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PRELIMINARY REPORT ON CHANDLER - PORT DANIEL AREA, BONAVENTURE AND GASPE-SOUTH COUNTIES

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# PRELIMINARY REPORT

# ON

# CHANDLER-PORT DANIEL AREA

## BONAVENTURE AND GASPÉ-SOUTH COUNTIES

BY

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on

# CHANDLER - PORT DANIEL AREA

Bonaventure and Gaspé-South Counties

by

W.G. Ayrton

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## INTRODUCTION

The Chandler - Port Daniel area, mapped by the writer during the summer of 1960, is in the southeastern part of Gaspé peninsula. It is bounded on the north by latitude 48°25', on the south by Chaleurs bay and on the east and west respectively by longitudes 64°40' and 65°05'. It covers approximately 350 square miles, and includes Newport township and parts of Raudin township and Grand Pabos Seigniory in Gaspé-South county, as well as parts of Port-Daniel and Weir townships in Bonaventure county. The area to the southwest was mapped by Badgley (1956).

The coastal strip along Chaleurs bay is fairly well settled. The principal towns and villages are, from east to west, Chandler, Pabos Mills, Newport, Gascons and Port Daniel. Inland the area is wooded, with the timber rights being held by Gaspesia Sulphite Company Limited. The southern part of the area is easily reached by the Matapedia-Gaspé line of the Canadian National Railways and by Route 6, both of which follow the coast. A secondary road joins Chandler to Pellegrin, which lies to the north of the area mapped. Another road follows the North Port Daniel river to a point about six miles north of Route 6. Two bush roads cross the area, leaving Route 6 just to the west of Chandler. One follows the West Grand Pabos river as far as McNeil brook and extends to the head-waters of the North Port Daniel river. The other reaches Sept Iles lake and the Grand Pabos river.

## TOPOGRAPHY

Physiographically, the area is characterized by two main units, namely, the Chaleurs Bay Coastal plain, and the Gaspé plateau. From the coast, the plain rises gradually northward to a point about 12 miles inland from Maquereau point, where an escarpment marks the edge of the plateau. The top of the escarpment is approximately 1,000 feet above sea-level. From the edge of the plateau, the land surface continues to rise gently to a general elevation of 1,200 feet. All the drainage is directed towards Chaleurs bay.

The plateau is a dissected upland with deep valleys cut by three main rivers; the North Grand Pabos, the West Grand Pabos and the North Port Daniel (the first two are locally known as the North river and the West river, respectively).

The coastal plain, where it is underlain by Silurian rocks, makes fairly good farming land, but much of it is underlain by rocks of the Maquereau group and is relatively poor agriculturally. The land surface over the Maquereau is rolling and commonly swampy.

The coast is for the most part rugged, with cliffs, headlands and stacks. Baymouth bars with tidal lagoons occur at Chandler and Port Daniel. Marine terraces up to an elevation of approximately 100 feet were recognized.

Most of the many small lakes are found within the area underlain by the Maquereau group. The largest, approximately 1½ miles long, is Sept Isles lake.

## GENERAL GEOLOGY

The oldest rocks in the region are included in the pre-Middle Ordovician Maquereau group. They are mainly metamorphosed greywacke, arkosic quartzite, orthoquartzite, greenstone and slate. The major structure within the Maquereau group is a syncline plunging to the southwest.

To the west, the Maquereau is unconformably overlain by the Mictaw group of Middle Ordovician age. The Mictaw is composed of greywacke, sandstone, and shale.

To the southwest, both the Maquereau and the Mictaw are overlain by Silurian sandstone, limestone and siltstone of the Chaleurs Bay group. The latter rocks generally dip to the south and, in places, are tightly folded.

To the North the Maquereau and Mictaw groups are overlain by Silurian rocks arranged in a syncline.

The extreme northern part of the area is underlain by tightly folded Upper Ordovician limestone and shaly limestone. These rocks are in contact mainly with the Silurian but also with the Maquereau and the Bonaventure along an east-west fault.

Flat-lying Carboniferous Bonaventure conglomerate rests with angular unconformity upon the folded rocks of the Maquereau and Chaleurs Bay groups.

## TABLE OF FORMATIONS

| PERIOD | | GROUP | FORMATION | LITHOLOGY |
|---|---|---|---|---|
| Quaternary | | | | Glacial till; beach and stream deposits. |
| Carboniferous | | | Bonaventure | Conglomeratic redbeds, calcareous cement. |
| | | Intrusive rocks | | Serpentinite, diorite, granite, intermediate porphyritic dyke. Acidic dykes. |
| Silurian | Middle | Chaleurs Bay group | Indian Point | Chocolate, maroon, and greenish-grey siltstone. |
| | | | West Point | Well bedded, grey, nodular limestone; maroon siltstone; pink, crinoidal limestone |
| | | | Bouleaux | Thin bedded, maroon and green, calcareous siltstone; stromatoporoids and corals at base. |
| | | | Gascons | Green, calcareous siltstone. |
| | | | La Vieille | Dove grey, fossiliferous, nodular limestone. |
| | | | Clemville | Quartzose sandstone; nodular limestone with green, shaly partings. |
| | Undivided | | | Dark calcareous siltstone; greenish grey siltstone; limestone; red shale; quartzose sandstone. |
| Ordovician | Upper | Matapedia | Pabos | Limestone and argillaceous limestone |
| | Middle | Mictaw | | Conglomerate; greywacke sandstone; black shale. |
| | Post Maquereau | | | Red, ferruginous sandstone. |
| | Pre-Middle Ordovician | Maquereau | | Greywacke and arkosic quartzite; ortho-quartzite; greenstone; slate. |

## MAQUEREAU GROUP

The Maquereau group, along with its relations to adjacent formations, is the main theme of the present investigation. The group outcrops in a roughly triangular area of some 140 square miles. It includes the oldest rocks in the region and is unconformably overlain by the Middle Ordovician Mictaw group. It has been considered as Cambrian or even Precambrian by previous workers, but as no fossils have yet been found in the rocks of the group it can only be classed as pre-middle Ordovician.

Excellent exposures of the Maquereau are found along the coast. The type locality, at Maquereau point, exhibits well bedded, steeply dipping, dark green, greywacke quartzite. Here, also, small localized zones of pegmatites, probably caused by metamorphic differentiation rather than by magmatic intrusion, are common. Similar greywacke quartzite containing pegmatitic material is found along North Port-Daniel river, about half a mile above the government fishing camp. In general, exposures are very poor inland, except along the rivers.

The Maquereau group is made up mostly of a monotonous sequence of metamorphosed greywacke quartzite and red impure quartzite. There are, however, several quite distinct rock assemblages which, under detailed investigation, might be established as formations. Greenstones which Alcock (1935, p.10) calls andesites, are found here and there. They appear to represent a series of separate flows, possibly three, interbedded with greywacke quartzite. Several layers display relict structures of pillows. Dykes of similar igneous material cut the greywacke quartzite just south of the Mictaw-Maquereau contact on West Grand Pabos river.

Between Pabos Mills and West Grand Pabos river steeply dipping orthoquartzite is interbedded with red, impure quartzite and red slate. These rocks are in the central portion of a major syncline, and plunge under a massive, red sandstone.

At the Chandler wharf, beds ½ to 1 inch thick of red, ferruginous material are interbedded with metamorphosed greywacke quartzite. In places, the rock contains fragments of hematitic shale. This zone is approximately 1½ miles wide. It is also seen on the Pellegrin road north of Chandler, and can be traced to the west as far as McKenzie brook.

## MICTAW GROUP

The Mictaw group, found in the western part of the area, unconformably overlies the Maquereau. The type locality is along Mictaw river, a branch of the Middle Port Daniel river and outside the area under study. The group is dated as Middle Ordovician by Alcock (1935, p. 14) and Northrop (1939, p. 12) on the basis of graptolites.

The Mictaw group consists mainly of feldspathic, greywacke sandstone and greenish black shale. However, the base is marked by a predominantly reddish conglomerate, 1,000+ feet thick, consisting mainly of material derived from the underlying Maquereau. The fragments include arkosic and greywacke quartzite, greenstone, and milky quartz. Boulders 1½ feet in diameter are present. The conglomerate is best seen in a deep gorge on the North Port Daniel river about 3 miles upstream from the government fishing camp.

On West Grand Pabos river, the basal conglomerate consists of cobbles of well rounded, pink, medium-grained granite. This granite is obviously pre-Mictaw but no pre-Mictaw granite has been recognized in the area by the writer.

The Mictaw detrital rocks decrease in grain size westward, grading from conglomerate in the east through sandstone to shale. The shale is fissile and greenish black. A few layers contain limestone nodules.

The Mictaw group is unconformably overlain to the north by the Silurian. The contact is exposed only on North Port Daniel river, and here poorly, but the trend of the two units is not parallel. A quartz pebble conglomerate marks the base of the Silurian. This conglomerate is very similar to that at the base of the Silurian where it unconformably overlies the Maquereau at Anse à Pierre-Loiselle.

The southern margin of the Mictaw at the contact with the Chaleurs Bay group was not seen, but differences in structure, age and lithology, and the evidence of an angular unconformity elsewhere in Gaspé between Ordovician and Silurian make it reasonable to assume that an unconformity separates the Mictaw from the Chaleurs Bay group.

In the region just to the north of the government fishing camp on North Port-Daniel river, the Mictaw group has been intruded by serpentine and augite diorite.

## MATAPEDIA GROUP

### Pabos Formation

To the north of the Silurian, and in contact with it along an east-west trending fault, are the Upper Ordovician rocks of the Pabos formation (Kindle 1936, p. 2). These rocks are mostly shaly limestones that display a marked brown and grey colour-banding on the weathered surface. The grey colour marks the more calcareous beds. The rocks are tightly folded in general and particularly so close to the fault zone. No fossils were found.

## SILURIAN

### Undivided

A band of Silurian rocks lies between the Pabos formation to the north and the Maquereau and Mictaw groups to the south. This band is composed of dark calcareous siltstone, greenish-grey siltstone, dark limestone, red shale and quartzose sandstone. It forms a westerly plunging syncline, well displayed on the upper North Port Daniel river. Downfaulting of the Silurian at its contact with the Pabos has crumpled and compressed part of the Silurian band. Thus, this band may be in a half graben. The contact between Maquereau and Silurian was not seen.

The northern Silurian probably is contemporaneous with the Chaleurs Bay group, but the writer could not divide it into Chaleurs Bay units.

### Chaleurs Bay Group

The Chaleurs Bay group, as exposed along the coast in the southwestern part of the area affords some of the best Silurian sections in the Appalachians. Because of their accessibility, good exposure, structural simplicity and abundant fossils, they have been studied in considerable detail by Logan (1862), Schuchert and Dart (1926), Northrop (1939), Badgley (1956), and Burk (1959). Inland exposures are generally poor.

The Clemville is the basal formation of the Chaleurs Bay group. It is about 200 feet thick, and includes quartz pebble conglomerate, quartzose sandstone, and nodular limestone with green, shaly partings.

The La Vieille formation is composed of about 350 feet of light grey weathering, slightly silty, nodular limestone, the nodules being of smooth dark grey limestone.

The Gascons formation consists mainly of about 1,850 feet of green, calcareous siltstone. At the mouth of Chouinard brook, it contains a coral reef zone some 6 feet thick.

The Bouleaux formation is gradational between the siltstone of the Gascons formation and the limestone of the West Point; the first appearance of large stromatoporoids and corals is taken as its base. It consists of about 800 feet of interbedded maroon and green calcareous siltstone, silty shales, and grey nodular limestones.

The basal part of the West Point formation is composed of massive beds of pink crinoidal limestone. The rest of the formation (total thickness about 1,700 feet) is made up of green and maroon siltstone, and well bedded, grey, nodular limestone.

The Indian Point is the youngest Silurian formation in the area, cropping out in the southwest corner. The basal beds are chocolate-coloured siltstone. Maroon and greenish grey siltstone make up the remaining 200 feet of beds exposed.

## BONAVENTURE FORMATION

The flat-lying Bonaventure formation overlies the Maquereau and Chaleurs Bay groups with pronounced angular unconformity. It is a coarse, red conglomerate with a few interbeds of red, arkosic sandstone. The boulders in the conglomerate are up to 3 feet in diameter and, in general, reflect the lithology of the underlying rock. The cement is calcareous throughout.

Bell (Alcock 1935, p.94) gives the age of the Bonaventure formation as probably Early Pennsylvanian. No fossils were found during our work.

The formation is well exposed on the coast just behind the church at Newport, and also to the east of the wharf at Chandler. In both places, the Bonaventure formation overlies the Maquereau group. At other places it overlies the Chaleurs Bay group. The limited extent of its outcrop areas suggests valley-fillings on the post-Silurian land surface. The maximum thickness appears to be 50 feet.

The beds are flat except at a locality two miles north of Chandler where they dip 70 degrees south to vertical. Here, the beds have been involved in the same down-faulting which affected the Silurian synclinal belt to the west.

## POST-MAQUEREAU UNIT (Unknown age)

This unit overlies the Maquereau group northwest of Pabos Mills and Newport. It is a purplish-red, medium-grained, ferruginous, arkosic sandstone with a siliceous cement. It is less metamorphosed than, and also lithologically different from, the underlying Maquereau group. The rock is not bedded save for strings of oriented shale fragments. It could represent the remnants of a syncline, and originally may have covered a much larger area.

Exposures on the southwest side of Route 6, a quarter-mile northwest of Pabos Mills, show the relationships of this unit with the underlying Maquereau. Maquereau orthoquartzites, dipping steeply and striking almost west, disappear beneath "Post Maquereau" rocks that are arranged in a northwesterly trending syncline.

Mictaw or Maquereau

Rocks that could belong either to the Mictaw or the Maquereau are found on the West Grand Pabos river, and on Pine and Plat Brooks. They were first noticed by Kindle (1936), who assigned them to the Mictaw. They consist of a thin, basal conglomerate overlain by rusty weathering orthoquartzite and red shale. They seem, however, to be more metamorphosed than the Mictaw, and are lithologically dissimilar.

## INTRUSIVE ROCKS

Serpentinite intrudes Silurian (?) rocks in Weir township near the headwaters of North Port Daniel river. The intrusion is about 2 miles long, and 2,000 feet wide. It trends northeast, parallel to the strike of the Silurian strata, and is marked by denuded buff weathering hills. It contains large inclusions of hornblende schist and altered impure quartzite and is surrounded by breccias. It is intruded by a dyke of white, muscovite granite.

Serpentinite also intrudes the Mictaw (?) about one mile north of the government fishing camp on North Port Daniel river. Three small bodies of serpentinite have been outlines here, and nearby is a dyke of augite diorite trending approximately north. Two small dioritic intrusions occur about 4 miles and 7 miles respectively north of the main dyke, and may be related to it.

Dykes of an acidic porphyritic rock, dipping vertically, intrude the Pabos and the Silurian in the northern part of the area. The largest of these dykes, about 30 feet thick, is west of the mouth of Rocky brook.

A vertical dyke, 15 feet thick, of a porphyritic, intermediate rock, intrudes the Chaleurs Bay group at Gascons. According to Knopf (Schuchert and Dart, 1926, p. 55), it is an anorthosite porphyry.

## STRUCTURAL GEOLOGY

The northern part of the area is crossed by an east-trending fault which separates the Pabos formation from the northern Silurian belt. This may be the same as that outlined by Skidmore (1958) in the Honorat West area. In the present area, the fault is vertical with the downthrown side on the south. The south compartment may have also moved westerly. The fault is well exposed on Grand Pabos river about one mile west of "13-Mile Camp", and a fault breccia up to 30 feet thick is found in the river bed for about a mile. The fault is also well exposed about 2 miles north of Chandler, where the road to Pellegrin follows the fault trace for about half a mile.

The structure of the Maquereau group is not yet well known. A southwest-plunging syncline in the eastern part of the belt appears to be the major structure within the group. Minor folds at Newport West trend easterly.

The Mictaw Group dips steeply west and southwest near the Mictaw-Maquereau contact, and becomes complexly folded west of this contact (Badgley, 1958).

The rocks of the Pabos formation are tightly folded along axes striking N.70°E.

The northern Silurian belt has a syncline striking N.70°E. and plunging westerly at a low angle. The Silurian rocks of the Chaleurs Bay group generally dip southeasterly. However, east of Port Daniel there is probably a small syncline in the shape of a nearly closed basin.

## ECONOMIC GEOLOGY

### Copper, Nickel, Manganese

A.- Mineralized zones have been found at various locations in Raudin township along the North Grand Pabos fault zone, as outlined below:-

1. At the headwaters of West Grand Pabos river, a grab sample taken from brecciated quartzite gave 0.03% copper and 0.08% nickel. The brecciated quartzite contains much finely disseminated pyrite and is very rusty.

2. Gerald Hunt claims, Raudin township. On the south bank of North Grand Pabos river, ¾ mile west of the mouth of Rocky brook, a pit has been dug about 30 feet up the side of the slope. Disseminated bornite, chalcopyrite, malachite and some very fine native copper (?) were seen in this pit. The host rock is a green schistose, calcareous siltstone. The copper minerals appear to be related to stringers of calcite. A grab sample from this location gave 1.27% copper.

Disseminated bornite was seen about ¼ mile to the west of this pit, 1,300 feet up the stream immediately south of Harrison brook.

3. Farther to the east, at the mouth of Rocky brook, tiny needle-like crystals of millerite (nickel sulphide) were found on the north side of the fault zone. At the mouth of Dry brook where the fault zone is again exposed, pyrite was noted.

B.-Newport township (lots 4 and 5, range 1; lots 14 to 19 Rang du Village de Newport).

On lot 19, Newport Village range, a pit has been dug 20 feet up a cliff on the shore of Anse à Blondel. Here volcanic rocks overlie greywacke quartzite and the contact zone carries chalcocite and malachite. Part of the showing has been dug out.

Chalcocite was also observed in the volcanics in the southern parts of lots 15 to 19, Rang du Village de Newport, and also in the southern part of lots 4 and 5, range 1. Test pits have been dug at several places on these lots. During the summer of 1960, Steerola Explorations Ltd., a subsidiary of Steel Rock Iron Mines Ltd., did detailed geological mapping and geophysical work on a block of ground including lots 11 to 20, Rang du Village de Newport, and lots 19 to 25 of ranges IV and V, Newport township.

C.- Small amounts of copper and manganese related to diorite and serpentinite intrusions have been found on Port Daniel township on lots 31-32 of range XI, and lot 28 of range XII. Finely disseminated chalcopyrite was seen at a few places within the serpentinite and it is with pyrite in a diorite dyke.

The sedimentary rocks close to the intrusions are silicified and are enriched in manganese. The manganese is concentrated along certain horizons as 'nodules' of wad, replacing a porous sandstone. An assay of a 6-pound grab sample gave 6.50% manganese.

Chromite, Asbestos, Talc. (Harvie, 1920; Alcock, 1935; McGerrigle, 1940).

Chromite, asbestos, and talc occur in the serpentinite of lots 28-37, ranges II and III, Weir township. This body has been prospected more or less seriously at various times for some 60 years. The most serious work was done in 1942 in search of chromite by Chromite Mining and Smelting Corporation, which took an option on the claims covering the serpentinite body. Trenching and diamond drilling disclosed some small lenses of chromite. Three of these are at the surface, the largest is about 12'x 5' x 5½'. Chromite grains are scattered throughout the serpentinite and, locally, are abundant.

The asbestos showings in the serpentinite were investigated by MacLaurin Brothers between 1906 and 1920, and, more incidentally, by Chromite Mining and Smelting in 1942-43. The MacLaurin work consisted of two or three shallow pits and one pit about 12 feet across and said to be about 30 feet deep. Some short-fibre asbestos of fair quality was noted at the pits and at a few other places in the serpentinite. McGerrigle (1942) reports that, in some loose pieces of serpentinite, asbestos made up about 10 per cent of the rock, but that the average percentage was much lower.

Talc occurs in lot 37, range II, Weir township, near the eastern end of the long dyke of granite. This, also, was prospected by the MacLaurins, and a pit 40' x 40' x 15' (deep) was dug. The quantity of talc now to be seen is small and the quality rather poor.

## Iron

Lenses and bands of iron-bearing rock varying from siliceous hematite to jasper and hematitic sand occur intermittently in the Maquereau from the Chandler wharf eastward for one-half mile (lots 60-72, range I, Pabos seigniory). The largest mass seen (62 feet by 20 feet) is 320 feet northeast of the shore end of the wharf. The iron-bearing rock here is jaspery or siliceous hematite. This occurrence, and a smaller one at the wharf, constituted the principal showings on the Caldwell and Harrison claim, reported on by T.C. Denis (1916).

## Sandstone

A sandstone quarried about 2 miles northwest of Chandler is used for construction fill.

## Limestone

A quarry in West Point limestone at Gascons Ouest supplies the Gaspesia Sulphite Limited mill at Chandler.

## Gravel

Pits supplying gravel for road material are in use at Chandler, Gascons, and Port Daniel.

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