

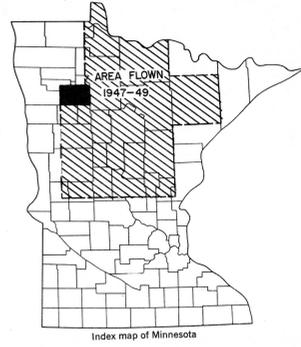
**EXPLANATION**

34

Magnetic contours with flight traverses:  
dashed contours indicate incomplete or doubtful data

Magnetic contour enclosing area  
of lower magnetic intensity

2,293  
Measured maximum or minimum intensity  
within closed high or closed low



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 25 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 gyro-stabilized continuous-strip camera. Positional accuracy of all the surveys after 1947 was increased by use of a gyro-stabilized vertical sight.

Dr. G. M. Schwartz, Director of the Minnesota Geological Survey, has furnished the drill hole and geologic information shown on this map.

Several drill holes in the area covered by this map provide information on the thickness of glacial overburden, but knowledge concerning the bedrock is inconclusive. The northwest corner of this map area is in the glacial Lake Agassiz plain, which consists of clay and silt. The remainder is covered with clayey till, terminal moraine, and outwash. As in other areas of western Minnesota, the glacial drift here is very thick. In this region it is probably about 350 feet thick.

At McIntosh, in T. 148 N., R. 41 W., decomposed rock, probably representing the weathered pre-Cretaceous surface, was found at a depth of 300 feet. Little is known, however, of the character of the fresh rock. In the holes in sec. 7, T. 150 N., R. 41 W., rock found at a depth of 160 feet was tentatively identified as bedrock, but this depth is much shallower than bedrock depth elsewhere in this area and must be considered doubtful. Three wells in the eastern part of T. 150 N., R. 38 W., are reported to have penetrated white clay that is thought to represent decomposed granite.