, Paul L., 1959, The Greenleaf anomaly, a significant gravity feature, in Symposium on Geophysics in Kansas: Kansas Geol. Survey Bull. 137, p. 105-120.

Morelli, C., ed., 1974, The international gravity standardization net 1971: International Association of Geodesy Special Publication 4, 194 p.

Sims, P. K., and Zietz, Isidore, 1967, Aeromagnetic and inferred Precambrian paleogeologic map of east-central Minnesota and part of Wisconsin: U.S. Geol. Survey Geophys. Inv. Map GP-563, scale 1:250,000.

Thiel, E. C., 1956, Correlation of gravity anomalies with the Keweenawan geology of Wisconsin and Minnesota: Geol. Soc. America Bull., v. 67, no. 8, p. 1079-1100.

United States Geological Survey, 1973, Aeromagnetic map of southeastern Nebraska and parts of adjacent States: U.S. Geol. Survey Open-File Report, scale 1:250,000.

Woollard, G. P., 1943, Transcontinental gravitational and magnetic profile of North America and its relation to geologic structure: Geol. Soc. America Bull., v. 54, no. 6, p. 747-790.

Woollard, G. P., 1951, Annual report of the Special Committee on the Geophysical and Geological Study of Continents, 1950-1951: Am. Geophys. Union Trans., v. 32, p. 634-647.

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963
GRAVITY BASE: DOD 553-0 (IGB 15414)
GEODETIC REFERENCE SYSTEM 1967

LINE 1

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	BOUGUER ANOMALY (MGAL) D=2.50 (GM/CC)
0084	41 47.50	95 56.50	1072.0	980197.87	-30.65	-67.21	-64.89
0083	41 46.10	95 55.80	1296.0	980177.64	-27.72	-71.92	-69 11
0082	41 45.35	95 55.35	1164.0	980183.77	-32.88	-72.58	-70.05
0081	41 43.75	95 55.12	1358.0	980166.96	-29.05	-75.37	-72.42
0080	41 42.70	95 54.30	1125.0	980177.55	-38.80	-77.17	-74.72
0079	41 42.00	95 53.80	1124.0	980173.91	-41.48	-79.82	-77 38
0078	41 40.83	95 53.02	1286.0	980158.50	-39.91	-83.77	-80.97
0077	41 39.93	95 52.45	1286.0	980154.54	-42.52	-86.38	-83.59
0076	41 39.42	95 52.00	1274.0	980153.32	-44.10	-87.55	-84.79
0075	41 38.28	95 51.85	1047.0	980164.49	-52.57	-88.28	-86.01
0074	41 37.56	95 51.60	1128.0	980157.08	-51.29	-89.76	-87.31
0073	41 36.17	95 51.10	1198.0	980147.17	-52.53	-93.39	-90.79
0072	41 34.90	95 50.65	1042.0	980154.23	-58.24	-93.78	-91.52
0071	41 34.50	95 50.70	1013.0	980155.68	-58.92	-93.47	-91.27
0070	41 34.16	95 50.25	1009.0	980155.76	-58.71	-93.12	-90.93
0069	41 33.25	95 50.10	1056.0	980150.41	-58.28	-94.29	-92.00
0068	41 31.80	95 49.25	1103.0	980144.37	-57.73	-95.34	-92.95
0067	41 31.20	95 48.70	1229.0	980134.46	-54.89	-96.81	-94.14
0066	41 30.78	95 48.92	1154.0	980143.25	-52.52	-91.88	-89.38
0065	41 30.32	95 48.75	1093.0	980142.54	-58.28	-95 56	-93.19
0064	41 29.75	95 48.45	1178.0	980136.20	-55.77	-95.95	-93.39
0063	41 29.05	95 48.15	1171.0	980133.83	-57.76	-97.69	-95.15
0062	41 28.65	95 48.15	1263.0	980131.51	-50.83	-93.90	-91.16
0057	41 27.69	95 47.80	1244.0	980135.94	-46.75	-89.17	-86.47
0058	41 27.36	95 48.01	1191.0	980140.37	-46.81	-87.43	-84.84
0060	41 26.49	95 47.30	1045.0	980157.72	-41.88	-77.53	-75.26
0061	41 26.28	95 47.05	1023.0	980162.28	-39.08	-73.97	-71.75
0056	41 25.62	95 47.00	1123.0	980161.07	-29.90	-68.20	-65.76
0055	41 25.00	95 46.80	1177.0	980163.05	-21.91	-62.05	-59 50
0054	41 24.78	95 46.73	1211.0	980162.80	-18.63	-59.94	-57.31
0053	41 24.30	95 46.71	1220.0	980165.36	-14.51	-56.12	-53.47
0052	41 24.05	95 46.45	1253.0	980166.14	-10.25	-52.99	-50.27
0051	41 23.65	95 46.40	1261.0	980167.36	-7.68	-50.69	-47.95
0050	41 23.25	95 46.20	1276.0	980169.50	-3.53	-47.05	-44.28
0049	41 22.88	95 46 30	1289.0	980170.28	-0.98	-44.94	-42.14
0048	41 22.60	95 46.22	1290 0	980171.63	0.88	-43.11	-40.31
0046	41 22.58	95 45.30	1228.0	980177.85	1.30	-40.58	-37.91
0047	41 22.15	95 45.85	1254.0	980177.08	3.62	-39.15	-36.42
0045	41 21.70	95 44.73	1136 0	980188.89	5.01	-33.74	-31.27
0044	41 20.83	95 44.73	1112.0	980194.04	9.20	-28.72	-26.31
0043	41 20.35	95 44.35	1037.0	980201.09	9.92	-25.45	-23.20
0042	41 19.55	95 43.85	1175.0	980194.88	17.88	-22.19	-19.64

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 1 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	BOUGUER ANOMALY (MGAL) D=2.50 (GM/CC)
0041	41 18.90	95 43.85	1124.0	980200.14	19.32	-19.02	-16.58
0040	41 17.99	95 43.35	1138.0	980201.69	23.54	-15.27	-12.80
0039	41 17.38	95 43.05	1186.0	980200.02	27.30	-13.15	-10.57
0038	41 16.68	95 42.55	1166.0	980203.36	29.81	-9.96	-7.43
0037	41 15.90	95 42.50	1236.0	980199.71	33.91	-8.25	-5.57
0036	41 15.19	95 42.08	1272.0	980198.04	36.68	-6.70	-3.94
0035	41 14.37	95 41.85	1113.0	980209.75	34.67	-3.30	-0.88
0034	41 13.93	95 41.68	1174.0	980206.01	37.32	-2.72	-0.17
0033	41 13.08	95 41.34	1184.0	980204.94	38.46	-1.92	0.65
0032	41 12.22	95 41.03	1055.0	980212.34	35.01	-0.97	1.32
0031	41 11.35	95 40.62	1047.0	980210.27	33.49	-2.22	0.06
0030	41 10.48	95 40.15	1203.0	980196.55	35.74	-5.29	-2.68
0029	41 9.65	95 39.88	1079.0	980201.31	30.08	-6.72	-4.38
0028	41 8.75	95 39.65	1131.0	980196.25	31.26	-7.32	-4.86
0027	41 7.90	95 39.05	1149.0	980194.81	32.78	-6.41	-3.91
0026	41 7.00	95 38.63	1084.0	980199.50	32.70	-4.27	-1.92
0025	41 6.14	95 38.20	1177.0	980194.05	37.28	-2.86	-0.31
0024	41 5.25	95 37.92	1075.0	980200.46	35.43	-1.24	1.10
0023	41 4.41	95 37 78	1115.0	980195.76	35.74	-2.28	0.14
0022	41 3.56	95 37.40	1044.0	980197.91	32.49	-3.12	-0.85
0021	41 2.70	95 37.00	1012.0	980196.76	29.61	-4.90	-2.71
0020	41 1.84	95 36.50	1006.0	980193.54	27.11	-7.20	-5.01
0019	41 1.38	95 36.20	1004.0	980191.31	25.38	-8.86	-6.68
0018	41 0.53	95 36.10	1001.0	980186.63	21.69	-12.45	-10.28
0017	40 59.65	95 35.75	995.0	980181.89	17.70	-16.24	-14.08
0016	40 59.24	95 35.35	1026.0	980176.50	15.83	-19.16	-16.93
0015	40 58.45	95 35.20	985.0	980174.56	11.22	-22.38	-20.24
0014	40 57.75	95 34.45	982.0	980166.48	3.90	-29.59	-27.46
0013	40 57.58	95 35.55	1058.0	980163.77	8.59	-27.49	-25.20
0012	40 56.95	95 34.45	973.0	980158.11	-4.12	-37.31	-35.19
0011	40 55.85	95 33.36	973.0	980139.82	-20.77	-53.96	-51.84
0010	40 54.95	95 33.35	989.0	980130.76	-26.98	-60.71	-58.57
0009	40 54.08	95 33.38	982.0	980123.86	-33.24	-66.73	-64.60
0008	40 53.27	95 32.92	1020.0	980114.35	-37.97	-72.76	-70.54
0007	40 52.39	95 32.52	1053.0	980106.61	-41.29	-77.21	-74.92
0006	40 51.53	95 32.23	1066.0	980101.80	-43.60	-79.95	-77.64
0005	40 50.65	95 31.75	1074.0	980096.60	-46.73	-83.36	-81.03
0004	40 49.75	95 31.05	1044.0	980094.56	-50.25	-85.86	-83.59
0003	40 48.90	95 30.94	1081.0	980089.22	-50.84	-87.71	-85.37
0002	40 48.06	95 30.56	965.0	980094.14	-55.58	-88.49	-86.40
0001	40 47.18	95 30.25	1023.0	980088.10	-54.85	-89.74	-87.52
0085	40 46.30	95 29.70	1070.0	980083.55	-53.67	-90.16	-87.84
0086	40 45.45	95 29.24	988.0	980087.11	-56.55	-90.25	-88.11
0087	40 44.54	95 28.70	953.0	980088.00	-57.60	-90.10	-88.03

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 1 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0088	40 43.71	95 28.38	957.0	980087.10	-56.89	-89.53	-87.45
0089	40 42.88	95 27.90	1024.0	980085.14	-51.31	-86.23	-84.01
0090	40 42.00	95 27.72	1028.0	980081.34	-53.42	-88.48	-86.25
0091	40 40.25	95 26.90	1141.0	980073.90	-47.62	-86.54	-84.06
0092	40 39.35	95 26.30	1088.0	980077.98	-47.19	-84.30	-81.93
0093	40 38.50	95 26.01	1109.0	980077.78	-44.15	-81.97	-79.56
0095	40 36.72	95 25.25	1189.0	980074.60	-37.15	-77.70	-75.12
0094	40 35.00	95 24.65	1058.0	980083.80	-37.71	-73.79	-71.49
0517	40 34.08	95 24.65	1113.0	980080.38	-34.58	-72.55	-70.13
0516	40 33.08	95 24.65	1096.0	980081.53	-33.54	-70.92	-68.54
0515	40 32.25	95 24.35	1021.0	980086.17	-34.72	-69.54	-67.33
0514	40 31.40	95 23.80	966.0	980089.61	-35.19	-68.13	-66.04
0513	40 30.60	95 23.80	993.0	980088.00	-33.07	-66.93	-64.78
0512	40 29.75	95 23.25	941.0	980091.07	-33.62	-65.72	-63.67
0511	40 28.90	95 22.85	1007.0	980087.17	-30.05	-64.39	-62.21
0510	40 28.05	95 22.50	929.0	980091.83	-31.46	-63.14	-61.13
0509	40 27.17	95 22.25	915.0	980092.92	-30.38	-61.58	-59.60
0508	40 26.25	95 21.70	919.0	980092.50	-29.05	-60.39	-58.40
0518	40 25.50	95 21.15	1032.0	980085.35	-24.46	-59.66	-57.41
0519	40 24.50	95 21.15	1034.0	980084.34	-23.79	-59.06	-56.81
0520	40 22.90	95 20.00	1058.0	980082.35	-21.14	-57.23	-54.93
0521	40 21.00	95 19.50	935.0	980088.05	-24.18	-56.07	-54.04
0522	40 20.12	95 18.95	1029.0	980080.55	-21.53	-56.63	-54.40
0523	40 19.35	95 18.75	981.0	980081.20	-24.25	-57.71	-55.58
0059	41 26.93	95 47.35	1143.0	980147.75	-43.30	-82.28	-79.80

LINE 2

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0182	42 5.75	95 40.42	1415.0	980221.48	-2.15	-50.41	-47.34
0181	42 4.80	95 39.10	1218.0	980231.24	-9.49	-51.03	-48.39
0180	42 4.48	95 37.90	1301.0	980223.16	-9.28	-53.66	-50.83
0179	42 3.85	95 36.85	1217.0	980224.89	-14.51	-56.02	-53.37
0178	42 3.07	95 35.62	1350.0	980212.11	-13.61	-59.66	-56.72
0177	42 2.18	95 33.25	1418.0	980200.62	-17 37	-65.73	-62.66
0176	42 1.50	95 32.20	1305.0	980202.06	-25.54	-70.05	-67.21
0173	42 0.50	95 30.70	1236.0	980198.92	-33.67	-75.82	-73.14
0174	42 0.05	95 29.74	1324.0	980189.97	-33.67	-78.82	-75.95
0175	41 59.50	95 29.25	1191.0	980195.98	-39.34	-79.96	-77.37
0172	41 58.65	95 27.50	1332.0	980179.26	-41.53	-86.96	-84.06

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 2 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0170	41 57.59	95 25.20	1197.0	980179.68	-52.21	-93.04	-90.44
0171	41 56.95	95 24.40	1239.0	980173.88	-53.10	-95 36	-92.67
0169	41 56 03	95 23.05	1382.0	980158.98	-53.18	-100.31	-97.31
0168	41 54.98	95 20.75	1401.0	980151.51	-57.28	-105.07	-102.03
0167	41 53.40	95 18.40	1487.0	980139.53	-58.81	-109.53	-106.30
0166	41 52.03	95 16.15	1300.0	980148.57	-65.30	-109.64	-106.82
0165	41 51.75	95 14.90	1375.0	980144.46	-61.94	-108.83	-105.85
0164	41 50.90	95 13.84	1381.0	980145.17	-59.39	-106.49	-103.49
0163	41 50.05	95 12.65	1386.0	980144.87	-57.95	-105.22	-102.21
0162	41 49.55	95 11.45	1403.0	980143.80	-56.67	-104.52	-101.47
0161	41 49.18	95 10.85	1338.0	980148.27	-57.76	-103.39	-100.48
0160	41 48.60	95 9.65	1275.0	980153.13	-57.95	-101.44	-98.67
0159	41 48.25	95 9.10	1328.0	980150.92	-54.65	-99.95	-97.06
0158	41 47.40	95 7.95	1299.0	980160.19	-46.84	-91.14	-88.32
0157	41 46.55	95 6.80	1351.0	980172.54	-28.32	-74.40	-71.47
0156	41 46.20	95 5.58	1332.0	980183.80	-18.32	-63.75	-60.86
0155	41 45.65	95 4.30	1333.0	980192.37	-8.84	-54.30	-51.41
0154	41 44.85	95 3.15	1289.0	980202.13	-2.02	-45.98	-43.18
0153	41 44.28	95 2.00	1369.0	980202.81	7.04	-39.65	-36.68
0152	41 43.90	95 0.84	1383.0	980206.23	12.35	-34.82	-31.82
0151	41 43.10	94 59.75	1444.0	980205.68	18.73	-30.52	-27.38
0150	41 42.15	94 58.52	1440.0	980208.79	22.89	-26.22	-23.10
0149	41 41.30	94 57.44	1409.0	980212.83	25.29	-22.77	-19.71
0148	41 40.94	94 56.85	1441.0	980212.68	28.68	-20.46	-17.33
0147	41 40.00	94 55.15	1298.0	980228.59	32.56	-11.71	-8.90
0096	41 39.55	94 54.35	1265.0	980233.67	35.21	-7.94	-5.19
0134	41 38.65	94 52.70	1373.0	980234.21	47.25	0.42	3.40
0135	41 37.90	94 51.55	1271.0	980245.59	50.16	6.81	9.57
0136	41 37.35	94 50.44	1284.0	980248.42	55.04	11.24	14.03
0137	41 36.99	94 49.30	1318.0	980249.75	60.10	15.15	18.01
0138	41 36.12	94 47.70	1326.0	980253.65	66.06	20.83	23.71
0139	41 35.25	94 46.60	1313.0	980257.65	70.14	25.36	28.21
0140	41 34.58	94 45 42	1348.0	980256.67	73.45	27.48	30.40
0141	41 33.55	94 43.10	1450.0	980250.46	78.38	28.92	32.07
0142	41 32.85	94 42.05	1341.0	980258.60	77.31	31.58	34.49
0143	41 32.46	94 40.80	1352.0	980255.66	75.99	29.88	32.82
0144	41 31.95	94 39.80	1458.0	980244.91	75.97	26.25	29.41
0145	41 31.11	94 38.70	1389.0	980244.94	70.77	23.40	26.41
0146	41 30.18	94 37.50	1401.0	980237.17	65.52	17.74	20.78
0133	41 29.39	94 36.30	1344.0	980234.29	58.46	12.63	15.54
0132	41 28.82	94 35.15	1279.0	980232.24	51.16	7.53	10.31
0131	41 28.46	94 34.55	1304.0	980225.94	47.74	3.27	6.10
0130	41 28.16	94 34.05	1307.0	980222.23	44.77	0.19	3.03
0129	41 27.65	94 32.95	1387.0	980209.50	40.32	-6.98	-3.97

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 2 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0128	41 27.10	94 32.35	1383.0	980204.34	35.61	-11.56	-8.56
0127	41 26.61	94 31.78	1338.0	980203.36	31.13	-14.50	-11.60
0126	41 26.26	94 30.60	1291.0	980199.90	23.77	-20.26	-17.45
0125	41 25.90	94 30.15	1364.0	980192.74	24.02	-22.50	-19.54
0124	41 25.40	94 29.50	1318.0	980191.04	18.74	-26.21	-23.35
0123	41 25.02	94 28.20	1277.0	980187.17	11.58	-31.97	-29.20
0122	41 24.23	94 27.12	1283.0	980177.28	3.44	-40.32	-37.53
0121	41 23.30	94 25.90	1307.0	980162.74	-7.45	-52.03	-49.19
0120	41 22.88	94 24.80	1339.0	980154.21	-12.35	-58.01	-55.11
0119	41 22.42	94 23.75	1257.0	980154.77	-18.81	-61.68	-58.95
0118	41 21.55	94 22.43	1274.0	980148.50	-22.18	-65.63	-62.86
0117	41 20.69	94 21.30	1274.0	980145.45	-23.94	-67.40	-64.63
0116	41 19.85	94 20.30	1263.0	980144.02	-25.15	-68.23	-65.49
0115	41 18.92	94 18.98	1290.0	980140.53	-24.71	-68.71	-65.91
0114	41 18.06	94 17.84	1261.0	980141.30	-25.38	-68.39	-65.65
0113	41 17.20	94 17.00	1279.0	980138.64	-25.06	-68.69	-65.91
0112	41 16.35	94 14.45	1181.0	980144.64	-27.01	-67.29	-64.72
0111	41 15.50	94 13.40	1234.0	980140.23	-25.16	-67.25	-64.57
0110	41 14.60	94 12.25	1255.0	980138.22	-23.85	-66.66	-63.93
0109	41 14.28	94 11.30	1219.0	980140.68	-24.30	-65.88	-63.23
0108	41 13.75	94 10.30	1227.0	980139.87	-23.57	-65.42	-62.75
0107	41 13.30	94 9.11	1206.0	980141.38	-23.36	-64.49	-61.87
0106	41 12.90	94 8.82	1155.0	980144.40	-24.54	-63.93	-61.42
0105	41 11.96	94 7.55	1227.0	980139.27	-21.49	-63.34	-60.68
0104	41 11.50	94 6.52	1127.0	980146.20	-23.28	-61.72	-59.27
0103	41 11.19	94 5.67	1225.0	980140.02	-19.78	-61.56	-58.90
0102	41 10.82	94 5.25	1211.0	980140.64	-19.92	-61.23	-58.60
0101	41 10.33	94 4.33	1149.0	980144.36	-21.30	-60.49	-57.99
0100	41 9.85	94 3.75	1207.0	980140.28	-19.21	-60.38	-57.76
0099	41 9.70	94 2.85	1098.0	980146.93	-22.59	-60.04	-57.65
0098	41 9.54	94 2.00	1111.0	980145.66	-22.39	-60.29	-57.87
0097	41 8.55	94 0.80	1189.0	980139.32	-19.92	-60.47	-57.89

LINE 3

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0266	42 40.98	94 55.00	1274.0	980269.94	-19.85	-63.30	-60.54
0265	42 39.55	94 51.00	1283.0	980268.52	-18.28	-62.03	-59.25
0264	42 39.10	94 50.10	1281.0	980268.42	-17.89	-61.58	-58.80
0263	42 38.75	94 49.00	1229.0	980270.85	-19.82	-61.74	-59.07

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 3 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	BOUGUER ANOMALY (MGAL) D=2.50 (GM/CC)
0262	42 38.20	94 47.75	1251.0	980268.92	-18.86	-61.52	-58.81
0261	42 37.80	94 46.50	1262.0	980267.04	-19.10	-62.14	-59.40
0260	42 37.45	94 45.40	1273.0	980265.79	-18.79	-62.21	-59.44
0259	42 37.00	94 44.30	1264.0	980265.30	-19.45	-62.56	-59.82
0258	42 36.60	94 43.00	1277.0	980262.49	-20.44	-63.99	-61.22
0257	42 36.10	94 42.00	1240.0	980264.66	-20.99	-63.29	-60.59
0255	42 35.30	94 39.60	1237.0	980261.18	-23.55	-65.74	-63.06
0267	42 34.92	94 38.40	1249.0	980260.55	-22.49	-65.08	-62.37
0254	42 34.45	94 37.25	1247.0	980263.82	-18.70	-61.23	-58.52
0268	42 34.00	94 36.00	1256.0	980259.74	-21.25	-64.09	-61.37
0253	42 33.56	94 34.75	1248.0	980258.08	-23.01	-65.57	-62.86
0269	42 33.11	94 33.60	1247.0	980255.97	-24.53	-67.06	-64.36
0252	42 32.70	94 32.53	1246.0	980252.28	-27.70	-70.20	-67.49
0251	42 31.82	94 29.98	1249.0	980243.18	-35.20	-77.80	-75.08
0250	42 31.00	94 27.60	1241.0	980241.53	-36.37	-78.69	-76.00
0249	42 30.05	94 26.00	1204.0	980243.23	-36.72	-77.78	-75.17
0248	42 29.60	94 25.40	1188.0	980243.95	-36.83	-77.35	-74.77
0247	42 29.12	94 23.80	1179.0	980244.75	-36.15	-76.37	-73.81
0246	42 28.70	94 22.98	1163.0	980245.97	-35.81	-75.47	-72.95
0245	42 28.30	94 21.50	1159.0	980252.72	-28.83	-68.36	-65.85
0244	42 27.80	94 20.30	1153.0	980257.04	-24.33	-63.65	-61.15
0243	42 27.20	94 19.07	1140.0	980262.46	-19.23	-58.11	-55.63
0242	42 26.75	94 17.32	1127.0	980277.70	-4.53	-42.97	-40.52
0241	42 26.50	94 16.84	1142.0	980283.39	2.94	-36.01	-33.53
0240	42 26.10	94 15.72	1132.0	980294.61	13.82	-24.79	-22.33
0239	42 25.30	94 14.50	1140.0	980304.69	25.86	-13.03	-10.55
0238	42 24.72	94 13.24	1136.0	980313.23	34.89	-3.85	-1.39
0237	42 24.33	94 12.15	1131.0	980320.51	42.29	3.71	6.17
0236	42 23.90	94 11.00	1135.0	980327.75	50.55	11.84	14.30
0235	42 23.44	94 9.70	1122.0	980333.88	56.15	17.88	20.32
0234	42 23.00	94 8.53	1121.0	980338.90	61.73	23.50	25.93
0233	42 22.60	94 7.50	1123.0	980342.16	65.78	27.48	29.92
0232	42 22.10	94 6.37	1100.0	980346.22	68.43	30.91	33.30
0231	42 21.70	94 5.00	1111.0	980347.31	71.16	33.26	35.68
0230	42 21.26	94 4.20	1102.0	980349.94	73.60	36.01	38.41
0229	42 20.74	94 2.53	1095.0	980352.03	75.81	38.47	40.84
0228	42 20.35	94 1.62	1070.0	980354.11	76.13	39.63	41.96
0227	42 19.62	93 59.80	946.0	980364.15	75.60	43.34	45.39
0226	42 19.40	93 59.35	1106.0	980353.27	80.10	42.38	44.78
0225	42 18.97	93 58.44	1104.0	980353.34	80.63	42.97	45.37
0224	42 18.28	93 56.43	994.0	980360.50	78.48	44.58	46.73
0223	42 17.73	93 54.80	1094.0	980353.60	81.81	44.49	46.87
0222	42 17.37	93 54.12	1097.0	980353.27	82.30	44.88	47.27
0221	42 17.21	93 53.50	1097.0	980353.50	82.77	45.36	47.74

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 3 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	BOUGUER ANOMALY (MGAL) D=2.50 (GM/CC)
0220	42 16.99	93 52.30	1091.0	980353.26	82.30	45.09	47.45
0219	42 16.10	93 49.98	1100.0	980350.71	81.93	44.41	46.80
0218	42 15.50	93 48.80	1048.0	980352.60	79.83	44.09	46.36
0217	42 15.00	93 47.65	1058.0	980350.70	79.62	43.53	45.83
0215	42 14.30	93 46.00	1080.0	980347.45	79.49	42.65	45.00
0216	42 14.02	93 45.40	1066.0	980347.47	78.61	42.26	44.57
0214	42 13.42	93 44.08	1077.0	980344.20	77.28	40.55	42.88
0213	42 13.08	93 42.98	1089.0	980340.63	75.35	38.20	40.57
0212	42 12.50	93 41.76	1068.0	980339.48	73.09	36.67	38.99
0211	42 12.10	93 40.60	1008.0	980339.89	68.46	34.08	36.27
0210	42 11.70	93 39.48	1006.0	980336.09	65.07	30.76	32.95
0209	42 11.30	93 38.30	1006.0	980330.76	60.34	26.03	28.22
0208	42 10.90	93 37.10	1016.0	980325.03	56.15	21.50	23.71
0207	42 10.40	93 36.00	1007.0	980319.62	50.65	16.30	18.49
0206	42 10.00	93 34.85	990.0	980316.62	46.65	12.88	15.03
0205	42 9.30	93 33.50	983.0	980313.89	44.31	10.78	12.92
0204	42 8.85	93 32.30	1018.0	980309.58	43.97	9.25	11.46
0203	42 8.18	93 31.20	1029.0	980297.77	34.20	-0.90	1.34
0202	42 8.00	93 29.90	1045.0	980289.30	27.50	-8.14	-5.87
0201	42 7.55	93 28.75	1054.0	980282.39	22.11	-13.84	-11.55
0200	42 7.30	93 27.50	1046.0	980275.85	15.20	-20.48	-18.21
0199	42 6.78	93 26.42	1039.0	980263.51	2.98	-32.46	-30.20
0198	42 6.38	93 25.25	1035.0	980256.53	-3.78	-39.08	-36.83
0197	42 5.95	93 24.04	1053.0	980250.71	-7.26	-43.17	-40.89
0196	42 5.53	93 22.90	1042.0	980247.45	-10.92	-46.46	-44.20
0195	42 5.02	93 21.70	1042.0	980243.37	-14.24	-49.78	-47.52
0194	42 4.65	93 20.72	1058.0	980239.91	-15.64	-51.72	-49.43
0193	42 4.25	93 19.50	1064.0	980235.71	-18.68	-54.97	-52.65
0192	42 4.00	93 18.89	1064.0	980233.28	-20.73	-57.02	-54.71
0191	42 3.60	93 18.30	1063.0	980232.45	-21.05	-57.31	-55.00
0190	42 2.94	93 17 11	1069.0	980227.64	-24.31	-60.77	-58.45
0189	42 2.12	93 14.80	1094.0	980221.07	-27.30	-64.61	-62.24
0188	42 1.38	93 12.93	1119 0	980216.99	-27.92	-66.08	-63.65
0187	42 0.75	93 11.65	1085.0	980218.55	-28.61	-65.62	-63.26
0186	41 59.96	93 9.35	1035.0	980217.84	-32.84	-68.14	-65.89
0185	41 59.37	93 8.15	1050.0	980216.74	-31.64	-67.46	-65.18
0184	41 59.00	93 7.04	984.0	980219.56	-34.48	-68 04	-65.90
0183	41 58.20	93 4.68	1043.0	980213.99	-33.30	-68.87	-66.61
0269	41 57.47	93 3.50	1028.0	980214.67	-32.93	-68.00	-65.76
0270	41 56.50	93 1.15	1042.0	980214.53	-30.30	-65.84	-63.58
0271	41 56.05	93 0.00	1029.0	980217.55	-27.83	-62.93	-60.69
0272	41 55.58	92 58.91	1037.0	980218.29	-25.63	-61.00	-58.75
0273	41 55.15	92 57.70	961.0	980224.71	-25.72	-58.49	-56.41
0274	41 54.64	92 56.55	998.0	980222.20	-23.98	-58.02	-55.85

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 3 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	BOUGUER ANOMALY (MGAL) D=2.50 (GM/CC)
0275	41 53.86	92 55.40	1005.0	980221.03	-23.32	-57.60	-55.42
0276	41 53.40	92 54.19	1014.0	980221.08	-21.74	-56.32	-54.12
0277	41 52.96	92 53.02	994.0	980222.59	-21.45	-55.35	-53.19
0278	41 52.55	92 51.81	1019.0	980220.68	-20.39	-55.15	-52.94
0256	42 35.60	94 40.80	1240.0	980263.70	-21.20	-63.50	-60.80

LINE 4

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	BOUGUER ANOMALY (MGAL) D=2.50 (GM/CC)
0381	43 1.98	94 36.20	1177.0	980332.46	1.97	-38.18	-35.62
0380	43 1.70	94 34.80	1176.0	980334.56	4.39	-35.72	-33.16
0379	43 0.75	94 32.00	1169.0	980334.33	4.93	-34.94	-32.40
0378	43 0.60	94 30.25	1190.0	980334.56	7.36	-33.22	-30.64
0377	43 0.60	94 29.00	1180.0	980336.34	8.20	-32.04	-29.48
0376	43 0.60	94 27.75	1161.0	980334.57	4.65	-34.95	-32.43
0291	42 59.55	94 26.70	1194.0	980324.99	-0.25	-40.97	-38.38
0290	42 59.55	94 25.35	1160.0	980321.92	-6.52	-46.08	-43.56
0289	42 59.02	94 23.55	1164.0	980317.04	-10.22	-49.92	-47.40
0288	42 58.60	94 21.75	1145.0	980316.86	-11.56	-50.61	-48.12
0287	42 58.60	94 20.60	1138.0	980316.74	-12.34	-51.15	-48.68
0280	42 58.40	94 19.40	1124.0	980315.83	-14.26	-52.60	-50.16
0281	42 58.15	94 18.25	1138.0	980313.16	-15.24	-54.05	-51.58
0282	42 57.80	94 17.05	1141.0	980310.29	-17.30	-56.22	-53.74
0283	42 57.80	94 15.85	1139.0	980307.05	-20.73	-59.58	-57.10
0284	42 57.55	94 14.70	1139.0	980302.34	-25.06	-63.91	-61.44
0285	42 57.20	94 13.50	1084.0	980301.43	-30.62	-67.59	-65.24
0286	42 56.85	94 12.30	1136.0	980295.06	-31.57	-70.32	-67.85
0292	42 56.85	94 11.20	1120.0	980294.00	-34.14	-72.34	-69.90
0293	42 56.58	94 10.00	1130.0	980289.79	-37.00	-75.54	-73.09
0294	42 56.35	94 8.85	1144.0	980286.46	-38.67	-77.69	-75.20
0295	42 56.00	94 7.70	1147.0	980283.79	-40.53	-79.65	-77.16
0296	42 56.00	94 6.58	1152.0	980282.30	-41.55	-80.84	-78.34
0297	42 55.70	94 5.32	1147.0	980280.83	-43.04	-82.16	-79.67
0298	42 55.55	94 4.10	1130.0	980280.06	-45.18	-83.72	-81.27
0299	42 55.20	94 2.94	1155.0	980277.18	-45.18	-84.58	-82.07
0300	42 55.20	94 1.85	1148.0	980277.96	-45.06	-84.22	-81.72
0301	42 54.78	94 0.62	1127.0	980278.71	-45.65	-84.09	-81.65
0302	42 54.56	93 59.38	1137.0	980279.64	-43.45	-82.23	-79.76
0303	42 54.30	93 58.24	1138 0	980280.06	-42.55	-81.36	-78.89
0304	42 54.10	93 56.85	1148.0	980278.69	-42.68	-81.83	-79.34

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 4 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0305	42 53.90	93 55.68	1138.0	980279.90	-42.11	-80.92	-78.45
0306	42 53.40	93 54.52	1121.0	980281.52	-41.33	-79.57	-77.13
0307	42 53.40	93 53.35	1136.0	980281.74	-39.70	-78.45	-75.98
0308	42 53.15	93 52.18	1138.0	980282.61	-38.27	-77.08	-74.61
0309	42 52.90	93 51.00	1159.0	980282.09	-36.44	-75.97	-73.45
0310	42 52.50	93 49.80	1154.0	980284.52	-33.88	-73.24	-70.73
0311	42 52.50	93 48.68	1164.0	980285.74	-31.72	-71.42	-68.89
0312	42 52.20	93 47.45	1166.0	980290.14	-26.68	-66.45	-63.91
0313	42 51.95	93 46.29	1183.0	980294.07	-20.77	-61.12	-58.55
0314	42 51.68	93 45.10	1213.0	980300.29	-11.33	-52.70	-50.06
0315	42 51.65	93 43.95	1201.0	980309.14	-3.56	-44.52	-41.91
0316	42 51.30	93 42.73	1246.0	980322.00	14.06	-28.44	-25.73
0317	42 50.80	93 41.58	1255.0	980334.96	28.62	-14.19	-11.46
0318	42 50.80	93 40.40	1250.0	980341.09	34.28	-8.36	-5.64
0319	42 50.80	93 39 25	1234.0	980346.75	38.43	-3.65	-0.97
0320	42 50.35	93 38.00	1228.0	980359.54	51.34	9.45	12.12
0321	42 50.15	93 36.85	1176.0	980372.87	60.08	19.97	22.52
0322	42 49.98	93 36.02	1192.0	980377.72	66.69	26.03	28.62
0323	42 49.55	93 34.55	1213.0	980385.84	77.43	36.06	38.69
0324	42 49.40	93 33.35	1206.0	980391.52	82.68	41.54	44.16
0325	42 49.15	93 32.10	1210.0	980396.22	88.13	46.86	49.49
0326	42 49.15	93 30.99	1221.0	980399.11	92.05	50.41	53.06
0327	42 48.85	93 29.83	1230.0	980402.37	96.61	54.66	57.33
0328	42 48.48	93 28 70	1249.0	980403.76	100.34	57.74	60.46
0329	42 48.24	93 27.55	1258.0	980403.80	101.59	58.68	61.41
0330	42 48.20	93 26.20	1271.0	980404.18	103.25	59.90	62.66
0331	42 47.75	93 25.00	1266.0	980402.46	101.74	58.56	61.31
0332	42 47.34	93 23.87	1276.0	980400.05	100.88	57.36	60.14
0333	42 47.30	93 22.65	1253.0	980399.21	97.94	55.21	57.93
0334	42 47.03	93 21.50	1245.0	980395.89	94.28	51.81	54.52
0335	42 46.75	93 20.30	1228.0	980391.41	88.62	46.74	49.40
0336	42 46.50	93 19.10	1236.0	980385.03	83.37	41.21	43.90
0337	42 46.50	93 17.95	1217.0	980380.23	76.78	35.27	37.92
0338	42 45.98	93 16.75	1230.0	980369.86	68.41	26.46	29.13
0339	42 45.60	93 15.64	1210.0	980359.50	56.74	15.48	18.10
0340	42 45.50	93 14.40	1154.0	980350.02	42.15	2.79	5.30
0341	42 45.25	93 13.23	1150.0	980335.96	28.09	-11.13	-8.64
0342	42 45.14	93 12.53	1141.0	980327.05	18.50	-20.42	-17.94
0279	42 45.00	93 12.00	1131.0	980321.83	12.55	-26.03	-23.57
0343	42 44.55	93 11.20	1115.0	980306.05	-4.06	-42.09	-39.67
0345	42 44.25	93 10.30	1117.0	980291.91	-17.56	-55 66	-53.23
0344	42 44.25	93 9.70	1097.0	980286.00	-25.35	-62.77	-60.38
0346	42 44.25	93 8.50	1060.0	980278.53	-36.30	-72.45	-70.15
0347	42 44.33	93 7.38	1108.0	980269.29	-41.15	-78.94	-76.53

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 4 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0348	42 44.10	93 6.20	1028.0	980268.02	-49.59	-84.66	-82.42
0349	42 43.80	93 5.05	1011.0	980264.07	-54.69	-89.17	-86.98
0350	42 43.43	93 3.90	1046.0	980257.43	-57.48	-93.16	-90.89
0351	42 43.00	93 2.70	1047.0	980254.25	-59.92	-95.63	-93.36
0352	42 42.83	93 1.60	1027.0	980252.91	-62.89	-97.92	-95.69
0353	42 42.60	93 0.40	1027.0	980250.82	-64.63	-99.66	-97.43
0354	42 42.15	92 58.00	972.0	980251.24	-68.71	-101.86	-99.75
0355	42 41.60	92 55.62	962.0	980250.49	-69.57	-102.38	-100.29
0356	42 41.30	92 54.50	956.0	980249.67	-70.51	-103.11	-101.04
0357	42 40.96	92 53.22	950.0	980248.75	-71.48	-103.88	-101.82
0358	42 40.40	92 50.84	958.0	980249.11	-69.53	-102.20	-100.12
0359	42 39.55	92 46.80	931.0	980254.68	-65.22	-96.97	-94.95
0360	42 39.10	92 44.65	983.0	980254.36	-59.97	-93.50	-91.36
0361	42 38.65	92 42.55	920.0	980262.03	-57.55	-88.93	-86.93
0362	42 38.33	92 41.35	917.0	980264.55	-54.83	-86.11	-84.11
0363	42 37.75	92 38.95	909.0	980270.44	-48.82	-79.82	-77.85
0364	42 37.44	92 37.30	908.0	980274.78	-44.11	-75.08	-73.11
0365	42 37.00	92 35.45	891.0	980281.57	-38.26	-68.65	-66.71
0366	42 36.70	92 34.25	904.0	980283.40	-34.75	-65.59	-63.62
0367	42 36.40	92 33.10	904.0	980285.35	-32.35	-63.18	-61.22
0368	42 35.95	92 30.70	910.0	980286.64	-29.82	-60.86	-58.88
0369	42 35.00	92 27.40	884.0	980286.16	-31.32	-61.47	-59.55
0370	42 34.55	92 25.02	892.0	980287.76	-28.29	-58.71	-56.78
0371	42 34.10	92 22.40	884.0	980291.90	-24.23	-54.38	-52.46
0372	42 33.25	92 19.12	943.0	980300.21	-9.09	-41.25	-39.21
0373	42 32.90	92 16.76	973.0	980305.09	-0.86	-34.05	-31.94
0374	42 32.50	92 14.40	922.0	980308.37	-1.78	-33.23	-31 22
0375	42 31.60	92 11.00	1000.0	980305.68	4.22	-29.89	-27.72

LINE 5

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0432	40 16.65	97 26.67	1523.0	980035.67	-14.80	-66.74	-63.43
0431	40 16.65	97 24.40	1520.0	980036.33	-14.42	-66.26	-62.96
0430	40 16.65	97 23.26	1521.0	980036.35	-14.31	-66.18	-62.88
0429	40 15.78	97 23.26	1503.0	980037.61	-13.44	-64.71	-61.44
0428	40 15.78	97 22.14	1507.0	980037.46	-13.22	-64.62	-61.34
0427	40 15.78	97 20.98	1489.0	980039.35	-13.02	-63.81	-60.57
0426	40 15.78	97 19.84	1492.0	980040.14	-11.95	-62.84	-59.60
0425	40 15.78	97 18.72	1421.0	980046.12	-12.65	-61.11	-58.03

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 5 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0424	40 15.78	97 17.56	1474.0	980043.84	-9.94	-60.21	-57.01
0423	40 15.78	97 16.43	1482.0	980044.85	-8.18	-58.73	-55.51
0422	40 15.78	97 15.29	1450.0	980048.74	-7.30	-56.75	-53.60
0421	40 15.78	97 14.15	1447.0	980048.72	-7.60	-56.95	-53.81
0420	40 15.78	97 13.10	1506.0	980048.40	-2.37	-53.74	-50.47
0419	40 15.78	97 12.00	1482.0	980050.71	-2.32	-52.87	-49.65
0418	40 15.78	97 10.90	1468.0	980053.67	-0.68	-50.74	-47.56
0417	40 15.78	97 9.80	1449.0	980056.44	0.31	-49.11	-45.97
0416	40 15.78	97 8.60	1425.0	980059.63	1.24	-47.36	-44.27
0415	40 15.78	97 7.50	1442.0	980060.25	3.46	-45.72	-42.59
0414	40 15.78	97 6.50	1441.0	980062.06	5.18	-43.97	-40.84
0413	40 15.78	97 5.25	1434.0	980064.22	6.68	-42.23	-39.12
0412	40 15.78	97 4.10	1420.0	980066.54	7.68	-40.75	-37.67
0411	40 15.78	97 3.00	1419.0	980067.61	8.66	-39.74	-36.66
0410	40 15.78	97 1.90	1387.0	980070.33	8.37	-38.94	-35.93
0409	40 15.78	97 0.60	1371.0	980070.60	7.13	-39.63	-36.65
0408	40 15.78	96 59.52	1383.0	980069.16	6.82	-40.35	-37.34
0407	40 15.78	96 58.38	1393.0	980068.30	6.90	-40.61	-37.58
0406	40 15.78	96 57.25	1355.0	980070.28	5.31	-40.91	-37.96
0405	40 15.78	96 56.11	1368.0	980068 74	4.99	-41.67	-38.70
0404	40 15.78	96 55.00	1365.0	980069.87	5.84	-40.72	-37.75
0403	40 15.78	96 53.88	1398.0	980069.30	8.37	-39.31	-36.27
0402	40 15.78	96 52.83	1334.0	980075.13	8.18	-37.32	-34.42
0401	40 15.78	96 51.60	1354.0	980072.49	7.42	-38.76	-35.82
0400	40 15.78	96 50.44	1393.0	980069.77	8.37	-39.14	-36.11
0399	40 15.78	96 49.33	1330.0	980075.99	8.67	-36.69	-33.81
0398	40 15.78	96 48.18	1332.0	980078.22	11.09	-34.34	-31.45
0397	40 15.78	96 47.06	1309.0	980081.75	12.45	-32.19	-29.35
0396	40 15.78	96 45.92	1266.0	980084.96	11.62	-31.56	-28.81
0395	40 15.78	96 44.80	1264.0	980085.33	11.80	-31.31	-28.57
0394	40 15.78	96 43.75	1303.0	980083.19	13.33	-31.11	-28.28
0393	40 15.78	96 42.50	1294.0	980083.73	13.02	-31.11	-28.30
0392	40 15.78	96 41.38	1279.0	980084.38	12.26	-31.36	-28.58
0391	40 15.78	96 40.25	1312.0	980081.78	12.76	-31.98	-29.13
0390	40 15.78	96 39.14	1332.0	980081.47	14.34	-31.09	-28.20
0389	40 15.78	96 38.00	1330.0	980081.97	14.65	-30.71	-27.83
0388	40 15.78	96 37.00	1313.0	980084.78	15.86	-28.92	-26.07
0387	40 15.78	96 35.95	1367.0	980083.45	19.61	-27.02	-24.05
0386	40 15.78	96 34.75	1402.0	980083.15	22.60	-25.22	-22.18
0385	40 15.78	96 33.50	1413.0	980085.11	25.59	-22.60	-19.53
0384	40 15.78	96 32.50	1457.0	980083.15	27.77	-21.92	-18.76
0383	40 15.78	96 31.30	1444.0	980084.52	27.92	-21.33	-18.20
0382	40 15.78	96 30.05	1513.0	980080.14	30.03	-21.58	-18.29
0381	40 15.78	96 29.00	1492.0	980081.24	29.15	-21.74	-18.50

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 5 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0380	40 15.78	96 27.90	1503.0	980080.46	29.41	-21.86	-18.59
0379	40 15.78	96 26.90	1466.0	980082.08	27.55	-22.45	-19.27
0378	40 15.78	96 25.90	1467.0	980081.05	26.61	-23.42	-20.24
0377	40 15.78	96 24.52	1417.0	980083.58	24.44	-23.89	-20.81
0376	40 15.78	96 23.50	1365.0	980085.66	21.63	-24.93	-21.96
0455	40 15.78	96 22.45	1345.0	980086.08	20.17	-25.71	-22.78
0456	40 15.78	96 21.25	1364.0	980083 85	19.72	-26.80	-23.83
0457	40 15.78	96 20.00	1337.0	980085.46	18.80	-26.81	-23.90
0458	40 15.78	96 18.90	1357.0	980083.91	19.13	-27.16	-24.21
0459	40 15.78	96 17.80	1316.0	980085.50	16.86	-28.02	-25.17
0460	40 15.78	96 16.50	1263.0	980086.52	12.90	-30.18	-27.44
0461	40 15.78	96 15.20	1340.0	980079.94	13.56	-32.15	-29.24
0462	40 15.78	96 14.20	1243.0	980085.33	9.83	-32.57	-29.87
0463	40 15.78	96 13.10	1184.0	980090.86	9.81	-30.58	-28.00
0464	40 15.78	96 12.00	1129.0	980098.43	12.20	-26.30	-23.85
0465	40 15.78	96 10.90	1138.0	980098.61	13.23	-25.58	-23.11
0466	40 15.78	96 9.75	1090.0	980099.50	9.61	-27.57	-25.20
0467	40 15.78	96 8.55	1066.0	980094.54	2.39	-33.97	-31.65
0468	40 15.78	96 7.45	1049.0	980089.99	-3.76	-39.54	-37.26
0469	40 15.78	96 6.55	1086.0	980087.03	-3.24	-40.28	-37.92
0470	40 16.65	96 6.55	1085.0	980088.83	-2.83	-39.83	-37.48
0471	40 16.65	96 5.15	1211.0	980079.93	0.12	-41.18	-38.55
0472	40 16.65	96 4.15	1227.0	980076.05	-2.25	-44.10	-41.44
0473	40 16.65	96 3.05	1129.0	980079.03	-8.49	-47.00	-44.54
0474	40 16.65	96 1.90	1093.0	980081.48	-9.42	-46.70	-44.33
0475	40 16.65	96 0.60	1097.0	980081.30	-9.23	-46.64	-44.26
0476	40 16.65	95 59.60	1158.0	980076.31	-8.48	-47.98	-45.46
0477	40 16 65	95 58.50	1226.0	980070.74	-7.66	-49.47	-46.81
0478	40 16.65	95 57.50	1137.0	980076.02	-10.75	-49.53	-47.06
0479	40 16.65	95 56.30	1106.0	980077.04	-12.64	-50.36	-47.96

LINE 6

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	D=2.50 (GM/CC)
0395	40 15.78	96 44.82	1264.0	980085.33	11.80	-31.31	-28.57
0433	40 16.63	96 44.82	1281.0	980084.32	11.13	-32.57	-29.78
0434	40 17.62	96 44.81	1291.0	980084.10	10.37	-33.66	-30.85
0435	40 18.40	96 44.80	1308.0	980083.28	9.99	-34.62	-31.78
0436	40 19.26	96 44.78	1320.0	980083.07	9.63	-35.39	-32.52
0437	40 20.13	96 44.80	1347.0	980082.23	10.04	-35.91	-32.98
0438	40 20.97	96 44.68	1343.0	980083.49	9.67	-36.13	-33.22

TABLE OF PRINCIPAL FACTS FOR SIX BOUGUER GRAVITY PROFILES COLLECTED IN IOWA AND NEBRASKA IN 1963--CONT.

LINE 6 CONT.

STATION	LAT N (DEG-MIN)	LONG W (DEG-MIN)	ELEV (FEET)	OBS GRAV (MGAL)	FREE AIR (MGAL)	BOUGUER ANOMALY (MGAL) D=2.67	BOUGUER ANOMALY (MGAL) D=2.50 (GM/CC)
0439	40 21.84	96 44.54	1392.0	980081.87	11.36	-36.11	-33.09
0440	40 22.60	96 44.50	1345.0	980087.04	10.98	-34.89	-31.97
0441	40 23.55	96 44.50	1378.0	980086.58	12.21	-34.79	-31.79
0442	40 24.50	96 44.50	1410.0	980086.06	13.29	-34.80	-31.74
0443	40 25.30	96 44.50	1389.0	980090.17	14.23	-33.14	-30.12
0444	40 26.10	96 44.50	1383.0	980093.88	16.19	-30.98	-27.98
0445	40 27.05	96 44.50	1432.0	980096.51	22.01	-26.83	-23.72
0446	40 28.00	96 44.50	1462.0	980102.69	29.60	-20.26	-17.09
0447	40 28.00	96 43.45	1437.0	980105.61	30.17	-18.84	-15.72
0448	40 28.00	96 42.52	1447.0	980105.73	31.23	-18.12	-14.98
0449	40 28.80	96 42.52	1404.0	980114.90	35.16	-12.72	-9.67
0450	40 29.70	96 42.52	1439.0	980118.92	41.14	-7.94	-4.82
0451	40 30.52	96 42.52	1449.0	980124.33	46.26	-3.16	-0.01
0452	40 31.30	96 42.60	1452.0	980129.92	50.98	1.45	4.61
0453	40 32.25	96 42.70	1464.0	980135.36	56.13	6.20	9.38
0454	40 33.00	96 42.75	1413.0	980144.06	58.92	10.72	13.79
0480	40 34.00	96 42.55	1425.0	980148.51	63.01	14.40	17.50
0481	40 34.90	96 42.30	1435.0	980151.56	65.65	16.71	19.83
0482	40 35.60	96 42.40	1358.0	980160.47	66.28	19.96	22.91
0483	40 36.50	96 42.40	1344.0	980165.27	68.42	22.58	25.50
0484	40 37.50	96 42.40	1305.0	980170.39	68.39	23.88	26.71
0485	40 38.40	96 42.40	1223.0	980178.21	67.15	25.44	28.10
0486	40 39.20	96 42.45	1254.0	980178.08	68.75	25.98	28.70
0487	40 40.05	96 42.45	1314.0	980174.79	69.83	25.02	27.87
0488	40 41.00	96 42.45	1294.0	980176.88	68.63	24.49	27.30
0489	40 41.95	96 42.40	1235.0	980180.88	65.66	23.54	26.22
0490	40 42.79	96 42.40	1171.0	980185.12	62.63	22.69	25.23
0491	40 43.58	96 42.40	1169.0	980184.85	61.00	21.12	23.66
0492	40 44.60	96 42.40	1227.0	980180.25	60.33	18.48	21.14
0493	40 45.40	96 42.40	1216.0	980180.24	58.09	16.62	19.26
0494	40 46.15	96 42.20	1167.0	980183.25	55.38	15.57	18.11
0495	40 47.05	96 42.50	1183.0	980179.45	51.74	11.39	13.96
0496	40 48.00	96 42.50	1159.0	980179.48	48.09	8.56	11.08
0497	40 48.90	96 42.50	1158.0	980178.07	45.25	5.75	8.27
0498	40 49.50	96 42.50	1136.0	980178.39	42.60	3.86	6.33
0499	40 50.55	96 40.80	1138.0	980184.53	47.37	8.55	11.02
0500	40 51.50	96 38.90	1143.0	980190.13	52.02	13.03	15.52
0501	40 52.35	96 38.90	1127.0	980190.42	49.54	11.10	13.55
0502	40 53.55	96 38.90	1157.0	980187.16	47.31	7.85	10.36
0503	40 54.98	96 38.80	1287.0	980177.11	47.35	3.45	6.25
0504	40 55.90	96 38.70	1275.0	980176.86	44.60	1.11	3.88
0506	40 57.60	96 38.70	1330.0	980175.10	45.47	0.11	3.00
0507	40 58.40	96 38.70	1327.0	980170.67	39.56	-5.69	-2.81