

Marginal notes

The Precambrian Long Range Inlier is the largest external basement mass of the Appalachian Orogen. This map presents results of a 1:50 000 scale reconnaissance mapping of the southern third of the inlier, which consists predominantly of pre-Grenvillian granulite-facies quartzofeldspathic gneisses and crosscutting granitic to gabbroic plutons mostly of Grenvillian age.

For detailed complementing information, users are referred to recent descriptions and interpretations of the Precambrian and surrounding rocks by Cawood and Williams (1986), Erdmer (1984, 1986), Owen (1986, b), Owen and Erdmer (1986), Williams (1985), and Williams et al. (1984, 1985, 1986).

The oldest rocks form a heterogeneous metaplutonic gneiss complex (units Hbg, Hgd, Hgm) that, on the basis of multiply folded migmatitic foliation(s) and crosscutting relationships, includes protoliths of several pre-Grenvillian structural ages. Interspersed with the gneisses are silvers of supracrustal assemblages of both sedimentary (units Hp, Hc, Hq, pelitic, marble, and quartzite) and igneous origin (amphibolite or parts of unit Hm, which occurs as thin bands parallel to compositional layering in the metasedimentary strata, interpreted as mafic extrusive rocks or small dikes). Contacts are parallel to foliation and compositional layering, and it is unclear whether the supracrustal rocks represent a younger structure on the gneissic basement, or large screens that would predate the intrusion of the plutons from which most of the gneiss complex is derived.

The Taylor Brook Gabbro Complex (unit Hga) contains a wide variety of gradational and end-member rock types from gabbro to norite to anorthosite. It differs from the distinctive anorthositic massifs of Labrador and Quebec by its largely mafic nature. Its age is likely early Grenvillian, as it intrudes the gneiss complex and is massive in its centre, like the plutons of the Grenvillian granitoid suite (e.g. Hbg, Hgd, Hgm). All known marble and calc-silicate bands large enough to be differentiated on the map flank the gabbro complex.

Units Hhd, Hhd, Hhd, and Hgm form a suite of dioritic plutons that are more deformed than the Grenvillian gneisses, and are assumed to be slightly older on that basis (however, the Potato Hill Diorite has yielded zircons that fall on the reported Grenvillian concordia intersect, see below). These rock types may also be coeval with the Taylor Brook Gabbro Complex, which implies a similar early Grenvillian age for the complex.

Units Hba, Hbg, and Hgd are part of a suite of leucocratic granitic plutons which are structurally younger than most of the penetrative deformation in the inlier as they cut across most fabrics. They are of Grenvillian age (see below), and thus constitute a rare example of voluminous Grenvillian magmatism.

Diorite and metabasite dikes of the northeast-trending Escobedo Long Range swarm are seen in all the above units. They range in width from a few centimetres to metres in the western part of the inlier to more than 50 m along the eastern margin, where they are well exposed near 5000 N.

Miogeoclinal Cambrian to mid-Ordovician carbonate, sandstone, and shale strata (CO platform) overlie unconformably the Precambrian rocks in many places at the periphery of the inlier. They include locally a complete sequence from the Cambrian Forteau Formation to the mid-Ordovician Norris Point Formation, as in Gros Morne National Park. These autochthonous strata are structurally overlain by Cambro-Ordovician rocks of the Humber Arm Allochthon in the west and of the Coney Head Allochthon in the east. The miogeoclinal and allochthonous strata are imbricated with the Precambrian rocks in a west-verging stack that spans the entire Great Northern Peninsula; the Precambrian inlier is thrust westward above an overturned-to-the-west faulted syncline of miogeoclinal and allochthonous rocks, and the miogeoclinal rocks east of the inlier are thrust westward over the Precambrian rocks near the Deer Lake Basin. This geometry is interpreted to be the product of late Taconic deformation.

An early Devonian granite pluton (Devils Room Granite, unit Dg) intrudes the Precambrian rocks along the eastern margin of the inlier. It is the first Paleozoic granite to be recognized in Grenvillian rocks in Canada (another has recently been identified in one of the basement massifs of the southern U.S. Appalachians), and as it is exposed within 60 km of the Appalachian front to the west, it is one of the most external Acadian granites anywhere in the orogen.

A nearby granite east of the inlier, part of the Gull Lake Intrusive Suite (Smyth and Schillereff, 1982), of similar age (see below), is thrust over part of the Coney Head Allochthon and over Silurian rocks along a northeast-striking fault which is parallel to the fault marking the eastern margin of the Devils Room pluton; the truncation of the Devils Room pluton is thus interpreted to be of post-Acadian, probably Carboniferous age.

The Tournaian and Viséan strata of the Deer Lake Basin overlie the Precambrian rocks and deformed Cambro-Ordovician to Silurian rocks along the southeastern margin of the inlier. Their gentle (10 to 150) dips appear to be entirely depositional, and their contact with the Precambrian rocks is not reworked. Brittle faulting and folding have deformed the Carboniferous strata farther east, in the vicinity of the Cabot Fault.

U-Pb ratios from zircon in the French-Childs, Killdevil Hill, Cat Arm, and Potato Hill plutons collectively define a line intersecting concordia at 1042 ± 22 ± 1 Ma. Zircon from unit Hbg near the head of Western Brook Pond gives a 207Pb/206Pb age of approximately 1250 Ma. U-Pb ratios in zircon from the Devils Room and Gull Lake plutons together yield a concordia-discordia intercept of 398 ± 27 ± 7 Ma. U-Pb analyses of sphenes from the Devils Room pluton give close to concordant ages of 400 Ma. Sphene, zircon, and apatite from the Devils Room and Gull Lake plutons all have Pb-Pb isotopic ratios which plot on a line whose slope is very close to 400 Ma.

A discussion of the polyphase metamorphism of the Precambrian rocks, which ranges from granulite to greenschist facies events, is given by Owen and Erdmer (1986).

The French-Childs plumbon has been the focus of recent gold exploration and economic vein-host concentrations have been reported in several localities. The metallogenic setting of this first significant gold occurrence in Newfoundland is discussed by Tuach and French (1986). Movement along major Paleozoic faults and the proximity of Paleozoic plutons appear to be controlling factors in the localization of the mineralization.

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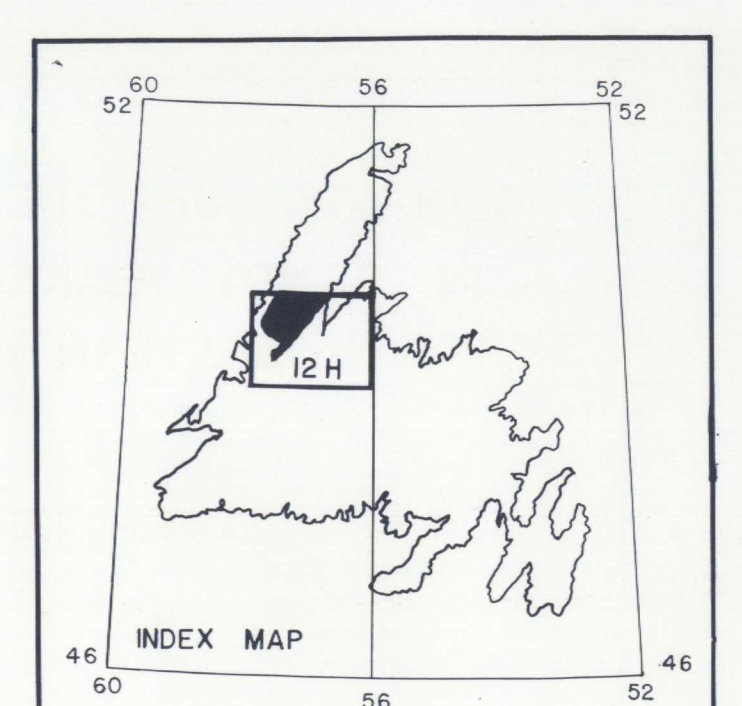
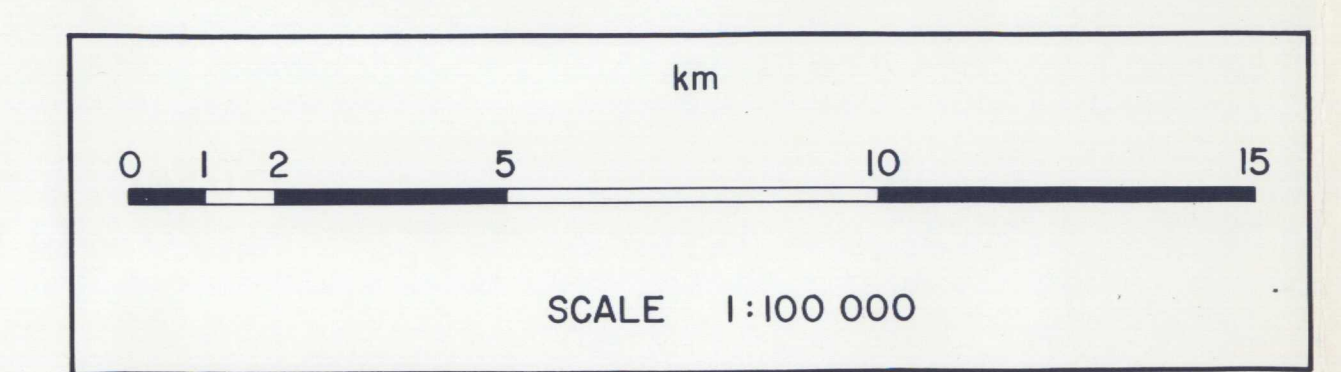
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- PALEOZOIC**
- Silurian to Carboniferous
- Deer Lake Basin: coarse-bedded, proximal, red and grey conglomerate and sandstone of Tournaian and (or) Viséan age
- Su, Sdu: Silurian and Siluro-Devonian rocks undifferentiated
- Devonian (398 Ma old)
- Dg: massive, fresh biotite megacrystic granite
- Ordovician and older**
- Humber Arm Allochthon, Coney Head Allochthon: includes parts of the Humber Arm Supergroup sedimentary slices, and of the Bay of Islands ophiolitic slices, emplaced in mid-Ordovician time, as well as equivalent (Taconic) klippen in the east
- CO platform: autochthonous platform to miogeoclinal strata of Cambrian to mid-Ordovician age; sandstone, carbonate and shale west of the Long Range Inlier, metamorphosed to quartzite, marble and schist in the south and east
- PRECAMBRIAN**
- Long Range Inlier assemblage
- Neohelikian (Grenvillian; 1042 Ma old)
- Hbg: pink, medium to fine-grained, leucocratic biotite granite, commonly epidotized
- Hmg: pink, megacrystic biotite granite
- Hgd: pink to grey megacrystic biotite and (or) hornblende granodiorite
- Helikian or older (1042 Ma or older)
- Hhd: dark green to pink, megacrystic to massive biotite and hornblende quartz diorite to granodiorite
- Hhd: medium grained dark grey hornblende diorite
- Hqd: medium grained, leucocratic quartz diorite to tonalite
- Hqd: gneissic phase of Hqd; medium grained quartzite and tonalite gneiss
- Hga: medium to coarse grained, pyroxene and olivine mesocratic to leucocratic gabbro; minor norite, anorthositic gabbro and anorthosite; locally amphibole and biotite bearing
- Hc: grey to white, massive to finely banded quartzite and quartz-rich gneiss
- Hc: buff, grey or white medium to coarse grained marble and calc-silicate rock, commonly graphitic, and locally with olivine, diopside, garnet and tremolite
- Hp: rusty-weathering, grey pelitic and psammitic schist and gneiss; locally with sillimanite and garnet
- Hm: dark green to black, medium to coarse grained amphibolite to dioritic gneiss; massive to foliated metagabbro
- Helikian or older (1250 Ma or older)
- Hgn: pink to buff, granitic to tonalitic, migmatitic hypersthene gneiss; biotite and (or) hornblende bearing; largely leucocratic, but with more than 50% amphibolite inclusions locally; includes minor exposures of other units undifferentiated
- Hgm: medium grained to megacrystic pink granitic orthogneiss
- Hgm: medium grained grey to buff biotite granodiorite orthogneiss
- S11: sillimanite
- Au: gold
- x data or sample station, no structural measurement
- contact
- gneissosity, schistosity, banding
- igneous layering
- unconformity
- thrust fault
- steep fault
- minor folds; W, S, Z shows sense of asymmetry
- rodding
- slickensides
- Geology by Philippe Erdmer 1983, 1985



**GEOLOGY OF THE LONG RANGE INLIER
IN SANDY LAKE MAP AREA (12H)
WESTERN NEWFOUNDLAND**
by
PHILIPPE ERDMER
1986

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