

Esplanola, Whitefish Falls and Manitoulin Island

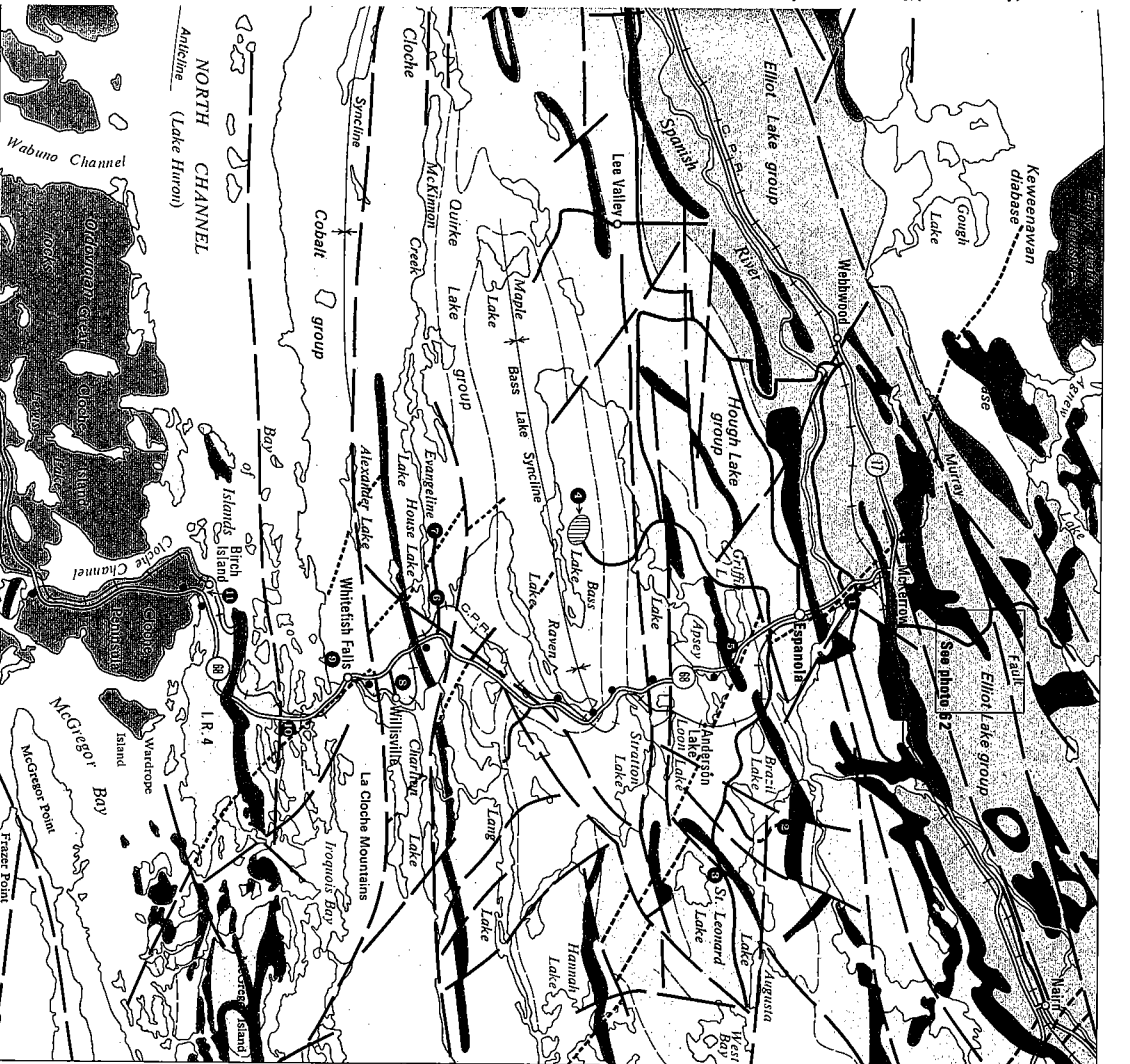
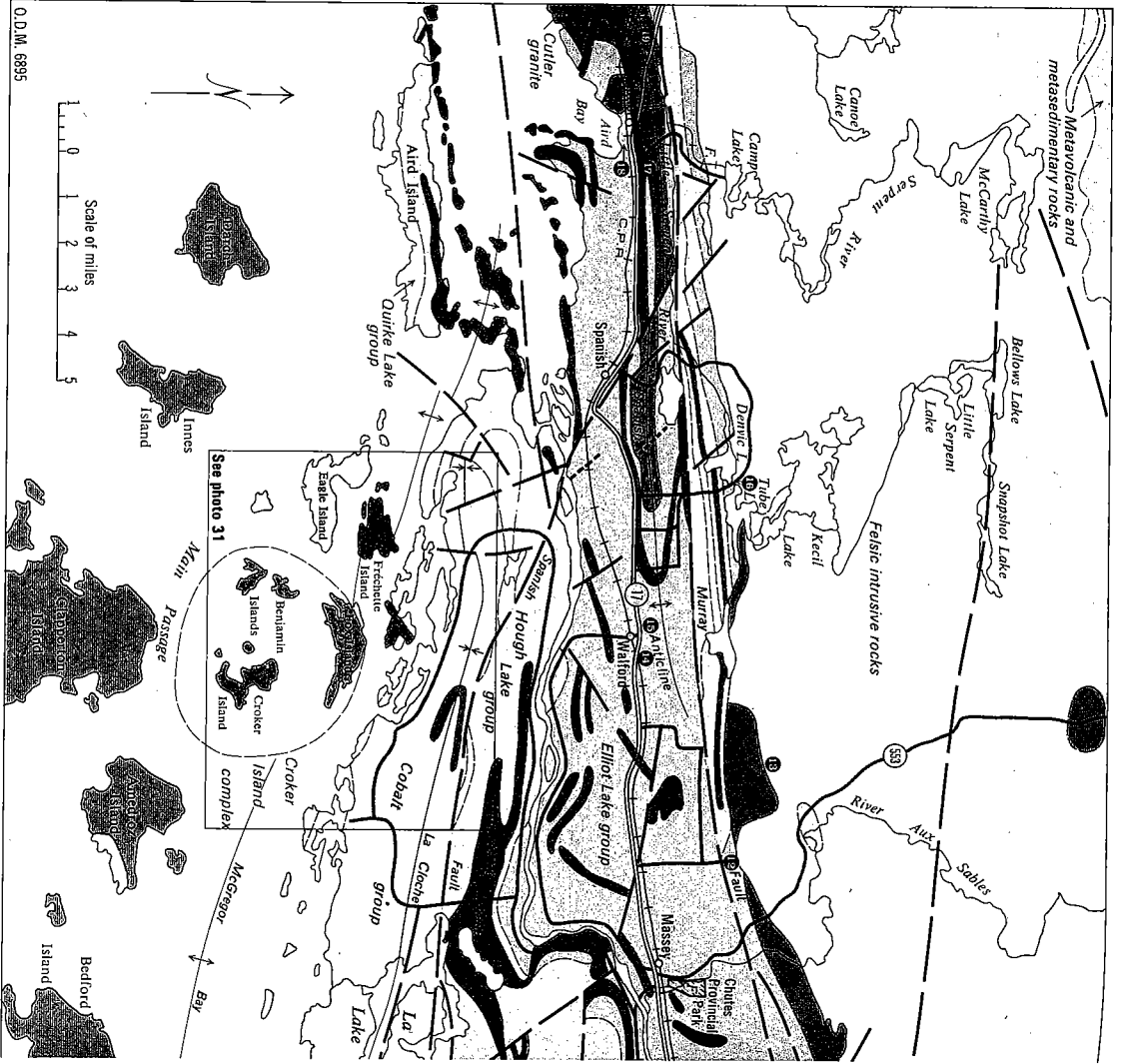
The long side trip described in the next two sections starts at and returns to Espanola via Highway 68. It varies with several alternative routes and side visits to mineral localities but may be as long as 300 miles, round trip. Note that the ferry route shown on many maps from the west end of Manitoulin Island to Blind River is not in use at the time of writing, the only route for the motorists to and from the north shore of Lake Huron being via Highway 68. A ferry runs to Tobermory and Southern Ontario from the south tip of the island during the summer months.

This journey goes through some of Ontario's most delightful lakeshore scenery and passes from the Precambrian rocks of the mainland to the Paleozoic rocks and Pleistocene and Recent deposits of Manitoulin and the other islands. The trip is of considerable historical interest because of the area's close association with North American history and pre-history. Highway 68 passes the site of one of North America's earliest human settlements. It traverses lands where Indian folklore and legend still flourish; where rock paintings and engravings testify to the Indian culture that existed before the arrival of Europeans. The highway crosses the main canoe route used by traders and explorers in opening up Central Canada during the seventeenth and eighteenth centuries. It penetrates into rural Ontario communities whose buildings and fence lines are unchanged since the days of the earliest European settlement.

The area caters to tourists. Accommodation is plentiful and the various trips and side trips cover most of Manitoulin Island except for its westernmost extremity.



Photo 63. Summers Creek near Dunlop Lake.



POINTS OF INTEREST

- 1 Deposit of Pleistocene varved clay.
- 2 Brazil Lake cobaltite occurrence.
- 3 St. Leonard scheelite locality.
- 4 Mongowin Pluton.
- 5 Espanola Municipal Centennial Park.
- 6 Magestic Mine.
- 7 McMillan Mine.
- 8 Williams fire tower.
- 9 Wallace Mine.
- 10 Parking area.
- 11 Roosevelt Monument.
- 12 Massey Mine.
- 13 Hermina Mine.
- 14 Walford bridge.
- 15 Walford church.
- 16 Waterfalls resort.
- 17 Outcrop of staurolite bearing foliated rock.
- 18 Former Cutler acid plant.
- 19 Kennebec falls and picnic area.
- Additional point of geological interest (see text).

Note: Roads shown in a double line indicate guidebook routes. Roads shown in grey indicate other means of access.

O.D.M. 6895

Espanola to Whitefish Falls and Birch Island Road

HIGHWAY 68

Just west of McKerrow, Highway 68 leads south to Espanola, a distance of about a mile. Half a mile south of the junction of Highways 17 and 68, an olivine diabase dike of the Sudbury swarm outcrops on the east side of the road. Note the typical rusty brown weathering and the rounded surface of the weathered rock. This is known as spheroidal weathering. Half a mile further south on Highway 68 and just north of the Spanish River, rocks of the McKim Formation are exposed in a large rock cut. Note the thin bedding of the metamorphosed sedimentary rocks, ripple marks and small scale crossbedding. Sudbury type breccia is spectacularly developed on top of the exposure on the east side. Here the contact between the folded McKim rocks and the crosscutting breccia zone can be seen on the east wall of the cut. On the west side, cleavages (parallel planes along which the rock splits which reflect a preferred orientation of mineral grains formed during deformation and metamorphism) and lineations (linear elements in deformed rocks which also reflect a preferred orientation of mineral grains) are exposed. Chlorite aggregates which probably represent altered chloritoid crystals are also present.

ESPANOLA

Approximately one quarter mile east of Highway 68 on the north bank of the Spanish River opposite the pulp and paper mill, there is a deposit of Pleistocene varved clay. The clays are thinly laminated and various laminae are coloured in shades of grey and pink. Claystone nodules, which are concretionary structures formed by accumulation of minerals about central nuclei, occur in the varved clay.



Photo 64. Large quartz vein in diabase near Brazil Lake.

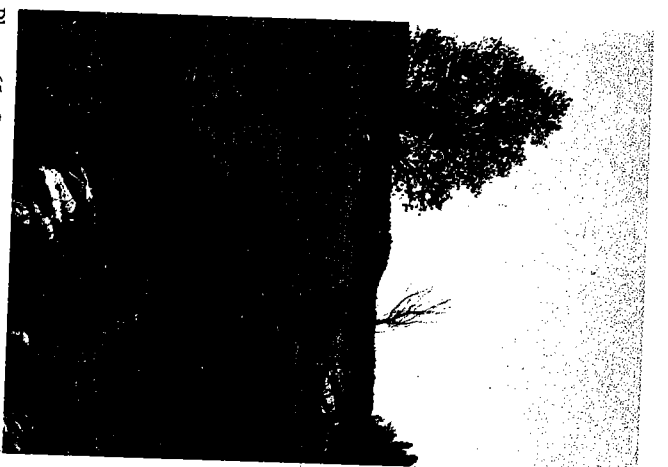


Photo 65. St. Leonard Lake.



Photo 66. Clear Lake, south of Espanola from Highway 68.

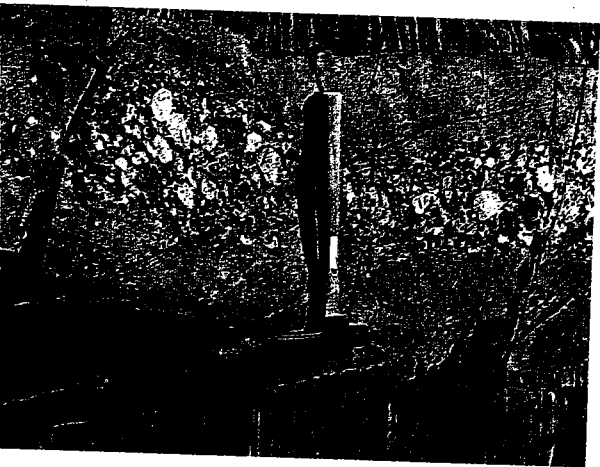


Photo 67. Conglomerate dike in well-bedded Espanola siltstone, Clear Lake, Highway 68.

To the south of the Spanish River lies the town of Espanola, a pulp and paper manufacturing town, tourist centre and supply centre for the surrounding countryside. Some of the original mill buildings and houses were built of a red brick, fired at the turn of the century from deposits of the local clay which in this vicinity was fired directly as excavated without further preparation because certain selected beds contained a suitable proportion of clay and sand.

MINERAL LOCALITIES NEAR ESPANOLA

The following two side trips away from Highway 68 involve driving over old roads with some walking in bush country. They are not recommended during or after wet weather for private cars. Visitors are advised to wear heavy footwear. The description of Highway 68 continues on the next page.

BRAZIL LAKE — ST. LEONARD LAKE SIDETRIP

Continue on Highway 68 through Espanola immediately south of the town to the West Bay Penage road. Penage Lake is the local spelling of a lake, shown on most maps as Panache Lake. Turn off Highway 68 and go east on this road approximately five miles passing two lakes. One tenth of a mile beyond the second (Brazil) lake turn left on an old road, continue one and a quarter miles to a cabin by a beaver pond on Brazil Creek and park. Continue north on foot one and a quarter miles on a bush road to an old adit and dump.

Brazil Lake Cobaltite Occurrence

A Nipissing Diabase dike intrudes rocks of the Espanola Formation. Pits have been dug for surface exploration of a vein carrying quartz, carbonate, pyrrhotite, actinolite, cobaltite and minor chalcopyrite. A horizontal opening or adit has been used for subsurface exploration. Cobaltite crystals up to one inch across and actinolite crystals are to be seen in the dump. The top of the bluff adjacent to the adit affords a good view of Brazil Lake. There is a massive but barren quartz vein at this point (photo 64). Return to the West Bay Penage road.

St. Leonard Scheelite Locality

Continue east on the Penage road for about one and a half miles, cross a small creek and pass a pond on the north side of the road to a spot where the road curves past a diabase outcrop on the north shoulder. There is a slight clearing on the south side of the road

and a few yards to the southeast there is a trench. In this trench and in a series of pits and trenches on the south side of the hill about a quarter mile south of the road the following minerals occur in metamorphosed rocks of the Espanola Formation: idocrase (vesuvianite), garnet, scheelite (fluorescent), powellite (fluorescent), molybdenite, sphalerite, and chalcopyrite. Scheelite and sulphides have also been found in Mississagi quartzite exposed between the above locality and St. Leonard Lake (photo 65). Return to Highway 68.

MONGOWIN PLUTON SIDETRIP

Bass Lake Magnetite Occurrence

Turn west off Highway 68 at the West Bay Penage road intersection. Proceed half a mile and turn south on the Apsey Lake road. After a further three and three quarter miles take the left fork south and after a mile and a quarter take the right fork south. Three quarters of a mile further on, park, turn right onto a rough road and continue for three quarters of a mile. In a clearing on the north side of Bass Lake, there are several old buildings, partially collapsed. Walk west about fifty yards to an old pit and dump.

The pit is one of several used to explore the Mongowin Pluton for nickel and copper. The basic rocks of the pluton can be examined in these pits and outcrops adjacent to the access road. In the pit, a vein cutting basic rocks contains masses of magnetite with a colloform, radiating structure and coatings of dense cream coloured serpentine (figure 4).

Return to the junction of Highway 68 and the West Bay Penage road and resume the journey south on Highway 68.

HIGHWAY 68 SOUTH OF ESPANOLA

Espanola Municipal Centennial Park

Drive south on Highway 68 a mile and a quarter south of the West Bay Penage road to a small point which projects out into Clear Lake, shown on most maps as Griffin Lake (photo 66). This area has picnic grounds and a public bathing beach. Here thinly bedded metamorphosed calcareous siltstones and impure limestone of the Espanola Formation are intruded by several tabular dike-like bodies of conglomerate (photo 67). These have presumably formed as a result of injection of water-soaked sediments into partly consolidated Espanola sediments. The dike rock resembles the rocks of the underlying Bruce Formation. This locality is considered classic and has been illustrated in text books, reports and professional papers. To preserve the outcrop sampling is not



Photo 68. Large scale crossbedding in the Espanola Formation, Highway 68 at Anderson Lake side road.

permitted. Sedimentary structures present in the Espanola rocks include bedding, ripple marks and ball-and-pillow structures. Small white crystals of scapolite, a metamorphic mineral, are also present.

Outcrops along Highway 68

Seven tenths of a mile south of Clear Lake, large scale crossbedding is exposed in calcareous sandstone of the Espanola Formation. This small outcrop is to be found on the east side of the road a few yards north of the Anderson Lake side road. In a further seven tenths of a mile there is crossbedded sandstone of the Serpent Formation.

Two and a half miles south of Clear Lake, a rock cut exposes a fault zone in the Mississagi Formation west of the road. Vein quartz and crushed or mylonitized sandstone fragments constitute the zone, whilst on the south fringe of the outcrop a few hundred feet west of the present road there are exposures of Bruce type conglomerate with stretched pebbles.

Continuing south on Highway 68, roads leading to Loon Lake and Raven Lake are passed to the east. Three tenths of a mile beyond the Raven Lake road an outcrop on the west side of the highway shows large scale crossbedding in sandstones of the

Serpent Formation; the thickness of the individual crossbeds is of the order of feet.

A mile south of the Raven Lake road, outcrops of Gowganda Formation argillite, conglomerate, and quartzite occupy the nose of the Bass Lake Syncline. Many outcrops are intensely brecciated and contain blocks derived from the underlying formations. Here a mass of Sudbury breccia has been forced into the nose of the fold.

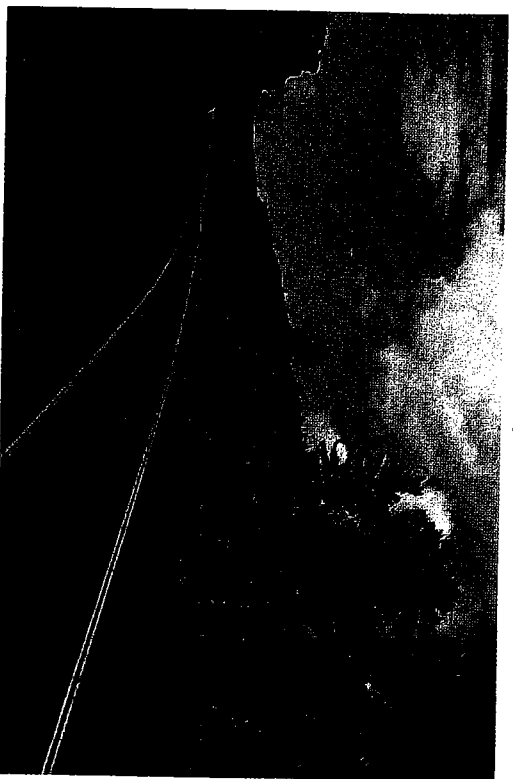
Just over a mile further south an outcrop on the west side of the railway track contains large angular to rounded blocks of quartzite in breccia considered by some to be of Sudbury type. This outcrop can be seen from the Lang Lake road sign post. The Lang Lake road leads off to the east a few hundred yards past this point.

HOUSE LAKE GOLD PROSPECTS

This short side trip visits old gold prospects. Part of the route is accessible in good weather by private cars.

Two and a half miles beyond the Lang Lake road, the former Highway 68 forks off to the west. Leave Highway 68 and follow this road round a right angled corner to a track leading west. This track follows the north shore of House Lake, a long narrow lake eroded along a fault. East striking quartz-carbonate-pyrite-arseno-

Photo 69. Interbedded red and green sandstones of the Lorrain Formation on the north limb of the La Cloche Syncline, Highway 68.



pyrite veins outcrop in Gowganda sandstone just north of the lake. These have been explored for the minor gold content of the sulphides at the east end of the lake, at the Majestic Mine south of the trail immediately west of the railway track, and at the McMillan Mine near the west end of the lake at the west end of the trail. The track is drivable in good weather to the railway but there is currently no graded crossing and the road beyond is not suitable for private cars.

McMillan Mine

The McMillan Mine was the only property to achieve production as the result of this prospecting activity and in the period 1934 to 1937 gold and silver valued at \$97,357 were recovered. Specimens of gold-bearing arsenopyrite and pyrite are to be seen on the dumps at both the McMillan and Majestic mines.

Return and continue the journey south on Highway 68.

NORTH RANGE LA CLOCHE MOUNTAINS

Just beyond the old Highway 68 road junction there is a road cut in interbedded pink and grey sandstones of the Lorrain Formation (photo 69). Three tenths of a mile beyond the junction, there are occurrences of feldspar-rich cross-bedded greenish weathering sandstone of the Lorrain Formation.

The highway then crosses the Canadian Pacific Railway and rises over the north range of the La Cloche Mountains. A section through the upper part of the Lorrain Formation is exposed in the rock cuts. There are several members of the Lorrain present including green pebbly sandstone, pink hematitic sandstone, and white sandstone.

Willisville lookout

The Willisville road turns off east along the south face of the ridge of sandstone below the Willisville fire tower. Just east of the road junction there is a suitable parking area. Excellent views looking south towards Manitoulin Island can be obtained here. The valley in the foreground marks the outcrop of the easily eroded Gordon Lake Formation in the trough of the La Cloche Syncline (photo 70). The next ridge to the south marks the outcrop of the Lorrain Formation on the south limb of the syncline. Ridges in the distance mark the outcrop of resistant Lorrain and Bar River Formations surrounded by flat lying Paleozoic limestone and shales.

Continuing south on Highway 68, "cherty" sandstone occurs four tenths of a mile south of the Willisville turn off at the top

of the Lorrain Formation. This rock is quarried at the nearby Lawson Quarry of the International Nickel Company of Canada Limited and is shipped to the company's smelters at Sudbury where it is used as flux. On top of the outcrop to the west of the road, glacially polished surfaces are exposed. To the south, white Lorrain sandstone containing microscopic grains of kyanite, andalusite, and pyrophyllite is exposed.

WHITEFISH FALLS AREA

Village of Whitefish Falls

Highway 68 crosses the Whitefish River above Whitefish Falls (photo 71), and the former highway forms an access road to the village of Whitefish Falls, a residential and resort community on the edge of Indian Reserve No. 4 of the Ojibway Whitefish River Indian Band. There are government docks along the Whitefish River and it is the starting point for cruises into the scenic Bay of Islands. It is a favourite location for motion picture and television crews producing stories of the outdoors and of the present day Indian way of life. Ancient Indian glyphs, trail markers made with some unknown dye more than a century ago, can be reached by boat from Willisville. They lie to the east along the rocky walls of Charlton Lake at Alligator Mountain.

From the access road a fine view is obtained of the falls and of the bridges carrying the highway and railway over the Whitefish River. Immediately west of the road bridge on the north side of the river a diabase dike (dark) cuts the Lorrain sandstone (light) (photo 72). The dike does not continue on the south side, evidence that the gorge is eroded along a fault. The falls occur where a harder band of the Lorrain quartzite interrupts the flow of the river.

Wallace Mine

The old Wallace Mine lies about three quarters of a mile west of Whitefish Falls on the north shore of the Bay of Islands. This is the site of the first discovery of nickel in Ontario, made and developed in 1847. Chalcopyrite, nickel, ferrous pyrrhotite and pyrite form the mineralization. There was no production from this site.

Continuing south on Highway 68, at a parking area on the east side of the highway a mile and three quarters from the Whitefish Falls turn-off, there is interbedded conglomerate and laminated argillite of the Gowganda Formation cut by at least

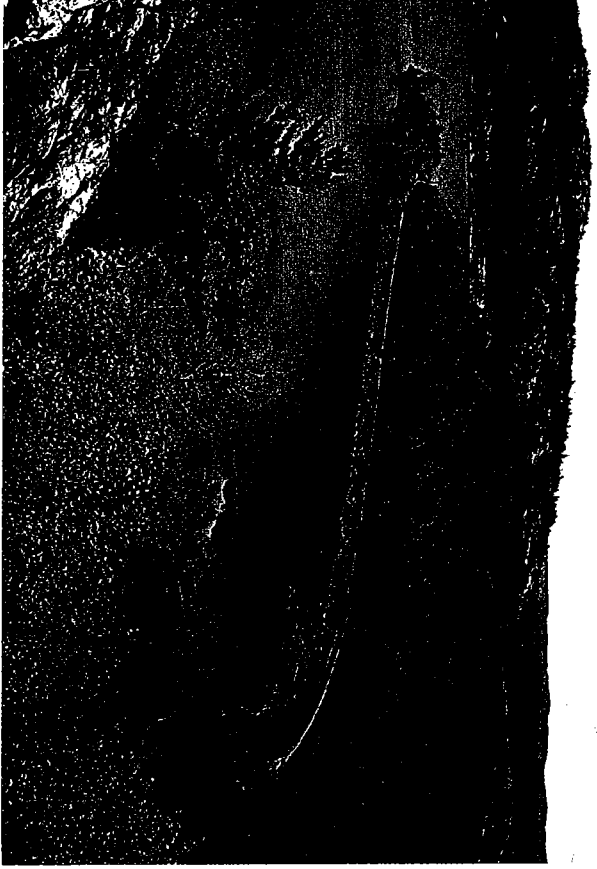


Photo 70. Frood Lake from the Willisville side road. The valley marks the outcrop of the easily eroded Gordon Lake shales and siltstones in the trough of the La Cloche Syncline. The highground is Lorrain quartzite.

one and possibly two sets of diabase dikes. Interesting features include the variety of pebbles in the conglomerate, the rhythmic bedding in the argillite and the cleavages, minor folds (photo 73), and breccias. Two tenths of a mile further on, the contact between the Gowganda Formation and the underlying Serpent Formation is exposed on the east side of the road.

BIRCH ISLAND ROAD

The Birch Island road joins the highway from the west just over four miles south of the parking area. Three tenths of a mile before this road is reached, mica rich sandstone of the Mississagi Formation may be seen showing well developed cleavage. Material from several pits south of the highway was used for tile in the Montreal Metro subway. One tenth of a mile before the Birch Island road on the north side of the highway, Paleozoic conglomerate unconformably overlies rocks of the Mississagi Formation. The conglomerate consists of angular fragments of the older Huronian rocks in an impure limestone matrix.

Roosevelt Monument

At the road junction a monument commemorates a fishing trip taken by Franklin Delano Roosevelt in 1943 prior to the Quebec conference where Roosevelt and Churchill laid the plans for the invasion of Normandy and for the conduct of the war in south-east Asia (photo 75).

Photo 71. Whitefish Falls and the road bridge carrying Highway 68.



Photo 72. A diabase dike cutting the Lorrain quartzite, seen from the highway bridge at Whitefish falls.



Photo 73. Gowganda Formation near Whitefish Falls. Note the thin rhythmic bedding of the argillite, fold structures, and cleavage (parallel to the hammer handle).



Photo 74. Young members of the Whitefish Falls Indian community at Birch Island, sitting on Paleozoic shales at the junction of Birch Island Road and Highway 68.



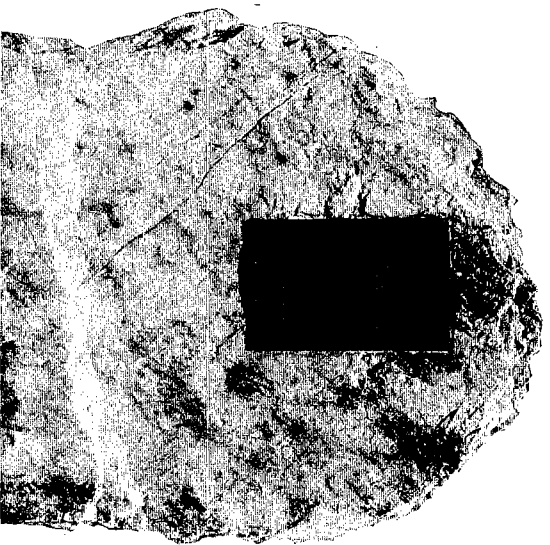
Other points of interest are the stone church at the road junction and an outcrop of Paleozoic shales weathering green and red (photo 76). Excellent views of the Bay of Islands and the La Cloche Mountains can be obtained from the road or from the dock in the village of Birch Island (photo 77). On the shore west of the railway station, pyrite rich sandstone lies at the base of the Paleozoic rocks.

Southern limit of the Precambrian Shield

The Birch Island road junction marks the southern limit of continuous outcrop of the ancient rocks of the Precambrian Shield and the northern limit of the relatively young Paleozoic rocks forming Cloche Peninsula, Great Cloche Island, Goat Island and Manitoulin Island.

The highway continues across the Cloche Peninsula over Paleozoic rocks southwards through the Indian Reserve to Swift Current, at which point it leaves the mainland and crosses a causeway to Great Cloche Island and Manitoulin. For convenience this last part of the mainland is described on page 127 in the next section which deals with the Paleozoic rocks of Manitoulin and the islands.

Photo 75. Roosevelt Memorial at Birch Island.



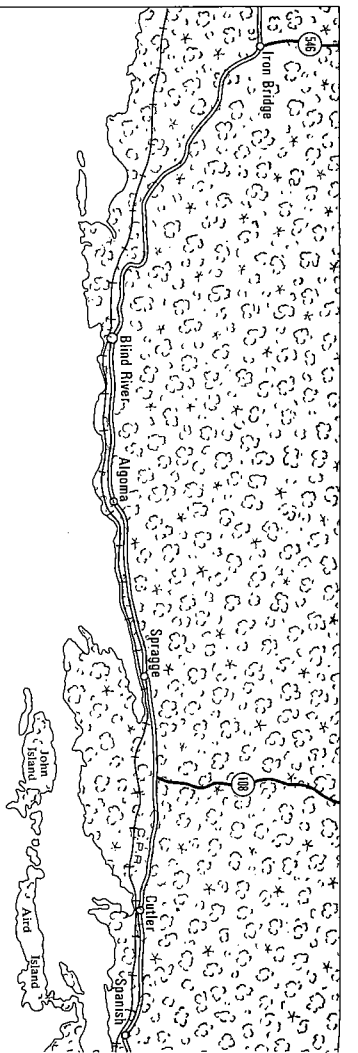
Manitoulin and the Islands of the North Channel

PALEOZOIC TOPOGRAPHY

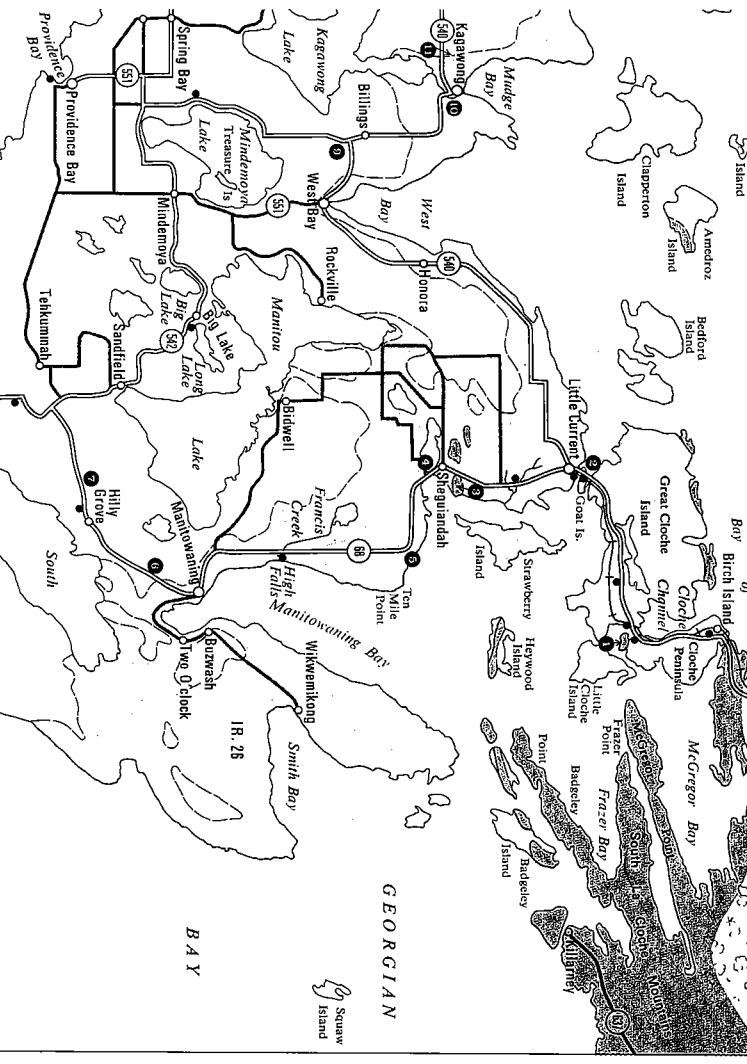
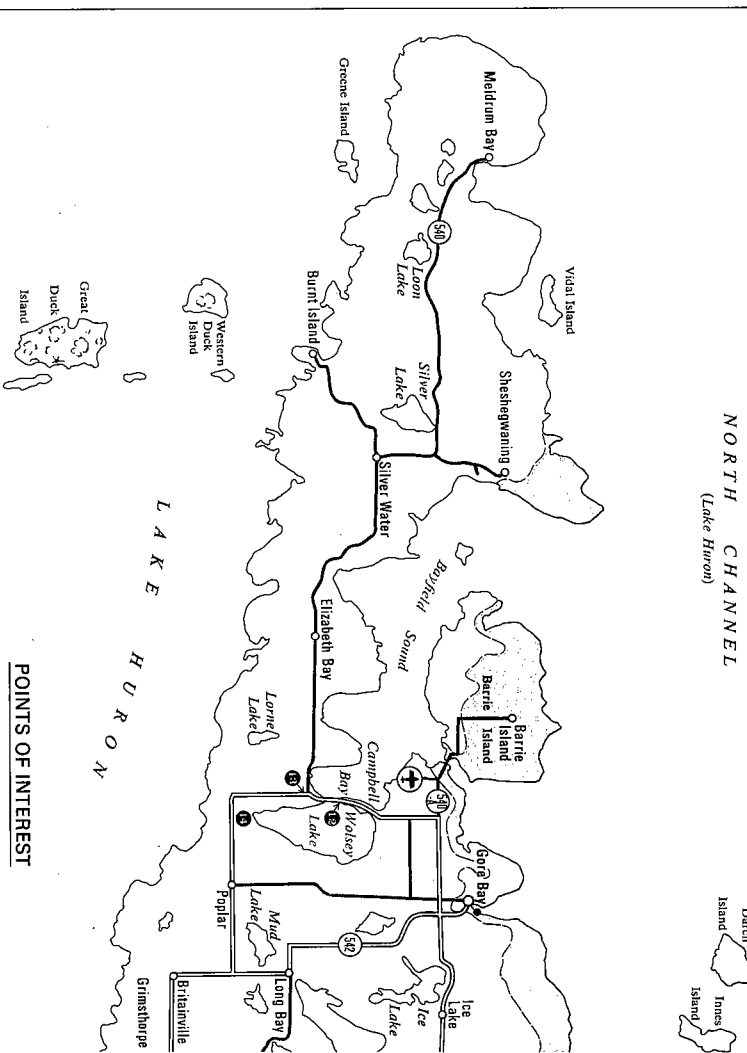
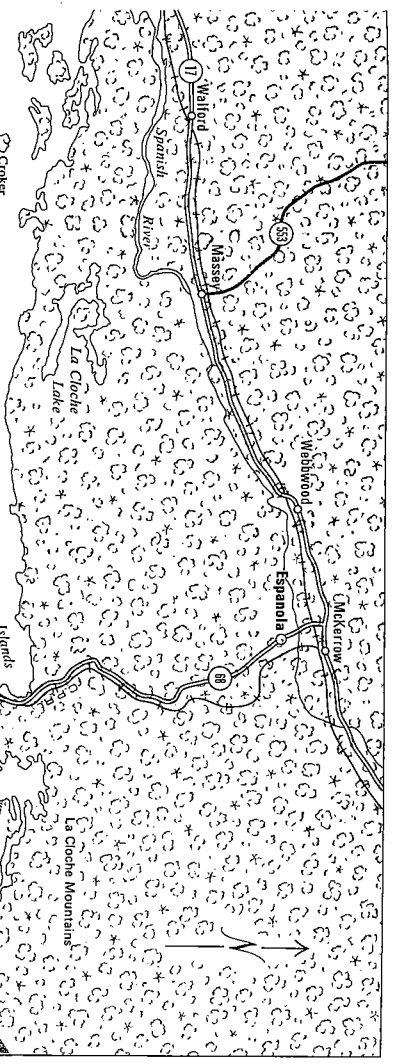
The Paleozoic rocks of the area consist of well bedded limestones, dolomites and shales which are generally moderately to richly fossiliferous. Some typical fossils are shown in plates A-D. The individual formations, their thicknesses, their dominant rock type and some characteristic fossils are listed in table 4. The rocks strike east-west and slope gently south. Thus the northern part of the islands of the Manitoulin District is characterized by a dip and scarp or cuesta topography with northward facing scarps developed over the harder or more massive limestone and dolomite beds, while shelf or dip slopes mark the less resistant shales or thinly bedded sequences (photo 34). Streams flowing over these

Photo 76. Close up of the variegated shales weathering green and red shown in Photo 74.

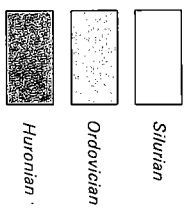




NORTH CHANNEL
(Lake Huron)



LEGEND



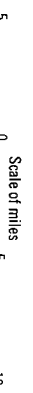
Silurian

Ordovician

Huronian

POINTS OF INTEREST

- 1 Dreamers Rock lookout.
- 2 Swing bridge.
- 3 Shegwanandah quarry.
- 4 Little Current Howland Museum.
- 5 Ten Mile Point scenic lookout.
- 6 Fossil coral colonies.
- 7 Fossil hill.
- 8 Relationship of Amabel and Guelph Formations.
- 9 Billings Hill.
- 10 Bridal Veil Falls & Kagawong.
- 11 Quarry.
- 12 Picnic spot.
- 13 Excellent view over Wolsey Lake and Campbell Bay.
- 14 Nipissing shoreline.
- 15 Additional point of geological interest (see text).



Note: Roads shown in a double line indicate guidebook routes. Roads shown in grey indicate other means of access.

PALEOZOIC STRATIGRAPHY OF MANITOULIN ISLAND
(after B. A. Liberty)

Table 4.

Formation	Lithology	Fossils	Thickness Feet
Silurian	Dolomite	Stromatoporoids, <i>Favosites</i> , <i>Eospirifer</i>	0-30
Guelph	Dolomite	Corals, pentamerids	50-180
Amabel	Dolomite	Pentamerids, corals	50-135
Fossil Hill	Dolomite	Stromatoporoids, ostracods, corals	60-100
Mindemoya	Dolomite	Ostracods, corals, brachiopods.	110
Cabot Head	Shale, dolomite, gypsum	<i>Parnotthis eugenienensis</i> <i>Coelospira planoconvexa</i> <i>Brockocystites</i> sp. <i>Paleofavosites</i> sp.	70
Manitoulin	Dolomite		
Ordovician			
Georgian Bay	Limestone, shale	Brachiopods, bryozoa pelecypods, gastropods, corals	300-480
Whitby	Shale, limestone	Graptolites, brachiopods, ostracods, trilobites	25
Lindsay	Limestone, dolomite	<i>Tetradium fibratum</i> <i>Isotelus maximum</i> <i>Pseudogygites</i>	40-85
Verulam	Limestone, shale	Brachiopods, bryozoa	60
Bobcaygeon	Limestone, dolomite	Brachiopods, bryozoa crinoids, corals	80-135
Gull River	Limestone, dolomite	<i>Tetradium, columnaria</i> Ostracods, Bryozoa	80-235
Basal Beds	Shale, sandstone, conglomerate		0-80

LATE GLACIAL AND POST-GLACIAL
LAKE PHASES IN THE HURON BASIN

Table 5.

Phase commenced years ago	Lake Phase	Original Lake Elevation	Present Raised Shoreline Elevation
2,000	Huron	580	580
4,000	Algoma	596	625
6,000	Nipissing	605	650
9,000	(Uplift began due to glacial unloading)		
10,000	Stanley	200?	600-550
	Kosak	390?	695
	Shegulandah	435?	765
	Payette	465?	800
	Cedar Point	495?	850
	Penetang	510?	875
1,000	(Ice retreat)		
	Main Algonquin	605	1015
12,000	Early Algonquin	605	

escarpments have picturesque waterfalls as for example High Falls south of Ten Mile Point (photo 84) or Bridal Veil Falls at Kagawong (photo 87).

PLEISTOCENE AND RECENT DEPOSITS

Beach and Strand Lines

As noted and summarized in table 5, the islands document much of the Pleistocene and Recent history of what is now Lake Huron. Precise levelling studies of old beach lines traced around the Great Lakes and carbon dating of organic remains trapped in or below beach deposits have permitted the compilation of the data shown in the table.

The dip and scarp topography of Manitoulin Island has been further modified by the beach and strand lines of the different stages of the development of the Great Lakes; those related to the Nipissing stage (650 feet) are particularly conspicuous. These features are either the result of erosion - wave cut terraces in unconsolidated materials, and platforms and scour surfaces on bedrock (photo 78) now partially covered by soil and residual deposits of boulders and cobbles; or of deposition - sands and silts deposited as sheets, bars (photo 91), or dunes (photo 93).

MANITOULIN ISLAND

Manitoulin Island is the largest fresh water island in the world, 110 miles long and up to 50 miles wide. Deep bays indent the shoreline and there are many inland lakes, the largest of which are Manitou, Kagawong and Mindemoya. The total land area is approximately one million acres of which roughly a quarter is occupied by farms, with two fifths in pasture, two fifths in woodland and a fifth devoted to crops.

Communications and Facilities

The approach to the island is by Highway 68 previously described or through the Bruce Peninsula to Tobermory and then by ferry to South Baymouth. An airstrip is maintained at Gore Bay. The branch of the Canadian Pacific Railway to the island only handles freight from the docks on Goat Island opposite Little Current. Bus service is maintained to Espanola and the Trans Canada Highway.

The island with its pleasant rural scenery, good access, good fishing and hunting, and facilities for cruising and sailing in the waters of the North Channel, Bay of Islands, McGregor Bay, Frazer Bay, and Georgian Bay is popular with tourists and cottagers.

Resources

Of the population of 12,000 some 3,000 are Indians. The main occupation is farming, largely the raising of beef and dairy cattle, sheep, and turkeys for which Manitoulin Island is famous. Lumbering, boat building, and the tourist industry provide additional income.

The rocks of the island have attracted attention as possible reservoirs for oil and gas. Exploration was begun in 1863 after an oil seep was found near Wikwemikong. Over one hundred holes have been drilled and prior to 1961 there was some minor oil production.

MANITOULIN HISTORY *Route of the Voyageurs*

Although known to prehistoric man and the Indians, it was not until 1615 that Champlain first made mention of the island after a journey over what became the first part of the route of the voyageurs – the overland and canoe route used by explorers, missionaries and fur traders. This route led from Montreal by the Ottawa River to Mattawa, thence to Lake Nipissing, the French River and Georgian Bay. It continued through the North Channel of Lake Huron skirting the north shore of Lake Huron past the eventual trading posts of La Cloche and the mouth of the Mississagi River and carried on to the St. Marys River, Sault Ste. Marie and Lake Superior.

Its success as a route for the French fur traders in the 1660s caused the English to set up a competitive trading route through Hudson Bay which led to the formation of the Hudson's Bay Company in 1670. In 1779 at the height of the fur trade, Montreal traders formed the North West Company using the voyageurs' route to control the rich fur trade along and northwest of the Great Lakes, through their La Cloche, Mississagi and Green Lake posts, until in 1821 they merged with the Hudson's Bay Company. The route was used by many of the notables of central Canada's early history: Allouez, Brûlé, Dulhut, des Groseilliers, Henry, McGillivray, Nicolet, Radisson, Simpson, Thompson, Verendrye, among others. It is of interest that in 1669 Father Allouez was sent to investigate Indian stories of copper in the Huron – Superior region.

Jolliet, Marquette and La Salle also explored Lake Huron in the 18th century. La Salle's ship The Griffon, the first to be built on the Great Lakes, was wrecked near Manitoulin. The

Photo 77. Shore scene, Birch Island.

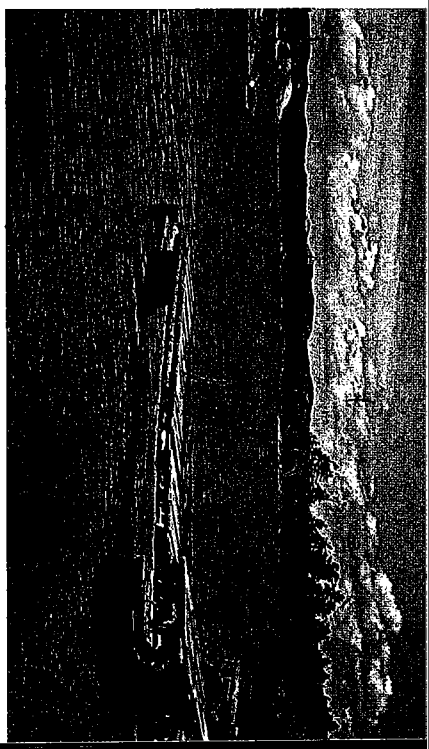
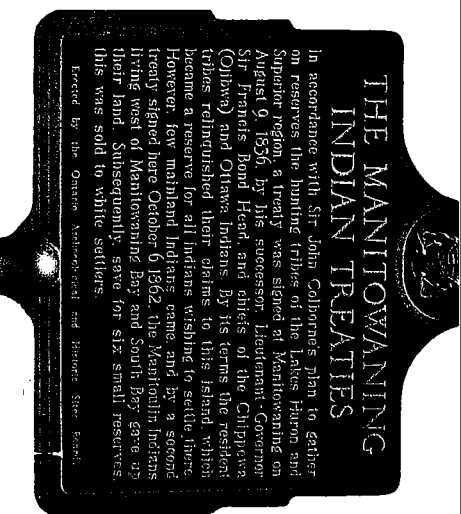


Photo 78. A terrace cut by wave action on unconsolidated material during the Nipissing stage of the Great Lakes development. Large scale glacial fluting has been preserved on the bedrock platform.



Photo 79. A rural scene on Manitoulin Island. Note the split rail fence crossing a wave cut terrace.

Photo 80. A historic sites marker at Manitowaning.



actual site has never been identified although claims have been made for wrecks found near Tobermory and Mississagi.

Manitoulin's Indians

Ottawa Indians inhabited the island till 1652 when they were driven out by the Iroquois. No mention is made of the island between 1700 and 1815, but it is believed that sickness struck the island and that to purify the land and rid it of evil spirits the Indians burned the vegetation.

Following the war of 1812, Indians fleeing the Americans took refuge on the island. In 1832 a mission was set up at Smith Bay, founding the community of Wikwemikong; the mission continues as a major project of the Jesuits to the present day.

In 1836 a treaty set aside the island for the Indians living there, and such others as wished to relocate. Few availed themselves of this option and a second treaty in 1862 surrendered to the Government all but the eastern end of the island, now the Manitoulin Indian Reserve. Subsequently a number of other Indian reservations were created.

Early Settlement

Ample evidence of the early settlers who followed can be found in their farms, with fields bounded by split rail fences and boulders laboriously cleared into large heaps. On many farms, the older buildings still stand near the larger and better homes, which were built in later years when farms and families became established.

The weathered timber, the varied style of the buildings, the crossroad churches, one room schools, and community halls, largely disused, testify to a way of life which has passed. Historic site markers at Swift Current, Ten Mile Point and Manitowaning commemorate this early history of the island.



Photo 81. Flat lying Gull River limestone beside the Voyager marker, Cloche Peninsula.

Highway 68 Birch Island Road to Little Current

CLOCHE PENINSULA AND ISLAND

The journey continues south on Highway 68 from the junction of the Birch Island road. A road cut on the west side of the road, four tenths of a mile beyond the Birch Island road, shows the Bobcaygeon Formation overlying the Gull River Formation, the contact being placed at the base of a ten foot shale unit. Three and a half miles further south and east, the highway approaches a causeway linking Cloche Peninsula and Great Cloche Island. At this point the road runs due west. The channel here is variously known as Cloche Channel or Swift Current. A historic sites plaque commemorates the route of the voyagers.

The Gull River Formation is exposed in low outcrops adjacent to the road and around the shore. This comprises well bedded limestone with some red beds. Hills of the Lorrain Formation which were islands in Ordovician seas at the time of the deposition of the Ordovician formations stick up through the limestone.

DREAMERS ROCK LOOKOUT

The view from this lookout is one of the finest in Ontario and is well worth the short diversion from the main highway. Turn in at the Birch Lake Lodge side road, about one hundred yards

east of the voyageurs plaque, and drive in for three quarters of a mile past a gravel road forking south. Park at a dirt road leading south. Walk down this dirt road and across the bar separating two bays. Note the well bedded Paleozoic sediments underlying the bar, and contrast them with the ridge to the north and the hill to the south, which comprise Precambrian Lorrain quartzite. From the south end of the bar a well marked trail climbs the prominent hill, the summit of which is known as Dreamers Rock.

The view from the top is spectacular. To the north and west lie the North Channel, the Bay of Islands, and the La Cloche Mountains (photo 82); to the east there is McGregor Bay and Frazer Bay with the white hills of McGregor Point, Frazer Point, and Badgeley Point; and to the south Manitoulin Island spreads out in the vicinity of Little Current and Manitowaning Bay.

According to local Indian legend, youths from local tribes came here for their period of fasting before entering manhood. Several "bird-track" carvings are deeply incised in the hard rocks at the summit of this hill. A. J. Casson of the "Group of Seven" Canadian artists painted here and on the islands. Return to Highway 68 and cross the causeway.

Photo 82. View northwest from Dreamers Rock.

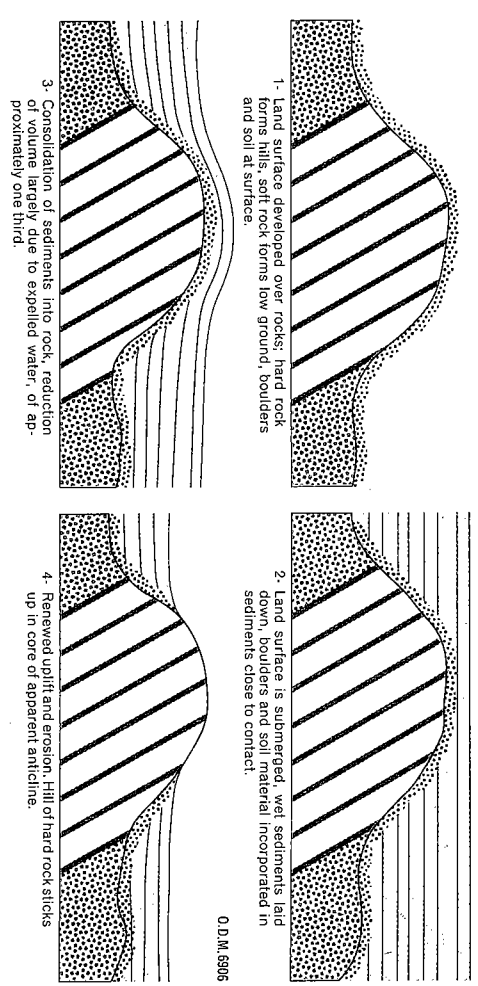
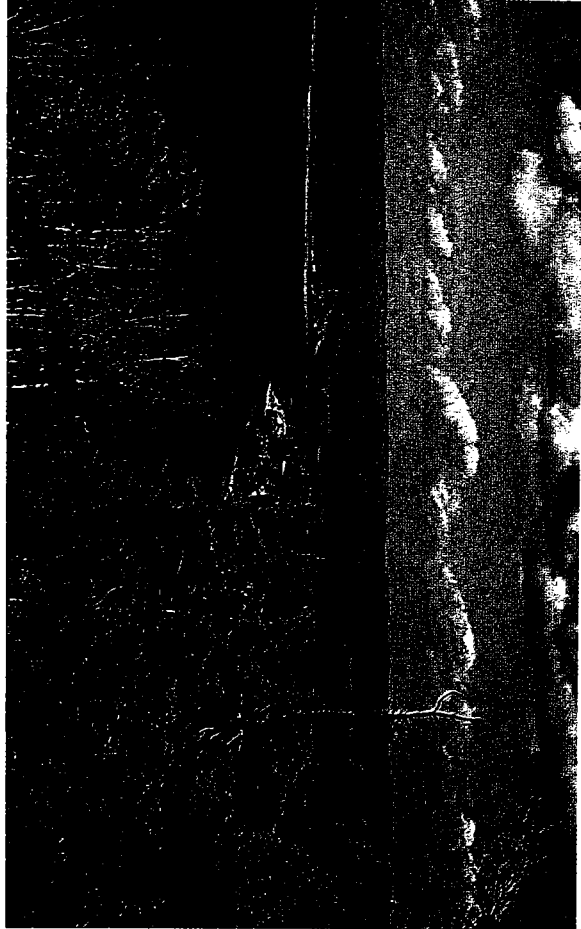


Figure 6. Schematic diagram illustrating the development of drape folds.

GREAT CLOCHE ISLAND AND GOAT ISLAND

The Great and Little Cloche Islands are named from the French word "cloche" meaning bell after a group of rocks which when struck give a clear bell-like tone. Indian legend has it that they were tocsin rocks, struck and sounded on the approach of the enemy. The rocks are located at the eastern tip of the Great Cloche Island and are reached by a trail on the high plateau.

On the west shore of the channel north of the causeway, residues of weathered Lorrain sandstone are exposed immediately below the Paleozoic rocks. These represent weathered surfaces developed during the Lipalean Interval which have been preserved by the Paleozoic cover and are just now being re-exposed. To preserve the occurrences, sampling is not permitted.

Beyond the causeway near the railway crossing, bedrock comprising limestone and minor shale of the Bobcaygeon and Gull River Formations may be seen. These rocks are generally flat lying except in the vicinity of knobs and hillocks of the underlying Lorrain Formation, such as may be seen from Highway 68 between one mile and two miles south of the railway. Fold structures in the limestone caused by compaction of the sediments during induration reflect the structure of the contacts; thus anticlines and domes in the sediments can be used to predict the shape of the contacts. Such folds are called drape folds or compaction folds (figure 6). These relationships are well exposed along Highway 68 on Great Cloche Island.

Continue over the bridge to Goat Island on which the railway yards and the Little Current docking facilities are located. Immediately across the bridge there is a prominent road cut developed in limestone of the Verulam Formation.

Highway 68 on Manitoulin Island Little Current to South Baymouth

A single lane swing bridge leads from Goat Island to Little Current over the North Channel at the narrows leading to Georgian Bay. The bridge affords a view of the docking facilities on Goat Island. All shipping using Goat Island or passing between Georgian Bay and the North Channel passes this locality.

LITTLE CURRENT

Little Current is the largest community in the District of Manitoulin for which it is also the administrative centre. It serves as a supply centre for the residents and the numerous tourists. Docking facilities for float planes, cruisers and yachts are available. Prominent road and railway cuts at the south end of the bridge expose the Lindsay Formation which is moderately fossiliferous.

LITTLE CURRENT TO SHEGUIANDAH

Highway 68 meets Highway 540 in Little Current. Leave Little Current southbound on Highway 68. Three and a tenth miles from the junction, the road crosses a meandering creek. Shales of the Sheguiandah beds, the uppermost members of the Whitby Formation, are exposed in the banks of the creek. Graptolites, brachiopods, gastropods, cephalopods and crinoid stems are found in these shales. Approximately two tenths of a mile further south, the next sequence above the Whitby Formation, namely the Wikwemikongising beds of shale and limestone of the Georgian Bay Formation, are exposed on the west side of the road.

Half a mile beyond this point there is a good view to the east over the eastern section of the North Channel and the entrance to Manitowaning Bay.

Sheguiandah Quarry

At a point five miles from Little Current, the old Sheguiandah quarry lies to the southeast of the road. The quarry was developed in a ridge of Bar River Formation penetrating the Paleozoic cover rocks. The hard quartzite of this formation provided prehistoric man with the source material for his spear and arrow heads and crude implements.

EARLY ARTIFACTS AT SHEGUIANDAH

Quartzite Tools

The village of Sheguiandah lies a mile and a quarter beyond the quarry. At this locality in 1951, scientists performing archaeological

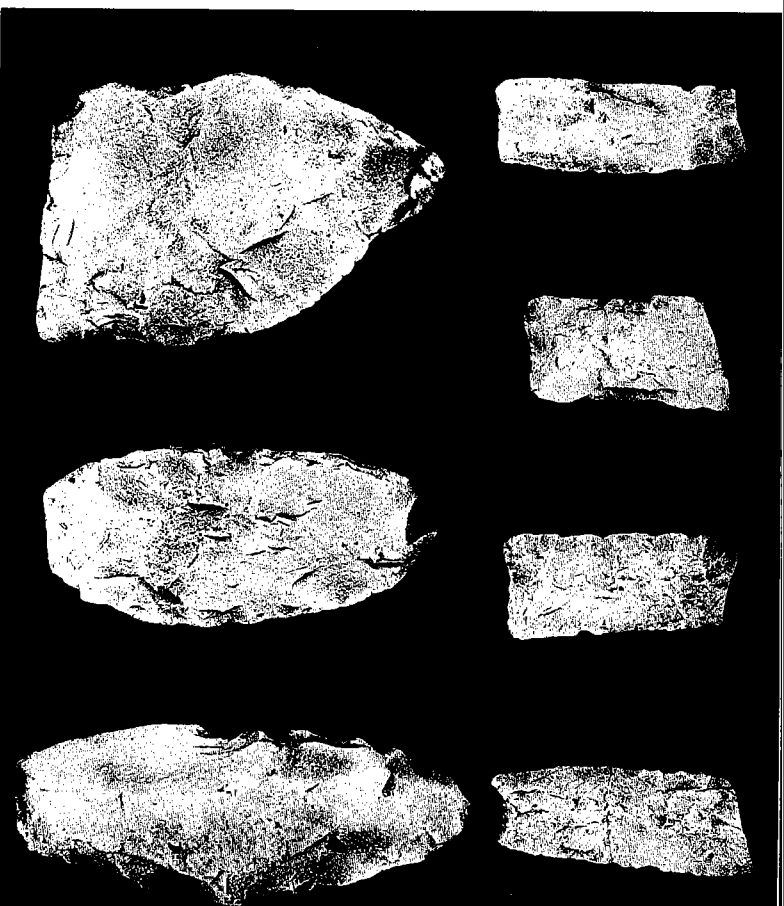


Photo 83. Quartzite artifacts from Sheguiandah, Highway 68. Sheguiandah was a prehistoric quarry site found to contain artifacts in various stages of manufacture. The broken projectile points (upper row) are lance or spearheads probably made by late Paleo-Indian (Plano) peoples between 7000-8000 BC or possibly somewhat earlier. The large cutting and chopping tools (lower row) are also a type probably made by these early hunters as well as by later peoples (Shield Archaic) who also visited the site. The site was excavated by Thomas E. Lee of the National Museum of Man (Ottawa) in the early 1950's. (Photo courtesy Peter Sorck, Royal Ontario Museum. Scale half actual size.)

surveys for the National Museum of Canada found nearly a thousand quartzite artifacts at the surface of a hilltop site near several quartzite ridges. Excavating, the archaeologists uncovered a massed layer of artifacts and quartzite chips but strangely no spear or arrow heads; lower still in a thin yellow soil layer, they found projectile points of an unusual type resembling those used by prehistoric western Indians. Further down in unsorted materials containing fairly large boulders they uncovered fragments of quartzite tools quite different from those of the uppermost layer; deeper yet another type of quartzite tool was found. At still lower levels artifacts were encountered in meltwater deposits.

An Early Quarry

Meanwhile, beneath a nearby peat bog, they uncovered a rock surface identified as one quarried by human hands, together with more artifacts. This early quarry lay beneath a layer of peat which they found by radioactive age dating to be 9,000 years old.

Artifacts in Glacial Till

Obviously the artifacts found in the relatively undisturbed soil layers indicate a history of occupancy by man after the last ice had left the area. However, geologists identified the unsorted materials in which the lower artifacts were found at the first site as glacial till, leading to the conclusion that the site was occupied during the ice age. It is suggested that men occupied campsites along a glacial front in the area. As minor ice advances and retreats took place, the glacial till was reworked and the artifacts which had become incorporated in the deposits were moved short distances, then dropped.

The Area's Earliest Habitation

Various interpretations have been made from the evidence available. Certainly the site must have been worked more than 9,000 years ago and is the oldest indication of human habitation dated with certainty in the area. Some scientists, relating the glacial tills to specific interstadial times (halts with minor oscillations in the advance or retreat of ice sheets), have published opinions that they may be 30,000 years old or even older but this is not universally accepted. The interest caused by the problems of age-dating the locality may have drawn attention from the fact that this locality has an astonishingly long history of quarrying and of persistent attraction for human habitation, for the Sheguiandah quarries were worked until quite recently and the site overlaps into the present day village. The local museum with its exhibits on Indians and early settlers is well worth visiting.

HIGHWAY 68 SOUTH OF SHEGUIANDAH

Just south of the Sheguiandah crossroads and adjacent to the Little Current Howland Museum, road cuts show Lindsay and Whitby Formations lying on an irregular surface of the Precambrian Bar River quartzite. Large blocks, boulders, cobbles and fragments of quartzite are abundant in the Ordovician sediments particularly in the Lindsay Formation. The Ordovician sediments show drape folding over the knobs of quartzite. These features provide clear evidence of the unconformity.

Ten Mile Point Scenic Lookout

Continuing southward on Highway 68 the crest of the main escarpment occurs three miles south of Sheguiandah. At the Ten Mile Point scenic lookout, there is an excellent view eastwards over Manitowaning Bay and northeasterly over Heywood Island

and beyond to Badgley Point and Frazer Bay. A historic sites marker commemorates the early Jesuit missions and particularly the mission established in 1648-1650.

High Falls

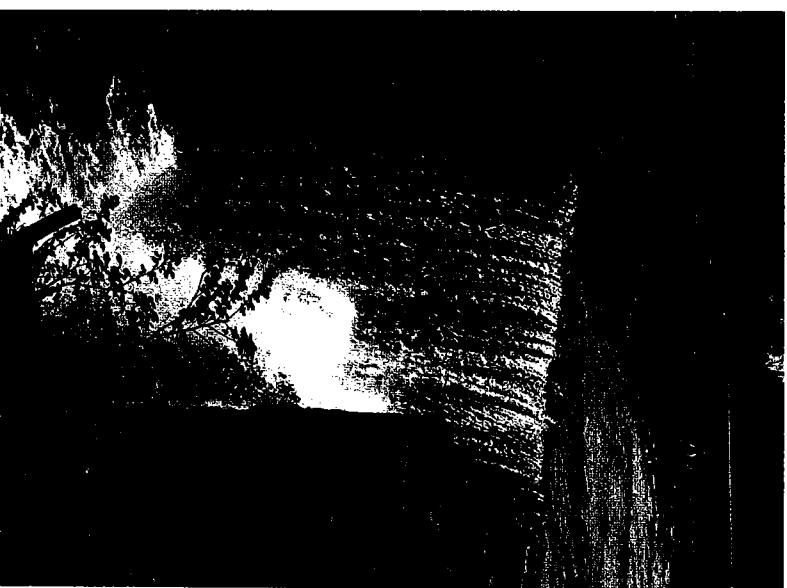
Five and a half miles further south, immediately east of the highway at High Falls, Francis Creek flows over a caprock comprising six feet of Ordovician limestone above 23 feet of thinly bedded shales and limestone (photo 84). Fossil coral is found at the base of the sequence.

HIGHWAY 68 SOUTH OF MANITOWANING

Manitowaning Area

The Manitowaning sideroad leads from Manitowaning to Wikwemikong and the Manitoulin Indian Reserve No. 26. In Manitowaning the Pioneer Museum preserves early buildings and other relics of the settlers. Beside the museum, a historic

Photo 84, High Falls, Manitowaning Area. Here Francis Creek flows over a caprock of massive Ordovician limestone overlying thinly bedded shales and limestones.



sites marker commemorates the Indian treaties and the events leading to the colonization of Manitoulin Island (photo 80).

One and three quarter miles south of Manitowaning on Highway 68, road cuts show massive tan and grey carbonate rocks that weather brown. These are the Silurian Manitoulin Formation. Fossil coral colonies are to be observed here.

One and a quarter miles past the Black Rock road on the east side of Highway 68 a tree covered hilllock is a drumlin into which a shoreline was cut during the Nipissing Stage of Great Lakes development.

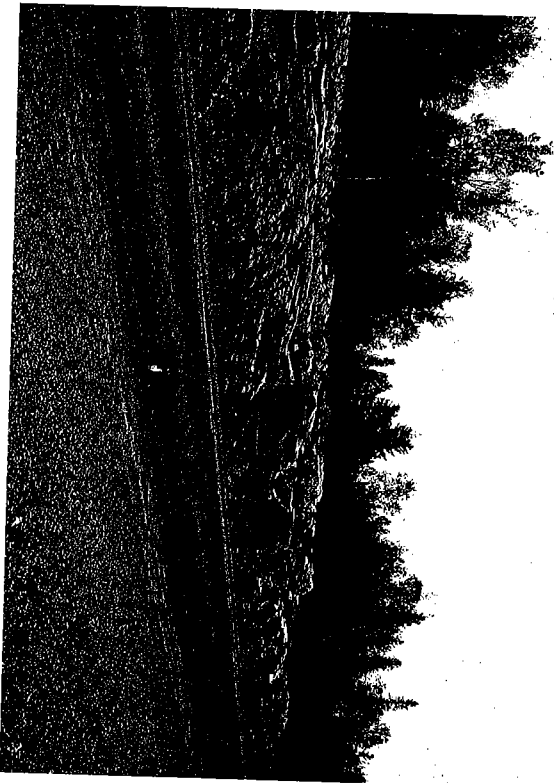
Fossil Hill

Two and a quarter miles south of the Black Rock road, the Fossil Hill Formation is exposed to the west of the highway and along former Highway 68. This is the type section (see page 168). However, better fossil collecting is to be had on the western end of Manitoulin Island. Parking is best on the Eagles Nest road at the top of the hill.

HIGHWAY 68 SOUTH OF HIGHWAY 542

The junction of Highway 542 occurs about three and a quarter miles further south. A side trip along this road is described

Photo 85. A limestone outcrop of the Amabel and Guelph Formations, illustrating facies change, (see opposite page).



below. Continuing south, the Amabel Formation is exposed in a road cut, two and a quarter miles beyond the Highway 542 junction.

At the South Bay road an outcrop on the east side of the highway between the South Bay road and the outskirts of South Baymouth shows the relationships of the Amabel and Guelph Formations. At the south end of the outcrop a massive bed of bluish crystalline limestone represents a former reef core. At the north end of the outcrop, thin bedded grey and pinkish carbonate rocks are draped against the core and constitute the flanking deposits. Within the flank deposits, a two foot tongue of tan dolomitic limestone of the Guelph Formation can be traced eastwards into the Amabel sequence. Such a lateral change from one sequence to another, by change in bedding and lithology, is referred to as facies change (photo 85).

SOUTH BAYMOUTH

Highway 68 ends at South Baymouth Dock, seventy-six miles from Espanola. From this point ferry service is maintained during the summer months to Tobermory near the head of the Bruce Peninsula in southern Ontario. This is a popular access route from southwestern Ontario and adjacent parts of the United States. The rock exposures along the shore at this point show the Amabel Formation. Carious weathering (solution pits) and solution widening of the joints are characteristic.

Visitors may return to Little Current direct or continue on trips exploring the island to the west on roads, some of which are gravel. Return to Little Current may be made conveniently from several points along the side trips, notably Mindemoya and West Bay.

Highways 542 and 551

South Baymouth to Providence Bay

HIGHWAY 542

Return north to the junction of Highway 542 and turn west on Highway 542. Four miles from the junction, Highway 542 passes through the village of Sandfield, lying at the outlet from Manitou Lake, the largest of the inland lakes of Manitoulin. Just past the Silver Bay road, which is five and a half miles beyond Sandfield, there is a road cut in well bedded moderately fossiliferous limestone of the Fossil Hill Formation.



Photo 86. Blocky limestone along the shore of Providence Bay.

HIGHWAY 542 AND 551

Mindemoya

Highway 542 skirts Big Lake and reaches the village of Mindemoya. For those breaking off the side trip at this point Highway 551 leads north past Mindemoya Lake with an excellent view of Treasure Island, to West Bay on the north shore of the island and easy access to Little Current.

Continue west seven miles on joint Highways 542 and 551 past the southern tip of Mindemoya Lake. Turn south to Providence Bay on Highway 551.

PROVIDENCE BAY

At Providence Bay follow the pavement through the village and along the east side of the bay to a junction with a gravel road leading east. The rocks exposed along the shore southwards past the Providence Bay dock to the lighthouse are of the lower Amabel Formation and the upper Fossil Hill Formation. The rocks are moderately to very fossiliferous, yielding mainly corals but also crinoids, brachiopods, and gastropods (photo 86).

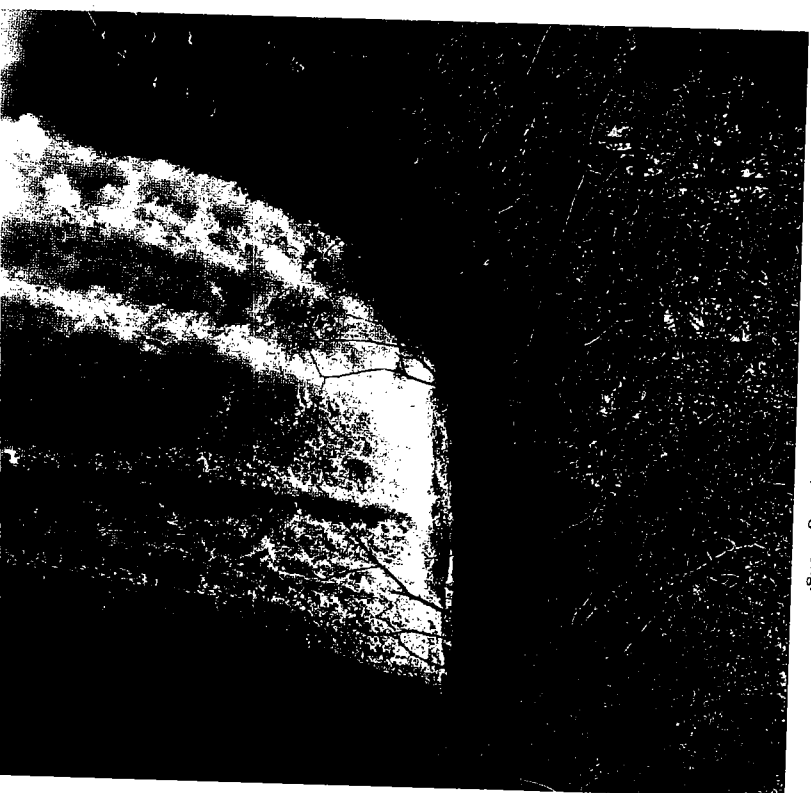
Providence Bay to Billings via sideroads

It is advisable to note mileages carefully on this short trip. Return north to the junction of Highways 551 and 542, and turn east on the joint Highways 551 and 542 towards Mindemoya. Go east 1.3 miles, then turn north on a gravel road. This road passes along the west side of Mindemoya Lake. 2.4 miles north of Highway 542 on the brow of a hill, the Fossil Hill Formation (here very fossiliferous) overlies the Mindemoya Formation.

BILLINGS HILL

At 5.9 miles north of Highway 542, turn left at a road junction and at 7.2 miles fork left. The top of Billings Hill lies at 9.2 miles from Highway 542. Park at the top of the hill. This is the top of the escarpment. In the cuts descending the hill, the Fossil Hill and upper part of the Mindemoya Formation can be examined.

Photo 87. Bridal Veil Falls, Kagawong.



The Fossil Hill Formation is moderately to richly fossiliferous. The junction with Highway 540 is met at 9.6 miles. To the west, ditches on the south side of the road expose variegated shales of the Cabot Head Formation.

Those wishing to return to Little Current may turn east on Highway 540 (21 miles) via West Bay. For those going west on Highway 540 see the next trip.

Highway 540

Little Current to Campbell Bay

HIGHWAY 540 TO KAGAWONG

Drive west on Highway 540 from Little Current. Five and a half miles along the highway there is a beautiful view north over the North Channel of Lake Huron to the La Cloche Mountains. The prominent mountain at the west end is Mount McBean.

High Hill and West Bay

Twelve miles out of Little Current the view ahead is of High Hill and the Silurian Escarpment. At the community of West Bay,

Photo 88. Village of Kagawong from the dock.

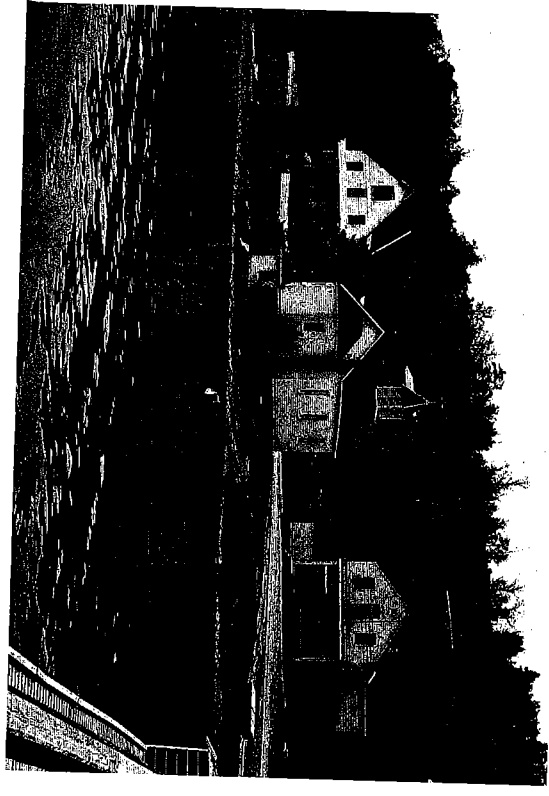


Photo 89. The Ordovician-Silurian contact in a limestone quarry, one and a half miles west of Kagawong. The contact lies at the base of the narrow weathered band.

Highway 551 leads south to Mindemoya and Providence Bay (see page 137). The Manitowlin District High School is located on the west side of West Bay.

Billings Hill

Three miles beyond West Bay at Billings, the junction is reached with the gravel road leading south to Mindemoya Lake described on page 137. The Billings Hill fossil locality lies on this road four tenths of a mile south of the junction.

BRIDAL VEIL FALLS, KAGAWONG

The Bridal Veil Falls (photo 87) lie just east of the highway at the entrance to Kagawong. A limestone bed forms the caprock over a series of shales and limestone beds. A public footpath follows the creek to Mudge Bay. Highway 540 swings west here but visitors are advised to follow the old road into the village of Kagawong (photo 88). Here outcrops are of the upper member of the Georgian Bay Formation (limestone forming the scarp) over the lower member of the Georgian Bay Formation (interbedded shales and limestones). Turn at the dock and return to Highway 540.

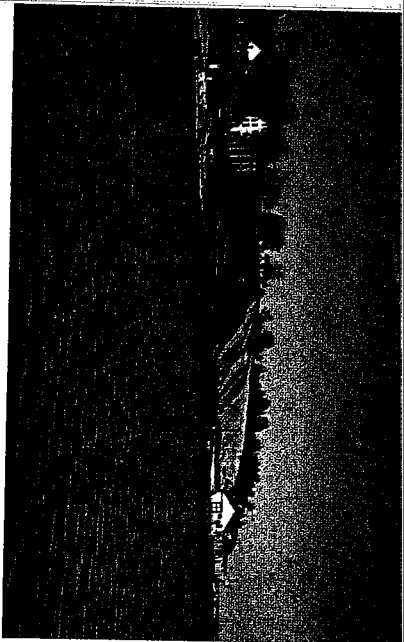


Photo 90. A former Nipissing lake bar, represented by a gravel hill behind the dock, Gore Bay.

Photo 91. Campbell Bay and the Wolsey causeway.

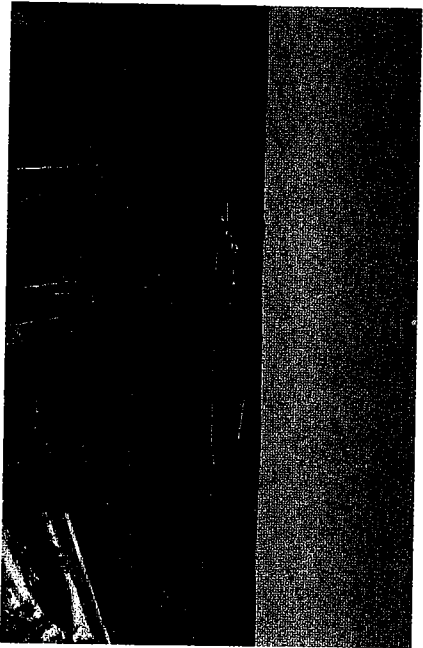


Photo 92. Fossils in the Fossil Hill Formation, in a rock-cut above Campbell Bay.



Photo 93. Sand dunes over a Nipissing Platform near Poplar.



Photo 94. The Manitoulin-Niagara escarpment across Campbell Bay from the Wolsey causeway.



HIGHWAY 540 TO GORE BAY AND CAMPBELL BAY

Ordovician — Silurian Contact

The highway crosses a slight escarpment a mile and three quarters west of Bridal Veil Falls. A quarry on the north side of the road shows 18 feet of massive dolomitic limestone overlying half a foot of thick bedded eroded dolomitic limestone. These constitute the basal part of the Manitoulin Formation of the Silurian System. They overlie 9.5 feet of thick bedded dolomitic limestone of the Georgian Bay Formation which is the uppermost formation of the Ordovician System. Fossils are to be seen particularly in the uppermost unit (photo 89).

CORE BAY

The community of Ice Lake is passed after four miles; half a mile further on Ice Lake itself lies to the south of the road. At the junction of Highways 540 and 542, Highway 540B leads north into the village of Gore Bay. The government dock is located two miles north of Highway 540 and provides an excellent view of the town of Gore Bay and of the escarpment on the east side of the bay. North of the dock, glacial and ice contact deposits

have been modified by the Nipissing Lake Stage of the Great Lakes. The hill adjacent to the dock probably formed a bar in the earlier lake. To the north a former beach line can be seen (photo 90).

Returning to the junction of Highways 540 and 542, continue west on Highway 540. The highway passes over a wave-washed bedrock plain on which remain lag deposits of abundant boulders, where these have not been cleared by the early settlers.

CAMPBELL BAY AREA

Highway 540A gives access to the Gore Bay air strip, and 540 swings south across a causeway separating Wolsey Lake from Campbell Bay. There is a picnic spot on the causeway just south of the bridge over the outlet from Wolsey Lake. This locality affords an excellent view of the Niagara Escarpment on the west side of Campbell Bay. Note the dip and scarp form or cuesta (photo 94).

Three quarters of a mile beyond the picnic spot, take a gravel road which forks left and park at the top of the hill. The scarp is developed in the Fossil Hill Formation over the Mindemoya Formation. The Fossil Hill Formation is moderately fossiliferous (photo 92). A major attraction of this locality is the excellent view over Wolsey Lake and Campbell Bay (photos 91, 74).

The visitor may return to Little Current by Highway 540 or may continue west on Highway 540 to Madam Bay, the westernmost community on Manitoulin Island and the former docking point for a ferry service to Blind River. It is important to note that the ferry no longer operates.

RETURN VIA POPLAR AND MINDEMOYA

A slightly different return route may be followed by continuing along the gravel road south and east through Poplar to Highway 542, rejoining Highway 540 at Gore Bay or continuing east to Mindemoya.

Four and a quarter miles along this road from the Wolsey Lake south roadcut, and two and three quarter miles before reaching Poplar, the Nipissing shoreline is well exposed. On the north side of the road a wave cut bluff is cut into Pleistocene till (photo 78). The nearshore flat is marked by bedrock showing prominent southwest trending glacial fluting. To the east and south of the road the base of the Nipissing bluff and the wave cut platform are obscured by sand dunes (photo 93).

This concludes the description of Manitoulin Island. Visitors should now return to Espanola and Highway 17.

Espanola to Serpent River

HIGHWAY 17 TO MASSEY

Drive west on Highway 17 which follows the Spanish River for some sixteen miles beyond McKerrow, keeping south of the Murray Fault. Half a mile west of Highway 68, on the north side of the road, a northwest striking Keweenawan olivine diabase dike cuts both an east striking metamorphosed sill of Nipissing Diabase and metamorphosed sedimentary rocks. The ridges which occur in this vicinity and as far west as Webbwood and Massey are composed of quartzite (white) or metamorphosed Nipissing Diabase (black). The low lying farmland is generally on clay and sand deposited at the bottom of lakes which formed in Recent time after the retreat of the Pleistocene ice sheet.

RIVER AUX SABLES, CHUTES PROVINCIAL PARK

Massey lies at the junction of the Aux Sables and Spanish rivers, and is a community of some 1,200 people serving an agricultural area and an Indian Reservation. Highway 553, a gravel road, runs north from Highway 17 and serves the Chutes Provincial Park and tourist camps in the vicinity of Whiskey Lake, Madawanson Lake, and Lac aux Sables. The Ontario Ministry of Natural Resources operates the Chutes Provincial Park on the northern outskirts of Massey beside a waterfall on the River Aux Sables. Note that some local signs use the spelling Aux Sable.

From Highway 17 to north of the Chutes Park, the River Aux Sables moves through a series of gorges eroded in schists interbedded with quartzite. The gorge to the north of the present highway bridge is well worth a visit. The park's name was