DESCRIPTIVE NOTES
Map 37-1965: Arsenic content of stream and spring sediments

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. Arsenopyrite is the principal arsenic-bearing mineral in these deposits. 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 on samples of sediment collected from the channels of rivers and streams and from rivulets flowing from springs. Where possible the active channels were sampled, but in a few cases the residual sediment of dried-up streams was used. In muskeg areas and in streams where beaver workings are present the sediment contained abundant decomposed organic matter.

The sediment was dried, sieved to -80 mesh, ground to -150 mesh, and analyzed for arsenic according to the procedure outlined by Lynch and Mihailov (1963)[1] and the modifications noted in the text of the paper accompanying this map.

The values are expressed in parts per million. The subdivisions used on the map are arbitrary and based on experience in the district. The lowest subdivision can be taken to represent the background in some areas. In others the background is slightly higher.

All streams and rivers were traversed on foot, and the stream sediments were collected, where possible, at intervals of 1,500 feet.

The arsenic content of the stream and spring sediments ranges from less than 2 to 13,000 ppm. The background for the whole district is about 5 ppm, but in some areas the background is less than 2 ppm. This indicates that the values obtained for each stream or group of streams should be considered individually.

Some of the known sulphide deposits in the district are marked by higher than normal contents of arsenic in the neighbouring stream sediments. Examples are: South Little River (Brunswick No. 12 deposit, south of the map-area), Rocky Brook - Stephens Brook system (Beresford copper and other deposits), Nigadoo River (Nigadoo mine), Armstrong Brook (Anaconda deposits), Orvan Brook (Orvan Brook deposit), and Elmtree River (Keymet mine).

Numerous examples of streams with sediment containing higher than average amounts of arsenic occur in virgin areas and are unrelated to known deposits or contaminating agencies. Some of these may indicate the presence of sulphide deposits containing arsenic minerals. A few of the more important streams that should receive further investigation are Little River, Middle River and some of its tributaries, Six Mile Brook and some of its tributaries, Cherry Brook, Rocky Brook, the stream draining Nigadoo Lake, some of the tributaries of Nigadoo River, a number of the tributaries of the South Tetagouche River, Wild Cat Brook, some of the tributaries of Forty Mile Brook, Guitar Brook, Quitard Creek, Fournier Brook, Hendry Brook, Belledune River, Lake Brook, Ellis Brook, North Nigadoo River, tributaries of Elmtree River, South Nash Creek, and a few of the streams draining southeast into the Jacquet River south of Big Hole Brook. The last group of anomalies appears to be related to the northeast trending faults west of Jacquet River. Many of the anomalous dispersion trains of arsenic are long, exceeding two miles in some streams. A number of short isolated anomalous dispersion trains also occur throughout the district.

Many of the arsenic anomalies in the stream sediments are coincident with heavy metal anomalies in the water. There is a general correlation of the arsenic contents of the sediments with those for zinc, lead, and manganese in most streams, and with nickel, molybdenum, and silver in some streams.

The presence of abundant manganese hydroxides and oxides (Map 44-1965) may be a factor in the localization of arsenic in some of the anomalous streams. Manganese hydroxides (and oxides) adsorb arsenic and hence may give false anomalies. This feature should be carefully considered when evaluating all anomalies on this map.

The arsenic contents of the stream and spring sediments shown on this map should be compared with the heavy metal content of stream and spring water on Map 32-1965, and also with the contents of individual elements in the sediments recorded on Maps 34-1965 to 44-1965 inclusive.

[1]Lynch, J. J. , and Mihailov, G. : Field and laboratory methods. used by the Geological Survey of Canada in geochemical surveys; No. 3, Method for determining arsenic; Geol. Surv. Can., Paper 63-8 (1963).