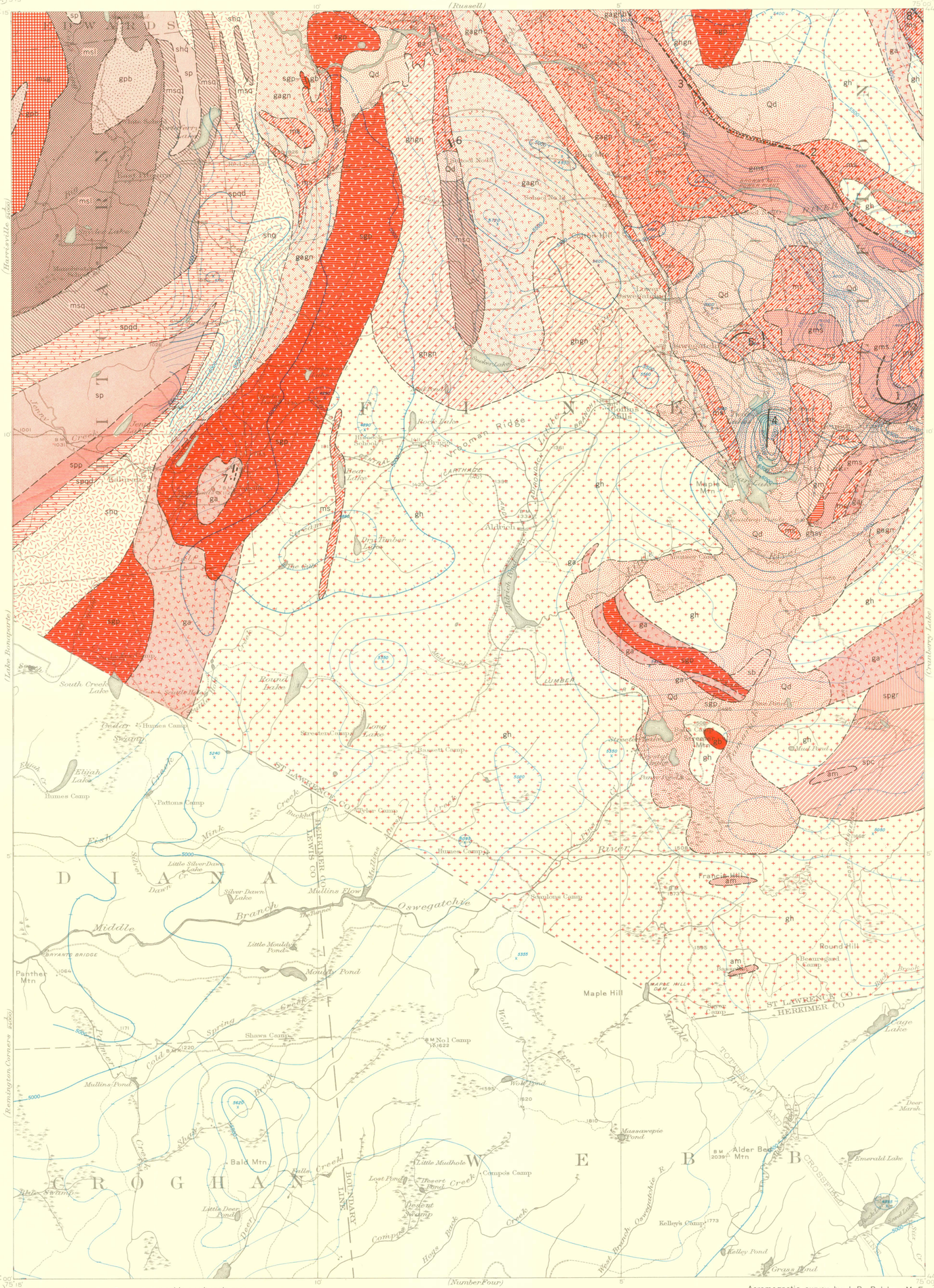


Aeromagnetic survey by J. R. Balsley, M. E. Hill, and D. L. Rossman, 1945. Geology by A. F. Buddington, B. F. Leonard, and C. L. Rogers, 1943–49

EXPLANATION

QUATERNARY

Pleistocene

Qd

Glacial drift

Moraine and water-laid sand and gravel, mapped only where bedrock cannot be reasonably inferred

PRECAMBRIAN

gm | gms

Microcline granite gneiss, gm, commonly sillimanitic, in part garnetiferous, locally with layers of metasediments. Metasediments and migmatitic gneiss; commonly with sheets of microcline granitic gneiss (in part sillimanitic) and locally with sheets of alaskite, gms

gagn | gagnb | ga | gpb

Alaskite granite gneiss, gagn (contaminated facies, gagnb). Alaskite granite, ga. Porphyritic biotite gneiss, in part with augen structure, gpb

ghgn | ghsy | gh

Hornblende granite gneiss, ghgn; contaminated with metasedimentary material and amphibolite (syenitic development), ghsy. Hornblende granite, gh

gpb

Hornblende granite gneiss, in part with a phacoidal structure, in part coarse even-grained

shq

Hornblende quartz syenite gneiss, phacoidal structure, granoblastic texture

spqd | sp | spp | sb

Pyroxene quartz syenite gneiss, spqd. Pyroxene syenite gneiss, quartz-bearing, sp. Pyroxene syenite gneiss with interlayers of shonkinite gneiss and feldspathic ultramafic ilmenite-magnetite pyroxenitic gneiss, spp. Biotite syenite gneiss, sb

spc | spgr

Pyroxene syenite gneiss; mafic minerals include ferroaugite, ferrohypersthene, and ferrohastingsite; locally massive, spc. Fayalite-ferrohedenbergite granite spgr. *Age relations unknown*

msl | msy | msq | ms

Garnet-biotite migmatitic gneiss and biotite-quartz-feldspar gneiss, each with interlayers of amphibolite, msg. Marble, locally with beds of pyroxene granulite, msl. Pyroxenic and calcareous quartz-feldspar gneisses, fine-grained quartz-feldspar granulite and quartzites with intercalated beds of limestone and pyroxene granulite, msq. Metasediments, undifferentiated, and related migmatites with associated sheets of granite gneiss. Pyroxenic, hornblendic and biotitic gneisses; quartzite and feldspathic quartzite; quartz-feldspar granulite, amphibolite; skarn and local marble lenses, ms

am

Amphibolite, largely with granitic veins and sheets

gb

Metagabbro gneiss

Magnetic contours and flight traverse

Contours dashed where data are incomplete; contours show total intensity relative to an arbitrary datum

Magnetic contour enclosing area of lower magnetic intensity

5320

Measured maximum or minimum intensity within closed high or closed low

Contact

Approximately located

Mine

Dip-needle readings

Solid where more than +40°; dashed where +20° to +40°; dotted where +10° to +20°

An aeromagnetic survey of approximately 6,100 square miles in the Adirondack Mountains in northern New York State was made during May and June 1945 and August, September, and October 1946 by the U. S. Geological Survey. The survey was undertaken primarily to guide a program of exploration for magnetite, which was a joint effort by the U. S. Geological Survey, the U. S. Bureau of Mines, and the New York State Science Service. The aeromagnetic data were subsequently compiled as magnetic maps to aid in the long-range geologic studies in this region by the Geological Survey. The geology shown on the map is somewhat generalized from the more complex reality. Pleistocene drift, morainal material, and water-laid gravel and sand blanket much of the area mapped, but most are omitted from the map so that a ready comparison may be made of the aeromagnetic data and the underlying bedrock.

The magnetic measurements were made by a continuously recording AN/ASQ-3A airborne magnetometer installed in an AT-11 airplane. East-west traverse lines were flown approximately 1,000 feet above the ground at intervals of a quarter of a mile. Aerial photographs were used for pilot guidance, and the flight path of the aircraft was recorded by intermittent photographs. The distance from plane to ground was measured with a radio altimeter.

Interpretation of the magnetic map requires a great deal of caution, tempered with experience. It must be emphasized that not all the peaks and ridges on the aeromagnetic map indicate buried ore deposits. Most of the highs are produced by minor amounts of disseminated magnetite occurring as an accessory mineral throughout large volumes of country rock. The quantity of disseminated accessory magnetite is often rather uniform for a given rock type, but it may vary considerably from one rock type to another. The presence of disseminated accessory hematite, together with unexpected permanent magnetization effects, further complicates the picture. These features account for most of the anomalies. In addition, certain belts of rock contain disseminated iron oxides in amounts greater than those usually termed "accessory" but significantly less than those required to produce magnetite bodies of commercial interest. Such rock belts yield substantial magnetic anomalies.

The U. S. Geological Survey has made a ground reconnaissance by dip-needle of all the prominent aeromagnetic anomalies that are considered most likely to indicate ore deposits. This work has been supplemented in places by the U. S. Bureau of Mines and New York State Science Service. Some of the results of the work by the Geological Survey have been published in preliminary form by Hawkes and Balsley (1946) and by Leonard (1953).

With very few exceptions, the most promising anomalies have already been tested by diamond drilling. This phase of the work, together with pertinent dip-needle work done on certain undrilled anomalies, has been summarized by Reed and Cohen (1947).

REFERENCES

Hawkes, H. E., and Balsley, J. R., 1946, Magnetic exploration for iron ore in northern New York: U. S. Geol. Survey Strategic Minerals Inv. Prelim Rept. 3-194, p. 2-4. 9 p.

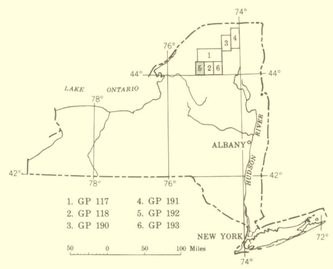
Leonard, B. F., 1953, U. S. Geol. Survey Mineral Inv. Field Studies Map MF-10

Reed, D. F., and Cohen, C. J., 1947, Star Lake magnetite deposits, St. Lawrence County, New York (Nov. 1945 to Nov. 1946): U. S. Bur. Mines Rept. Inv. 4131, 34 p.

LIST OF MAGNETITE MINES AND PROSPECTS

1. Benson mines
2. Benson mines extension
3. Skate Creek
4. Twin Lakes
5. Twin Lake Stream
6. Greene Farm
7. Jayville
8. Spruce Mountain Northwest

NOTE: Aeromagnetic data are obtained and compiled along a continuous line, whereas ground magnetic surveys are made at separate points. Errors within the normal limits of any magnetic measurement may cause slight discrepencies between flight lines in an aeromagnetic map, which would be more obvious than similar discrepancies between points in a ground magnetic map. For this reason as much care should be excerised in evaluating magnetic features that appear as elongations along a single aeromagnetic traverse as in interpreting an anomaly indicated by a single ground station.



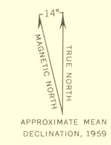
INDEX MAP OF NEW YORK SHOWING PUBLISHED AEROMAGNETIC MAPS IN THE ADIRONDACK AREA

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C., MR 6935

AEROMAGNETIC AND GEOLOGIC MAP OF THE OSWEGATCHIE QUADRANGLE ST. LAWRENCE, HERKIMER, AND LEWIS COUNTIES, NEW YORK

By

James R. Balsley, A. F. Buddington and others



Scale 1:62 500

1 0 1 2 3 4 Miles

Contour interval 100 and 500 gammas

1959

GEOPHYSICAL INVESTIGATIONS
MAP GP-192

For sale by U. S. Geological Survey, price 50 cents