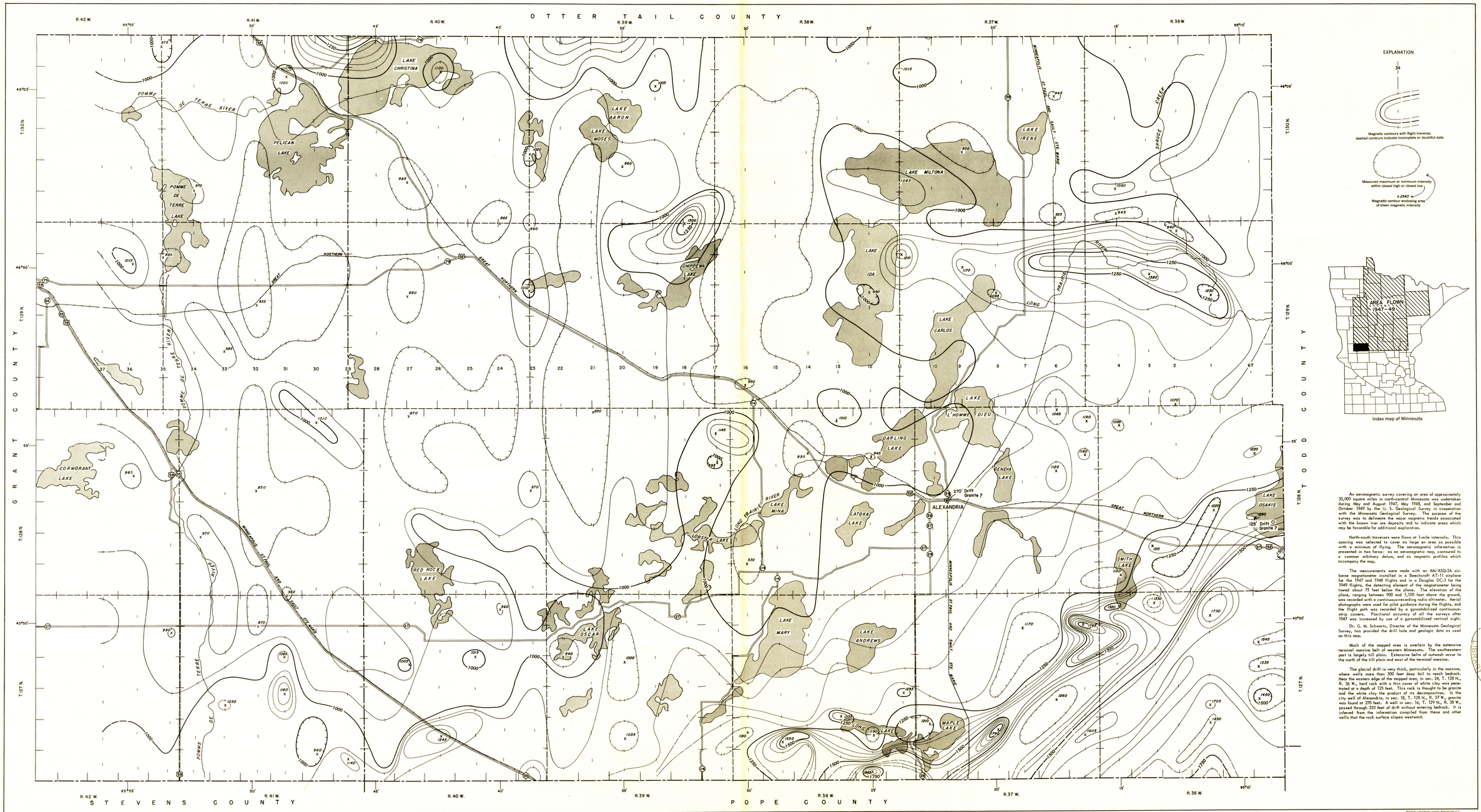
GS (WISCO)

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE MINNESOTA GEOLOGICAL SURVEY



EXPLANATION

54

Magnetic contours with flight traverse; dashed contours indicate incomplete or doubtful data

Measured maximum or minimum intensity within closed high or closed low

X 2543

Magnetic contour enclosing area of lower magnetic intensity

Index map of Minnesota

An aeromagnetic survey covering an area of approximately 30,000 square miles in north-central Minnesota was undertaken during May and August 1947, May 1948, and September and October 1949 by the U. S. Geological Survey in cooperation with the Minnesota Geological Survey. The purpose of the survey was to delineate the major magnetic trends associated with the known iron ore deposits and to indicate areas which may be favorable for additional exploration.

North-south traverses were flown at 1-mile intervals. This spacing was selected to cover as large an area as possible with a minimum of flying. The aeromagnetic information is presented in two forms: as an aeromagnetic map, contoured to a common arbitrary datum, and as magnetic profiles which accompany the map.

The measurements were made with an AN/ASQ-3A airborne magnetometer installed in a Beechcraft AT-11 airplane for the 1947 and 1948 flights and in a Douglas DC-3 for the 1949 flights, the detecting element of the magnetometer being towed about 75 feet below the plane. The elevation of the plane, ranging between 900 and 1,100 feet above the ground, was recorded with a continuous-recording radio altimeter. Aerial photographs were used for pilot guidance during the flights, and the flight path was recorded by a gyrostabilized continuous-strip camera. Positional accuracy of all the surveys after 1947 was increased by use of a gyrostabilized vertical sight.

Dr. G. M. Schwartz, Director of the Minnesota Geological Survey, has provided the drill hole and geologic data as used on this map.

Much of the mapped area is overlain by the extensive terminal moraine belt of western Minnesota. The southwestern part is largely till plain. Extensive belts of outwash occur to the north of the till plain and east of the terminal moraine.

The glacial drift is very thick, particularly in the moraine, where wells more than 300 feet deep fail to reach bedrock. Near the eastern edge of the mapped area, in sec. 24, T. 128 N., R. 36 W., hard rock with a thin cover of white clay was penetrated at a depth of 125 feet. This rock is thought to be granite and the white clay the product of its decomposition. In the city well of Alexandria, in sec. 18, T. 128 N., R. 37 W., granite was found at 270 feet. A well in sec. 16, T. 129 N., R. 38 W., passed through 333 feet of drift without entering bedrock. It is inferred from the information compiled from these and other wells that the rock surface slopes westward.

Base from Minnesota Department of Highways maps

TOTAL INTENSITY AEROMAGNETIC MAP OF DOUGLAS COUNTY AND PART OF GRANT COUNTY, MINNESOTA

RELATIVE TO ARBITRARY DATUM

0 1 2 3 4 MILES

Contour interval 50 gammas
Flown 1000 feet above surface

1951

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY, WASHINGTON, D. C.

Aeromagnetic survey 1947 by J. R. Balsley and M. E. Hill
Compilation directed by J. L. Meuschke

M(200)
GP no.51
Sheet 1
c.1
GEOL LIBRARY - RESTON
3 1818 00117014 9

For sale by U. S. Geological Survey
PRICE 35 CENTS