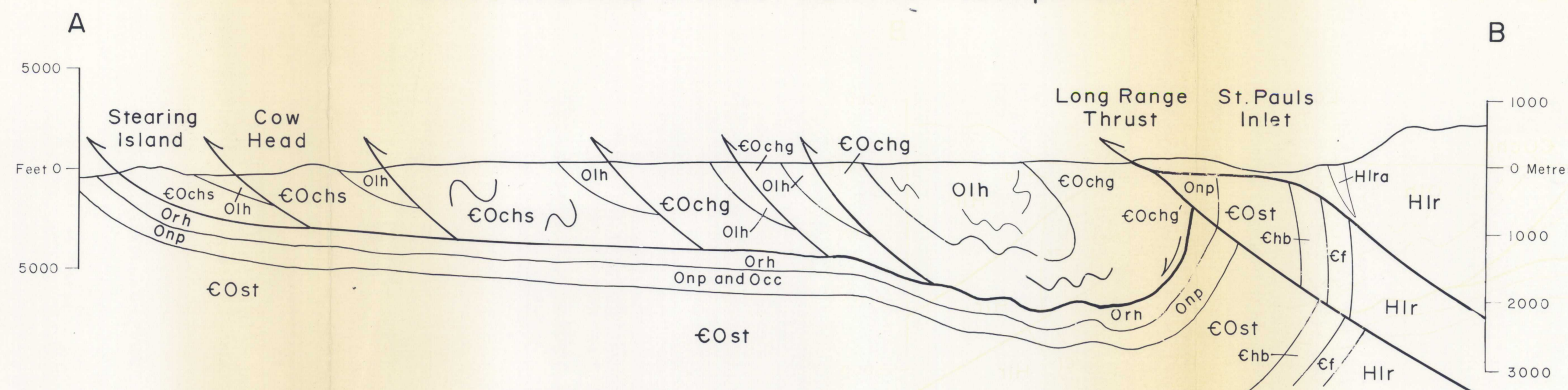


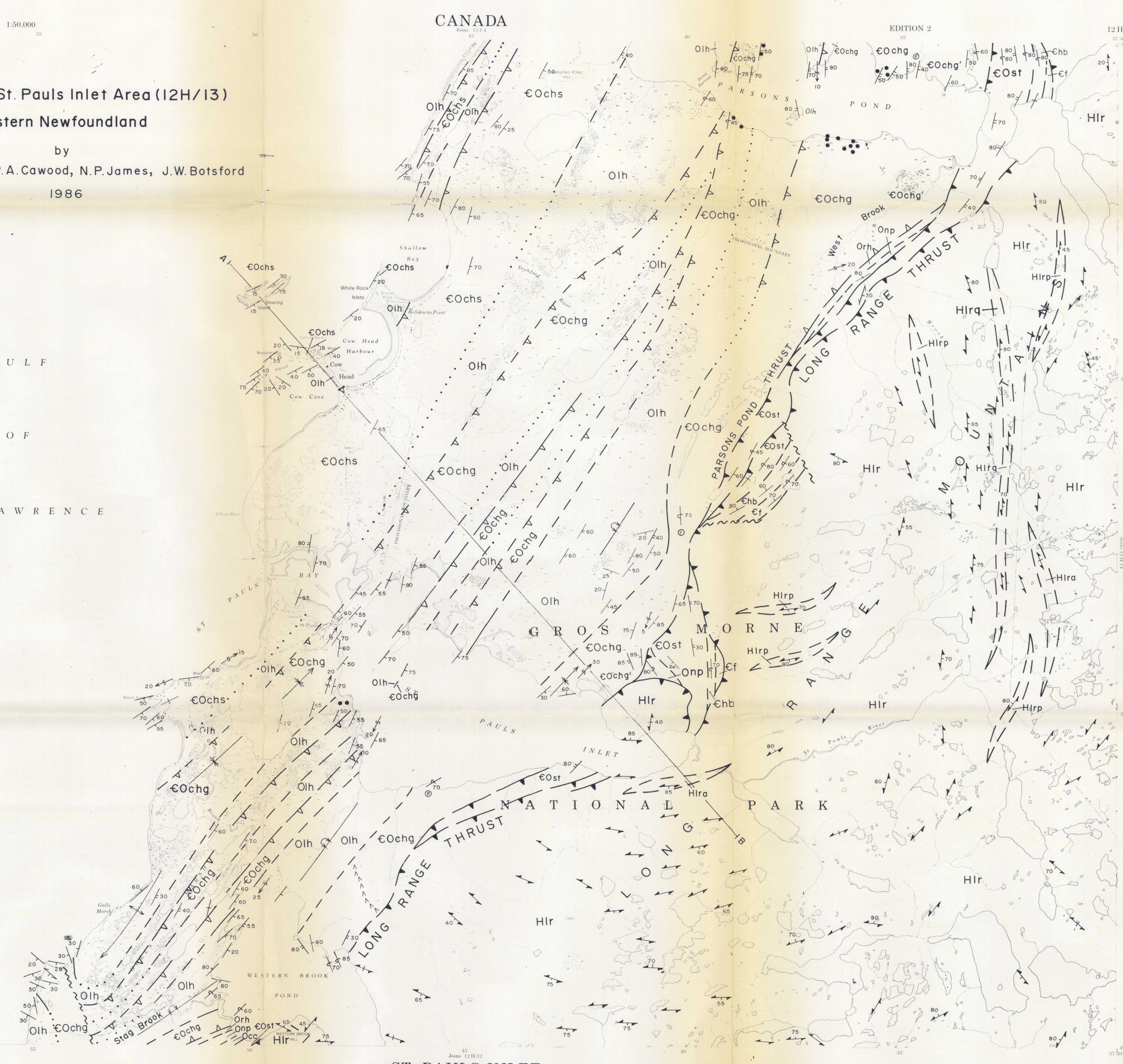
STRUCTURAL CROSS SECTION (Simplified)



Geology of St. Pauls Inlet Area (12H/13)
Western Newfoundland

by
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1986

GULF OF ST. LAWRENCE



ST PAULS INLET
ST. BARBE NORTH DISTRICT
NEWFOUNDLAND

Scale 1:50,000 Échelle

HUMBER ARM ALLOCHTHON

- LOWER TO MIDDLE ORDOVICIAN
 - Lower Head formation* (overlies Cow Head Group)
 - Oih medium to thick bedded grey green sandstone, pebble conglomerate, and shale. Sandstones are finer grained at base of unit and coarser upward. Ellipsoidal lumps of indurated and coarser sandstone in friable and finer grained sandstone are common.
- MIDDLE CAMBRIAN TO LOWER MIDDLE ORDOVICIAN
 - Cow Head Group (overlies Rocky Harbour melange where unaffected by later structures)
 - Shallow Bay formation*
 - Ochs thick bedded coarse boulder to cobble limestone breccia and conglomerate, thin bedded platy limestone and shale, calcareous sandstone, minor chert.
 - Green Point formation*
 - Ochg thin bedded platy limestone and shale, medium bedded cobble to pebble limestone breccia and conglomerate, buff dolomitic siltstone, chert and sandstone. Oochg, mainly grey green shale with thin beds of buff dolomitic shale, siltstone and platy limestone.

- MIDDLE ORDOVICIAN
 - Rocky Harbour melange* (gradational above Norris Point formation)
 - Orh grey scaly shale with blocks of grey to buff sandstone and calcareous sandstone.

AUTOCHTHONOUS AND PARAUTOCHTHONOUS ROCKS

- MIDDLE ORDOVICIAN
 - Norris Point formation*
 - Onp medium to thin bedded grey shale and sandstone, commonly graded.
 - Cape Cormorant Formation
 - Ooc medium to coarse limestone breccia with clasts of mainly Table Head limestone; minor grey shale and sandstone of Norris Point type.
- MIDDLE CAMBRIAN TO MIDDLE ORDOVICIAN
 - St. George and Table Head Groups
 - Oost medium to thick bedded grey limestone, buff dolomite, minor shale; grey to white marble with calcite veins near Long Range Thrust; includes medium to thin bedded dolostone, shale and limestone of Cambrian Port au Port Group at base of some sections; includes Cape Cormorant breccia north of St. Pauls Inlet.

- LOWER CAMBRIAN
 - Hawke Bay Formation
 - Chb thick bedded massive to crossbedded white and pink quartzite
 - Forteau Formation
 - Cf medium to thin bedded grey green shale and buff calcareous siltstone and limestone; includes a thin unit of red and green quartz sandstone and arkosic sandstone to granule conglomerate at base.
- PRECAMBRIAN (Helikian)
 - Long Range Complex
 - Hir foliated to massive pink to grey granitic to tonalite gneiss; Hira, amphibolite and foliated metagabbro; Hirp, quartzite and quartz-rich gneiss; Hirp, pelitic and psammitic gneiss.

- * Informal stratigraphic names
- Stratigraphic contact, defined, approximate, assumed
- Early thrust fault or tectonic contact at the base of a structural slice, defined, approximate, assumed
- Late or out-of-sequence thrust or high angle reverse fault, defined, approximate, assumed
- High angle fault, approximate, assumed
- Anticlinal axis with plunge
- Synclinal axis with plunge, overturned
- Axes of minor folds with plunge
- Bedding, tops known, inclined, overturned
- Bedding, tops unknown, inclined, vertical
- Cleavage, inclined
- Foliation in Long Range Complex, inclined, vertical, direction of dip known, direction of dip unknown
- Fossil locality (new)
- Laker
- Petroleum exploration well

MARGINAL NOTES

The Precambrian Long Range Complex consists of metamorphosed igneous rocks with lenses of ortho- and para-igneous rocks. The structural geology of the complex is taken from Fisher (1984). Lower Cambrian strata of the Forteau and Hawke Bay formations overlie the Long Range Complex with profound unconformity, although in the map area the Precambrian-Cambrian contact is commonly overturned and locally fault-modified. Where Lower Cambrian strata are preserved between St. Pauls Inlet and Parsons Pond, each occurrence displays steep westerly dips in the south to vertical and overturned beds in the north, suggesting westward transport of the Long Range Complex from south to north along the length of each separate occurrence of Lower Cambrian strata. Stratigraphic correlation of basal parts of the cover sequence in most places indicates an important dislocation between basement and cover rocks.

A fairly complete section of cover rocks above the Long Range Complex occurs in the central locality between St. Pauls Inlet and Parsons Pond. There, an overturned section of the Forteau and Hawke Bay formations is followed westward and stratigraphically upward by thin bedded dolostones and limestones, followed by thick bedded carbonates of the Ordovician St. George and Table Head groups. The Long Range Thrust (Johnson, 1941; Selver, 1953) brings crystalline Precambrian rocks above the carbonates of the St. George and Table Head groups to most places, and locally above the Cow Head Group (see structural section A-B). The fault is well-exposed in the headwaters of West Brook where chloritized, crushed and broken Long Range granites overlie recrystallized limestone that has a tectonic heading and contains numerous calcite veins. The fault dips 30 degrees east and is locally bedding in the footwall carbonates is parallel to the fault. Downstream and toward the west, bedding in the carbonates dip moderately westward toward the basement rocks. Farther downstream, the carbonates are overlain by shales and sandstones of the Norris Point formation and Rocky Harbour melange.

Stratigraphic relationships occur in Stag Brook, just south of the southern margin of the map area. There the Long Range Thrust is marked by a steeply-dipping to overturned section of deformed carbonates (Ooch), carbonate breccia (Ooc) and shale and sandstone (Onp). Farther downstream, a continuous section of the Cow Head Group (Ochs) and overlying Lower Head formation forms the overturned limb of a faulted syncline with axis parallel to the Long Range Thrust.

Carbonate breccias of the Cape Cormorant Formation in Stag Brook are in stratigraphic contact with overlying shales and sandstones of the Norris Point formation, with local intertonguing of carbonate breccias and shales in the contact zone.

The Humber Arm Allochthon consists of tectonized structural slices containing Cambrian-Ordovician rocks of the Cow Head Group overlain by Ordovician Lower Head sandstones. Basal relationships are poorly exposed in the map area with only local occurrences of melange between allochthonous rocks and underlying Cambrian-Ordovician cover rocks at West Brook and Stag Brook. Basal relationships are much clearer in the adjacent area to the south (Williams, 1985; Williams et al., 1985). In west places to the map area, the Cambrian-Ordovician cover sequence and Long Range Complex are thrust above the Cow Head Group.

Limestone breccia units of the Cow Head Group are coarse, chert and most abundant toward the west and progressively finer, thinner and less frequent in eastern stratigraphic sections (James and Stevens, 1986). These features serve to contrast the Shallow Bay (Ochs) and Green Point (Ooch) formations of the Cow Head Group. Sections dominated by grey shales, buff dolomitic siltstones and thin platy limestones at the east end of Parsons Pond and St. Pauls Inlet (Oochg) are regarded as basal, mainly Cambrian parts of the Green Point formation, rather than a separate, cover and more distal facies of the Cow Head Group as suggested by Williams et al. (1986).

A disconformal contact between the Cow Head Group and Lower Head formation is well exposed on the north shore of St. Pauls Inlet and at Western Brook Pond. Lower Head sandstones are interbedded with the highest limestone breccia units of the Green Point formation, and the base of the Lower Head formation is defined by the lowest sandstone bed in the section.

The base of the Lower Head formation is about the same early Middle Ordovician age in both eastern and western occurrences across the map area. Sandstones of the Lower Head formation are finer at the base of the unit and coarser upward. Coarser varieties are quartz-feldspar sandstones and conglomerates with clasts of red shale, chert, limestone and limestone breccia. The largest clasts are an obvious sampling of upper parts of the Cow Head Group.

Thrust contacts between separate north-south-trending belts of the Cow Head Group and Lower Head formation are inferred on structural grounds, as most sections are southeast-dipping and southeast-facing. On the southwest side of St. Pauls Inlet, a contact between Lower Head sandstone and overlying Green Point limestone and limestone breccia is marked by

disruption of both units and an intervening narrow zone of shaly melange. Lower Head shales were westward. Similarly at Lower Head, southeast-dipping sandstones are in structural contact with Shallow Bay limestones and limestone breccias. Shales at the contact display slight westward dips and a large limestone breccia block is surrounded by shales in the contact zone. The deepest petroleum exploration well at Parsons Pond penetrated two intervals of Green Point formation, each structurally above Lower Head sandstone over a depth of 1300 metres (Fleming, 1970). Separated belts depicted on the map are interpreted from existing exposures and air photo expression, and their number is minimal. Fabrication is interpreted as Ordovician and related to the assembly and emplacement of the Humber Arm Allochthon (Williams et al., 1985). An overturned syncline in allochthonous rocks between Western Brook Pond and St. Pauls Inlet, and the occurrence of westerly-verging folds that increase in abundance from west to east, are interpreted as later structural features associated with overthrusting of the Long Range Complex.

The Parsons Pond area has long been of interest for its petroleum seepage, and a number of exploration wells were drilled along the shore of Parsons Pond and St. Pauls Inlet. A complete history of petroleum exploration is given by Fleming (1970).

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