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WAKUACH LAKE MAP-AREA, QUEBEC - NEWFOUNDLAND

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W. R. A. Baragar

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WAKUACH LAKE MAP-AREA, NEW QUEBEC - NEWFOUNDLAND

The southern boundary of the map-area is about 13 miles north of the town of Schefferville. The area covers about 5,400 square miles and affords a complete cross-section of the Labrador Trough. Although the term 'Labrador Trough' has little genetic significance it is widely accepted and is useful to denote the western, less-metamorphosed fringe of the Labrador geosyncline. It is used here for the assemblage of rocks bounded on the west by the banded gneisses of map-unit 1 and on the east by the biotite schists of map-unit 23a.

The banded gneisses (1) are mixed rocks that occur mostly in alternating dark and light layers. Most are quartz diorite or granodiorite-gneiss, with biotite as the major ferromagnesian mineral and hypersthene scarce but characteristic. Plagioclase is commonly antiperthite. Unfoliated greenish grey granodiorite and syenodiorite (2) form a massive body within the banded gneisses and may be roughly outlined on aerial photographs. Its contact with the banded gneisses (1) is uncertain but is probably gradational. The massive rocks too contain minor hypersthene but the biotite content is low. White to pale pink granite and quartz monzonite (3) intrude the banded gneisses as major discrete bodies and as small lit-par-lit layers. Only the larger masses are shown. The rock contains only minor biotite, and rare hornblende and pyroxene. Muscovite is virtually absent.

Rocks of the Labrador Trough rest unconformably on banded gneisses of unit 1. They may be divided broadly into two major divisions: a lower, predominantly sedimentary division (4-14) and an upper, predominantly volcanic division (15-18). Parts of each division have previously been given group names—the Knob Lake Group by Harrison[1] and the Doublet Group by Frarey[2].

Rocks of map-unit 4 are poorly defined assemblages of grey basalts and mottled red and green sandy tuffs, tuffaceous sandstones, and volcanic breccia. They were probably formed during a period of concurrent vulcanism and sedimentation. Rocks of unit 5, with rare exceptions and regardless of rock type, are purplish red, brick-red, or pink. Quartzite is predominant and is commonly cross-bedded. Conglomerates are mainly composed of quartz and feldspar pebbles, rarely more than an inch in diameter, cemented in quartzite or arkose. Almost all are in the western part of the red-bed exposures. Minor interbedded pink limestone and sandy limestone contain local stromatolite zones.

The red beds (5) have an estimated minimum thickness of 3,500 feet near Lac Cramolet and Lac Musset. Unit 6 changes from predominantly dolomite in the south to predominantly greywacke in the north. Near the northwest corner of the map-area it is mainly greywacke and shale with fairly regularly occurring interlayers of dolomite. This dolomite may interfinger with the overlying Attikamagen Formation (7), and the greywacke facies should properly be considered part of the latter.

The Attikamagen Formation (7, 8), mainly greywacke, siltstone and shale or slate with intercalated massive and pillowed grey basalts, is probably more than 7, 000 feet thick in the central part of the map-area. Graded bedding, if present, is not clearly marked. The Denault Formation (9) is mainly buff-weathering, grey to white dolomite with varying amounts of interbedded chert. Stromatolite zones are particularly well developed in the belt that passes through Hurst Lake and Lac Chassin. Near Lac Chassin the formation is at its maximum thickness, more than 4, 000 feet.

The Wishart Formation (10) is predominantly white, grey, or dark grey, massive quartzite, commonly faintly bedded or crossbedded. Shale may be prominent near its base, and in the western part of the trough it is commonly capped by 5 to 40 feet of black chert. Thickness in most places ranges from 150 to 300 feet. The Sokoman Formation (11), of mainly well-layered cherty iron-formation, can be subdivided into a number of stratigraphic units that may be correlated from place to place. It commonly ranges in thickness from 500 to 800 feet, and in the western part of the trough is generally underlain by 20 to 100 feet of ferruginous slate or shale known as the "Ruth Formation".

Unit 12 consists mainly of dolomite in alternating thin, white, pink, or buff beds. A wavy stratification gives it a distinctive appearance. Stromatolite structures are common. This dolomite is not present in the type area of the Knob Lake Group.

Menihek shales, siltstones, and greywackes (13) are indistinguishable from those of the Attikamagen Formation (7) unless their stratigraphic position can be determined. Sedimentary and volcanic rocks overlying the iron-formation in the central part of the map-area are now assigned to the Menihek Formation rather than the Howse Group as in the past; most of the sedimentary part of these rocks is lithologically like sediments of the Menihek Formation in the western part of the trough and they occupy the same stratigraphic position.

The Doublet Group (15-18) rests on the Menihek Formation with little apparent discordance, but much of the contact is a fault. Conglomerate at the base of unit 15 near Walsh Lake contains pebbles lithologically like the rocks of the Knob Lake Group (2), and is therefore evidence of an unconformity. Unit 15 is composed largely of agglomerates, breccias, lapilli, and tuff, but these are commonly schistose and in many places primary features are obscure. Lenses of iron-formation (16) near the north end of Murdock Lake are interbedded with the upper part of unit 15 and extend into the overlying sedimentary formation (17). Most of the iron-formation is thinly layered quartz-magnetite rock with alternate layers rich in one or another of these constituents. The rock is coarser grained than any observed in the Sokoman Formation (11) and magnetite is the major metallic mineral. Thinly interlayered iron carbonate and quartz form

the upper part of the main lens. The sedimentary unit (17) of the Doublet Group, composed of black argillite and greywacke, is virtually co-extensive with the belt of meta-gabbro (20) and ultrabasic sills (21) that separate the volcanic members of the group. The sediments are in thin strips between the closely spaced sills and many bands are too small to be shown. The upper unit of the Doublet Group (18) consists mainly of pillowed and massive meta-basalts with minor associated meta-gabbro. The latter occurs in small, irregular bodies intimately associated with the flows and is probably mainly extrusive rather than intrusive. A few of the flows and associated gabbros contain sparse phenocrysts and aggregates of feldspar up to an inch or more in diameter.

Sills are present at all stratigraphic levels in the Proterozoic rocks of the Labrador Trough but are most abundant in the argillaceous formations in the central and eastern regions. Glomeroporphyritic gabbro (19) is a distinctive, coarsely porphyritic, feldspathic gabbro found only in the narrow belt of sills between Hurst and Murdock Lakes. Its emplacement appears to have been closely followed by that of a swarm of gabbro sills (20), a few of which penetrated the glomeroporphyritic gabbro and formed composite sills. Many of the gabbro sills (20) show some differentiation, olivine being concentrated near the base and gabbro pegmatite and rarely granophyre near the top. Ultramafic sills (21) are confined to the eastern part of the trough. They are commonly directly overlain, along a rather poorly defined contact, by a layer of meta-gabbro.

The Labrador Trough is adjoined on the east by a succession of schists and gneisses that trend in roughly the same direction as the rocks in the trough. The metamorphism that affected these rocks appears to be continuous with the metamorphism imposed on rocks in the trough and, therefore, probably has the same origin. The rocks from which the schists and gneisses originated may have been part of the succession now present in the trough or they may have been in part older. Now, however, because they have been so greatly reconstituted by a later metamorphism, they are considered the youngest rocks in the area.

The hornblende schist (22a) ranges from fine to coarse grained and is composed mainly of hornblende with various amounts of plagioclase and minor epidote. Unit 22b is composed almost entirely of tremolite and actinolite with minor carbonate. It is identical to the altered border zones of the ultrabasic rocks in the trough. The quartz-feldspar-biotite schists (23a) are light grey, thinly layered rocks. They generally contain some muscovite and locally a little garnet. The garnet-staurolite-mica schists (23b) are generally coarse-grained rocks (± 5 mm) containing, in addition, plagioclase and quartz in various amounts. The granodiorite gneiss (24) is a grey to pink, medium-grained rock, generally containing about 10 per cent biotite. The boundary between the hornblende schist and the granodiorite-gneiss is completely gradational.

The sub-greenschist facies of metamorphism covers a broad area in the western part of the trough, where the effects of metamorphism are slight and inhomogeneous. Pumpellyite is a characteristic mineral of this zone. In the greenschist facies the rocks are almost entirely recrystallized, and plagioclase is invariably albite. The western boundary of the almandine-amphibolite facies is placed where the plagioclase changes from albite to oligoclase.

Iron orebodies occur within iron-formation on the southwestern side of the Labrador Trough. Sulphide deposits, largely pyrite and pyrrhotite, are abundant in the eastern part of the trough, particularly in the thin shale interlayers between gabbro and ultrabasic sills in the two eastern sill belts. Chalcopyrite is found in a number of places within or adjacent to gabbro, and copper-nickel minerals occur in close association with some ultrabasic rocks. One new showing of copper-nickel minerals is of interest as it occurs within the schists well to the east of the Labrador Trough. The showing is exposed in the bed of a small creek about a mile northwest of Savalette River at a point 15 miles east of the eastern boundary of the trough. Where observed it consists of finely disseminated pyrrhotite and minor chalcopyrite in a highly carbonaceous metasediment. A semi-quantitative spectrographic analysis of a specimen indicated the presence of between 0.1 and 1 per cent each of nickel and copper[3].

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[1] Harrison, J.M.: The Quebec-Labrador Iron Belt, Quebec and Newfoundland; Geol. Surv., Canada, Paper 52-20 (1952).

[2] Frarey, M.J.: Willbob Lake, Quebec and Newfoundland; Geol. Surv., Canada, Paper 52-16 (1952).

[3] Spectrographic Laboratory, Geological Survey of Canada.

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