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# DEPARTMENT OF THE INTERIOR

## INFORMATION SERVICE

GEOLOGICAL SURVEY

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### COPPER-BEARING IRON DEPOSITS AT TOLSTOI MOUNTAIN, KASAAN PENINSULA, PRINCE OF WALES ISLAND, SOUTHEASTERN ALASKA

A detailed examination of the copper-bearing magnetite deposits at Tolstoi Mountain, Prince of Wales Island, was made recently by L.A. Warner and Karl Stefansson of the Geological Survey, according to a report by William E. Wrather, director of the Survey, to Secretary of the Interior Harold L. Ickes. The investigation was a part of the Geological Survey's project to appraise the mineral resources of southeastern Alaska.

Geologic, topographic, and magnetic maps of the deposits have been made, and a report is in preparation.

Tolstoi Mountain is about 40 miles northwest of Ketchikan, the nearest port. It is at the north end of Kasaan Peninsula, which is on the east side of Prince of Wales Island. Several small deposits, principally of magnetite, are in an area about 1½ miles long and ¼ mile wide that extends northwestward and southeastward from Tolstoi Mountain. Altitudes within this area range from 500 to 1,500 feet. Several of the deposits northwest of Tolstoi Mountain have been prospected, and these may be reached by a trail about 2 miles long, which leads from Tolstoi Bay, beginning 1½ miles south of Tolstoi Point.

The area in which magnetite is exposed is bounded on the northeast by a large granodiorite mass, which extends from Palmer Cove to Tolstoi Point, and on the southwest by a large fault zone, which passes through a saddle just south of Tolstoi Mountain and trends northwestward nearly parallel to the granodiorite contact. Within this area the rocks consist mainly of greenstone interlayered with metamorphosed shale, sandstone, conglomerate, and thin lenses of limestone. The bedded rocks in general strike northwest, although locally they are contorted by folding. These rocks were intruded by numerous dikes of diorite, syenite, and lamprophyre, which for the most part trend northeastward.

The ore minerals consist mainly of magnetite with accessory amounts of pyrite and chalcopyrite. The chief gangue minerals are garnet, epidote, chlorite, amphibole, and calcite, with some quartz. The ore forms pods, lenses, and stringers in greenstone and clastic layers which have been brecciated by folding and faulting. Much of the ore has replaced the broken greenstone and clastic material, but some of it fills openings in these rocks. A few small veinlike deposits contain mainly pyrrhotite and chalcopyrite with subordinate amounts of magnetite.

The largest deposits are on the northwest flank of Tolstoi Mountain, at an altitude of about 1,100 feet. Early development work on these deposits included an adit 100 feet long and several open cuts. A dozen trenches were added by the Bureau of Mines in 1944. The best ore is south and east of the adit. Within an area of 200 by 150 feet, three or four small lenticular ore bodies are indicated by trenching and dip-needle surveys, and others may be present. The attitudes of these lenses are not clear and the depths to which they extend are not known. The adit penetrated one of the ore bodies 50 feet below the surface. The exposed bodies may not go much deeper than this and may contain 50,000 to 100,000 long tons of ore. Other small lenses may be present at greater depth. Chemical analyses of this ore are not yet available, but the ore is estimated to average about 50 percent of iron and about 0.5 percent of copper. Similar magnetite deposits elsewhere on Kasaan Peninsula contain small amounts of gold and silver and are relatively free of phosphorus and titanium.

North of the adit portal low-grade magnetite ore is exposed in trenches and open cuts in an area 300 feet long and 100 feet wide. As much as 75,000 long tons of material containing about 30 percent of iron and less than 0.5 percent of copper may be present.

About 1,000 feet N. 40° W. of the adit portal are small deposits of magnetite which may aggregate 20,000 long tons of material containing 40 percent of iron and less than 0.5 percent of copper. About 1,000 feet farther west is another small deposit which may contain about 10,000 long tons of similar material. Other deposits are known in the Tolstoi Mountain area, but the reserves in them are thought to be in the order of a few hundred tons.

Extensive dip-needle surveys within the area indicated that there are no magnetite deposits at or near the surface larger than those exposed in the trenches and open cuts. Because much of the ore is low grade and the deposits are small, they are thought to be of little economic significance, although they might contribute some ore when and if the larger deposits elsewhere on Kasaan Peninsula are mined.