DESCRIPTIVE NOTES
Map 32-1965: Heavy metal content of stream and spring waters

Geological

South of a line following the Millstream River and westward through Tetagouche Lakes, the area is underlain mainly by the Ordovician Tetagouche Group comprising a series of complexly folded and sheared metasediments, metavolcanics, and metabasic intrusives. These are intruded south of Bathurst by a granitic mass.

North of the Millstream River the rocks are mainly of Ordovician, Silurian, and Devonian age. The Elmtree Group, of probable Ordovician age, is composed of folded and contorted metasediments and some metavolcanics which are intruded by a granitic stock in the vicinity of Antinouri Lake. The Silurian and Devonian rocks comprise both sediments and volcanics that are faulted in places, gently folded, and on the whole are less metamorphosed than the older rocks in the district. In the Nicholas Dénys area the Silurian rocks are intruded by a granitic stock that has an associated metamorphic aureole in which the rocks are mainly hornfels and skarn. Another granitic stock intrudes Silurian volcanic rocks along South Benjamin River.

East of Nepisiguit River the area is underlain by the Pennsylvanian Bathurst Formation. These rocks are mainly siltstones, sandstones, grits, and conglomerates that dip gently eastward.

Flat-lying conglomerates and sandstones (Bonaventure Formation), possibly of Triassic age, underlie Heron Island and fringe the coast in the Jacquet River area.

Glacial till, sand, and gravel mantle the whole district, and recent post-glacial sands and clays cover much of the area around Bathurst Harbour and occur in the shore section at Jacquet River.

The principal mineral deposits in the area are massive, vein, and disseminated deposits containing essentially iron, zinc, lead, and copper sulphides. Molybdenite occurrences are associated with the Bathurst, Nicholas Dénys, and Antinouri Lake granitic bodies.

The text of the paper accompanying this map should be consulted for further details on the geology and economic geology of the district.

Geochemical

The analyses recorded on this map were done at the sample site on stream and spring waters using the method described by Boyle, Illsley, and Green (1955)[1].

The values are expressed as total heavy metal (principally zinc, copper, and lead) in parts per million. The subdivisions used on the map are arbitrary and are based on experience in the district. The lowest subdivision can be taken to represent the background. Most of the heavy metal in the water is zinc. The pH of the waters ranged from 3.5 to 8.4, but the majority of the values are between 8.5 and 7.5. The temperature of the waters during the period of sampling (June - September) ranged from 5° to 24°C.

All streams were traversed on foot, and the streams were tested, where possible, at intervals of 1,500 feet.

The heavy metal content in the stream and spring waters ranges from 0.000 to 0. 2 ppm. Some of the dispersion trains are more than 5 miles in length, but most are short, of the order of a mile or so. A number of the streams with high heavy metal content drain areas known to contain sulphide deposits. Some of these include Nepisiguit River (Key Anacon deposit, south of the map-sheet), South Little River (Brunswick No. 12 deposit, south of the map-sheet), Fortymile Brook (Caribou deposit), Orvan Brook (Orvan Brook deposit), and Elmtree River (Keymet mine).

Numerous other rivers, streams, and brooks contain higher than normal amounts of heavy metals that cannot be directly related to known mineral deposits or contaminating agencies. These merit further detailed investigation. Of particular interest are Cove Brook east of Bathurst, Cherry Brook, Flemming Brook, the stream immediately north of Flemming Brook, some of the tributaries of Middle River, Wild Cat Brook, the three creeks draining south into the South Tetagouche River upstream from its junction with the main Tetagouche River, the tributary joining the Middle River near its junction with the North Middle River, the creek draining north into Fortymile Brook in the extreme southwest corner of the map-sheet, the north-draining tributary of South Nash Creek, and a number of the tributaries of Jacquet River, including McNeill Brook, Hayes Gulch, Wildcat Brook, and Fails Gulch Brook. The last group of anomalies appears to be related to the northeast trending fault systems west of Jacquet River.

The water anomalies are generally coincident with anomalies in the stream sediments, but the dispersion trains in the water are shorter than those in the sediments. There is also a general correlation of heavy metal anomalies in the water with those for zinc, copper, lead, arsenic, and antimony, as well as with molybdenum in the sediments of most streams.

The dispersion trains of heavy metals in the stream waters are more uniform than those in the stream sediments. Water analyses have, therefore, a decided advantage when one unknowingly collects a poor sediment sample.

The heavy metal content of the stream and spring waters shown on the trap should be compared with the heavy metal content of the stream and spring sediments shown on Map 33-1965 and with the contents of specific elements in stream sediments recorded on Maps 34-1965 to 44-1965 inclusive.

[1]Boyle, R. W. , Illsley, C. T. , and Green, R. N. : Geochemical investigation of the heavy metal content of stream and spring waters in the Keno Hill - Galena Hill area Yukon Territory; Geol. Surv. Can., Bull. 32 (1955).