FORILLON
NATIONAL PARK

A GUIDE by MAXIME ST-AMOUR

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THE HARMONY BETWEEN MAN, THE LAND AND THE SEA

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In association with Parks Canada

National Parks Centennial

Centenaire des parcs nationaux

1885–1985:
100 years of Heritage Conservation
Canada's first national park was established in 1885 at Banff, Alberta. Today there are national parks and national historic parks in every province and territory. The National Parks Centennial is an occasion to renew our commitment to preserve examples of our heritage unimpaired for the benefit of all Canadians.

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PREFACE

Forillon is a remarkable park. Its landscapes, flora, fauna and history contain a host of surprising aspects, and this variety has great appeal for visitors. In fact, this richness is such that it still fascinates the author who since 1970 has been exploring and analyzing the area's many facets and working in various ways to make the park better known.

This book has as its purpose to make the public more aware of the merits of Forillon National Park. It does not claim to be a scientific study of the area but is rather intended to disseminate information about the main characteristics of Forillon that set it apart from other territories. It is also an interpretation of what the author believes to be the essential features of Forillon, though the story would be incomplete without participation in the many interpretive activities available at the park itself.

It is addressed to everyone: past and future visitors; local and regional residents, and even those who are unable to visit the park. We hope that it will help people to understand and appreciate why Forillon was established as a National Park.

The book also responds to the many specific information requests sent to us each year by teachers, students and the general public concerning the geological, botanical, wildlife, marine and historical features of the area.

What follows is an overview of the range of topics within the Forillon context. They are subjects that can be researched and studied in depth or absorbed simply for the joy of learning.

Maxime St-Amour

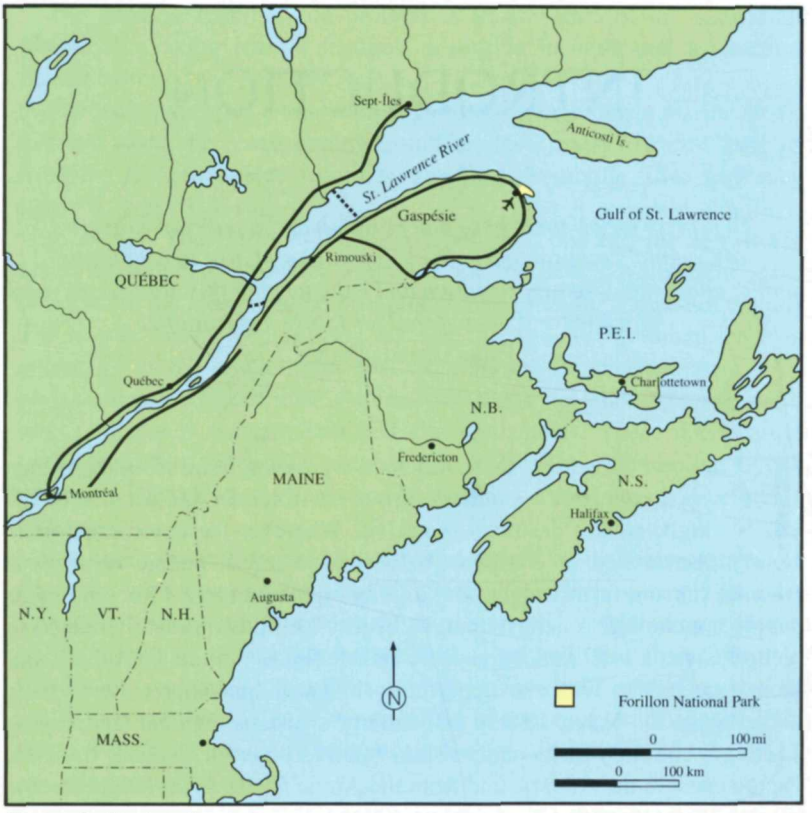


Figure 1 Regional map

INTRODUCTION

To protect for all time those places which are significant examples of Canada's natural and cultural heritage and also to encourage public understanding, appreciation and enjoyment of this heritage in ways which leave it unimpaired for future generations.
Parks Canada Policy

For some time now, there has been a growing trend towards heightened collective awareness of our environment and a correspondingly greater desire to protect it. Wherever the environment has clearly deteriorated or continues to be mismanaged, people want steps taken to prevent further abuse and to effect rehabilitation. More and more people are coming to believe that the quality of life is intimately related to nature. Canada's national parks were established to provide Canadians and their descendants with the opportunity to know and appreciate in their natural state the beauty of this vast country's various regional landscapes. There are currently thirty national parks in every part of Canada, from the Pacific coast to the Atlantic and from the Arctic Circle to the southernmost reaches of the country. The network will be complete only when each of the thirty-nine land sub-regions and nine marine sub-regions, which together form the forty-eight natural regions of the national landscape, is represented by a national park. The first steps towards the creation of the parks system were taken in 1885, when the Canadian government determined to protect the mineral hot springs and their surroundings in the heart of what is now Banff National Park in Alberta.

Parks Canada is also the agency responsible for the administration of Canada's national historic parks and sites, an impressive network of locations associated with historic persons, events, achievements or places. In addition, it now administers nine heritage canals. Through these three systems — national parks, historic parks and sites and heritage canals — Parks Canada carries out its mandate to preserve our national heritage.

It was with a view to adding to this system of property dedicated to preservation that in 1970 the last stretch of land on the south shore of the St. Lawrence River, at the tip of the Gaspé peninsula, became the first national park in Quebec. It was called Forillon, a name closely linked with the area from its earliest beginnings.

The heritage that Forillon protects is an amalgam of the natural and historical: striking natural features, a seaside location and a wealth of human history.

The park comprises a total area of 244.8 km^2, including a marine area of 4.4 km^2 along the coast running from Cap-des-Rosiers to Petit-Gaspé and from the shore upstream from Cap-aux-Os to Penouille. (See park map, figure 6, pages 118–19.)

Its theme, The Harmony Between Man, the Land and the Sea, is also broad in scope; it provides a framework for park development, gives direction to the interpretation program and focusses the interest of visitors. The word "harmony" is used here in the broadest possible sense, to mirror all of the relationships that exist among the three elements. The play of forces between man, the land and the sea is a complex balance of links, influences, antagonisms and also agreements. These interrelations range from the continually recurring to the single instance, but overall there is a pattern of cyclical change involving days, seasons, centuries, millenia. . . .

We naturally tend to judge the things around us in human terms. For example, we know that the sea will eventually win out over the land and that the Forillon peninsula will one day no longer exist; thus we perceive an imbalance of forces, an uneven battle, an end. But from a broader standpoint, we can see that there is harmony in a cliff crumbling into the sea. It is part of the order of things, of the eternal cycle in which the rocks that rise from the sea return to it once again, possibly to reappear some day as a new mountain chain.

Nature is made up of both the tiny and the grand; the same holds true for the harmony between man, the land and the sea.

THE LAND

This chapter tells the story of how Forillon's rocks and landforms were created, and describes the continuous changes they have undergone as well as those that are taking place today. The chapter also discusses Forillon's climate, and describes the park's various habitats including an overview of its land flora and fauna.

THE BEDROCK AS WE SEE IT

Earth's history is one of repeated crustal upheavals and collapses, steady erosion of exposed surfaces, and the deposition of sediment in low-lying areas.

Such events continue to take place on both a small scale and a continental scale everywhere on our planet. Some periods are clearly marked in the rock, providing evidence of ancient environments that no longer exist. Learning to read the signs of the past contained in rocks is an important as well as fascinating pursuit.

Geology — the study of the composition of the earth's crust and the mechanisms of its evolution — appears to be a complex subject, and not without reason, for it reveals to us truths that even the most fertile imagination could not have conceived. Over the past hundred years, geologists have contributed greatly to our understanding of the earth's landscapes. In earlier centuries, explanations of natural phenomena were often based on speculation and superstition, and various schools of thought developed which were not always in agreement. The objectivity of the scientific method, however, provided irrefutable evidence that gradually led to the disappearance of many popular beliefs. The development of geological thought is an interesting study in itself, and reference to it is made from time to time in this guide.

For rocks to be of general interest in a given region, they must form a significant portion of the landscape, be easily seen, and be significantly different from other visible formations nearby. If in addition the region's terrain is varied, the visitor's interest will be assured. In Forillon Park, the

bedrock provides eloquent testimony to major disturbances in the earth's crust and how they affect the formation of landscapes.

Northern Gaspé is a land of coastal cliffs, and Forillon is no exception. Rock is visible everywhere and is the basis of the park's land features. This continental bedrock can be seen in the high cliffs along the northern wall of the whole Presqu'île* of Forillon (see figure 6, pages 118 and 119), in the indented southern coast, in the walls of the valleys carved out by rivers, and even alongside the roads — wherever the thin layer of Gaspé soil has not been able to accumulate.

The rock is always found in layers, or strata: the layers can be thin, crumbly sheets, or thick and rough, or grey and smooth, or they can appear in parallel red and green bands. Nowhere in the region, however, are the stratified layers perfectly horizontal, as found in the Montreal area, for example. In Forillon they are usually sloped, and sometimes even completely vertical. In some areas the rock has so many folds and overturns that it resembles a folded carpet.

All of the park's very visible escarpments were formed by the deposit of water-borne sediment (hence the name "sedimentary rock") consisting of particles of various types and sizes. At Forillon, three main rock types are found.

SHALE, SANDSTONE AND LIMESTONE

Shales are thin, smoothly textured sheets of rock formed from very fine mud and clay deposits; such deposits accumulate in areas of weak current flow, such as at the base of the continental shelf. The northern portion of the park has vast expanses of shale.

The rough texture of sandstone is an indication of its origin as grains of sand cemented together, and its name is altogether appropriate. The erosion of sandstone inevitably results in sand. The whole of the Forillon area along the Bay of Gaspé from Penouille to Petit-Gaspé consists of sandstone.

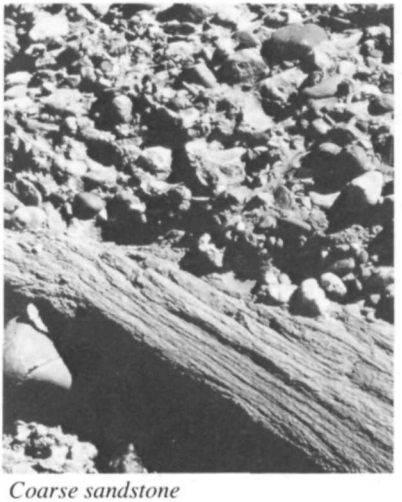
The third type of rock — limestone — comprises almost the whole of the Forillon Presqu'île. Smoothed by the polishing action of water, these primarily grey rocks have a different origin from either shale or sandstone. Limestone is the result of a chemical reaction involving the precipitation of calcium carbonate (lime) dissolved in seawater. This reaction may be a straightforward chemical one or it may result from deposits of living organisms such as corals, mollusks or other calcium-rich creatures. Limey mud beds currently cover approximately half of the world's ocean bottoms.

On our planet, from the mountain tops to the depths of the ocean, water is the major carrier of rock particles of all sizes. We need only think of the carrying power of the brownish spring runoff to understand how enormous quantities of rock, sand, clay and mud can travel great distances. Of course, the distance travelled will vary with the force of the water and the

* Presqu'île: type of peninsula with a narrow part making it "nearly an island"; here it refers to the finger of land stretching out to Cap Gaspé.

Limestone

Sandstone



Coarse sandstone

Shale

weight of the particles. A rock may be moved by a river's current only a few centimetres each year, but a bit of clay caught up in the flow of this same river may travel hundreds of kilometres from its point of origin after years of continuous travel. The average thickness of uncompacted sediment at the ocean bottom is 650 m.

The question "How long does it take to form a rock stratum?" is a difficult one to answer, precisely because so many factors come into play. First of all, different types of sedimentary rocks require various time periods and different locations for their accumulation as sediments. The sedimentation speed is slower in the open sea than near the coast. Near the mouth of a river, where the process is fastest, accumulation appears to be

Limestone strata, Cap-Bon-Ami

approximately one millimetre per year. But in the enormous expanses of deep-sea ocean floor in the abyssal parts of the ocean, where only clay sediments are found, the speed is no more than a millimetre every thousand years. Compare this figure to the thickness of some mountainous geological formations, and you will have an idea of the extent of geologic time which stretches over tens and even hundreds of millions of years.

One must also take into account the time required for the thick layers of sediment deposited on the ocean floor to harden into rock. This transformation takes place essentially by means of the steady expulsion of the water contained in the sediment and the cementing of the sediment particles. Recent drilling in the ocean floor has provided samples of very ancient sediments, tens of millions of years old, which are soft and malleable because they are still impregnated with water. Obviously, such areas remained submerged from the time the deposits were first accumulated. Geologists have concluded that in most cases the expulsion of water and the transformation of sediment into rock took place after portions of the ocean floor emerged from the sea as a result of upheavals of the earth's crust.

EVENTS OF GREAT MAGNITUDE

At the bottom of the sea, layers of sediment naturally collect horizontally on top of one another. Once out of water, however, they may lie in any

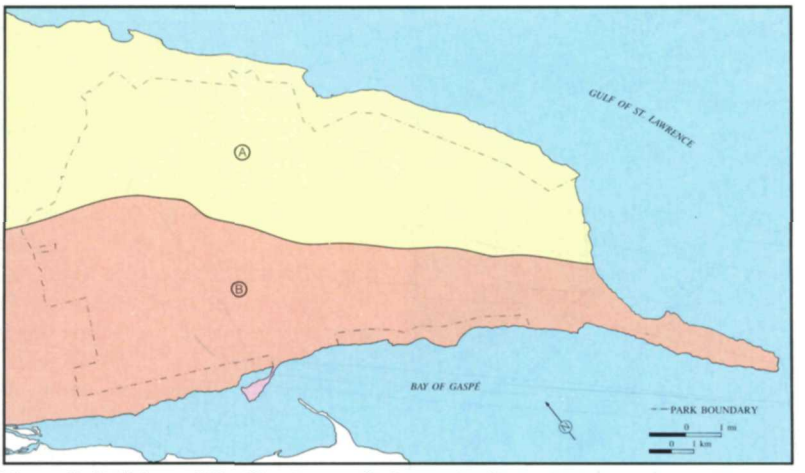


Figure 2 Build-up of Forillon in two distinct episodes

combination of angles: sloped, vertical or even upside down, depending on the intensity of the folding of the earth's crust and the number of times the strata have previously been subjected to similar movement.

At Forillon the mere appearance of the folds in the rocks shows us that the park can be divided into two distinct zones (see figure 2). The whole northern portion (A) consists of intensely folded rocks, with strata often vertical or in twisted beds. (There are clearly visible examples, primarily along the sea coast from Rivière-au-Renard to the end of the Cap-des-Rosiers plain.) On the other hand, the whole southern half (B) has regular strata all inclined in the same plane.

It seems clear that the disturbances of the earth's crust were much more severe in the northern portion of the park. The history of the formation of the Gaspé peninsula and of Forillon itself tells us that cataclysmic events took place in the distant past, events that were far removed in time from one another. We can also conclude that for each such cataclysm, the forces at work in the earth's crust acted in different ways to produce mountains and new land areas from thick layers of marine sediment.

But first it is important to understand certain basic concepts about the formation of the earth's crust.

For some people, it is much more comforting to think that the world we know was always the way it is now — that the mountain behind the house has always been there and is there to stay. However, this way of thinking on the human scale must be transcended, for the age of mountains is not counted in centuries but in millions of years.

Moreover, the earth's crust is relatively easily affected by forces emanating from the earth's core. In terms of the overall size of the earth, its surface is no more than a thin layer; if we were to imagine the earth as a circle with a radius of 5 m, the crust would be only 4 cm thick at its deepest point.

Folded rock

The folds in the earth's crust are generally caused by intense lateral forces. Where the folds are ∪-shaped, they are called "synclines," and where they are ∩-shaped, they are termed "anticlines." These two types of folds may range from one metre to several kilometres. A single very large syncline, say tens or even hundreds of kilometres wide, is called a "geosyncline." Some such enormous depressions in the earth's crust are covered by the sea and have become immense sedimentation basins. When the next cataclysm (geologists call it an orogeny) takes place, the thick horizontal layers of sediment may be raised to a shallower depth or may even emerge completely and gradually turn into rock. The stratifications we see in rock indicate the type and intensity of the cataclysms that took place in our region's distant past while it was still in the throes of creation. The strata may be horizontal, inclined or strongly folded layers of the same rock type, of alternating types or of altogether different ones.

Another important concept to be grasped is the idea of geologic time. This concept is so abstract that it only becomes meaningful when we can familiarize ourselves with a number of reference points, especially since the geologic scale is calculated in terms of millions of years. Modern geology, with its refined evaluation and dating methods, is able to provide reasonably accurate data on the age of rocks, even though the figures are so large as to be beyond comprehension. For a better understanding of the key chronological points in the history of the earth's crust, the following table of Geologic Time Periods also includes biological data, such as dates for the first appearance of plants and animals and when some of them became extinct. For example, we find that 70 million years ago, when the Rocky Mountains were being heaved out of an immense basin of sedimentation, the first whales were appearing in the sea.

BEYOND THE HUMAN SCALE

The concept of time as it relates to geological events goes beyond our usual scales.

Since it takes 500 years for one centimetre of calcium to be deposited, a mountain like Mont Saint-Alban, which dominates the Cap-Bon-Ami area, must have taken 18 million years of sedimentation. And what can be said about its age, which is 350 million years? In contemporary terms, it

GEOLOGIC TIME PERIODS

GEOLOGIC DIVISIONS	NUMBER OF YEARS AGO	SOME GEOLOGICAL EVENTS	NOTES ON FAUNA & FLORA
Precambrian	600 000 000 and over	Canadian Shield	Very simple marine life (algae and protozoa)
Cambrian	600 000 000	Coast of the Lower St. Lawrence River	Trilobites, sponges, sea stars, jellyfish
Ordovician	500 000 000	Uplifting of the Gaspé northern coast	Marine life only. More mollusks and trilobites
Silurian	425 000 000	Primarily erosion in the Gaspé	Earliest fish. First land plants.
Devonian	400 000 000	Sedimentation. Uplifting of the Gaspé	First sharks. More corals. First forests, first insects.
Carboniferous	345 000 000	Sedimentation of *Bonaventure Island*	More marine life. First reptiles. *Flying insects. Large forests* and swamps
Permian	280 000 000	The Gaspé still in a tropical zone	More reptiles and insects. Trilobites become extinct
Triassic	230 000 000	Uplifting of American Appalachians. Beginning of the formation of the Atlantic	First dinosaurs. First mammals and flies. More conifers and ferns.
Jurassic	180 000 000		More dinosaurs. First birds
Cretaceaous	135 000 000		Dinosaurs become extinct. First flowering plants.
Eocene	70 000 000	Uplifting of the Rockies and the Andes	First whales and seals. More of today's fish (herring, cod, etc.). More land mammals
Oligocene	36 000 000		More crabs, clams, snails. First cats, dogs, bears. First animals with hooves and elephants
Miocene	25 000 000	Completion of uplifting of the Alps. Upliftings of the Himalayas	Today's fish species. More whales and monkeys. First appearance of today's aquatic birds
Pliocene	12 000 000	Continents and oceans as they are today	Today's marine life. Fewer mammals. More elephants, horses, carnivores. Beginning of man's evolution
Pleistocene	1 000 000	Continental glaciation periods	Earliest tools. Appearance and disappearance of mammoths in Canada as forests receded
Recent	10 000	End of last glaciation period	Domestication of animals. Farming. Forests, fauna and man increasingly towards north as ice recedes. Development of civilizations

would be as if we were to travel from Montreal to Forillon at the rate of 3 mm per year.

A HISTORY OF DISTINCT PERIODS OF UPLIFT

As in the Maritime provinces, the mass of sedimentary rock of which the Gaspé is composed rests on Precambrian rock, the oldest still found on earth. In fact, the whole of the Canadian Shield, from the Prairies to Labrador, is made up of this Precambrian rock, which originated in the depths of the earth.

Throughout the Cambrian period, the Gaspé region was part of the geosyncline called the Great Appalachian trough. Heavy sedimentation took place, and rocks from this period can be found along the south shore of the St. Lawrence River from Quebec City to Matane.

During the Ordovician period, the ocean advanced to cover much of the land which is now Quebec, as shown by the presence of rocks (limestone and shales) from that period in the Lac Saint-Jean region and also from Montreal to Quebec City. Today's Gaspé peninsula continued to be formed through sedimentation at the bottom of the Great Appalachian geosyncline. During this period the earth's crust at the bottom of this basin was subjected to a series of crumplings and vertical uplifts that produced the innumerable narrow folds now found in these rocks.

Towards the end of the Ordovician period (about 450 million years ago), a series of intense uplifts, called the Taconian orogeny, raised the region into a very high mountain chain which caused the emergence of the rocks that cover much of the northern Gaspé coast. It was also during this orogeny that the St. Lawrence Fault was fractured, producing an emerging anticline in the northern part of the Gaspé and another farther south in what is now western New Brunswick. A deep trough, called the Gaspé geosyncline, remained between these two ridges though it was smaller than the earlier Great Appalachian geosyncline.

For tens of millions of years afterwards, during the Silurian and Devonian periods, the new neighbouring peaks sent erosion debris into the basin, gradually filling it. Towards the end of the early Devonian period (395 million years ago) this sedimentary basin began to uplift. The shallower water may have increased the sedimentation of sand on top of the fine lime silt, thus accounting for the striking sequence displayed in the Forillon landscape: a spine of limestone strata reaching to Cap Gaspé and supporting sandstone formations along the Bay.

Finally, a great upheaval in the middle Devonian period — the Acadian orogeny — caused the deformation and uplifting of the Gaspé geosyncline. From this ancient sea was born, so to speak, the second part of the Gaspé, located between the Ordovician mountains in the north of the peninsula and Chaleur Bay. Locally, this upheaval produced only one true downfold, a syncline, which became the Bay of Gaspé. During this period localized volcanic activity also occurred which further uplifted the Gaspé central massif (today's Chic-Chocs and Gaspésie provincial park). Devo-

Imprints of fossil brachiopods

nian sediments entrapped and preserved the remains and prints of primitive marine animals: corals, brachiopods, worms, several species of trilobites (the ancestor of crustaceans) and, finally, the first vertebrates — fish. Gaspé sandstone also confirms the presence of small plants that may have lived in ancient brackish water.

During the following Carboniferous period, the whole of the Gaspé remained above water, though a certain amount of sedimentation continued to take place in shallow seas at the eastern tip of the peninsula, as can be seen by examining the rocks around the Percé and Bonaventure Island area.

At the end of the Permian period, 230 million years ago, new orogenic upliftings threw up a continuous chain of mountains along the eastern coast of what is now the United States. These mountains abut the Gaspé massifs which were already in place since the Ordovician and Devonian periods.

The newly formed Great Appalachian chain crested a barrier which prevented any future major marine incursions on the east coast of the present United States. The Gaspé and Forillon, which had emerged some 200 million years earlier, continued to be eroded by the action of the weather. This wearing down of the Gaspé landscape has not stopped since that time, a period during which the great mountain chains of our present-day landscape — the Rockies, the Alps and the Himalayas — were formed. Originally, our Appalachians must have been a truly magnificent chain to have survived more than 375 million years of wear, especially when one considers that the rocks which formed them were not very resistant to erosion.

The final period, the Quaternary, from a million years ago to the present, will be discussed in a later section.

TROPICAL FOSSILS AT FORILLON

By reading its history, the existing rock at Forillon tells us about a series of incredible changes: mountains that rose up and then wore down until they virtually disappeared; ancient sea beds which today are perched at altitudes of hundreds of metres. In addition to such phenomena, limestone strata and sandstone beds hide still other sources of wonder: fossils.

Not so long ago people believed that fossils were sketches God made in the rocks to amuse himself. However, as far back as 3000 years ago, the Greeks had determined that fossils were ancient sea animals and that the rock in which they were embedded must have once been beneath the sea. Sometime during the Middle Ages, this interpretation was lost, and all sorts of odd beliefs became popular. Today, however, we know that fossils are the remains of plants or animals that died (usually in the sea), became buried in sediment and finally changed into rock along with it.

Fossils have contributed greatly to our understanding of the origins of rocks, mountains and even continents; they also have raised a number of questions. By systematically studying fossils and the rocks in which they were embedded, researchers eventually concluded that fossils not only reveal the relative age of the rocks in which they are found but also a pattern in the arrival upon the earth of various life forms. For example, dinosaur bones are discovered in layers that are much more recent than those in which primitive fish skeletons are found, and fish appeared long after tribolites. Thus by studying fossils, a great deal of light was shed on the evolution of life and on prevailing climatic conditions on the continents during the geological past.

When people think of coral, warm ocean waters come to mind, and with good reason. These small, primitive colonial animals live in the oceans to a latitude of 30° on either side of the equator. What then are we to make of the presence of coral fossils in the rocks of Forillon?

Explaining the presence of tropical fossils here calls for an intriguing hypothesis. To understand it, we must go back to a time over 350 million years ago when the park's rocks were formed. The continents were not even in the same place as they are now, but appear to have drifted.

Since the 1970s, scientists on the research ship *Glomar Challenger* have been making discoveries which prove irrefutably that the whole of the earth's crust is made up of approximately ten major plates, some of them forming what we call continents. It has also been demonstrated that these plates have in the past moved in various directions and are continuing to do so. Forces from the depths of the earth act on the plates, pushing them and causing them to move from 1 cm to 3 cm per year — a dizzyingly fast pace in terms of geologic time. Throughout earth's 4.6 billion-year history, the oceans have opened up and closed again and again as the plates which comprise our planet's crust have moved.

Where, then, was Forillon during the period of its corals? When the sediments which were later to become the rocks of Forillon were building up on the floor of an ancient sea, none of the American continent was located where it is today. In fact, the Atlantic Ocean did not yet exist at

this period. Increasingly accurate data have revealed that 200 million years ago North and South America were touching Europe and Africa; moreover, this entire land mass was farther south than it is today, so far south, in fact, that our section of North America was very close to the equator! These discoveries help us understand how the marine animals living during this period in a warm sea were covered by sediment that was to become the rocks of Forillon. They also explain how rocks formed in the same sea during the same period, and of course containing the same fossils, can be found today on different continents.

Since that time the Atlantic Ocean was created by the opening up and gradual widening of a fracture in the earth's crust. The plate supporting North America began to drift northwest, travelling thousands of kilometres in 200 million years. Today our continent continues to drift westward at an average rate of one centimetre per year. This may not seem fast, but time makes incredible things possible.

CONTRASTING RELIEF

Forillon is the end of a long chain of mountains and it is therefore not surprising that its terrain is uneven. Since the park's land was formed during two different geological periods, we should also expect differences in the relief of the park's northern and southern portions.

The rocks of Forillon, which emerged over 375 million years ago as tall mountains, have been worn down by several thousands of feet to what we see today. Erosion, by definition, removes raised areas by cutting away at, transporting and flattening them. It works at its own rate, which varies with the type of rocks and their degree of exposure to the forces of deterioration. As a result, it also tends to gradually erase evidence of its earlier action in sculpting the landscape. Nevertheless, there are in Forillon clear traces of large-scale erosion in the distant past.

In the Appalachian mountains, the relief depends directly on the existing bedrock. It features elongated ridges with flattened tops where the rock strata are resistant to erosion, and with sides that are often walls cutting through a great number of thicknesses of strata. This is called a cuesta relief. Such a pattern may be repeated several times throughout the syncline of the existing layers to create a landscape in which shelves and cliffs follow one another in parallel rows, somewhat like a giant staircase.

In the park, the whole of the Forillon ridge, from the Renard River valley to Cap Gaspé (part B in figure 2) presents a cuesta-like relief. It is perhaps easier to see by looking at the landscape along the same axis as the cliffs, for example from a boat facing Cap Gaspé. This type of relief is also clearly visible in the Cap-Bon-Ami area.

Streams that flow in the direction of incline of the layers can carve through escarpments. Thus the Cap-aux-Os, à l'Eau, Ascah and Beaudry streams, digging their beds out of the sandstone formations, have carved out canyons that in some locations are more than 40 m deep.

Even in the highest escarpments of the park, relatively deep transverse valleys, called water gaps or "cluses," are found. The main ones are

Cuesta-like relief, a succession of parallel cliffs

upstream in the Rivière-au-Renard and Anse-au-Griffon river valleys, and the la Rancelle valley, through which the Cap-des-Rosiers to Cap-aux-Os road runs. These transverse valleys are interesting because they are disproportionately large compared to the very small watercourses running through them, if there is a watercourse at all. In fact, most of the transverse valleys in Forillon are dead; the rivers that carved out the deep valleys running across the top of the Forillon ridge no longer exist. Such valleys are characteristic of Appalachian relief, but in the park, their origin is a mystery because it assumes a regional topography that is different from today's landscapes.

As mentioned earlier, the whole northern portion of Forillon (figure 2, part A) was severely folded during the Ordovician period, eroded over tens of million of years, and then subjected to further folding and faulting during the Devonian period; it has been eroding since that time.

If we consider only the peaks found in this northern part of the park, it becomes apparent that this erosion platform is an inclined plateau. High near the Rivière-au-Renard valley, the bed gradually disappears into the sea near the Cap-des-Rosiers plain, after which the incline continues underwater out into the gulf for about 2 km. The fact that the countryside has a hilly appearance is due to the valleys created by the two major rivers and the many streams cutting into the limestone formations and especially into the soft shales that are so abundant in the region.

The land between L'Anse-au-Griffon and the foot of the hill leading to the Cap-Bon-Ami sector has a relatively smooth relief, carved only by a few shallow streams. The flattened appearance of this whole area is the result of marine erosion at a time when the sea level was higher than it is today. However, the large size of this level area and the accuracy of the

available data on the last marine influx show that the plain has existed for a very long time, much before the last glacial period.

THE MOST RECENT ICE AGE: MORE THAN A LONG WINTER

In geological history, the Quaternary period covers the last million years. Although it is certainly not the only period during which our planet went through episodes of glaciation, the period is featured by the fact that in only a million years there were four major ice ages, each of which lasted tens of thousands of years. The phenomenon has a particular impact, even though it was less striking than earlier mountain forming periods, because we tend to feel more involved in what is most recent, and because man was present at the time it occurred.

That much of the earth's surface was once covered by an immense sheet of ice was a daring theory put forward a century ago by the great naturalist Louis Agassiz. Like most new and unusual ideas, it was greeted skeptically. Since then, however, an impressive amount of data has been collected on existing glaciers (at the poles and at high altitudes) and on ancient glaciers which covered vast expanses of continents that are now densely populated. A great deal of current research is aimed at a better understanding of the causes of glaciation. It is clearly a subject that commands interest when one considers that an annual temperature drop of only 5C° could cause another ice age.

When we speak of glaciation we usually mean the last ice age, the one which left the most visible evidence on our landscape as it erased the effects of the three earlier glacial periods. It began about 70 000 years and its major effects ended about 10 000 years ago.

This phenomenon was the latest major geological event to affect the whole country. It is difficult for us to imagine what our familiar landscapes must have looked like, temporarily buried under immense glaciers only to be later covered by the sea. A number of Forillon's characteristic features are directly related to this glacial period, and if we are truly to understand its impact, or at least to learn something about how it happened, we should take the time to review what took place.

A glacial period, or ice age, is a period of cooling during which the average snow precipitation during winter exceeds the melting and evaporation during summer. Thus it does not involve a long period of intense cold as many people believe. A decrease of only a few degrees is enough to bring about the required conditions and to increase the buildup of snow each year.

That is what happened 70 000 years ago. Summer temperatures were not high enough to melt all of the winter's snow, and the snow began to accumulate, compact, and change into crystalline ice under the pressure of the weight of the upper layers of snow. When it became thick enough (60 m to 90 m or more), the ice of the lower layers began to behave like a plastic substance that could spread out and flow downhill. The snow and then the ice thus turned into glaciers.

For hundreds of years snow fell everywhere in North America and in Europe. It has been estimated that after about 50 000 years, this buildup of snow-ice near Montreal was more than 1.5 km thick! In Quebec, the pressure caused by the enormous weight of the glacial ice pushed it from the centre of the region towards the edges of the land, that is, towards the sea, so that it reached to Hudson's Bay, Labrador, the St. Lawrence River and the Gulf of St. Lawrence. The weight on the earth's crust became so heavy that the continent sank.

Because so much precipitation was consolidated on the continents in the form of ice and snow, the overall level of the world's oceans dropped by an estimated 55 m.

As the glaciers moved, they took with them everything that covered the bedrock: earth, trees, sand and gravel, and boulders of all sizes. They ground down the landscape and cut deeply into the major valleys. Then about 15 000 years ago, when the climate returned to what we consider normal, the glaciers began to melt, and the mass of water that was gradually released carried away with it enormous quantities of material, such as the sands of Tadoussac near the mouth of the Saguenay River, and other sands along the North Shore of the St. Lawrence.

The slower melting of the glacier located near Quebec caused it to act as a dam, which prevented the waters of the upper St. Lawrence and its tributaries from reaching the gulf. This damming effect created the Champlain Sea, a body of fresh water covering the St. Lawrence plain all the way to Lake Champlain near the American border (hence the name of this inland sea). It is estimated that this water reached a depth of 180 m. Then the ocean broke through, and the huge freshwater sea was finally joined directly to the gulf, which explains why today it is still possible to find in the unconsolidated deposits of this sea (in the Montreal area, for example) shells of ancient marine animals like those living today along the Gaspé coast.

At last freed from the intense weight of the glacier that had pressed it down, the earth's crust gradually rebounded, and by this uplift, a process known as isostasy, about 10 000 years ago the sea retreated from the land.

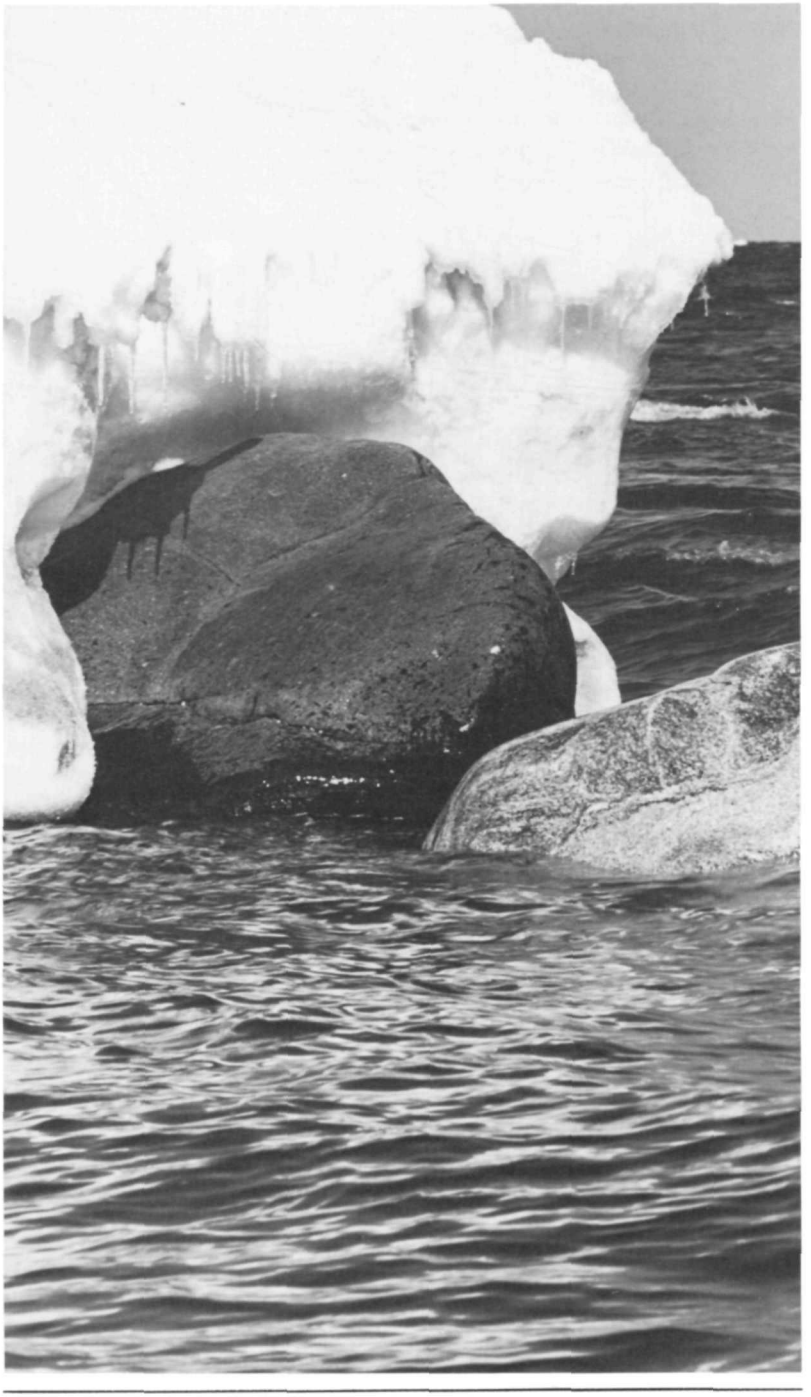
TRACES OF GLACIATION AT FORILLON

In view of the abundant evidence of glaciation elsewhere in Quebec, the lack of similar traces in the Gaspé has produced a debate which has gone on for a century: did the huge ice sheet that covered northern and western Quebec, grinding it down so thoroughly as it moved south, also affect the Gaspé peninsula?

The question is an important one because it is in fact hard to find obvious evidence such as the erratics* or glacial striations** so common in the Gatineau, the Laurentians, the Beauce and the New England States.

* Erratics: boulders, frequently rounded, that are carried by glaciers.

** Glacial striations: scratches on the rock surface grooved by erratics passing over the bedrock.



Boulders transported by the floating ice sheet

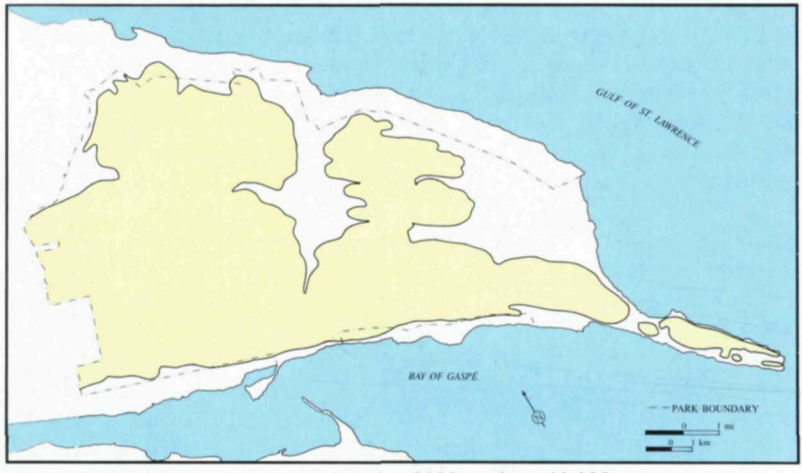


Figure 3 Marine invasion to an altitude of 100 m about 10 000 years ago

Recent studies at Forillon have uncovered many traces of glaciation, however, and in connection with what is already known about events elsewhere in Quebec, the new data bring significant findings. Here, in brief, are the major events that took place in this region during the last ice age.

About 70 000 years ago, local glaciers formed in the Gaspé and Forillon, spreading down from the mountain peaks at the same time as the immense ice sheet covering the rest of Quebec and Canada was getting larger. While the Laurentian portion of the ice sheet was advancing south towards the St. Lawrence River, the Appalachian ice sheet, which covered Gaspé's Notre-Dame mountains, including the Chic-Chocs, was also spreading towards sea level, northward, southward and eastward. The icecap covering the peaks of Forillon was behaving in like manner, though on a much smaller scale.

At the mouth of the Anse-au-Griffon and the Rivière-au-Renard valleys, terminal moraines (deposits of glacial till left at the snout of a glacier during its retreat) show that local glaciers flowed down the valleys to that point. The Chic-Chocs glacier descended through the valleys of the York and Dartmouth rivers and must have covered the Bay of Gaspé, encroaching upon the south side of the Forillon peninsula. Easterly and east-southeast glacial striations at an altitude of 75 m are evidence of this movement, as are the fragments of serpentine rocks found in this area. These greenish rocks, which are easily distinguishable and not local, come from central Gaspé, over 90 km distant.

Current research leads us to believe that the big Laurentian glacier in eastern Quebec reached no farther than the north shore of the Gulf of St. Lawrence where its southward advance stopped. However, an enormous sheet of floating ice must have extended beyond the glacier to occupy the gulf and the Laurentian channel. It must also have covered the northern sector of the park, since stones from the Laurentians have been found,

Water seeping between rock strata

The freeze-thaw process at work

among other locations, in glacio-marine deposits near the La Chute trail 30 m above the current sea level, and at cape Bon Ami at the 20-m level.

Along with much of the continent, the Forillon landmass sank below the current sea level. When the climate began to warm up again, and the glaciers started to melt, the meltwater filled in the depression. At that time, the sea level was approximately 30 m higher than the current level. As time passed and more ice melted, the level went still higher, creating a body of water (called Goldthwait's Sea in honour of a key researcher on this period in the Gulf of St. Lawrence and its estuary). This gradual rise in the level of the sea took on dramatic proportions, reaching land in the northern part of the park that today lies at an altitude of 100 m.

These data were confirmed by the discovery of marine terraces at these altitudes in the park. Even today, it is possible to see a notch created by wave abrasion at an altitude of almost 100 m in the cliffs of the Forillon Presqu'île. The height of this water level means not only that the whole coastal area between L'Anse-au-Griffon and Cap-Bon-Ami was under water but also that the Presqu'île of Forillon was an island! (See map, figure 3.)

The sediments left by this marine invasion are typical of deep water sedimentation (clay deposits), followed by shallow water sedimentation (littoral and estuary sand and gravel). Shells found in these sediments provide valuable data: carbon 14 dating shows that they are about 10 000 years old. Shells of this age found in the Cap-des-Rosiers plain at the 30-m level indicate that the receding sea had reached that level at that time.

Although the marine invasion remained for about 3000 years, the period during which it receded was fairly rapid. Glacier meltwater transformed small streams into rushing rivers. The Anse-au-Griffon River and its main tributaries are good examples. In these river beds and banks, large debris can be found today which could not possibly be accounted for by spring

runoff alone. Many streams continued to deepen the channels they had been carving even before the ice came, while others were new, following paths dating solely from the postglacial period. Of these, the Cap-des-Rosiers stream runs through marine deposits, while the Beaudry, à l'Eau and Ascah streams referred to on page 21 chiseled out deep gorges in the rocky formations through which they travelled on their way to the Bay of Gaspé.

Thus glaciation, marine transgression, and the various subsequent forms of erosion that occurred when first the ice and then the sea receded were the latest major events to affect Quebec's overall landscape. Research in these areas is far from complete, nor are all the possible repercussions known. Recent studies tend to show that the land upstream from Forillon on the south shore of the St. Lawrence is still rising, while in the Maritimes it is subsiding.

Learning to recognize the signs of these events in the field is in itself an adventure which enables us to appreciate the grandeur of the natural forces that are at work on our planet. It also leads us to ask what we would do if another ice age were to commence. A number of studies show that ice ages reappear in cycles and that we are due for another.

HOW WEATHERING PRODUCES EROSION TODAY

All the principles used thus far to explain the formation of the landscape and subsequent changes in it would never have been discovered and developed without observation, study and understanding of the very same phenomena that occur before our eyes today. "The present is the key to the past," wrote James Hutton in 1785 in his classic *Theory of the Earth*, an idea that has become one of the basic principles of modern geology. But because his theory of the planet's formation stated that a great deal of time was involved, the intolerant Church of the day declared him an atheist; the prevailing view was that the earth was only 4004 years old.

The processes that occur today are the continuation of the same events that have been taking place since the earth began. Erosion, sedimentation and rearrangement are transforming our landscape slowly but surely, and these phenomena reflect an ongoing dynamic.

Erosion affects Forillon in a variety of ways. Its combined effects cause shorelines to recede and mountain peaks to be worn away. It also contributes to the sculpting of the shapes, profiles and relief that are characteristic of the park landscapes.

Rainwater acts in many different ways on the landscape, even though its action is often imperceptible: it seeps into porous rocks and disappears; it streams over rock surfaces, dissolving elements into mineral salts which are carried away; it widens cracks and fissures.

The water that flows into these cracks then freezes, and the alternate freezing and thawing which takes place at our latitude hundreds of times each year causes a great deal of rock fragmentation at Forillon. Without the water seepage, freezing would have only a slight effect on the rocks, which would merely contract slightly from the cold. But the frozen water

increases in volume by about 10 percent and produces localized pressures of up to 15 kg/cm^2.

At Forillon, the stratified limestone formations are cut transversally by many "veins" of white crystals — calcite — which constitute fracture planes. Water seeps readily into these relatively soluble mineral-filled fissures which are weak zones. This action, combined with the cracking that results from the freeze-thaw cycle, is largely responsible for the vertical nature of the coastal escarpments and for their gradual retreat landward.

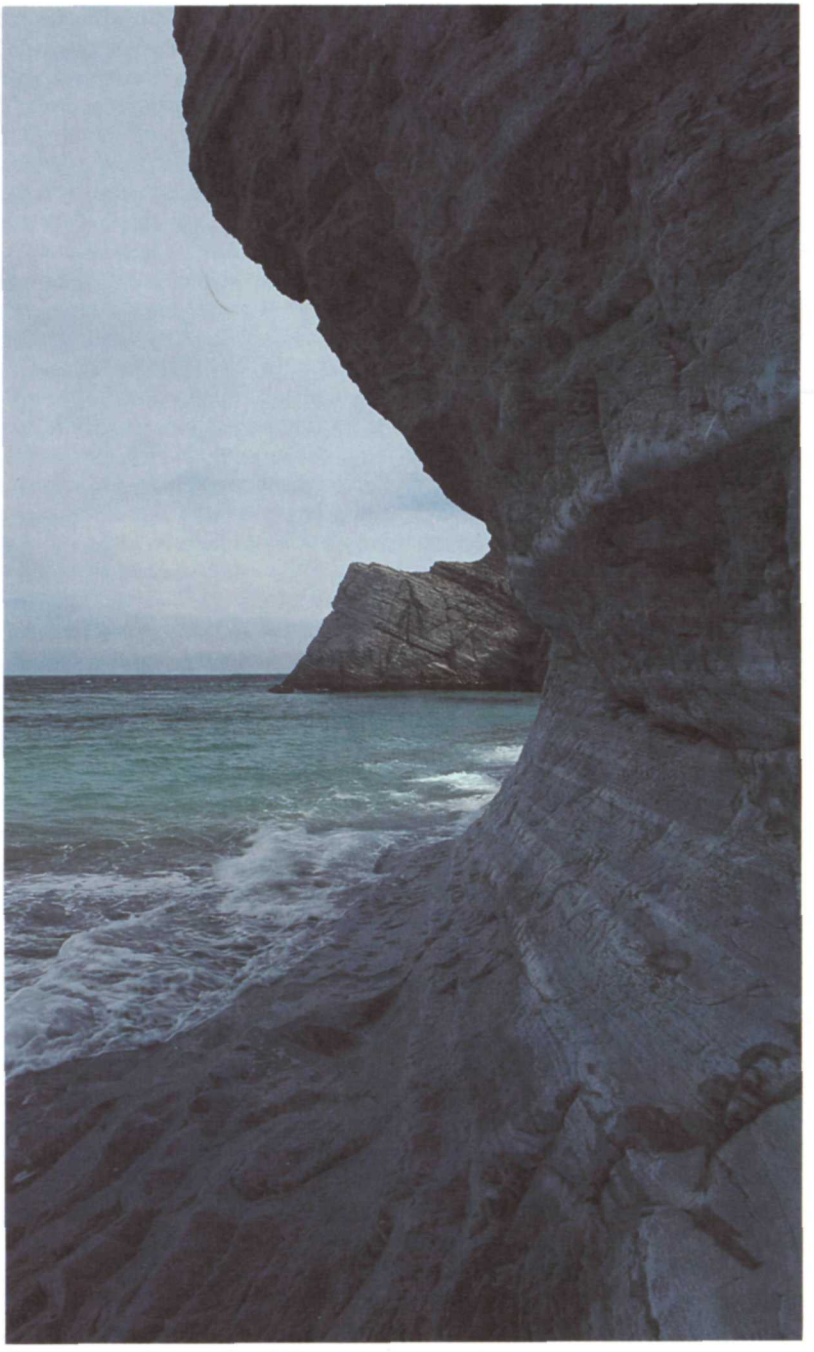
Although the agents of erosion and the nature of the weak zones are similar on either side of the Forillon Presqu'île, their effects vary, and we must look for the reason in the Devonian rock strata and its angle of dip. Whether we are at Le Quai rock, Mont Saint-Alban, Grande-Grève or Cap Gaspé, the incline of the strata is approximately the same everywhere; because the whole of the Presqu'île is part of the same fold, its rock layers all slope in the same direction. And it is precisely because of this homogeneity that there is a difference. To the north, the strata dip towards the centre of the peninsula while to the south, they of course dip towards the water of the Bay of Gaspé. Fragmentation and subsequent tumbling therefore differ on both coasts.

On the north side of the Presqu'île, on the bare vertical face of Mont Saint-Alban and all along the cliffs of the Forillon ridge from the Rivière-au-Renard valley to Cap Gaspé, the alternate freezing and thawing and the water runoff cause rock fragments and sometimes enormous pieces of rock to become detached and fall. These rock falls create overhangs in some locations which eventually crumble as well.

On the south side of the Presqu'île, although the escarpments are much lower, erosion is perhaps even more spectacular because it can be seen more clearly. Here also the runoff and the freeze-thaw cycle act on every possible fissure in the strata to detach rock fragments. These can be small or huge, horizontal (a large portion of a single stratum) or vertical (cutting across more than twenty strata). A typical scene shows chunks of detached rock lying on the layer below, ready to slide off gradually or suddenly. Evidence of past rock falls and of coming ones is everywhere along these bayside cliffs.

Wind is another cause of erosion. Its effect is generally considered to be negligible, but the abundant shales and bare outcrops of Forillon indicate that the wind indeed plays a role in dislodging and blowing away the small sheets of which the rock is composed. On a windy day, you can hear the fragments falling, and in winter so many pieces of rock are blown off that they quickly blacken the nearby snow.

Any discussion of erosion usually emphasizes, as we have just done, the effects on bare rock, where the absence of vegetation leaves it open to weathering. Under such conditions erosion is more direct, more dynamic and more obvious than the wearing down of bedrock in a forested area, which of course is almost negligible. It should therefore be remembered that for tens of millions of years, when the evolution of life on Earth had



Wave-cut notch, cape Bon Ami

not yet produced vegetation (see Table of Geologic Time, page 17), erosion took place at a much more rapid rate. The same situation prevailed each time the glaciers passed, clearing all existing forest cover from their path. Since water could act directly on the denuded rock, it carved through the soft rocks much more rapidly than through the harder layers. This helps us understand how the vast cuesta-like relief of escarpments so typical of the Forillon ridge came about.

We often underestimate the power of small watercourses to carve rock and carry off material. We can conceive of a stream carrying gravel, sand and other debris, but we tend to forget that the path it follows is a valley carved out by itself. Even its many waterfalls and rapids are often evidence of past erosion in areas of softer strata. The whole of the hilly landscape in the Ordovician rock area between the Rivière-au-Renard valley and the Cap-des-Rosiers plain is in fact a plateau amply carved by watercourses. Obviously the fact that most of the rocks in the area are shale greatly facilitated their being sheared into hollows and ridges.

Thus, slowly but surely, erosion does it work. In its own way, it creates features in the landscape that are both charming and spectacular. Clearly, Forillon Park with its many diverse examples is an ideal place to learn about erosion.

THE SEA'S CONTRIBUTION TO EROSION

The action of the sea on the coastline varies with the type of coast. Wherever wave deposition is not taking place, erosion is under way.

At Forillon, the cliffs appear to be a symbol of the battle between the land and the sea. With the evidence of the effects before us, we believe the cause is obvious, forgetting the geologically identical cliffs running from Mont Saint-Alban to the Rivière-au-Renard valley, which are not near the sea. In fact, even where high cliffs border the sea, there are today few parts of this coastline touched directly by waves. The areas where there is still direct contact are called wave-cut sea cliffs. Along most of the coast the escarpments are protected from direct sea contact by beaches or piles of boulders. It should be remembered, however, that these wave-protected cliffs are nonetheless retreating from the sea by the erosive action of thawing and freezing.

Where waves break directly onto the base of a cliff, they cause local erosion in the form of curved undercuts in the rock. These wave-cut notches are sometimes enough to create overhangs, which may fall anytime. This is the case at Le Quai rock, the Bon Ami cape and many other capes on the Bay of Gaspé coastline. Sometimes the notch is extremely pronounced at the very base of the cliff, where it is subjected to daily wave action. In other places, there may be a long curve towards the top, evidence of the sporadic action of big storm waves.

Seen from a distance, the profile of these undercuts appears to result from polishing or lapping by the waves. But in fact the action of the waves striking against the rock and removing fragments that have been fractured by freezing and thawing causes the undercutting.

On the northern coast of the Forillon Presqu'île, waves strike the rock beds both directly and from below. A 3-m-high wave strikes a wall with a hydraulic pressure of about 6000 kg/m^2.

This type of erosion is more pronounced, or at least more visible, where the rock strata present weak zones or more grip to wave action. Sometimes soft shales are sandwiched between layers of limestone, and the sea finds it easy to empty out these sheets, leaving spaces between the limestone layers. The waves can then strike against these new gaps with even greater force, continuing to work away at the shales like a chopping wedge in a log and eventually forcing the dislocation of the remaining strata.

In other cases, fissures and calcite veins present the sea with weak spots in the vertical plane. A small initial crack is gradually widened by the sea water's combined striking, dislodging and dissolving action, and by pebbles being picked up by waves and hurled against the walls of the widening hole. This action creates marine potholes like those found on the south shore of the Forillon Presqu'île. If these cavities get deeper without the overhang collapsing, they become coastal caves; there is a good example of such a cave at the Bon Ami cape.

It is the very principle underlying the erosion of fissures enlarged into potholes that has given the south coast of the Forillon Presqu'île its unique character: an indented coastline of small coves. From Grande-Grève to Cap Gaspé, a distance of 7 km, there are about forty coves of various sizes.

A close look at the rock wall at the back of these coastal indentations provides a revealing piece of evidence: a calcite vein. In some cases the presence of two or more veins spaced fairly far apart suggests that at one time neighbouring potholes may have merged or that two smaller coves may have combined to form the cave we see today.

All along the coast, then, the evolution of this whole process of development, *from fissure to pothole, from pothole to small cove*, and from small cove to larger cove, is clearly and eloquently demonstrated. This evidence of nature's processes by specific examples is one of the Forillon's key features.

ROCKY BEACHES AND A SAND SPIT

Many factors determine how, when and where the debris produced by erosion collects.

As we have already seen, very fine material is likely to be transported great distances whereas sand and stones are proportionately less mobile. The larger the fragment, the more it tends to remain close to its place of origin. This is the principle of inertia. There are exceptions to the principle, however, and we will discuss them later.

As elsewhere in Quebec, the deposits in Forillon do not date back farther than the last ice age. The advance and retreat of the glaciers removed all existing deposits that covered the land and replaced them with new ones.

The combined effects of weathering, as we have discussed, dislodge

rock fragments of all sizes. At the base of a cliff one often finds debris from the cliff face. Where the face erodes quickly or where there is a single, localized collapse, the fragments converge at the foot of the cliff into cone-shaped accumulations called talus cones. Such accumulations can be seen piled against the cliff base all along the north coast of the Forillon Presqu'île. Some very small ones remain for only a short time but others, which can be several dozens of metres wide at the base and very stable, have enormous chunks of rock as a foundation and have probably been there for centuries.

Talus cones may accumulate and merge into a continuous talus all along the foot of a cliff. A good example is at the foot of Mont Saint-Alban, where rocks fall constantly from the whole cliff face.

Rock falls are also the main source of deposits for Forillon's beaches. The sea waves disturb and rearrange the rock chunks and fragments that have collected at the foot of the cliffs, polishing and rounding them. Gradually, it spreads them all along the coast, sometimes over fairly great distances. A good example is the Petit-Gaspé beach, the southeasternmost point of the Bay of Gaspé's sandstone formations. Erosion of the sandstone produces sand, as shown clearly along the entire coast from Penouille to Petit-Gaspé. But as soon as we round the cape at Petit-Gaspé, we find a beach made of a very different kind of material, even though it too lies entirely on sandstone layers. In fact, except for a small sandy section near the cape, this beach is made up of pebbles and cobbles that come from the limestone coast located at right angles to it in the direction of Grande-Grève. It is a clear demonstration of the power of waves to transport good-sized rocks. It also shows that wave action in this area has a dominant direction, a subject we will return to in the chapter on the sea.

But how large can such pieces of rock be? On the beach along the Cap-des-Rosiers plain, south of the fishing harbour, you will find rocks weighing hundreds of kilograms! They were not brought here by people, for they are unlike the bedrock found in the Gaspé. They are more like the rock of the Canadian Shield and the Laurentians — granites and gneisses. How can they have crossed the river which is over 100 km wide here? Certainly, wave action could not have moved them along the coastline: their enormous weight precludes that possibility. The only reasonable explanation is that they were carried by drift ice which must have floated to that point, run aground and then melted, depositing its heavy cargo. Large masses of rock carried in this fashion by floating ice sheets during winter are called drift-ice boulders. In a way, they are similar to the erratics carried and then left behind by the glaciers moving over the land. Whether in liquid or solid form, water can do incredible things.

The Penouille sector is very different from the rest of the park. It is a peninsula along the north coast of the Bay of Gaspé formed entirely of sand. This type of sediment deposition is called a sand spit.

All the sediment comes from grains of sand transported by waves breaking onto the narrow beach at the foot of the cliffs from Cap-aux-Os to Penouille. As mentioned earlier, the wearing away of these sandstone

Rock fall, north side of the Presqu'île of Forillon

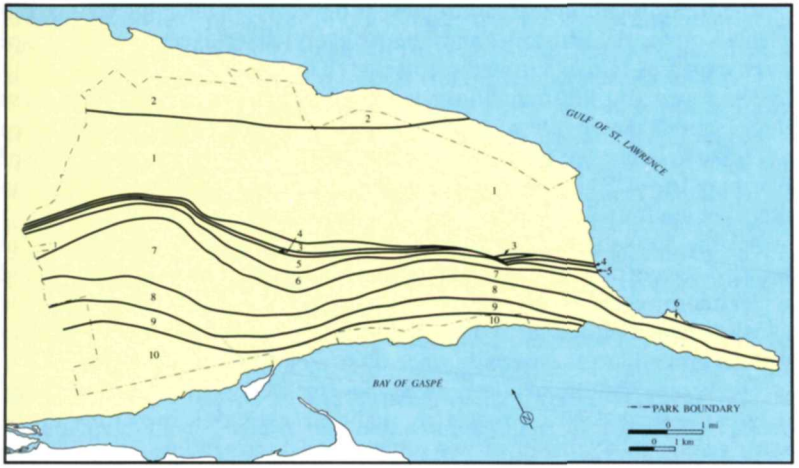
escarpments produces sand. Additional sand comes from the deep gorges carved out by the four small watercourses that flow into the bay just to the east. Waves entering the bay break onto the coast at a particular angle, producing a drift of particles towards Penouille. When winds are easterly, a similar drift pattern can be readily seen along the beach of this small peninsula.

Penouille was formed here because of a rock outcrop located in shallow water. Waves breaking on this bedrock deposited the sand they were carrying, and gradually the amount of sand built up. Other evidence indicates that the sand spit was formed fairly recently, no earlier than when the sea returned to its current level following glaciation and the subsequent marine transgression.

This type of environment is relatively unstable, based as it is on a process involving rearrangements of moveable material readily transported by water and wind. Pieces of driftwood that collect on the long eastern shore provide an excellent place for sand to collect more quickly and thus to accelerate the building of the triangular peninsula.

THE GEOLOGICAL SIGNIFICANCE OF FORILLON

Interest in Forillon's rocks is not a recent phenomenon. Many geologists studied the area during the nineteenth century and their published notes and reports greatly enhanced scientific knowledge concerning the formation of the earth's crust in this corner of the world, and the timing of the



Ordovician Period	(1) Cloridorme Formation
	(2) Cap-des-Rosiers Formation
Silurian Period	(3) L'Anse au Griffon River Formation
	(4) Sayabec Formation
Devonian Period	(5) Roncelles Formation
	(6) Saint-Léon Formation
	(7) Cap-BonAmi Formation
	(8) Grande-Grève Formation
	(9) York River Formation
	(10) Battery Point Formation

Figure 4 The geological formations of Forillon

creation of the area compared to other land masses elsewhere on the planet.

William E. Logan, the founder of the Geological Survey of Canada, arrived as early as 1843 to explore the various sedimentary formations in this part of the Gaspé. He was followed by other scientists who came to conduct research on stratigraphy, palaeontology and geomorphology. The works of J. W. Dawson (1858), J. M. Clarke (1908), A. Coleman (1922), T. J. Alcock (1922), H. W. McGerrigle (1937), Russel (1946), L. Cumming (1955), Y. Pageau (1970), J. Béland and A. L'Espérance (1970), M. Allard and G. Tremblay (1979) were a substantial contribution to an understanding of this area. In 1972, the 24th International Geology Congress placed Forillon on its itinerary of key geological points of interest in Canada.

As was made clear in the first few pages of this book, Forillon is geologically important because of a number of its features. Following is a summary of them.

The rocks found in the park represent three very ancient periods of our planet's geological history, and almost everywhere except in the Gaspé large expanses of rocks from these periods have eroded.

The rocks also illustrate a number of geological formations from these three periods (see figure 4), and so many formations in such a small area are of keen interest to any serious student of rocks. Elsewhere in the Gaspé one may travel 50 km and see only three or four formations; in Forillon there are ten formations to be found in a mere 7 km.

All the formations from the Silurian and Devonian periods show an ordered succession arrangement, with the oldest rocks clearly covered under more recent layers, but they are all at the surface because of the syncline which placed them on an angle. This makes it easy to study them right at ground level, especially since there are numerous outcrops.

The vertical cutting of some landscapes (the many cliffs, rock faces and deep valleys) makes it possible to study the evolution over time of the same geological formation or two superimposed formations.

At Forillon there is a host of phenomena that are of interest to both the specialist and the student or visitor: stratifications of various types of rock, cross-bedding stratifications, synclinal and anticlinal foldings, folding contemporary with sedimentation, discordant contacts, fossils, dykes, faults, fractures, calcite and galena veins, concretions, cliffs, cuesta-like relief, sand spits, gorges, erratics, drift-ice boulders, talus cones and talus, pebble, cobble and sand beaches . . .

These phenomena are reminders of a distant past (up to 450 million years ago) as well as of the most recent ice age (50 000 to 10 000 years ago), and they also illustrate continuing erosion and sedimentation processes.

Here, one also finds evidence of transcontinental events, with tropical fossils serving as reminders of the theory of continental drift.

Because Forillon has so many different features in such a small area, it is undeniably of great geological interest. It is the fact that so many of these features are readily accessible and clearly illustrated, however, that helps it meet the basic objectives of a National Park, which are to protect special areas of our country, while making them accessible for the benefit and education of the public. Forillon is an open book that tells a long story. It is an invitation to learn to read the landscape.

THE CLIMATE IN THIS CORNER OF QUEBEC

There is a myth in the minds of most Quebeckers: the extreme cold of the Gaspé winter. The marked difference in temperature between Montreal and Quebec City leads people to conjecture that it must be that much colder 500 km to the northeast. They forget the winter tempering effect of a maritime location. The average January temperature for Forillon is -10°C, while for the rest of southern Quebec it lies between -10°C and -20°C. Moreover, the maritime effect on Forillon's basically continental climate helps to keep the summers cooler. The average July temperature is 17°C, while it varies between 15°C and 20°C for southern Quebec as a

whole. In other words, Forillon's climate is more temperate than in the rest of continental Quebec and even in other parts of Gaspé where the sea is not present to reduce the spread between the temperature extremes.

The sea also affects the duration of the frost-free season, which is longer at Forillon (120 to 140 days) than it is inland at Amos in the Abitibi region (only 90 days), even though they are both at similar average latitudes and altitudes. Thus the earliest autumn frosts at Cap-des-Rosiers usually arrive three weeks later than at Quebec City. In the spring, on the other hand, it takes time for the sea to warm up and this delays the beginning of the growing period (i.e. when the average daily temperature rises to 5.6°C or higher).

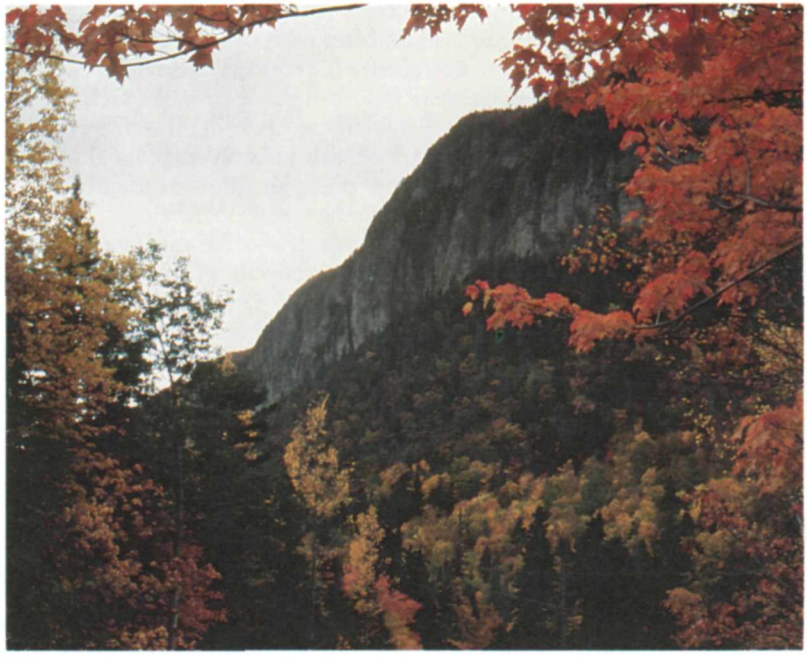
Even within the park there are marked differences between various locations on certain days, depending on whether they are at the tops of the highest peaks, exposed to wind, sheltered in forests, or at the foot of certain escarpments. The configuration of the topography itself has created a number of mild microclimates.

The prevailing winds at Forillon are northwest, which gives the region a predominantly continental climate. In summer, however, the wind is mainly southeast, which is the reason for the above-mentioned cooling effect of the maritime climate. The wind can also change direction during the day from northwest to west and then southeast or vice-versa, and these changes also affect the temperature. For example, the western beach at Penouille near the service building is sheltered from the sea winds that prevail in July and August. It is, however, directly exposed to wind from the northwest. On such breezy, cool and generally sunny summer days, the Petit-Gaspé beach is the most sheltered and warmest beach in the park.

Wind direction also affects the size of waves and thus the scale of their action both at sea and on the coastline. Because the wind can change direction and speed during the day, sea conditions are often unpredictable, which is a tribute to the intuition of the fishermen who used to earn their living by going to sea in their small boats. Particularly when navigation depended on sails and oars, these men had to be both skilful and cautious to cope with the changeable and difficult weather, not to mention the treacherous tidal currents.

Total annual precipitation at Forillon is 90 cm. Average winter snowfall is 280 cm, but much more snow accumulates on the higher land in the park, especially in the mountainous western area. In general, the ground at Forillon is covered with snow from mid-December to the end of April.

When it does not envelop everything in a shroud, giving us only a limited view of the landscape, fog is an interesting atmospheric phenomenon. It results from the condensation of masses of hot and humid air that are cooled when they come into contact with colder air masses or when they pass over cold waters — in this case the Gulf of St. Lawrence. It resembles a mass of very low cloud as it engulfs one area, then moves on to another. Sometimes thick fog will cover and shade half the park while the other side of the Forillon ridge, only a few kilometres away, is bathed in sunshine. At times like these, moving from one sector of Forillon to



Glimpse of the forest cover, Cap-Bon-Ami

another is like passing almost instantly to a completely different day.

Heavy fog covering a large area is, of course, unpleasant for tourists, but in earlier times it was a real danger for navigators and fishermen. There was a need for foghorns and lighthouses to warn sailors of the danger lurking in the "grey terror."

In recent years the climate appears to have changed. The winters are not what they used to be and spring is sometimes late. Fifty years ago at Cap-des-Rosiers it was possible to plant potatoes in April. These days it is better to wait until June.

At all periods of its long history our planet has undergone climatic changes. The ice age was followed by a warming trend that 5000 to 7000 years ago made yearly average temperatures higher than they are today. This warm period came to an end, and around 900 B.C., during the Iron Age, it grew colder. Then once again, from the year 1000 to the year 1200, it became warmer than it is today, as demonstrated by the proliferation of vineyards in England at that time; this was also the period of the great Viking expeditions to our shores. Finally, there was another colder period from the end of the fifteenth century to the beginning of the eighteenth. Called the Little Ice Age, it saw the end of the Viking colony that had been in Greenland for 500 years, and during this period the northern glaciers advanced southward. We will examine later the repercussions of some of these fluctuations on the fauna, flora and people of Forillon.

But before concluding this section on the climate, it is important to

Abandoned fields, l'Anse-au-Griffon valley

speculate that if current trends of air pollution continue, the cumulative effect of the pollutants which reduce the amount of solar radiation reaching the earth will inevitably have an effect on the world climate. The growing season for our crops may become shorter, perhaps so short as to make it impossible to farm at our latitudes. The "greenhouse effect," on the other hand, leads some researchers to predict that the earth's atmosphere will heat up, causing the glaciers at the poles to melt and raise our oceans to levels that would be catastrophic for most civilizations since they are primarily located near sea level on most continents.

LAND HABITATS

The great diversity of the park's habitats is shown not only in the variations in its relief, bedrock and exposure to climatic factors but also in its vegetation and wildlife. Each habitat therefore provides specific conditions for the life forms that live there, and each one has its own distinguishing stamp.

The habitats found in Forillon today were not always as we see them now. The glacial movements that ended about 12 000 years ago and the subsequent marine invasions cleared the old landscapes of all their vegetation. After the ice age, the park, like most of the land in Quebec and even in most of Canada, for a time was a devastated area. Tundra vegetation came first, followed by a sequence of shrubs and trees. It is very likely that there were periods during which species unknown to this area today

thrived. A study of fossil pollens in this region, such as have been conducted elsewhere, would give us more information about these intriguing aspects of the evolution of our habitats since the ice age. Let us therefore examine briefly the park's mosaic of habitats.

Forest Cover

Forest covers over 95 percent of the land in Forillon. It is a pleasant mixture of deciduous trees and conifers with one type predominating over the other in places. In fact, the forest landscapes show a variety of tree associations, with the distribution of each accounted for by a number of factors. In general, the climate at our latitude favours predominantly conifer boreal forests where the forest types "fir with yellow birch" and "fir with white birch and wood fern" form the typical climax forests here.

There are other factors besides climate, such as type of unconsolidated deposits, soil, drainage, slope, type of bedrock, effects of the sea, microclimate conditions like exposure to wind and position in relation to the sun, all of which contribute to the diverse nature of the forest cover. Approximately fifty different associations of trees have been identified at Forillon. In addition to these mature stands of trees, there are about ten more recent forest types resulting from such events as wood cutting, fire, windfall, insect epidemics or old age.

Abandoned Fields

Fields are eloquent evidence of the colonization and farming efforts by the generations of the nineteenth and early twentieth centuries. Located particularly along the park's coasts and in the Anse-au-Griffon valley, they correspond to the areas that had been covered by the sea about 10 000 years ago and thus enriched with deposits suitable for farming.

Now abandoned, these farmlands still play an important, although different, role by providing open areas which help to display a rich variety of animal and plant life. Many people feel that the opportunity to observe wildlife ordinarily hidden in woodlands adds a great deal to the credibility of Parks Canada's conservation mandate at Forillon. Here, people can see the wildlife that is protected.

The gradual disappearance of this type of environment because of the steady encroachment of the forest has created a dilemma. Since the mandate is to preserve parklands "unimpaired" for the benefit, education and enjoyment of Canadian citizens, should park management be carried out to maintain the fields as they are, or should the forest be allowed to continue its natural encroachment? Should the priority be the protection of a natural environment in its wild state, or the recognition and conservation of a significant natural and historical heritage habitat at Forillon that is of benefit to both wildlife and visitors? It is easy to take sides, but a wiser course might be to look for a compromise.

Cliffs

The Forillon cliffs are the rock faces of the Forillon ridge looking north

and east as it runs from one end of the park to the other, from the Rivière-au-Renard valley to Cap Gaspé.

These escarpments are impressive, especially along the seashore from the end of the Cap-des-Rosiers plain to the tip of the Forillon Presqu'île. The Mont Saint-Alban cliff also deserves a mention, for it rises to an altitude of 265 m and overhangs the Cap-Bon-Ami campground, itself located on the shelf of an escarpment which plunges 100 m to the sea below.

This whole coastal rock face varies in height to a maximum of 180 m southeast of the Bon Ami cape. The landform also varies at the foot of the cliffs; in some locations the water reaches the cliffs themselves, while in others there are beaches or piles of fallen rock and talus.

The composition of the rock strata differs along the cliffs; in some sections there is mudstone and shale at the base, while in others it is limestone. The sections therefore react differently to the action of freezing and thawing, producing a smooth wall in some locations and prominent shelves in others. These different cliff faces prevent wildlife and plants from encroaching in some places while elsewhere they are most suitable for selective colonization by certain species.

Salt Meadows

This habitat is restricted to the Penouille sector. The depression at the western end of the sand spit between the road and the beach is the best example. During the annual high spring tides and when strong southeasterly storms occur, the meadow is covered by salt water from the Bay of Gaspé, as evidenced by the large pieces of driftwood. Only plants that can tolerate salt are found in this type of habitat.

Salt Marsh

The bay behind Penouille is a salt marsh. Unlike the salt meadow, it is always flooded, and the level of salinity fluctuates regularly. When the snow and ice melt in the spring and the Ascah stream runoff pours into the bay, the water in the marsh is less salty than when a high tide fills it to the brim.

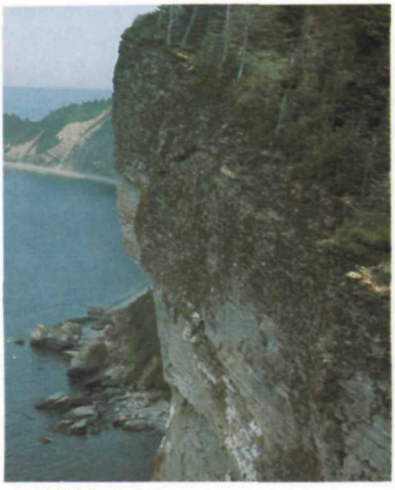
Around the edge of the marsh, drift-ice ponds remind us that ice can not only bring deposits but also take them away.

A salt marsh is a very special sort of habitat which provides food and shelter for a great number and variety of living things, but all must be adapted to the changing conditions of such habitats.

Natural Prairies

A natural prairie is an environment where weather conditions prevent forests from becoming established and which supports a continuous carpet of herbaceous plants.

At Forillon, there are a number of small natural prairies at the tops of some coastal cliffs, which are exposed to severe weather conditions. They are a refuge for a number of particular plant species.



A cliffside habitat

One of Forillon's watercourses

Salt marsh at Penouille

Sand Dunes

In all the park, this type of habitat is found only at Penouille. This entire sand spit — which was formed by a succession of sand bars, where the new ones offshore protect the previous ones from the waves — has also been acted upon by the wind. Wherever possible, the wind has carried off dry grains of sand and built them into small dunes.

Thus, the very ground of this small peninsula is totally different from the rest of Forillon by its relative instability, its sandy nature, its pH level, its rapid surface drainage, its very thin layer of organic soil, its flat relief at sea level. Very special plant associations are found here, and we will discuss them at greater length in the section on plant life.

Peat Bogs

The only peat bog at Forillon today is a "dry" bog located at the entrance to the Petit-Gaspé campground. It consists of the forest type "black spruce with sphagnum moss and cloud berry."

There may have been others several hundred years ago in the Cap-des-Rosiers plain, since there are layers of peat on the clay bed deposited by the sea transgression in the post-ice-age period. Such layers can be seen in the ditches alongside the road in the section between the harbour and the campground.

Watercourses

There are no major rivers in Forillon. There are, however, many streams of various lengths and flow rates cutting through all areas of the park except Penouille. Most flow fairly steeply towards the sea as rapids and waterfalls.

They continue to excavate valleys and transport sediment. In summer, the water level of some streams drops rapidly, and by July the water flows under the gravel bed for a while before surfacing farther downstream where the bedrock comes to the surface.

Lakes and Ponds

Because of the nature and configuration of the Forillon substratum, there are few stagnant bodies of water in the park.

Five lakes fill small depressions on the top of the ridge north of Penouille. Four of these, called the Penouille Lakes, which are joined by a trail from the Anse-au-Griffon portage, occupy the same trench between two ridges. The first has a depth up to 10.6 m; the remaining three are small with an average depth of less than a metre. Lac-au-Renard, nearly one kilometre in length, is clearly the largest lake in the park though its average depth is less than a metre. All of these lakes have a very high acidity level (pH 5.2), which is very close to the limit for speckled trout. Thus, in spite of a rocky limestone substrate which has a neutralizing effect, high acid rain levels could easily bring the acid level in these lakes to the critical point and eventually cause most of the trout to die. Moreover, the fact that these lakes are so shallow increases the risk of winter

kill: on the one hand, the ice may get thick enough to become too restrictive for life to survive beneath it for extended periods of time; on the other hand, the accumulated snow, which is as acid as rain, provokes sudden rises in acidity in spring when it melts.

Of the few small ponds found in Forillon, the most interesting is without doubt the one at Cap-des-Rosiers by the coastal road that runs along the sea between the lighthouse and the fishing harbour near the interpretation centre. It is one of the two freshwater ponds in the Gaspé located this close to the sea. It features many plants and animals that cannot be found elsewhere in Forillon. During stormy weather, when the sea waves are furiously smashing against the rock wall alongside the road only 10 m away, this pond provides a quiet shelter for seabirds. Many birds considered rare in the Gaspé have been sighted here. It is also a prime example of habitat evolution: a 1746 geographical map shows it opening onto the sea, at which time it must have been a salt marsh.

FORILLON PLANT LIFE

As we might expect, the great variety of habitats in the park allow different plants to grow here. To date almost seven hundred plant species have been found and identified in the park's territory. Oddly enough, 75 percent of them are not associated with the forest area that covers 95 percent of the park. It is also astonishing that 80 percent of Forillon's plants are specific to only one habitat in the park, which clearly shows that plants do not grow haphazardly.

Forillon is botanically interesting not just because we find representative plants typical of their respective habitats but also because much of the value of the park's plant life involves unique and very special features. Grantner's research on all the plant communities in the park and Morisset's studies on arctic-alpine cliff plants have greatly added to our knowledge and appreciation of this aspect of Forillon's resources. Since this book is intended to familiarize the general reader with the basic features of this land area, the author has avoided using technical terms as much as possible, and has had to limit the choice and scope of subject matter. For this reason we shall have to be content with a brief look at some of the significant aspects of plant life, for complete coverage would easily fill a whole book.

Contradictory Plant Life

Forillon's plant life holds many paradoxes. In this relatively small area of 240 km^2 there are plants living close together that normally grow far from each other; plants that require a harsh climate and a severe, poor habitat, and others that normally grow much farther south in rich soil; plants that were able to grow here because of a very cold period and others that came during a warmer period than the present climate. Some are recent plants and others are from prehistoric times.

As with rock formations, vegetation also is a kind of great open book from which we can read surprising stories. In earlier times wildflowers

were considered a veritable pharmacy. Recently there has been a renewal of interest in edible wild plants and their uses. And in addition to their identification, there is also the meaning of their presence in a certain spot today — the history of their migration, sequence, evolution and disappearance. As we shall see, an interest in botany can imply much more than simply plant identification.

Arctic-Alpine Plants

The park cliffs are an austere and dangerous habitat, with very limited possibilities for plant life. Moreover, the fragile nature of the rock causes pieces of cliff wall to fall off throughout the year and pile up at the cliff's base. Forillon's arctic-alpine plants live on these cliffs.

As their name implies, these plants come either from the Arctic or from very high mountaintops such as those found in the Rockies and the Cordilleras west of the Rockies. If at first this does not seem particularly strange, what is definitely striking is that these plants form populations that are completely cut off from their source. How can we explain the presence of species of tiny plants growing in Forillon and at the opposite side of the continent with no link between them? These two areas are thousands of kilometres apart, too far for seeds to have been carried all the way by the wind. How did they get here?

This is what we know: Here as elsewhere these species grow in open, bare areas where they do not have to compete with other plants. They will not grow in soil covered with vegetation; they must live alone and fairly spread out or in small clusters. Their normal habitat is beyond the tree line, either north in the tundra or high up on mountaintops. Living conditions are the same in both areas: trees can not grow there and summers and growing periods are short.

The cliffs at Forillon fulfil both these conditions. They are exposed to cold winds and receive little sun, which make for harsh growing conditions. The cliff walls are unstable because of erosion and constantly falling debris: this keeps the area open and bare. We might even say that its very instability makes it stable, in that as long as these conditions persist, arctic-alpine plants will survive here.

How long has this been going on? For about 10 000 years, ever since the ice age ended and the post-glacial sea receded, when waves stopped hitting the seacliff walls head on up to heights of nearly 100 m.

This is perhaps the key to the mystery of their presence here, or rather how they got here. It has been observed that as glaciers move, they lay waste whatever covers the rock beneath, so that what was previously a forest area becomes a devastated area. Then as the glaciers melt and recede, vegetation moves in to colonize these "new lands," as we can see today in places where glaciers are still receding.

As far as we can gather, when the ice cap over the northern half of our continent receded, it left an area a few kilometres wide behind it where growing conditions were quite severe. Only plants adapted to the prevailing conditions could grow there. This vast bare area at the edge of the

A diversified flora

glacier stretched as far as the Rockies, so that plants which normally only grew higher up could now begin to reproduce at the foot of the mountains. We believe this is how they scattered towards the east, colonizing the narrow corridor at the edge of the glacier and mingling with the arctic species that required the same living conditions.

As the climate gradually became warmer and the glacier receded towards the polar regions, the boreal forest followed. It was then much farther south than it is today, and it gradually invaded the area where the arctic-alpine plants had grown, and they in turn moved farther north. Since they cannot tolerate other plants, which are normally more competitive and more apt to monopolize territory, they disappeared from the areas that they had been the first to colonize after the ice age. Today they survive only in places where neither boreal forest nor other, more southerly plants that followed it were able to grow — on cliffs and mountaintops that have remained bare since the last ice age.

In all there are about thirty species of these rare plants in Forillon, and some of them exist in very small numbers, making them extremely valuable. They are like relics: small reminders of the great story of the ice age. The presence of these arctic-alpine plants in the Gaspé area has intrigued botanists for a century and has stimulated exploration and debate. For a long time these tiny plants formed the basis of the argument that the Gaspé had escaped the continental glaciation. Another hypothesis was that the glaciers had moved from west to east bringing with them the plants known from the Rockies. Botanical and geological data built up, clashed and finally provided new hypotheses which were able to satisfy a majority of scientists interested in the enigma of the unexplained presence of tiny plants that had come from so far away. Curiosity gives birth to knowledge. We are especially indebted to John Macoun (1883), M. L. Fernald (1925), V. C. Wynne-Edwards (1937), Brother Marie-Victorin (1938) and H. J.

Arctic-alpine plants

Plants transported from Europe

Scoggan (1950) for their work and publications on the subject.

We can now understand how the presence of such flora in Forillon worked in favour of establishing a national park here.

Taiga

The arctic habitat where because of the very harsh climate only low plants and dwarf trees grow is called tundra. The next area towards the south is the taiga, an area of sparse coniferous forest supporting a ground cover of lichen. The climate there is also harsh. The taiga marks the transition from open tundra in the north to the dense boreal forest in the south.

The landscape in the middle of Penouille is very much like that of New Quebec, several hundred kilometres north. Habitats that are typical of more northern regions are often found in the south, but usually at higher altitudes, whereas Penouille is right at sea level. What is more, it is often warmer there than in many other areas in the park. How can we explain this exception to the rule that a taiga should lie higher up or farther north than the boreal forest?

We do not know exactly. It would seem that the particular conditions of Penouille (sandy ground, poor soil and climatic factors) help create a habitat where growth conditions are similar in severity to those in the taiga. Here as in New Quebec we notice the same adaptation of certain black spruce in reproducing by a special process, whereby a branch at the foot of a tree takes root and grows into a new tree. It is a response to a difficult environment.

Quite a few interesting plants associated with this forest of black spruce are also adapted to the sandy substratum. As well as thirty-six species of lichens, which typically form in the underbrush, one can find club-mosses, ericaceae (woody plants in the heath family) and pioneer plants, the main one being *Hudsonia tomentosa*, the false heather.

Bloodroot

Penouille's ecological peculiarity is not that rare plants are found here but that unusual associations occur. This arrangement, on this tiny sand spit, unique in continental Quebec, gives Penouille its ecological importance — a world apart to be preserved.

Plants from both North and South

If we thought of New Quebec as we crossed the Penouille spit, we could just as easily imagine being in the Gatineau or the Eastern Townships when moving through other forest areas in Forillon.

A third type of forest, which here reaches a climax stage of ecological succession, is "sugar maple with yellow birch." There are also small groupings of red oak, elm and ash, and also small populations of *Sanguinaria* or blood-root, those elegant spring flowers that grow in the Laurentian maple underbrush. What are they doing here in the middle of a boreal forest when they should be much farther south?

To our knowledge no study of fossil pollens has been done in the immediate area that could furnish precise information on the age and evolution of the various successive types of forests in Forillon since the ice age. Nevertheless, certain conditions must have prevailed here for a time to promote the growth of these southern plants and trees, which are now found only in isolated groups. The warm period that prevailed between seven and five thousand years ago, as we saw in our look at climatic history, probably helped to extend the southern deciduous forest to this

A very, very old plant

Gaspé sandstone contains the remains of a plant that lived over 350 million years ago. Its name is *Psilophyton princeps*, and we believe it grew in brackish water. This deduction comes from various facts: first, sand deposits are normally found at the edge of continents; second, we find cross-bedding in the sandstone layers here, which suggests that at least now and then the deposits were made in running water. Some strata have ripple marks in their fossil state, similar to what we see today on sandy beaches at low tide. Also, only fragments of stems have been found — another sign of movement or disturbance. Finally, the plant itself is not a seaweed, but a true segmented plant, somewhat like present-day horsetails.

end of the Gaspé. Then the climate became colder, and this, in addition to perhaps the much more recent selective human interventions, may have reduced the number of areas where these species could grow, since they are now confined to quite limited areas in the park.

If this is what happened, the sugar maples, red oaks and blood-roots found here are also a kind of relic. As opposed to the arctic-alpine plants, they bear witness to a time that was warmer than today.

Latest Arrivals

A little over two hundred years ago Europeans colonized the wild coasts of Forillon. They cleared the land and created fields between sea and mountain. Until the mid-twentieth century, agriculture was a standard occupation, in fact, an essential need for survival on most of the inhabited land on the periphery and in the broad valleys of the Gaspé.

A whole procession of new plants, many of them as or with sowing seeds brought from Europe by settlers, grew and spread through the fields. Today these roadside wildflowers add a country charm to several sections of the highway throughout the park. They keep the soil from eroding, and also prove that they can live in man's environment as well as their own. Every summer they provide an extra note of beauty and colour to the countryside in the abandoned fields on the south shore of the Forillon peninsula, the Anse-au-Griffon valley and the plain of Cap-des-Rosiers.

LAND ANIMALS

The fauna of any area means essentially all forms of wild animal life that live there. For most people this generally signifies mammals, birds, reptiles, amphibians and fish, then insects and other invertebrates that are easy to see with the naked eye. As you might imagine, this chapter on the animals of Forillon will necessarily be incomplete. We will have to be satisfied with the most representative and significant aspects of land wildlife in the park, and also wildlife that is potentially most interesting to the reader and the visitor. Marine fauna as such will be dealt with in the next section of the book which concerns the sea.

Wildlife in the park has two main qualities: diversity and visibility. Needless to say, this combination delights visitors. Forillon has the reputation of being both rich and generous: everywhere you go you can see, you can hear, you can feel the beat of life.

History of Land Wildlife in Forillon

Were there dinosaurs here, as in the Canadian West, 150 million years ago? Were there mammoths and great carnivores 5 million years ago, in the Pliocene age? The answer is probably yes, though we do not talk about it much because no specimen has been preserved from those far away times. Erosion has affected the area for 350 million years, so there is no trace of these animals to be found in sediment or rock. If the sea had invaded Quebec 150 million years ago, our dinosaurs would have been

Wilson's warbler

Black-legged kittiwake with young

Red-tailed hawk

fossilized in sediments of the period and today we would be making much of the fact that these prehistoric animals actually did tread this ground. But without fossilization their bodies simply decomposed, as did the elephants and other great beasts of the Pliocene age. What few traces might have remained were swept away by the various glaciers that have smoothed down the landscape since then.

During the last ice age all animals that could not migrate certainly must have died of starvation, froze to death or been crushed. Extinction occurred as pitilessly for bears as for ants. Possibly seabirds and sea mammals were the only ones that came here during that period, but this is mere speculation. Very few people have studied these questions and the only answers are hypothetical.

After the ice age, animals followed the vegetation northward, repopulating the land. Insects, frogs, mammals, all began spreading into the area again. The Gaspé, and Forillon at its tip, are interesting in this regard because they are both peninsulas. Large expanses of salt water often provide ecological barriers to the movement of different animal groups. Peninsulas set limits as to how far certain species can go. The absence of some species here shows that some animals followed different post-glacial distribution patterns. We shall return to this again when we speak of the different animal groups.

Even the last two centuries have seen changes in the fauna of the area. When the white man cleared his land he created new habitats in this part of

the continent, thus favouring the arrival and establishment of new species of wildlife. But he also killed animals carelessly; some species were dangerously reduced and others were exterminated. Natural factors — forest fires, epidemics and heavy rains — also caused animal populations to fluctuate so that some increased and some declined.

Today and from now on in Forillon only natural factors will have an effect on the balance of animal populations. This is one of the roles of a national park.

Birds Everywhere

Since Forillon National Park was created in 1970, we have seen over 225 species of birds within its boundaries. There are two reasons for this large number. Forillon is strategically located at the tip of a large peninsula next to the St. Lawrence River, and points a finger into the Gulf, attracting concentrations of birds. Some just skim by the coast, some stop to feed en route and others stay for several months to nest and reproduce. The second reason is the variety of habitats. The many different places where birds can find food and shelter attract a great variety of different species.

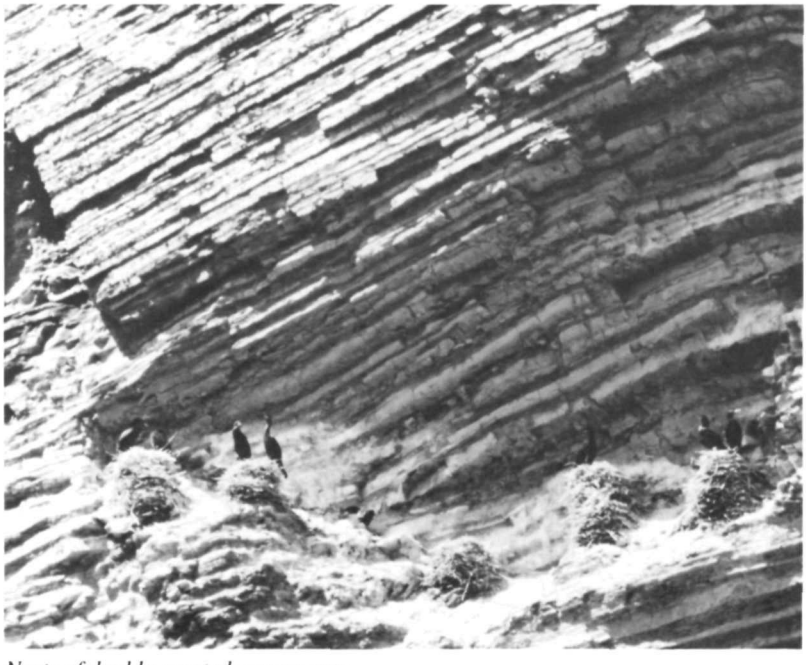
Thus, Forillon welcomes the whole range of small birds that usually live in fields and forests, such as sparrows, warblers, grosbeaks, woodpeckers, jays, waxwings, robins and thrushes. Birds of prey — falcons, hawks, owls — also live here. Some of them nest in the park, but most gather here during their spring and fall migrations.

An even more distinctive feature of the area is, of course, the seashore with its ever-present flocks of busy seabirds. (We have arbitrarily decided to discuss most of the so-called seabirds in this section, because they nest on a portion of land in Forillon.) Farther on, in the section entitled THE SEA, we will take a look at other seabirds that come here but without setting foot on land.

Most birds nest in solitary couples, or else the female looks after the nest and the young by herself. They usually reproduce in great secrecy, camouflaging their nests, and if you are able to spot them it is mostly by chance. But at Forillon, thousands of birds nest at the bottom and along the faces of the cliffs — great colonies or groups of birds in relative proximity to each other on these rocky open bluffs. Here they are easy to see and fascinating to watch.

The largest concentration of birds in the park is found at the corner of Cap-des-Rosiers cove where the cliffs form a right angle before stretching off towards the Bon Ami cape. The rocky wall here wears away, forming uneven narrow ledges where several thousand black-legged kittiwakes nest. There were a few hundred nests when the park was created; these grew to a few thousand at the beginning of the 1980s, whereas a 1936 bird inventory of the same cliffs does not even mention their presence.

Hundreds of double-crested cormorants build large nests of branches on wide ledges higher up on the cliffs, where they look after their young. (This bird was chosen as the symbol of the park's interpretation program.)



Nests of double-crested cormorants

This section of the cliffs of the Forillon Presqu'île also shelters several dozen razorbills, also called razorbilled auks or penguin. This species does not build a nest; the female lays a single egg, pointed at one end, in a crevice in the rock. In the same area of the coast, especially on the beach and on large humps of boulders or rockfalls, are several nests of herring gulls, a few black-backed gulls and eider ducks.

The seacliff at the edge of the Cap-Bon-Ami picnic and campgrounds is inhabited by herring gulls, double-crested cormorants and black guillemots. A telescope has been installed on Le Quai Rock, where you can get an excellent view of the constant comings and goings of these birds as they bring food to their young.

Although it also nests on the north shore, the black guillemot nests in greater numbers on the small escarpments on the south shore of the Forillon Presqu'île. This is probably directly related to the different type of erosion that affects these cliffs. Cracks already present in the slanting strata tend to widen, forming crevices where guillemots like to lay their one or two eggs. You can see these birds quite well at Anse-aux-Sauvages; from the dock you can even watch them fly under water in search of sandlances or other small fish.

Cap Gaspé marks the end of the peninsula, and here you can observe flocks of seabirds flying around the point as they pass from one side of the Presqu'île to the other. Gulls swirl and glide around the cliff all day long. A little farther away flocks of gannets go back and forth in search of food

Snowshoe hare

between the park's coastal waters and Bonaventure Island, where they nest by the tens of thousands.

In the summer at Penouille common terns dive head first into the shallow water near the shore to catch young sandlances and other small fish, while sandpipers and other shore birds go up and down the beach in search of small crustaceans. In the salt marsh great blue herons catch small flounders and sticklebacks, while herring gulls gather every day on the grassy islets in its middle. In August Bonaparte's gulls come here regularly as well. The mouth of the marsh, where the tide's ebb and flow bring food, is a favourite hunting spot of the osprey, which hovers over the water and then plunges feet first to grab fish with its long sharp talons. Eelgrass and other marsh plants attract and feed Canada geese, brants, black ducks and blue-winged teals on their migratory stops.

The Anse-au-Griffon valley is one of the best places in Quebec to observe birds of prey during their spring and fall migrations because of the Forillon peninsula's strategic location; it is a perfect place for migratory birds to stop before or after crossing the St. Lawrence River or Gulf. Another factor, just as important, is the abandoned fields that cover the floor of this valley, where rodents and other small animals abound — easy prey in such an open area. You can see a good many rough-legged hawks and sparrow hawks, and less frequently such other species as the red-tailed hawk and golden eagle. At dusk during the spring nesting period you become aware by sight and sound of the large number of American wood-

Fawn of white-tailed deer

cocks and Wilson's snipe that hide there during the day. At night, from April to June, you can hear the hooting of owls.

During the winter months, from January to April, the forests of Forillon shelter a few species in small numbers, mostly jays, grosbeaks, chickadees, woodpeckers, ruffed grouse and goshawks. Great activity, however, continues on the sea, as we will discover in the section entitled THE SEA.

Mammals

Our own species has always valued mammals more than any other animals, for we have more links with this animal group than any other. We have domesticated several species for food, transport, heavy work, guard duty, and also for simple amusement and company.

Our relations with the wild mammals of our country vary, depending on circumstances and on the species. Hunting and trapping are bound to establish certain direct contacts, but most people have a very superficial knowledge of Quebec mammals. Intellectually we are just as familiar, if not more so, with giraffes, elephants and lions as we are with moose, porcupines and lynx, although these live much closer.

Unlike birds, most mammals are usually difficult to observe. They hide themselves very well in their respective habitats; most of them live discreetly, being chiefly active at dawn or dusk or during the night. It is difficult to know and appreciate wildlife that you do not see.

But as we said earlier, wildlife at Forillon *can* easily be seen, and this

holds true for several species of mammals. Anyone interested should be able to encounter them quite frequently.

It is not at all unusual to see porcupines along park roads and trails, especially in early morning or late afternoon, even though they are active mainly at night. These large rodents are quite inoffensive and always run away once they become aware of a human's presence. Direct contact with a porcupine, however, should be avoided. If you were to get too close, the animal's reaction would be to turn its back and with a flick of its tail, try to plant a few of its 30 000 quills in your hide. (Dogs should definitely be kept on a leash.)

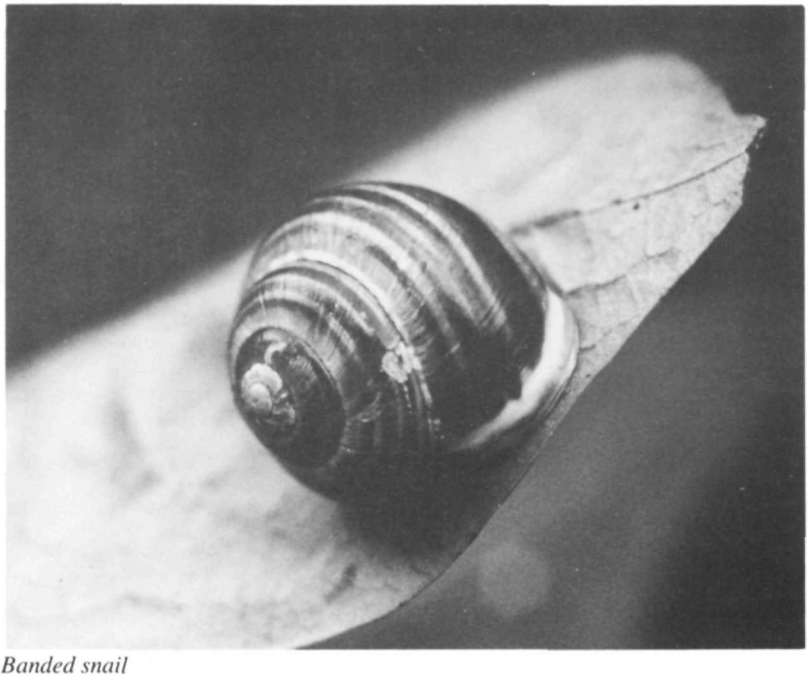
The common mammals of southern Quebec are well represented in Forillon, especially those from the boreal area. These animals, which returned here with the vegetation when the glaciers receded, include moose, black bear, red fox, lynx, bobcat, mink, snowshoe hare, red squirrel, eastern chipmunk, groundhog, beaver, muskrat and small rodents, moles and shrews. A few recolonizers, such as wolverine and caribou, have again disappeared from the Forillon area. Except for an isolated herd on the mountaintops in Gaspésie Provincial Park in the middle of the Gaspé peninsula, caribou have been gone for a century.

Others, like the white-tailed deer, followed the European settlers of the last few centuries as they cleared the new lands of America. Deer can not survive easily in most fully grown forests because of the lack of available food in winter. Forillon has many open fields and young forests with bushy underbrush, which provide a perfect food supply for deer, and the different types of mature forests offer the necessary winter shelter where deer congregate in "yards." There are around sixty white-tailed deer in Forillon. Their number should not decline radically in the next decade if the varied and favourable forest conditions remain the same.

Our largest land mammal, the moose, is well adapted to the boreal forest. It came here before the deer and will certainly remain here longer. It feeds on the fresh growth of fir and spruce in winter, and takes advantage of the many scrub trees such as mountain maple or red-osier dogwood that grow in the underbrush and in the disused fields. Although moose and deer take shelter in the forest, they can often be seen in the fields of Forillon, especially in the Anse-au-Griffon valley and the Cap-des-Rosiers plain, mostly in the small hours of the morning and at dusk.

Certain species of mammals, although quite common in neighbouring parts of the continent, have not yet settled here. There are no raccoons, though they are abundant south and west of the Gaspé, and no wolves, a boreal species very common west and north of here. Two species of weasel and several bats are also absent.

Only in the last few years have coyotes expanded their population as far as Forillon, where they can now be observed. They prey mainly on small rodents, hares and birds nesting on the ground; however, there is no need to fear that these late comers will upset the ecological balance. They will take their place in the animal community, controlled by the same natural laws that govern predators which came before them. Coyotes can be seen



Banded snail

along roadsides, especially near the large abandoned fields in the Anse-au-Griffon valley, the Cap-des-Rosiers plain and the south shore of the park along the Bay of Gaspé.

That great carnivore, the black bear, need not be unduly feared either. We know that in spring it sometimes attacks deer for food, but with the growth of new vegetation its diet becomes mainly buds, then various fruits such as strawberries, which abound in the former agricultural areas of Forillon. There is no dump in the park, and garbage is collected daily, so that bears, who also eat carrion, have not picked up the undesirable habit of foraging in garbage cans on picnic and camping grounds — a real problem (especially for public safety) in other parks. You should never amuse yourself by feeding roving bears. They easily get used to eating prepared food and can create havoc trying to get at it, not to mention the danger that they can cause to human lives. If you see a bear in Forillon, count yourself lucky and do not do anything except observe. It will usually leave fairly quickly as soon as it notices your presence.

Although campers are sometimes visited by hares, squirrels and chipmunks, most other species of small mammals, including several species of voles, shrews and mice, are little known and seldom seen.

Trails in the winter snow reveal the activity of non-hibernating mammals whose presence is less obvious in summer. You can come across trails of lynx, hares, foxes, mice and shrews almost everywhere.

The absence of biting insects is always of great interest to campers and vacationers. In fact, in Forillon there are almost no black flies or mosquitoes in the areas along the sea. Mosquitoes need bodies of stagnant water in which to lay their eggs and develop, and these are limited in number. Black flies need stream or river rapids for the same purpose, and there are few in the Presqu'île of Forillon. What streams there are lose most of their water in July because of the steep terrain, and this phenomenon, in addition to the winds that sweep the fields, also helps keep the Presqu'île and the edge of the Cap-des-Rosiers plain relatively free of annoying insects. Obviously farther inland, in areas sheltered from the wind by forest or terrain, there are enough insects to satisfy anyone.

Land Invertebrates

Animals without backbones make up the largest part of the animal kingdom. Groups and species on land are both varied and abundant, but because of their normal small size and lack of direct relationships with our species, most of these animals are interesting only to specialists. Some, however, are exceptions to the general rule and we will deal with them briefly.

The most important insect in Forillon is unquestionably the spruce budworm, which has been reappearing in cycles for centuries. It multiplies for a few years, then the epidemic is reabsorbed naturally, after causing damage that varies according to areas and years. The damage is caused by the larvae of small moths, which are so numerous and so voracious that they can devour all the new growth of white spruce or fir. If they infest the same tree for more than six years, it weakens and dies. At the beginning of the 1980s, large areas of the park, especially on the bay side, were covered by forests of conifers that for the most part were technically dead. This is not an ecological disaster; on the contrary, it is an example of the natural dynamics of forest renewal. The dead trees will fall one by one, or several at a time during wind or hail storms. Light will then reach the ground and promote new growth fairly quickly. In this way there is a succession of forests. Parks Canada has a policy of non-intervention in the matter; spraying is confined to developed areas for aesthetic reasons and, indirectly, for safety.

For those who are curious about the unusual, land invertebrates of Forillon also include tiny scarlet red acarids on the pebble beaches, and large brown or black orange-bordered slugs sometimes over 5 cm long. Acarids are easy to find in sunny weather; slugs usually come out in the evening when there is dew or rain.

Reptiles and Amphibians

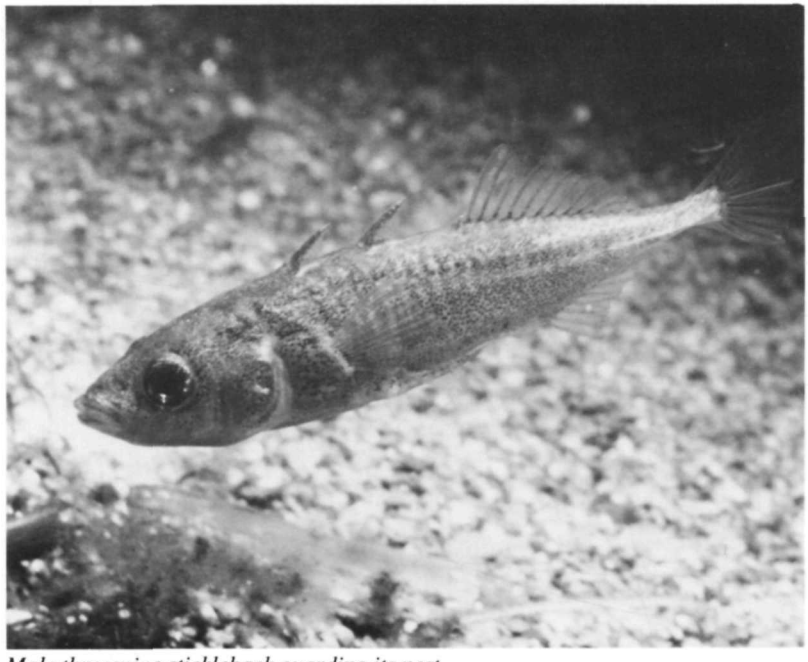
Since their body temperature is similar to that of their surroundings, these vertebrates are inactive for much of the year. We still do not understand

Eastern newt, called red eft during its first years

exactly why some of these species came as far as this end of the Gaspé, though the warmer period of five to seven thousand years ago certainly must have helped. We also know little of why other species did not come. There are no turtles in the Gaspé and only one species of snake, whereas New Brunswick, Nova Scotia and southern Quebec have many species of these reptiles.

There are not many garter snakes in Forillon, but you can find them almost anywhere in open areas such as fields, roads, rock piles facing south or at the edges of bodies of water. Contrary to the literature, this snake also lives at altitudes of over 115 m: the author found a specimen in the Lac-au-Renard area at an altitude of 380 m. A specimen 104.4 cm long, captured by the author in 1971, may be a Canadian record, and would seem to substantiate the ecological principle that individuals of a species are larger and stronger at the edge of their geographical range.

Amphibians also are rarely seen. Most frogs and salamanders move around only to reproduce in spring, then look for a more adequate living area. These migrations usually take place on rainy evenings. The red-backed salamander, the most secretive but perhaps the most abundant species, hides in deciduous forests under leaves or decomposing fallen tree trunks. Unlike most amphibians, it does not lay its eggs in the water. The spotted salamander and red-spotted newt have been found at Lac-au-Renard. The best time to see them is in early June, when they perform their nuptial dances in shallow water.



Male threespine stickleback guarding its nest

At spring thaw or shortly after, mink frogs, wood frogs, American toads and spring peepers migrate to lakes, ponds and flooded ditches, the males uttering their characteristic mating cry to attract females. These nocturnal concerts go on from mid-May to the end of June, every evening when the temperature remains above freezing. The green frog and the leopard frog begin their mating activities a bit later than the others. The reproduction period also varies according to the altitude of the body of water. A June evening spent with a good guide observing and listening to woodcocks followed by an exploration of the amphibian world in full activity can be a surprising and fascinating experience for anyone interested. This nighttime world is within everyone's reach, yet it is almost completely ignored by most people and unfortunately remains unappreciated.

Freshwater Fishes

Since rivers, streams, ponds and lakes are so closely linked to the land of Forillon, we dealt with them in the section on THE LAND. We will now deal with the fish in these waters.

The only true freshwater fish in Forillon is the speckled trout. It is found in all the year-round waterways in the park, from sea level to the highest peaks. The average size of trout throughout the park is rarely more than 15.6 cm, though larger specimens have been caught in some lakes. As we mentioned in the section on lake habitats, acid rain cuts down productivity here as well, even though there are limestone rocks in many areas. In

spring the melting of the acid snow can cause extensive mortality in certain lakes where the pH level (acidity) is close to the critical dose that this species can tolerate.

Threespine and ninespine sticklebacks live in the Cap-des-Rosiers pond. In June young eels 15 cm long can also make their way here when the water in the outlet flows sufficiently strongly to allow migration from sea to pond.

Long before fishing harbours were developed at the mouth of the Anse-au-Griffon and Cap-des-Rosiers rivers, salmon used to swim upstream. However, for many years now these small rivers have seemed inadequate for this species, which apparently ignores them.

In May smelt may come up the Anse-au-Griffon River, and maybe also the Petit-Gaspé Creek, searching for fresh water that runs over a sand or gravel bed, a spawning requirement for this species. The eggs are sticky and thus easy to locate; when they hatch, the young fry are carried out to sea, where the adults have already returned.

The drift-ice ponds found here and there on the edge of the Penouille salt marsh become brackish during the summer. During the high spring tides mummichog, threespine and ninespine sticklebacks may leave the marsh waters and restrict themselves to these ponds. These tiny fish reproduce intensively, so that in July and August the landlocked puddles teem with life. During the high tides of autumn, all the fish that have not been gobbled up by herons can leave these ponds for the marsh and the bay.

Thus we see that certain animals take advantage of both land and sea. Most inhabitants of the sea, however, never leave their habitat. We will now explore this fascinating environment that lies on either side of Forillon.

THE SEA

The sea washes Forillon's periphery. Even on the south shore, the size of the Bay of Gaspé opening on the gulf is large enough to maintain a sense of the park's marine character. Whether you are on the mountaintops of the Forillon ridge or on the beach at the edge of the Cap-des-Rosiers plain, your eye tends to drift out over a sea that stretches to infinity.

THE SEA, AN INTEGRAL PART OF THE PICTURE

Of course, the sea marks the boundary of the land, but it also defines it, giving the terrain a distinct, concrete outline. There is a kind of grandeur in the dramatic contrast between the seemingly limitless horizontal expanse of sea and the sharp vertical planes of the cliffs along its edge. These contrasts are always pleasing to the eye, even if one is not an artist.

The ever-present sea reflects perfectly the mood of each day. When it is calm, its nearly magical stillness gives an impression of peace and serenity. The surface of the water mirrors the sky; time seems suspended. When the sea is stormy, the powerful spectacle transmits a feeling of unleashed forces. One never tires of watching the rhythm of the unfolding, surging waves. Every now and then, without warning, a bigger, more shattering wave comes along, surprising the onlooker. The days and nights of heavy weather never fail to create excitement, not to mention fears for the coastal highway (will it hold?) and the safety of the boats in harbours.

Under normal conditions the steady rhythm of the waves is a reminder of the fluidity of water and its primal force. The waves also indicate the direction of the wind at any time — coming in from the open sea, turning, blowing against the waves and smoothing them down.

The sea changes every day, as well as with the seasons. As the sea water becomes colder in the fall, it takes on an astonishing transparency

Tide pool at Petit Gaspé 63

which remains all winter. At high tide the natural blue of the water can be clearly seen on top of the sheet of ice that forms at low tide along the coast. In January, February and March huge expanses of broken ice floes from the St. Lawrence River move slowly back and forth with the tide and the winds. The winds often create small (though sometimes very large) open stretches of water where hundreds of seabirds gather. Rivers in spring flood on both the gulf and the bay sides turn coastal waters brown — eloquent testimony to how the ocean recovers continental sediment.

A TRULY MARITIME ENVIRONMENT

The word *sea* is sometimes used in a literary sense simply to designate a large body of water. Lac Saint-Jean, where you can hardly see the opposite shore, is like an inland sea. At some places down the St. Lawrence River from Rivière-du-Loup, where the water is brackish and the river is impressively wide, people use the expression "on the sea." Although a catchy phrase for tourists, here one is actually on the St. Lawrence estuary.

The waters around Forillon are physically and chemically sea water. Forillon is right in the Gulf of St. Lawrence, which is a true coastal sea at the edge of the Atlantic stretching 358 km from Cap Gaspé to Newfoundland. The Magdalen Islands are 227 km away, the same distance as the North Shore around Natashquan — if you measure as the crow flies — over Anticosti Island. Even this large island is hidden behind the horizon because of the earth's curvature and you must climb to the top of a mountain such as Mont Saint-Alban to see its outline 64 km away. The Gulf is a vast expanse of seascape.

The water itself is definitely salty — 28 parts per thousand of salt in summer and 31 parts per thousand in winter. In fact, even though it receives a considerable amount of fresh water from the St. Lawrence system, at the northeast and southeast the Gulf of St. Lawrence is linked directly with the Atlantic and is a true sea basin. Salt water coming from the Atlantic compensates in a way for the large quantity of fresh water brought down by the river.

A very cold current (around 3°C in summer) from the Arctic, the Labrador Current, enters the Gulf through the strait of Belle Isle. It follows the north shore of the Gulf and goes upriver to above the mouth of the Saguenay, where it changes course to the south. It is caught in the river current and the two join to form the Gaspé Current. This current goes along the Gaspé peninsula, crosses the Gulf of St. Lawrence to the southeast and goes out through Cabot Strait between Newfoundland and Cape Breton Island. (See figure 5.) Since this outflow is on the surface, it produces a countercurrent farther down near the sea floor, but that current

is much slower and stays inside the Laurentian channel.

Near the park, the Gaspé current enters the Bay of Gaspé, where it mingles with the local waters. On calm days you can see the course of these currents from either side of Forillon as they pass along the coast, changing with the tides.

We now understand why the sea water at Forillon is warmer than along the north shore of the St. Lawrence River. The surface temperature here is around 12°C to 14°C in summer, whereas around the Mingan Islands it is only 3°C to 4°C because of the upwellings of the arctic current. At Penouille, deep inside the Bay of Gaspé, the water temperature is directly influenced by a large expanse of shallow water which extends from the mouth of the Dartmouth River as far as Penouille beach, where the water at low tide can go as high as 20°C. The tide is significant: when it is rising it brings colder and sometimes saltier water.

The tide changes four times a day: high, low, high, low. The rising tide produces a countercurrent to the Gaspé current, which becomes weaker. As the tide goes out the two currents superimpose on one another; they can flow as fast as three knots during spring tide. At Forillon these currents are especially important on the north shore, though they also appear along the south shore of the peninsula.

Tidal rhythms, caused by the changing position of the earth relative to the sun and moon, are a complex worldwide phenomenon, with local and regional peculiarities. How far and how high the water will rise in a given area depends on various topographic factors such as the slope of the seabed, the depth of a channel or the width of a bay mouth. For example, the St. Lawrence is somewhat funnel-shaped between Quebec City and Forillon, and this helps to produce much higher tides at Quebec than along the Gaspé.

Tides around the park are relatively small: the average maximum is about a metre and on some days they are barely noticeable along the shore. The reason is simple: if the coast is steep, particularly at the base of cliffs, the tidal zone is quite narrow and barely visible. As the tide goes out on pebble beaches, it is easier to see the high-water mark by the line of pebbles and seaweed left on the shore.

Waves are produced by the action of the wind on the surface of the water. Three factors determine wave formation: wind speed, duration and fetch — the distance the wave travels over open water. The most imposing waves at Forillon (and also the most important, because of their effect on the coastline) come from the east and southeast, because of the fetch possibilities from these directions. In fact, none of the winds from the west or the northwest, however strong, is able to stir up high waves from the end of the Bay of Gaspé or from the edge of Cap-des-Rosiers cove to act with great force on the coast of Forillon. Waves created by east and

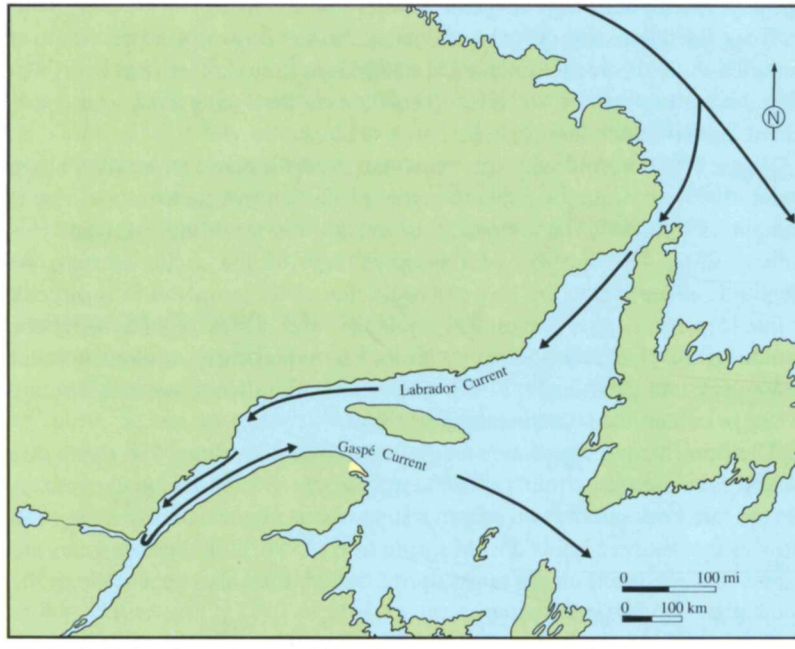


Figure 5 Labrador current and Gaspé current

Sea anemones and sponges, animals in spite of their appearance

southeast winds, however, are able to build up over great distances before breaking on the shore here.

These last-mentioned waves, though infrequent, play a major role in the erosion of the park coastline and the accumulation and reshuffling of beach materials. It is just such waves from the southeast that fashion the pebble beach at Petit-Gaspé from the limestone rocks along the Grande-Grève coast. This transport of rocks lessens as it proceeds towards Petit-Gaspé cape where the beach consists mostly of sand. The same waves carry sand along the bay shore, and it accumulates on the beach at Cap-aux-Os and especially along the southeast beach at Penouille. On the other side of the park these southeast waves shift rockfalls from the cliffs of Cap-des-Rosiers cove towards the harbour, thus adding more material to the long pebble beaches.

MARINE HABITATS OF FORILLON

All the world's oceans can either be considered as one single habitat or the colder oceans can be treated as one and tropical oceans as another. In a given area, the Gulf of St. Lawrence, for example, we can also consider the marine environment as composed of distinct, living habitats. Thus we are going to arbitrarily distinguish between different habitats of the sea around Forillon. Let it be recalled that the park's boundaries extend 150 m into the sea, thus including a sea zone of 4.4 km^2.

At first glance we may think of the sea as a fairly homogeneous environment where all animals are free to go where they like, but this is an illusion. There are actually several types of habitats in the sea, each offering a different range of living conditions. The sea contains a variety of frontiers or borders — physical, chemical or a combination of the two. Sometimes these borders are clear-cut, sometimes quite indistinct. For example, a sea floor exposed to waves offers living conditions quite different from one that is sheltered, even though they are exactly the same in substance. Fresh water from a stream may lower the salt content in a specific area, which will be a determining factor in the survival of certain species. Later in this section we will deal briefly with the main marine habitats of Forillon.

First, though, it might be in order to describe the various sections or contours of the seabed as it extends from the shore at Forillon. Going out from Penouille beach, the sea bottom slopes very gently: 150 m out the depth is 1.5 m. At Petit-Gaspé beach the slope is gentle (6.0 m deep at 150 m from shore), the profile of the seabed being much steeper and going out in tiers at the Petit-Gaspé cape. From the beaches on the edge of the Cap-des-Rosiers plain, the slope is very gentle, the plain on land continuing out under the water for over a kilometre, where the depth is only 10 m. At Grande-Grève, on the left side of the dock, the bottom slopes gently for

about 60 m to a depth of 8 m, then drops abruptly to 25 m where it resumes a gentle slope, so that 150 m from shore the depth is 30 m. At Anse-aux-Sauvages, as at Grande-Grève, the bottom drops to 8 m at the end of the dock, but then continues more gently out to sea, reaching a depth of 15 m at a distance of 150 m. As we see, the slope of the seabed varies around the park. Just as varied is the nature of the seabed.

There are many ways of classifying sea habitats, depending on the type of study made and the extent of the area covered. Since ours is essentially a coastal area, we will use the type of sea bottom as a basis for comparison.

Rock Bottoms. These are partly the undersea walls of the limestone cliffs and partly outcroppings of bedrock such as the strata that form the south shore of the Presqu'île and continue out into the water. The shoals off the two points of land southeast of Cap-des-Rosiers harbour, where the waves break before reaching shore, are also bedrock outcrop that resist erosion. This type of seabed offers a solid, immovable substratum for plants and animals, though sometimes it is devoid of both. Often when the rocks have no vegetation and are exposed to the waves and currents, you can see on them great numbers of a given animal species; however, when the rocks are densely covered with vegetation they provide abundant shelter for various kinds of fauna.

Rocky Bottoms. Very similar to the above, these bottoms are formed from rocks of varying sizes where a host of animals and plants can live. When these rocks are stripped of vegetation, they still offer a good deal of shelter along their sides and beneath them. By far the largest number and greatest variety of marine animal life at Forillon lives on this type of bottom. Fine examples can be found off the Petit-Gaspé beach (to the left of the bridge) and off the beach at Grande-Grève.

Sandy Bottoms. These bottoms often look like an undersea desert, for unless there are a few rocks on them, plants and animals have nothing to attach themselves to. Nevertheless, quite a variety of animals are able to live here, often hidden or camouflaged. It is easy to imagine the Penouille marine area having a sandy bottom, but this type of substratum is more widespread than one might think. The entire sea around the Anse-aux-Sauvages dock covers a sandy bottom, as does the Cap-des-Rosiers cove stretching out from the shale and limestone cliffs.

Muddy Bottoms. Of necessity this type of seabed is found only in very sheltered areas, particularly the one extending from the foot of the steep slope off Grande-Grève, which is actually a mixture of mud and sand. The light here is fairly dim, partly because of the water's depth and also because of the abundance of plankton that live in the various layers in summer. Here, fauna may be living on or in the mud or totally covered by it. Forms of life are fairly varied, but more thinly scattered than in shal-

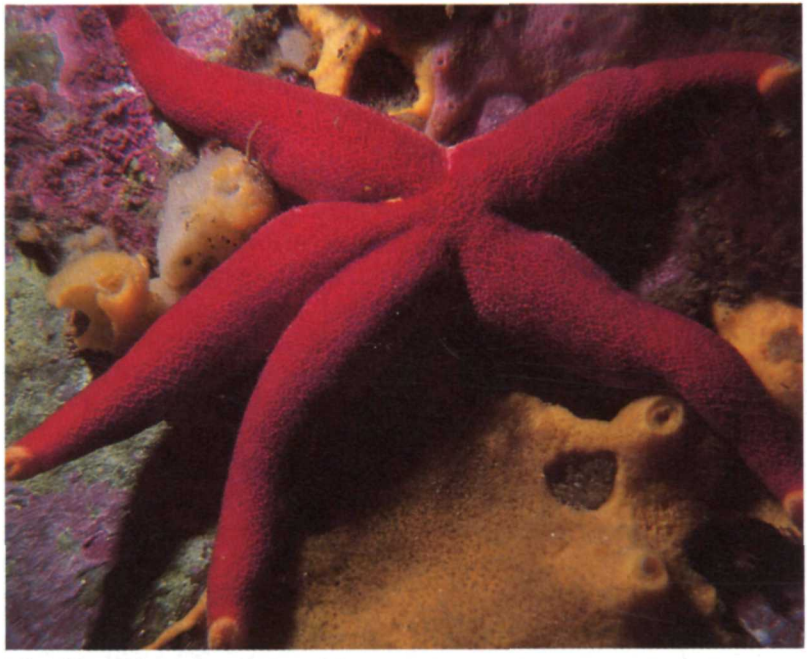
lower water, on a different substratum. The temperature rarely goes above 5°C. The Penouille salt marsh also has a muddy bottom, but otherwise its conditions are quite different: shallow water, lots of light, extremes of heat in summer and cold in winter, less oxygen in the water and great variations in salinity.

This review of marine habitats would be incomplete if we were to omit the one having no bottom, properly speaking — the open sea. This habitat is of course the largest, with varying conditions of light, temperature, currents and salinity. It has no shelter as such. Animals living there are extremely varied, from tiny forms of plankton to enormous fish and whales. Some species (called pelagic) drift around; others are great swimmers. Unlike other habitats, the open sea has a nomadic population which visits the park shores sporadically or regularly, depending on the species.

There is also a particular area of the sea that takes in most types of habitat described above, and which is found world-wide: the **intertidal zone** along the coast — the area between low and high tides. This habitat is always fascinating for those interested in natural phenomena. It is normally quite accessible and presents a wealth of detail: patterns of erosion, assortments of beach materials, stranded objects, and varied forms of life (sometimes quite abundant), behaviour tactics, adaptations, competition, signs of natural selection. This sea border, where many surprises await us, is often the ideal place for initiation into the amazing riches of the ocean world. Animals in this zone vary from one sea to another and from one area to another, inviting comparisons with other coasts already visited. It sometimes seems that only children or specialists and naturalists enjoy exploring intertidal waters, and this is unfortunate. Curiosity about the natural world should be a lifelong source of joy and fascination, and the intertidal zone can be particularly rewarding in this regard.

This dynamic environment is also a very demanding one for its inhabitants. The laws for organisms unable to adapt are merciless: many plants and animals die here. Yet it is also an area of high productivity. Just what are the living conditions in this particular habitat?

Animals who live here successfully have to be accustomed to extreme changes. They must be able to withstand the impact and the force of the waves, or be able to get away from them in time. When the tide goes out for six hours twice a day, they must be able to survive without benefit of water. This means being resistant to drying out and withstanding high or low temperatures, depending on the season. When it rains they must be able to adapt to a fresh water dousing or even immersion. In this habitat natural law, more swiftly and categorically than in others, requires that animals be adapted or readily adaptable, or be able to migrate at will when conditions do not suit them. Otherwise death will shortly consign their



Blood Star (Henricia), *predator of sponges*

remains to the many predators and carrion eaters that patrol this habitat at both high and low tides. Nature is generous and knows how to recycle: in her own way she teaches us not to waste.

The intertidal zone around the park is not extensive because of the small tides and the sloping shore; furthermore, the many pebble beaches, where living fixed to the bottom is impossible, restrict the densely inhabited intertidal zone to the limestone cliffs and small strands of bedrock. The Petit-Gaspé cape is the best spot to explore this type of habitat at Forillon.

A WEALTH OF UNSUSPECTED LIFE

It is hard for us to visualize the richness of marine life. Fortunately, more information has been made available recently, and the public is better informed on the abundance of life forms in the oceans. Although most films, books and articles deal with warm oceans, people are generally ready to believe that cold oceans also contain a great variety of animals. Faced with reality, however, one can only marvel at the extent of the variety. Many hundreds of species currently live in the waters around Forillon. Such an abundance boggles the imagination.

Surprising also is their relative abundance here. Some species comprise billions of individuals; some come in groups that represent millions of tons of animal life. Other species are so rare that we only know of them

through a single specimen discovered in the last hundred years.

As if nature were still not satisfied with these extravagances of diversity and productivity, marine life in these waters presents a whole range of the most unexpected adaptations and behaviour. Some species swim actively from birth to death. Others swim for a while, then cement their head to a rock, surround themselves with a wall of limestone and spend the rest of their days head down, bringing food to their mouths with their feet. Some animals that seem utterly tranquil succeed in digging into rock, where they hide in their excavations. Other species are born as males and change into females as they grow older, thus fulfilling both reproductive roles during their lifetimes. Among this array of bizarre behaviour are primitive animals that can eat prey which has paralyzing cells in its body, devouring it without activating the very sensitive cells, then cleverly storing them in strategic spots in their own bodies for use against their enemies.

Marine fauna here live secret lives, full of surprises of all kinds, even for researchers, and our knowledge of them is far from complete. Although they are not easily accessible, they do excite our curiosity.

As early as 1858 naturalists were dragging the bottom of the Bay of Gaspé and the surrounding waters to find out what was living there. After gathering specimens, and sorting and identifying them for many years, one of these pioneers, J. F. Whiteaves, in 1901 produced a general catalogue of sea invertebrates native to eastern Canada. This work documents 774 species and remains today an indispensable source of information on benthic, or deep-sea, fauna in the Gulf of St. Lawrence. Research by Dawson, Bell and Whiteaves in the nineteenth century was continued by Corbeil, Préfontaine, Bousfield and Brunel in the twentieth century. Specimens were gathered by various methods of dredging, by examining fish and the contents of their stomachs. Most of these studies, oriented towards the fishing industry, were done for the Saint-Laurent biological station at Trois-Pistoles (Laval University), later replaced by the Grande-Rivière marine biology station.

In spite of the enormous amount of work of all kinds, particularly inventories and studies regarding factors influencing the number and whereabouts of fish and invertebrates in the St. Lawrence River and Gulf, we still know very little of the biology and ecology of most species. Several groups are hard to identify because of similarity of species and because very few publications give a precise identification of these little-known animals. There is still much to to done.

The relatively recent method of collecting specimens by scuba diving is enabling us to discover species that were inaccessible by earlier sampling methods, which were limited to unconsolidated seabeds. Diving allows us direct observation, from which we can discover previously unknown behaviour and ecological relationships. Thus each year at Forillon we are

adding new species to the hundreds already known to us.

Beyond the problems of identifying fauna in the Gulf, studies to date have been largely concerned with determining differences in the biomass of animal populations and with deep-sea animal production. They were naturally aimed at actual or potential commercially important species. Specific studies were done on cod, herring, capelin, mackerel, plaice, halibut, scallops and lobsters, including the species they fed on. In 1948 oysters were introduced (unsuccessfully) in the Bay of Gaspé, and in 1960 arctic spider-crabs (sold now under the name of "snow crab") were first fished commercially. But many studies, even of edible species, remain incomplete. We know little and sometimes nothing of the reproductive rhythms of these species, their growth rate or their seasonal feeding habits in our local waters. Data collected on the North Shore do not necessarily apply to Forillon, even if the species are the same. A national park, according to its mandate, must not discriminate in its interest among species, unless there are specific conditions or activities that are important for certain species in its territory. Basically this mandate encourages interest in everything concerning the advancement of knowledge of its marine flora and fauna.

As we can see, one of Forillon's main natural features is the presence of typical seacoast communities. Moreover, because of its vast range of seabeds, sea depths, salinity and exposure to waves and currents, it also possesses animal and vegetable communities that are representative of the Gulf of St. Lawrence as a whole.

THE WORLD OF MARINE INVERTEBRATES

Although they exist in vast homogeneous expanses, underwater seascapes can only be observed at short distances. In summer a diver has an average visibility of six or seven metres around him, though this can triple in October. This does not detract from the beauty of the underwater world, which is much better seen close up. Rocky bottoms are especially amazing: there is life everywhere.

The rocks are largely covered with a layer of pink crust produced by a type of microscopic algae, some species of which produce a smooth surface crust, others a rough one. This pink background is the first surprise. Then, masses of yellow or green sponges grow encrusted on certain rock slabs. These bright colours are complemented by white, orange and brown-and-white marbled anemones — primitive animals whose name suggests a flower rather than an animal. Green sea urchins are also plentiful on these rocky bottoms. They either gather on the sides of blocks or they live on broad rocky surfaces, sometimes as many as twenty-five per square metre. At certain times sea urchins are known to be insatiable eaters; during these periods they completely destroy great expanses of

giant brown *Laminaria*, a genus of seaweed commonly referred to as kelp. We often see this kelp washed up on shore after storms, but it forms veritable undersea prairies along rocky coasts under the tidal zone for some five to seven metres, depending on the transparency of the water. These large kelp beds, which also include other species of seaweed, most of them less conspicuous, shelter a host of crabs, mussels and sea stars. In rock hollows and also in the cavities of certain animals themselves, such as sponges, live a host of vari-shaped tiny creatures, such as bristle worms, brittle stars, shrimps and crabs. Sculpins, flounders and ocean pouts live in these depths, while schools of mackerel, herring and sandlances pass over them.

The reader may find fault with this book — and perhaps justly so — for not giving a more precise description of the species mentioned. Biology students and those interested in becoming better acquainted with Quebec wildlife may have preferred that the species be identified with their Latin as well as their common English names. There are several reasons for not being more precise. This book is intended as a general overview of Forillon, though the sea here has so many riches that an entire book could be written about this one aspect of the park. Also, it is addressed to the general public, and scientific names can easily put people off. Furthermore, scientific terms refer to particular species, so that it would be impossible to use them without going into a great deal more description, and making the text even heavier.

Here is one example. We said above that a host of sea stars live in kelp beds. We could identify these as mostly boreal asteria (*Asterias vulgaris*), members of the genus *Henricia* (whose species on the Atlantic coast are still not well defined) and some specimens of polar sea stars (*Leptasterias polaris*). Other species of sea stars live farther down in the depths, such as mud-stars (*Ctenodiscus crispatus*), sun-stars (*Crossaster papposus* and *Solaster endeca*) and sea stars called *Pteraster militaris*, *Leptasterias groenlandica*, *Hippasteria phrygiama* and other undefined *Henricia*. These names may pique the curiosity of those with a naturalist bent who want to see what new forms they refer to (the descriptions of most of them date from the eighteenth and nineteenth centuries), but most readers may feel trapped in such terms, unable to appreciate either the meaning or the implications.

Popular information about the sea is becoming more available, and a growing number of people are taking a great interest in it. Not satisfied with simply knowing that the sea around us contains a host of very different and often strangely shaped animals, they want to learn more about it first hand. The photographs in this book were taken by the author in the waters around Forillon; we hope they have succeeded in showing some of the riches of this undersea world, which deserves to be seen to better

Sea stars feeding on remains of a sea urchin

Rock crabs will remain coupled for several days

Northern lobster, its mighty claws a good defence

Shorthorn sculpin camouflaged by colour change

advantage than as simply a beautiful expanse of water teeming with life. In fact, the more we know about the sea, the more we are filled with wonder.

Now, let us look briefly at what is implied, in terms of numbers of species, by the variety of primitive life forms living under the waters around Forillon Park. We have not included fish, which will be discussed in a separate section, nor any of the dozen groups of invertebrates making up several species but which drift around, such as jellyfish, hydromedusae, ctenophores (or comb jellies), tunicates and other forms of plankton.

To date there have been found in the immediate area of Forillon 5 species of sponges, 13 species of hydroids, 7 species of anemones, 2 species of brachiopods, 114 species of mollusks [including 8 chitons, 48 gastropods (spiral-shelled mollusks), 3 nudibranches (mollusks without a shell), 55 bivalves (two-shelled mollusks) and 3 cephalopods (squid and octopus)], 82 species of polychaetes (marine bristle worms), 235 species of crustaceans [including one species of lobster, 4 crabs, 3 hermit crabs and 17 shrimps, the other species belonging to the little-known orders of tiny crustaceans, especially amphipods (160 species), but also copepods (13 species), cirripeds (such as barnacles: 6 species), opossum shrimps (8 species), cumaceans (9 species), ostracods (5 species), isopods (5 species) and euphausiid shrimps (4 species)], 7 species of pycnogonids or sea spiders, 26 species of echinoderms [including 7 holothurians or sea cucumbers, 9 asteroids or sea stars, 3 echinoids or sea urchins, and 7 ophiuroids or brittle-stars with long slender flexible arms], a species of hemichordate (*Stereobalanus canadensis*, of interest to science because it may show a link between vertebrates and invertebrates) and 6 species of urochordates (ascidians such as sea peaches).

This far from complete list of some five hundred marine invertebrate species demonstrates more than just variety; it reflects the presence at Forillon of typical representatives of the evolution of animal life on our planet. If you refer to the table of geologic time periods on page 17, you will find the order in which some of these main groups appeared. It is apparent, for example, that even before the Rocky Mountains rose up seventy million years ago, mollusks, brachiopods, crustaceans, sea stars and sea urchins were already crawling around Forillon's seabed.

SALT WATER FISH

A popular notion has it that we know more about fish than any other sea animals. But, in fact, most people's knowledge about fish can often be summed up in a few names and a vague idea of what they look like. We may know the names of cod, herring and halibut, but we might not be able to tell them apart from haddock, shad or plaice. Likewise, nearly everyone can recognize a shark, but very few are able to immediately distinguish the different shark species living in Gulf of St. Lawrence waters.

Ocean pout, often hidden in its burrow

More than a hundred species of fish live in these waters. If the reader made a list of all the Quebec salt water fish he knows, he would quickly realize that a hundred is a considerable number. Even after thirty years of commercial fishing, very few fishermen know more than half of the species, since methods of catching fish are fairly selective. Also, some species are not very productive and several never grow longer than 25 cm. Although they are important, and sometimes exhibit fantastic shapes, these species are nearly unknown.

Among the small species in Forillon waters, capelin and sandlance are the most numerous. The capelin is well known to Gaspé and North-Shore people for its habit of "rolling" onto beaches at the end of May or the beginning of June. It is quite a spectacle to see millions of these tiny silvery fish crowding in to spawn in the waves breaking on the sand and fine pebble beaches. For us as spectators it is tangible proof of the wealth of the sea. And the truth is even more surprising: only 10 percent of the capelin population spawn before our eyes; the others reproduce down to depths of 30 m.

Sandlances also reproduce in the sand, but not on the beaches. Swimmers at Penouille and scuba divers who explore sand or gravel bottoms sometimes encounter these slender fish which live completely buried in the sand. At the slightest vibration of the bottom, caused by the touch of

a hand or foot, they dart out of their hiding place like lances, thus earning their name. In August the young sandlances swim along the coasts in dense schools, attracting cormorants, guillemots and gulls, and also schools of mackerel.

Mackerel are part of the tuna family. These indefatigable, non-stop swimmers gather in schools of thousands, sometimes millions, and swim along the park coasts, travelling noisily at the water's surface and creating a startling, even explosive marine spectacle.

If you fish with bait off the end of the dock at Grande-Grève or at Anse-aux-Sauvages, you may catch cunners, a fish that was commercially fished before 1920 for the quality of its flesh, and yellow-tailed flounder, a species allied to Canadian plaice and sold on the market under the inappropriate name of sole. Sculpins also live on the seabed here; their shape and colours are excellent examples of environmental adaptation.

Even if we acknowledge that it is impossible to review the many other species of interesting fish in such a general book as this one, we can not leave the subject without a few words on the cod. The cod fishing industry contributed much to the initial discovery and development of our country, and it still plays a major role in the Gaspésian economy (as we will see in the chapter on human history). This fish is the most important species in the world because of the amount of food it provides to humans. Fortunately it is also the most prolific species of fish. Its egg production is such that, according to calculations, if all the eggs laid by all female cod in one year developed into adults without any intervention from predators or other causes of death, enough cod would be produced to cover the bottom of every ocean in the world to a depth of 60 cm. The fecundity of this fish is only equaled by its voracity. Naturally it feeds largely on herring, capelin and various crustaceans and other small prey, but a study of the stomach contents of the cod has revealed that it swallows just about anything. Off Cap-des-Rosiers cod eat mainly brittle-stars, indicating that they prefer to seek their food near the seabed. They swim at depths of from 20 to 500 m.

SEABIRDS

Although the section THE LAND has already dealt with the seabirds that nest against the Forillon cliffs, a few additional words about this animal group fit into this section, for several species of seabirds that visit Forillon never set foot on land. They fly over, or in most cases, gather on the sea and feed from the waters around the park. This is the case with hundreds of scoters, or sea ducks — common, surf and white-winged scoters — and oldsquaws, who stop for a while during the spring and fall migrations. There are times in February and March when up to 30 000 oldsquaws gather on the ice-free waters off the coast and at the mouth of the Bay of

Oldsquaws

Gaspé. In March, when their quacking mingles with the cries of thousands of kittiwakes which have come to nest, you can sense spring in the air, even though the setting is still a wintry white. Flocks of eider ducks, red-breasted mergansers and golden-eyes join them, and the males' mating dances and intimidation rituals enliven the almost constant feeding activity.

In May and June, with the arrival of schools of capelin and herring, gannets from the colonies on Bonaventure Island can be seen diving close to the park beaches. Unlike other seabirds which dive from the surface of the water, gannets perform like veritable dive bombers. They plummet down from the air at speeds of up to 90 km/h and splash conspicuously into the water to snatch their prey.

We have used the word seabird in a rather broad and popular sense to designate birds that are often (but not always) seen in a marine context. It is interesting to note that some species deserve the name more than others, in that they are true ocean birds. Gannets, black-legged kittiwakes, razor-bills and black guillemots live year long on the sea far from coasts, coming to land only in spring and summer to nest. Others, such as cormorants and ducks (like oldsquaw, scoters), though at Forillon they behave like typical seabirds, nest much farther north on the shores of inland lakes and rivers, or on islands. We know that gulls do not restrict themselves to

Band of gray seals

the sea: they sometimes feed in fields at ploughing time, and many live "in town," far inland. Nonetheless, for most of the year all these species are everpresent and frenetically active along the seacoasts, adding sound, motion and spectacle to Forillon's marine mosaic.

MARINE MAMMALS

For some time this animal group has attracted great public interest. Seals and whales have made us more conscious of the need to respect life for its own sake, beyond traditional economic considerations. Today people are willing to travel, sometimes at great expense, to observe whales in their natural habitat, a thing undreamt of fifteen years ago, at least on this side of the continent.

Seals are also part of the wildlife protected at Forillon, and can be easily seen. From April to December they inhabit the park's coastal waters in numbers from 60 to 120, depending on the summer. From May to October they tend to remain in groups.

Gray seals, whose head profile somewhat resembles that of a horse, arrive first, after giving birth to their pups near the end of winter on faraway northern ice banks or shores where they abandon them. At the park, adults take advantage of the island-like outcroppings of rock off the north shore of the Forillon Presqu'île; here they can moult at the beginning

of summer and remain together until late fall. Their mournful howling from one group to another, which is clearly audible, has given rise to their popular French name of "loups-marins" or, in English, sea-wolves.

Harbour seals arrive around mid-May in time to give birth, usually before mid-June. Pups are born on the many large flat rocks off the north coast which have fallen from clifftops. Like the gray seal, the harbour seal feeds on deep-sea fish such as flounders, ray, cod and hake, and also capelin, herring and mackerel. It also eats sandlances, shrimps and crabs. Although it is true that these two species damage fishing gear, they are wrongly accused of eating large amounts of commercial fish.

Marine mammals at Forillon live in total freedom. About ten species of whales can be seen here, some of them solitary such as the humpback, minke and blue whale, some in groups of two to five such as the fin whale and harbour porpoise; others, like pilot whales and Atlantic white-sided dolphins, form herds occasionally numbering more than a hundred individuals. Although whales can be seen at the park anytime from May to December, their visits are usually more frequent in July, August and September, when they are visible almost every day if conditions are favourable. Since the water is quite deep at Cap Gaspé and off the south shore, rorquals (baleen whales, as are the humpback, minke, blue and fin) often come in quite close searching for schools of small fish such as capelin, sandlance and herring, or small shrimplike euphausiid crustaceans (called krill) which they strain through their baleen plates. You can learn to distinguish the various species by becoming familiar with their different features: the way a whale spouts, the shape of the dorsal fin and its size in relation to the part of the back that comes out of the water; size and colour, and finally surface behaviour — the number of times it comes up to breathe before its deep dive, and whether its tail comes out of the water when it finally dives.

We actually know very little about whales. Their lives remain mysterious, inspiring in us awe and respect. Although they are well adapted to our frigid northern waters, like us they are warm-blooded animals, and must breathe air right from birth. Recent studies have attempted to show that some species communicate by an elaborate system of sounds, and that their level of intelligence may be higher than we are inclined to believe. Knowing this, on those occasions when we have a chance to hear a whale breathe and spout, to see an animal whose basic needs are so similar to ours surge out of the water, new and surprising thoughts strike us. After observing a whale for some time, then watching it disappear out to sea, coming to the surface at regular intervals to catch its breath of life, we cannot help but reflect on the grandeur of the sea, the grandeur of life.

MAN

No brief history of a region will ever be acceptable to all readers. Some may argue that the inhabitants are painted in an unfavourable light, others that the facts depicted do not give the full substance of previous studies. While summarizing the history of humans in Forillon, the author has chosen to portray the intensity of the lives of the region's early inhabitants, showing how they managed to live in harmony with nature in an environment that was difficult and demanding, yet because of its generosity, offered many compensations.

THE FIRST INHABITANTS

Long before Forillon became a national park, people were drawn to the area. The reader may think of Jacques Cartier's visit here in 1534, but the first visitors go much farther back than that.

At the time the Egyptian pharaohs began construction of the pyramids, a thousand years prior to the Old Testament account of the life of Abraham, there were people living in the immediate vicinity of the park, specifically in the Rivière-au-Renard valley.

Other evidence of early human habitation of the Gaspé coast can be found at Penouille, Rivière-à-Martre and Ste-Anne-des-Monts where there are traces of occupation as early as 4000 to 500 B. C. The relatively mild climate of the period about 5000 years ago, mentioned earlier in this book, was probably a factor in bringing man to our shores. It is logical to assume that the climatic conditions that favoured distribution of new fauna and flora also had an influence on man, for the laws of nature affect all living things, whether they are aware of it or not.

Information on the earliest inhabitants is sparse. Very little serious digging has been done at either known or probable sites of habitation. In any case, the sites were temporary and seasonal, and few traces remain. The shape and finish of the stones used as projectile points provide some clues to the state of evolution. For example, use of the bow and arrow and the javelin thrower go back some four thousand years. Digs at sites dating

from the fifth century B. C. have yielded pottery and polished stone axes. Over time, tools and techniques were upgraded and cultural exchanges increased.

These earliest inhabitants lived in harmony with their environment. They obtained food by fishing, hunting and gathering. They pitched their tents near the seashore, probably for practical reasons: easy access by canoe; abundance of food (birds, fish, shellfish, etc.); lack of stinging insects. What very small amount of archaeological digging has been done in the area suggests that the earliest inhabitants of Forillon camped on headlands close to beaches, on terraces formed by the marine invasion that followed the melting of the glacier in the region, such as those present in the Anse-au-Griffon valley, the Rivière-au-Renard valley and at Petit-Gaspé. We know they inhabited the sand spit at Penouille; an abundance of chipped stones was collected here in 1973 by a preliminary research team.

Afterwards, it appears that the Gaspé peninsula was uninhabited from the eighth century until the fifteenth or sixteenth, though no one knows why. When the white man arrived in the sixteenth century, most inhabitants of the Gaspé peninsula were Micmacs, or Souriquois as they were sometimes called. This tribe first occupied the Acadian peninsula and the east part of New Brunswick. As the white man arrived to the south, some of the indigenous people moved north to the Gaspé. Sixteenth- and seventeenth-century chroniclers — our major source of information on these people — refer to them as the "Gaspésiens."

Two other Algonquin tribes were frequent visitors to the peninsula. The Etchemins, also called Malécites, who lived to the southwest of the Gaspé (western New Brunswick and parts of Maine), crossed the peninsula on their way to the north shore of the Gulf. The Montagnais, who lived on the north shore between Tadoussac and Sept-Îles, crossed the river to Percé to sell furs to the French.

Sixteenth-century Gaspé was also visited by the Huron-Iroquois tribes, a group culturally and linguistically quite different from the Algonquins. One of these tribes inhabited Stadacona (Quebec City). Every year whole families travelled downriver and fished along the north shore of the Gaspé (mackerel fishing with hemp nets). This is the tribe that Cartier met in Gaspé in 1534, and again in Quebec City the following year.

Although often belittled by white man as primitive savages, these unfamiliar and misunderstood people reflected quite a long cultural evolution. Amerindian values, principles, customs and beliefs all bear witness to an authentic culture and a truly remarkable adaptation to the environment. Just imagine the implications of crossing from Sept-Îles to Forillon in a fur-laden canoe! (See figure 1.)

Fur trading with the white man, mainly the French, changed the lifestyle of the Micmacs. In earlier times these people spent ten months of the year fishing, including ice fishing. They lived near the sea where the climate was milder than inland, as it is today. But if they were to supply furs of the highest quality, they had to begin spending the entire winter hunting in the forest. Contact with the white man brought many changes in

the needs and tastes of these Gaspésiens. They replaced stone fishing gear with iron implements; they learned to use firearms; they began to eat bread, biscuits and salt food; they learned to drink "firewater."

These first residents of the Gaspé had learned to live in complete harmony with their environment. Nature provided them with basic food and shelter. At the same time, their keen observation of nature led them to develop a spiritual culture, a moral sense, a religion. They treated Earth and Sea with respect, an example we would do well to emulate.

THE FIRST EUROPEANS TO SEE FORILLON

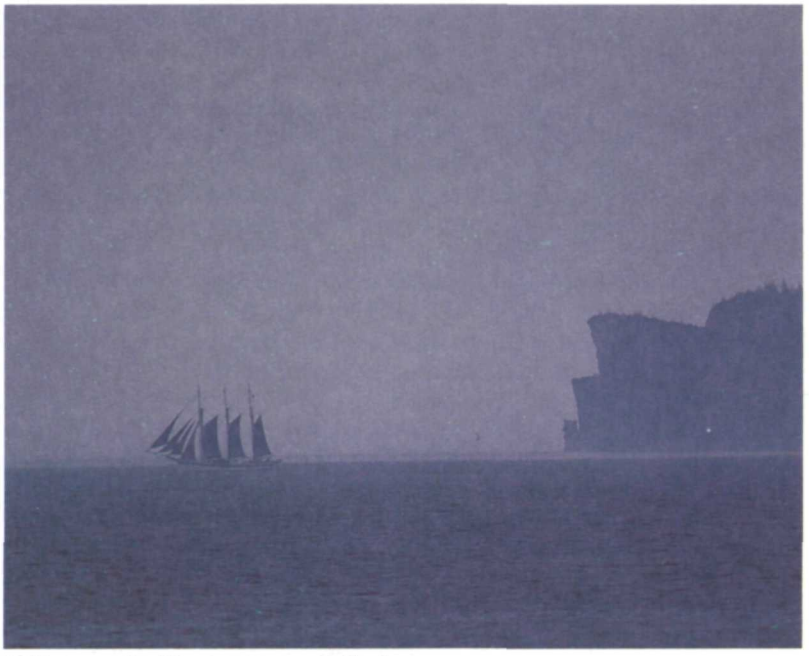
We are not really sure who the first European visitors were. Some argue that the Viking voyages and occupation of America between the year 1002 and the fourteenth century must have included exploration of the Gaspé coast. Archaeology has confirmed the discovery and occupation of America (Newfoundland in particular) by these Norwegians. But there is as yet no proof of any Viking presence in the Gaspé.

In 1497 the British hired the Italian explorer Giaovanni Caboto, better known to us as John Cabot (or Jean Cabot), to find a route to Asia. Cabot's account of the voyage and the originals of his charts have disappeared. Some historians believe he landed in Labrador. Others give the landing site as Cape Breton, St. John's, Newfoundland, or Prince Edward Island. Still others say he went north from Europe in his attempt to reach Asia. In other words, no one really knows whether he visited our shores at all.

Nor do we know very much about the early sixteenth-century voyage of the Corte Real brothers from Portugal. There is no evidence of their sailing up the St. Lawrence.

We do know that Bretons were fishing for cod off the shores of "New-Found-Land" by 1504. Later they were regularly joined by British, Spanish and Portuguese fishermen. Documented fact shows that most of these people fished off the Grand Banks south of Newfoundland, others in the Gulf of St. Lawrence. Some of the Europeans may have done some fishing in Gaspé waters. Because their presence here would have been strictly for fishing purposes and in no way related to politics or science, their visits were never recorded and so remain a matter of speculation.

Jacques Cartier's 1534 voyage had nothing to do with fishing. His mission was to discover for France a passage to Asia through the "baie des Châteaux" (Strait of Belle-Isle) to the north of Newfoundland, a known corridor. His ships sailed from Saint-Malo on 20 April and entered the Gulf on 27 May. He explored this "inland sea," that is, the western coast of Newfoundland, the Magdalen Islands and Prince Edward Island. On 3 July he reached Chaleur Bay, which he so named because of the beautiful weather on his arrival. There he met Micmacs who were apparently used to trading furs with white men. Although we do not know whether this trade had been carried on before on the Gaspé coast or only farther south, the former is more likely, since several days later, Cartier reports landing at "Cap de Pratto." The fact that the cape had a name,



Sailing past Forillon on the way to Quebec

apparently of Portuguese origin, suggests earlier visits by a Portuguese mariner, perhaps Corte Real.

Cartier's account of his arrival in the Bay of Gaspé in inclement weather is somewhat ambiguous. According to one interpretation, he was anchored off Grande-Grève from 14 to 16 July 1534. After high winds caused an anchor rope to break, he went up the bay as far as the safe harbour in front of Penouille, where he remained until 25 July. There he became acquainted with a group of some two hundred Iroquois who were spending the summer there. In the account of his voyage, Cartier wrote: "We saw large quantities of mackerel that they had caught close to shore, using nets made of hemp that grows in their land; my understanding is that they only come to the sea in the fishing season" [freely translated from Old French].

On 24 July, the eve of his departure, Cartier erected a wooden cross officially claiming the territory for France. The only documented fact about its exact location is that the cross stood at the entrance of the harbour.

There is disagreement among historians as to the identity of the point referred to by Cartier as marking the entrance to the harbour. There are a number of possibilities. One version has it that the cross was erected on the current site of the Gaspé Museum and the Jacques Cartier National Historic Park. Another sees the sand spit of Penouille as a more likely location. The soil and location of this point of land are more suited to the erection of a ten-metre cross intended to be visible to future mariners.

Whichever version is correct, this most important political event whereby this new land was officially claimed in the name of the King of France took place somewhere here in the Bay of Gaspé, in the immediate vicinity of Forillon.

FORILLON, A FISHERIES AND A PORT OF CALL

Before long, French fishermen came every year to fish the waters of the bay and the immediate vicinity. In 1603 Champlain wrote: "All these places — Gachepay, Baye des Moluës and Isle Percée — are sites where both dry and green* fish are taken" [freely translated from Old French].

The place that was called "Gachepay" and later "Gaspé" by the French corresponds to the subsequent site of Grande-Grave (see p. 104).

It soon became evident that the Grande-Grave site had a number of advantages. The water was deep right close to the shoreline, making it easy for large vessels to anchor. The beach consisted of large pebbles (the Old French word "grave" is properly defined as that type of beach), a suitable surface for spreading fish to dry. The prevailing winds (southeast and northwest) both hastened the drying of salt cod (what Champlain referred to as "dried fish"). In addition to all this, a freshwater stream crossed the beach at this point, of capital importance to shoreworkers and to the crews of large vessels that landed there. Champlain's journals show that on his twenty-three voyages across the Atlantic he was in the habit of stopping at "Gachepay" on his way upriver to Tadoussac and Quebec, and also when he was heading downriver out to sea. Other mariners of the period did the same.

Writing about this site, Champlain mentions that "fishing produces abundant catches of cod, herring, salmon, mackerel and lobster" [freely translated from Old French].

Despite the fishing potential and despite the strategic location of the Bay of Gaspé, population growth was slow during the French regime. In fact, during the development of fisheries in the Gulf, France did not encourage settlement. Preference was given to fishing expeditions financed by French outfitters who rigged their ships in the spring, came to fish all summer and returned to France in the fall.

THREAT FROM THE ENGLISH, A FURTHER HINDRANCE TO DEVELOPMENT

The Bay of Gaspé, like the entire coast, was under constant threat of attack by English ships. Fishing on a seasonal basis proved to be the least risky, as well as the least costly, since fishing installations were regularly destroyed by English pirate ships. Under these circumstances, to be a fisherman in the Gaspé was a most dangerous occupation. In fact, no

* "Green fish," or "green cod": fish preserved in brine.

permanent fishing settlement was established in the Bay of Gaspé before the eighteenth century, although as early as 1690 the summer population of the coast of Forillon stood at about two hundred Frenchmen.

In 1711 Admiral Walker en route from Boston burnt all the fishing vessels anchored at Grande-Grave. The fishermen were taken prisoner, homes and boats were burnt, and the entire catch was destroyed. Thus, the fishing industry of New France was repeatedly forced to start from scratch.

The English, well established all down the Atlantic coast, increasingly imposed their will in order to add to their territory and gain a better share of the fur trade, for by this time the trade in furs, especially beaver pelts, had replaced fishing as the largest industry of New France.

Under the 1713 Treaty of Utrecht, France ceded Newfoundland, Acadia, the land around Hudson's Bay and "Iroquoisie" (Lake Ontario) to England. Less than a century later history confirmed that France by that act had signed away New France.

Gaspé had long been suggested as a military post. It was argued that a fort at the entrance to the bay would serve to protect the entrance to the St. Lawrence River. Otherwise, if the English took Gaspé, Quebec City would be completely cut off. Nothing ever came of the plans, because of a shortage of funds coupled with scepticism about the strategy. Other areas of the country far from the Gaspé were considered of far greater importance. To understand the reasoning involved, it is necessary to examine the history of the period in a broader context.

Exhausted militarily and financially by its European wars, France gave little assistance to what was left of New France, which was in great need of help to resist English invasion. Between 1713 and 1754 France did attempt to reverse its colony's slow demise. A period of resistance got under way. An attempt was made to rebuild a French Acadia and maintain vital positions on the Atlantic coast and in the Gulf of St. Lawrence (construction of the fortress at Louisbourg, settling of Prince Edward Island). The St. Lawrence was fortified by walling Quebec City and Montreal and by beginning construction of a fort south of Lake Champlain, since Fort Chambly was too poorly located to defend the more southern boundaries of the colony. A fort was built on the Niagara River to protect the western fur route. The massive colonization of the Mississippi valley and the foundation of New Orleans, capital of Louisiana, completed the expanse of New France in America, a long curved corridor extending from the Gulf of St. Lawrence to the Gulf of Mexico.

It was in this vast political and economic context that the small outpost in the Bay of Gaspé found itself on the eve of the Conquest.

On 4 September 1758 Gen. James Wolfe arrived in the Bay of Gaspé after capturing the fortress at Louisbourg. He found a flourishing fishing station, totally undefended, comprised of some one hundred persons, mostly French fishermen. There were also about sixty settlers grouped close to a French merchant named Pierre Révol. The largest establishments were at Grande-Grave, Anse-aux-Sauvages and Gaspé (where the railway station stands today). There were twenty-two fishermen's cabins

along the banks of the two arms of the Bay of Gaspé and at Penouille and a lookout post at Cap-des-Rosiers. During the several days it took to round up about forty prisoners (including women and children) and to set fire to everything in sight, as was the custom, Wolfe used Grande-Grave as his headquarters. An excerpt from the journal of Thomas Bell, aide-de-camp to General Wolfe reads: "10th [of September]: The General gave orders for every thing being burnt and this day and the 11th was employed in executing those orders, we all returned with the General to the Camp at the Grand Grave."

After Wolfe had captured Louisbourg it was too late in the year for him to attack Quebec, so he spent much of the remaining season wreaking havoc on the French fishing stations along the Gaspé coast. A short two years later, following battles at Quebec, in Chaleur Bay at the mouth of the Ristigouche River, and finally at Chambly and Montreal, the remaining residents found themselves in a foreign country. New France was no longer. The English regime had begun.

SETTLEMENT BECOMES POSSIBLE

Lasting peace did not come automatically with the Conquest. Indeed, until the beginning of the nineteenth century, the conflict between Britain and her American colonies made any real security next to impossible. Nonetheless, the new regime did actively encourage permanent settlement in the Gaspé region, which was long overdue. The arrival of the fishing companies, and the economic system they represented, made it feasible for families to live in the area year-round.

Immediately following the end of the Seven Years War, a number of ethnic groups made their appearance in the area around Forillon. The first to arrive were British officers and men dismissed from Wolfe's army, who were given a variety of administrative positions and important parcels of land. Next came the Loyalists, Americans who remained loyal to the Crown after the American Revolution of 1775. They settled at Douglastown on the south shore of the Bay of Gaspé. They were closely followed, and later replaced, by Irish Catholics fleeing the potato famine, who also settled locally at Cap-des-Rosiers, L'Anse-au-Griffon and Rivière-au-Renard.

During the last quarter of the eighteenth century, many fishermen and merchant dealers from the Channel Islands (Jersey and Guernsey) arrived. They settled mainly at Grande-Grave, Anse-Saint-Georges and Cap-des-Rosiers.

These Anglo-Norman fishing companies hired fishermen from both local residents and non-locals (mostly from the lower St. Lawrence region, downriver from Quebec City). At first the non-locals came for the summer only, as before. Soon many of them settled in the area, founding new families or intermarrying with the English-speaking families established in places such as L'Anse-au-Griffon and Rivière-au-Renard.

During the first half of the nineteenth century the population of the

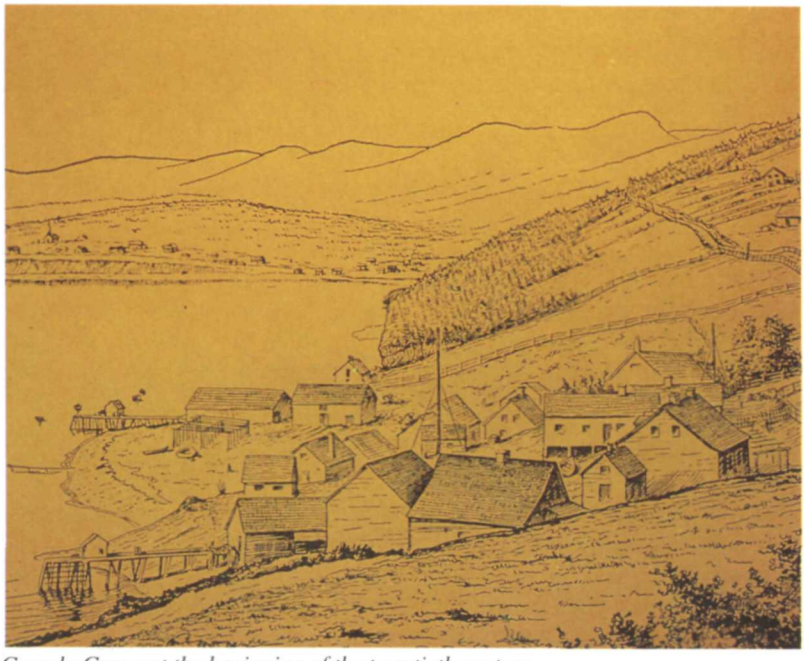
North coast of the Gaspé, a land of isolated villages

Gaspé increased by a factor of six (from 3000 in 1800 to 20 000 in 1850). Immigration from upriver was one contributing factor, but by far the most significant fact was the high birth rate, so much so that by 1850, 90 percent of the Gaspé population was Quebec born. The migration of families from the lower St. Lawrence soon transformed the regional population of the Gaspé into a largely French-speaking one.

This population was nonetheless far from homogeneous. In fact, the Gaspé was the most cosmopolitan rural area of Lower Canada. The inhabitants represented a broad spectrum of ethnic origin, religion, culture and financial status. Despite all the differences, in time a true Gaspésian identity emerged.

But this sense of regional identity developed slowly. Although the entire population lived in an economy based almost exclusively on dried cod (fishing and production), the Gaspésians lived and worked in isolated pockets, being separated from the rest of Lower Canada by distance and lack of transportation. The Gaspé villages were themselves unconnected by road during a good part of the nineteenth century.

Each village was virtually an island, the sea often its only link to other settlements. Transportation and trade were by water, as indeed were social visits. Each village traded individually with passing ships, as well as with local merchants and outfitters. For a long time, the only land route along the Gaspé north coast was the shoreline. The shore route was extremely risky, in many places practicable only at low tide on very slippery rocks.



Grande-Grave at the beginning of the twentieth century

The mountainous landscape, with numerous cliffs going right down to the shoreline, delayed the construction of a carriage road. So people had to look to the sea for all sorts of things.

THE INFLUENCE OF THE FISHING COMPANIES

Isolation fashioned the character and lifestyle of this population, it is true, but the cod exporting companies also played a major role in moulding the Gaspé way of life.

Throughout the Gaspé peninsula, including Forillon, cod marketing was conducted almost exclusively by the Anglo-Norman companies. The operating methods of these companies gave their owners immense financial and social power throughout the area from the end of the eighteenth century through the nineteenth and into the twentieth. Some people considered the merchants totally despicable because of the sheer extent of their monopoly over all aspects of life. Others have hailed them as the driving force behind the economic development of the Gaspé.

The companies operated by a credit system to fishermen. This bound a man to his supplier/employer. A company's basic requirement was availability of fishermen. This is why the companies promoted settlement along the Gaspé coast. Fishing was a seasonal activity, and the companies needed to ensure continuity; company growth was directly related to population growth.

The company provided the fishermen with everything: fishing gear; salt

to preserve the catch; flour, sugar and molasses; clothing for the entire family; household effects; consumer goods of all kinds, for all seasons. In return, the company demanded payment in dried cod. Some people were permitted to use other products as a means of exchange, such as cut planks, shingles, farm products, etc. — all of which could be resold to the fishermen at a profit.

The company weighed, assessed and classified all the fish it received. Each amount was entered in a ledger. Opposite each fisherman's name was entered a list of foodstuffs and other goods advanced by the company during the current year, with the price charged for each. The opposite page listed all quantities of fish provided to the company by the fisherman. The fisherman always held the wrong end of the stick. For one thing, the price of fish was set only at the very end of the season. So each spring the fisherman was obliged to mortgage his entire summer's catch without knowing what the end-of-season price would be, or how the company agent would classify his catch. Of course, the company's first priority was to balance its own books.

When the fishing season was a good one for both parties, people could be lured into spending their profits on new items that had arrived at the company store. As a general rule, though, the company encouraged every good fisherman to spend any profits on upgrading fishing equipment. Profits generally appeared as a credit with the company. Rarely did any cash change hands. This ensured customer continuity with the same company from one year to the next, whether a fisherman's account was in the black or in the red.

The distance from large cities permitted this barter system to persist well into the twentieth century. In the Gaspé, cod was money. When a company became aware that real money was being circulated, it easily collected it by offering a 20 percent discount on cash sales.

The system was perpetuated also by overspecialization in the fishing and processing of dried salt cod, effectively preventing commercial diversification.

This method of resource marketing, involving as it does a virtual monopoly and control of an entire population, has frequently been denounced as quasi slavery. But in the nineteenth century such a system was by no means unusual, nor was it unique to the Gaspé. The fisherman's total dependence on an exporting company was essentially the same as that of the forestry worker or miner. All were at the mercy of an all-powerful company.

The fishing industry was a risky business. Not all companies were wealthy, nor was power synonymous with financial security. In the first place, the companies dealt with penniless fishermen, to whom they made loans on the strength of the coming season's catch. Bad weather was another risk. Wind, rain and fog could severely hinder fishing and drying activities. Cod or, just as serious, bait could be in short supply. Then there were the ups and downs of the market to be considered. To deal with all the risks involved and still increase profits in a good season, the "Jersey

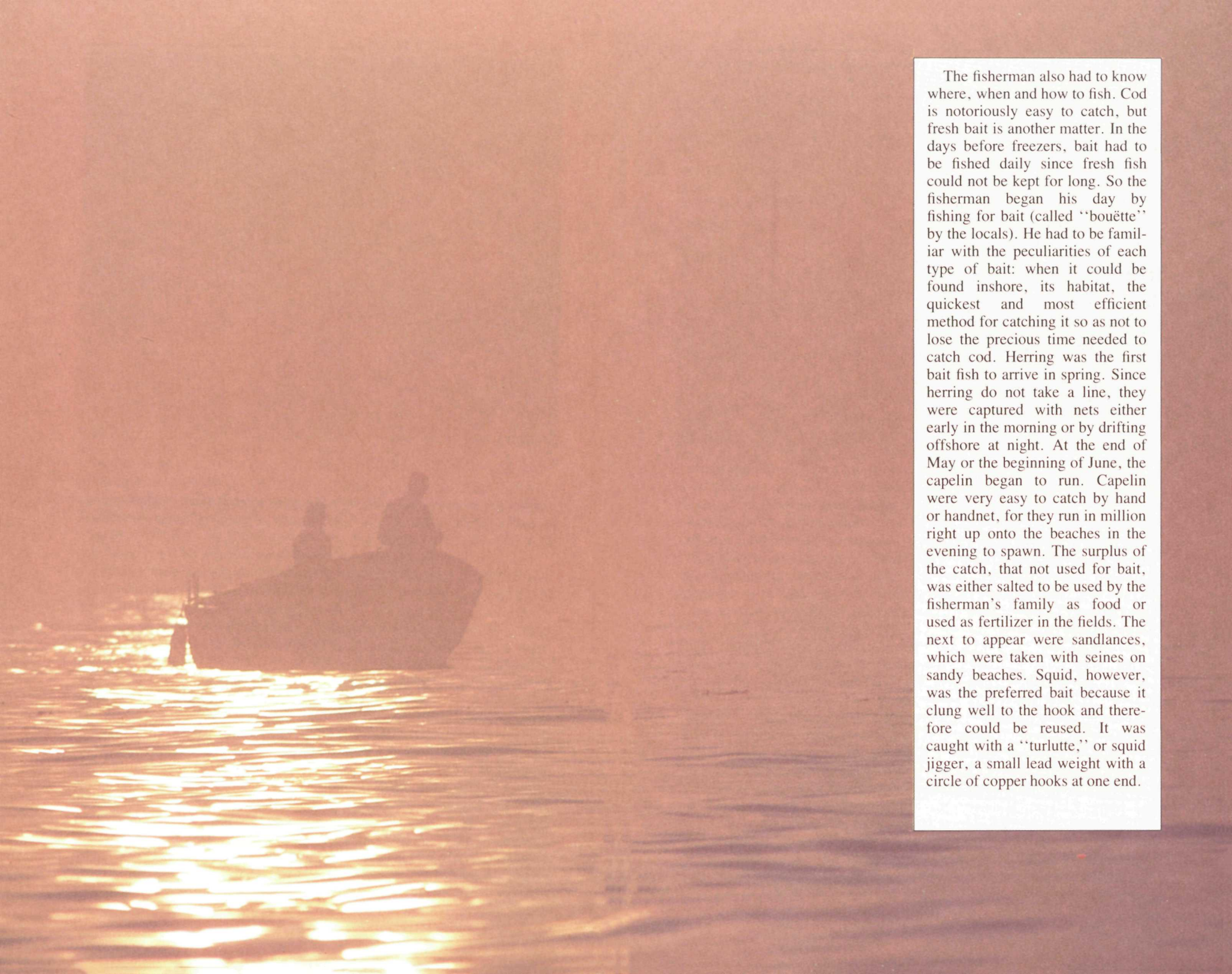
Cod splitting (sculpture by Benoi Deschênes)

system," as it came to be called, worked by establishing a number of branch offices along the coast, in addition to its head office business centre in one village. In this way, a good season in one area could compensate for a poor yield in another.

The man who developed the credit/barter system in the Gaspé was Charles Robin. He was a Jersey Islander who first set up an establishment in Chaleur Bay in 1767. In spite of a difficult beginning because of attacks by American pirates during the American revolutionary war against England, and because of discouraging governmental tactics, Robin's company, its subsidiaries and his name have continued to mark Gaspé business to this day.

As the French discovered early, Grande-Grave was a site with ideal conditions for a fishery. The size of its pebble beach, the deep water close to shore, the freshwater nearby, the southerly facing coastline of the Forillon Presqu'île, the exposure to the prevailing winds from the southeast and the northwest — everything concurred. So a fishery was soon established.

By 1777 two Guernsey Islanders, Helier Bonamy and Nicholas Le Mesurier, had some sixty employees working at Grande-Grave. Towards the end of the eighteenth century, the volume produced by a Jersey firm operated by two brothers named Janvrin at Grande-Grave was second only to that of the Robin company for the entire Gaspé peninsula. The company flourished until 1855, when it was taken over by the William Fruing



The fisherman also had to know where, when and how to fish. Cod is notoriously easy to catch, but fresh bait is another matter. In the days before freezers, bait had to be fished daily since fresh fish could not be kept for long. So the fisherman began his day by fishing for bait (called "bouëtte" by the locals). He had to be familiar with the peculiarities of each type of bait: when it could be found inshore, its habitat, the quickest and most efficient method for catching it so as not to lose the precious time needed to catch cod. Herring was the first bait fish to arrive in spring. Since herring do not take a line, they were captured with nets either early in the morning or by drifting offshore at night. At the end of May or the beginning of June, the capelin began to run. Capelin were very easy to catch by hand or handnet, for they run in million right up onto the beaches in the evening to spawn. The surplus of the catch, that not used for bait, was either salted to be used by the fisherman's family as food or used as fertilizer in the fields. The next to appear were sandlances, which were taken with seines on sandy beaches. Squid, however, was the preferred bait because it clung well to the hook and therefore could be reused. It was caught with a "turlutte," or squid jigger, a small lead weight with a circle of copper hooks at one end.

Company, a firm that had been operating for over twenty years in New Brunswick and wanted to establish its head office at Grande-Grave. Today's fishing harbour stands on the site of the original Fruing buildings.

In about 1845 a third large company, that of William Hyman, was established to the east of the Janvrin firm. For nearly sixty years, there was rivalry between Hyman and Fruing.

Both companies established branch offices on the north shore of the peninsula, from Cap-des-Rosiers to Rivière Madeleine. Both had their head offices at Grande-Grave — side by side. Volume was so large that in only a few decades Grande-Grave replaced Gaspé as the area's business centre. It was Grande-Grave's golden age.

Although these two companies were rivals, they worked as a team when it served their purpose. For example, they usually agreed on the price for cod, in their own interest and to avoid any attempt at bargaining by fishermen. For the companies, the most important thing was to have the fishermen fishing and producing dried cod. Competition did little to improve the fisherman's lot. He was caught in a system that made him totally dependent on the merchant.

Life went on in much the same way for nearly a century in Grande-Grave and the nearby villages. Company control of the population underwent few changes. Hyman and Sons bought out Fruing and Company in two stages, in 1918 and 1925. Business continued as before right up until 1967, the year Hyman and Sons went into bankruptcy.

For generations the population of Forillon existed in a vicious circle. The merchant was the main supplier of consumer goods. The credit system kept most of the population in a state of dependence bordering on slavery. The companies were also conservative and paternalistic in attitude. Obviously they discouraged education for fishermen's sons, who were not supposed to have any expectations other than following in their fathers' footsteps. This too kept life within very traditional bounds. Right up to the Second World War, life in Forillon was virtually the same as it had been for more than a century, with traditions handed down from father to son, from mother to daughter.

LIVING IN HARMONY WITH NATURE

Only in the past few decades has Forillon had modern conveniences: electricity, doctors, drugstores, grocery stores. Earlier the residents wrested whatever they needed from the environment. They had to be familiar with all the natural resources and make the most of everything at their disposal if they were to survive in this rural, coastal milieu. This self-sufficient, independent way was typical of Quebec turn-of-the-century farm life.

It must be remembered that here in the context of Forillon, the merchants were the social superiors of a general population largely dependent on them for both means of production (fishing gear, farm implements, etc.) and consumer goods. It was the credit system that kept the people in

Fishing at dawn with a handline

this state of dependence. Self-sufficiency in Forillon was far from total. Some people managed to escape complete dependence on the merchants, but they were the exception, not the rule. The only independence the fishermen did have was based on the fact that *they* had a monopoly on the know-how of their trade. No one other than the fishermen knew how to fish. There were people who could say, "My job was to dry cod." But the more specialized the job, the less the degree of independence.

Some Forillon farmers supported their families by agriculture alone. Most of these lived in the valley of Anse-au-Griffon. Some farmed the rich land deposited in the Cap-des-Rosiers plain by the early marine transgressions referred to in the first chapter. But for most Forillon families farming was minimal, merely a means of supplementing that which the sea provided.

Life was lived facing the sea, the great provider. The sea gave the fisherman the catch that he could trade with the local merchant for food and other goods and provided his family with a direct source of food (cod, herring, mackerel, lobster, crab, mussels, clams, etc.). Wresting a living from the sea required a good deal of practical knowledge, most of which was handed down from father to son and mother to daughter. Everyone had a job to do in those days; no one could afford to be idle. Versatility was also essential.

The fisherman had to be able to forecast the weather accurately by looking at the sea and the sky, both before setting sail and while fishing in

Gaining a bit of independence by some farming

his 18-foot barge.* Shoreworkers needed the same skills if they were to dry the cod successfully. For the fisherman, weather prediction was a matter of life and death. For the shoreworkers, usually his wife and children, it was a matter of economics; rain could ruin cod set out to dry and lower the price paid by the merchant. Everyone had to be on his toes.

For over four centuries, cod fishing was done by handline. This consisted of a long hemp or cotton line wound around a wooden frame (called a reel). At the end was a lead weight and two short lengths of line (called snoods); each of these had a hook on it, and each hook was baited. The actual fishing procedure consisted of letting out the line until the weight touched bottom, usually in water between 10 and 20 fathoms (20 to 40 m) in depth, depending on the site and time of year. The fisherman held the line just off the bottom, in order to feel the fish taking the bait. Two men working individually in a barge could bring in 10 to 12 quintals (1 quintal = 112 pounds, or 50.8 kg) on a good day. At the beginning of the twentieth century, the line-trawl was introduced — a bottom line fitted with between 100 and 150 hooks. This method was suitable for the larger boats that fished farther out on the banks. But the requirement for fresh bait remained.

Consider all the differences it would make in our lives if there were no electricity and no motors. We would have to relearn how to co-operate with nature, accurately assessing wind and tide before setting out under sail or in a rowboat to have any chance of getting back to shore; knowing how to preserve meat and fish by means other than freezing, or providing for the future by livestock breeding and farming. Such were the needs of people in the old days.

* Eighteen-foot barge: fishing boat 5–6 m in keel length, pointed at both ends, usually bridged, rigged with three masts and sails (bridge and masts removable).

A little of everything helped the villager subsist

At Forillon, the credit system with no circulation of money meant that residents had to choose between buying everything from the merchant and going more deeply into debt or making everything themselves. The latter was far more economical. For example, sewing and knitting the family clothes out of homespun cloth and yarn cost far less than buying ready-made clothing from a merchant. Fishing nets could be knitted at home during the long winters. Oilskins could be made by water-proofing cloth with cod liver oil. Most of the goods offered in the stores were beyond the means of ordinary people. Families and neighbours were more or less obliged to barter, and to find a use for virtually everything. Thus it was that cod liver oil was used for lighting, waterproofing the roof, tanning leather; what was left of the liver was used to make soap. Everything was recycled; nothing was wasted.

Those people who had the sense to devote some of their time and energy to farming the land were better off than those who did nothing but fish, and they were far less dependent on the merchants. They often had an easier life and fewer debts. Of course, being both fisherman and farmer meant not only extra work for the entire family but also a greater diversity of tasks. These people thus needed a broader range of know-how, intimately co-operating as they were with another part of their environment, the land.

Knowing how to plow, to sow, to reap, to raise livestock, and chickens; knowing how to nurse their animals, as they nursed themselves, with natural products, mostly plants . . . All this quaint and demanding lifestyle of farming in addition to fishing had its rewards. First, there was a feeling of independence and security based on self-confidence, which sprang from the variety of skills acquired and the inner strength that comes from self-knowledge. Then, there was also feelings of satisfaction for work well done, the wider the variety of tasks, the more numerous the sources of satisfaction.

The settlers of Forillon who had learned to co-operate with an environment they understood lived out their lives in harmony with land and sea. All their expertise was integrated with the environment.

WHALE OIL, A VITAL PRODUCT

The abundance of cod on this side of the Atlantic filled Catholic Europe's huge requirements for fish. The liturgical calendar listed 153 days of the

Salted split cod drying on a flake

The lens of the Cap-des-Rosiers lighthouse, a sculpture of glass

year when meat was forbidden. Two other growing requirements of the urban society at that time were fuel for domestic and public lighting and a machine lubricant. It so happened that the waters of the Gulf of St. Lawrence had the answer to these needs as well: whale oil.

Accustomed to this dangerous activity since the thirteenth century, the Basques were the first to cross the Atlantic to hunt whales, some time before Jacques Cartier visited our shores. One of Champlain's journals dated at the very beginning of the seventeenth century mentions sighting Basque whalers in the Tadoussac region and describes their hunting methods.

Towards the end of the eighteenth century the Loyalists who arrived in Gaspé from Massachusetts — then the world whaling capital — brought their skills with them. Soon whalers were setting out from the Bay of Gaspé. A number of Jersey Islanders and Scots were taught the skill by the Loyalists. The industry was based principally at Penouille where the whale oil was extracted by boiling down slabs of blubber in huge iron pots set over fires on the beach. Traces of the messy process are still visible in some places at certain seasons of the year. These consist of hard, black lumps of sand cemented together by whale oil that boiled over more than a century ago. Storms still wash up long bones, ribs and jaws, and sometimes vertebrae of these huge mammals. Even the name of the village (a kilometre upstream from Penouille) where the whaling schooners anchored echoes bygone days when danger lurked at every turn on the perilous journeys. It is called Farewell Cove.

Throughout the nineteenth century, whale oil was the main source of fuel that lighted the homes and streets of Europe's and America's large cities. The navigation lights finally erected in the St. Lawrence River and Gulf during the second half of the century also burned whale oil, and continued to do so long after the discovery of kerosene (coal oil) in 1845.

The Cap-des-Rosiers lighthouse, for example, the tallest in Canada, which was fitted with a top quality Fresnel lens, burned whale oil from 1858 until at least 1879, because it was the most readily available fuel.

The mad rush to catch whales soon slacked off, the result of overhunting and the substitution of man-made products for natural ones. Lighting gradually switched to kerosene, gas and later electricity. The whalebones used in corsets, hoopskirts and umbrella ribs were replaced by manufactured products. Chemistry saved the whale from extinction, and the human race from the ignominy of causing it.

RECENT HISTORY, A TIME OF CHANGE

Between 1850 and 1920 the inhabitants of the Gaspé saw little change in their society, although the Jersey companies were gradually withdrawing from the fishing industry because of bankruptcies which began as early as 1873.

After 1920, changes in the outside world began to be felt even here in a variety of ways. People's attitudes, habits, even the options open to them changed. The railroad arrived, as did Eaton's catalogue with pictures of every imaginable type of goods, including electric motors. Modern roads were built and education was more widespread. The Second World War came and went. Electricity came to the villages, as did the automobile. All these changes taking place in a mere thirty years could not help but transform considerably what the old folks called "the good old days." The world market situation, competition, sheer bad luck, progress and the increasing complexity of the business world caused the downfall of the powerful but outdated Hyman & Sons Company.

The departure of the merchant who had dominated village and area life for over a century had a drastic effect on habits and ambitions. A growing number of fishermen found other work. Many left the area temporarily, some for good.

Agriculture too changed completely. In fact, it died. Young people left, unemployment insurance was introduced, all manner of goods became available in the general and grocery stores that were springing up everywhere. People disposed of livestock, fields were left fallow. The urge to plan ahead for essentials on an annual basis waned. Gaspé residents had always had to work hard to survive. The advent of modern conveniences and technical progress made life easier. The result was that self-sufficiency no longer seemed essential. The farmland their ancestors had cleared, the land that had been farmed for generations, the land that was such an integral part of a self-sufficient way of life, was nearly all abandoned.

This was the situation when Forillon National Park was established in 1970 under federal-provincial agreement. Some 205 families were affected by the expropriation, most of them relocating in neighbouring villages where they had relatives. The move caused great emotional upset. It was seen by some as a virtual deportation. Since it is so natural to resist mentally an imposed change, it is easy to understand and appreciate the

Small cove, south side of the Forillon Presqu'île

great effort it took for these people to accept the havoc to their lives caused by the establishment of the park.

Much has been written about expropriation at Forillon. Despite the fact that it provided some people with the opportunity to fulfil longstanding dreams of moving, most of those involved found the experience very difficult and for some it was a real tragedy. In fact, they were not prepared for this event. The population in general was, as we have seen, very traditional. People were attached to land that in many cases had been in the family for generations. Although few farmed the land, it was home. Never did they think that something would come to disturb them in this remote corner of the Gaspé, so far from the large cities where everyone knows, in order to serve the community, expropriations occur frequently.

Forillon also was created to serve the community. But there was a difference. The community to be served was not local but strangers who would come from far away for a short visit. This was an entirely new concept and hard for the local population to accept, for they were the ones paying most of the cost.

It is not within the scope of this volume to describe the expropriation process in any detail, or to pass judgement on it. The subject is delicate, and to treat it justly, the arguments regarding the objections and constraints, the difficulties and feelings of those involved on both sides, would have to be elaborated with as much impartiality as possible.

In any event, permanent population of Forillon ceased within a short period of eighteen months. Former residents settled in a number of other coastal villages. Although they had to leave their own land, they stayed close at hand.

FISHING GOES ON

Few of the houses of the former residents have been left standing. However, it was not the intention of Parks Canada to make a purely wilderness park out of Forillon. The long human history of the area had built up over the years a rich cultural heritage.

Since prehistoric times, people have come here to fish. Each era had its own ways of fishing, and today there are still local fishermen who commonly use traditional fishing methods. These men use the harbours of Grande-Grave and of the Cap-des-Rosiers plain. The park administration has assumed responsibility for maintaining the harbours and making any required improvements. Cod fishing, so closely linked to Forillon's history, provides continuity in this relationship between man and the sea.

KEEPING THE OLD WAYS ALIVE

In its capacity as conservator of Canadian heritage, Parks Canada's mandate at Forillon includes the preservation and display of various historical aspects of our country's past. The everyday life of bygone days is a fundamental aspect of Forillon's historical value. The area is representative of the human history of the whole Gaspé during the period when the cod fisheries were operated by Jersey companies. Grande-Grave, where

three major companies had their head offices, adds importance to this feature of Forillon.

The park places special emphasis on a self-sufficient lifestyle based on fishing supplemented by small-scale turn-of-the-century farming methods. Already much material has been gathered from the region's older residents: fishing lore, fishing tales, legends and beliefs, folk art, first-hand experiences of people who were alive at the beginning of the century. To ensure that none of this rich heritage is lost, there will be exhibits in the restored buildings of the Grande-Grave sector of Forillon, illustrating the lifestyle of the people who lived here in harmony with land and sea.

PLACES AND PLACE NAMES

Exploring the toponomy of the Gaspé coast is an adventure in itself. Area place names tell stories, allude to beliefs, or describe features of the landscape. Some of them have undergone extensive changes over the centuries.

One example is a place called "Pointe à la Renommée," some forty kilometres upriver from Cap-des-Rosiers. Its name is a gallicization of the English "Fame Point." This in turn is an anglicization of "Faim Point," considered by His Majesty's mapmakers to be a spelling error. The original French name was "Pointe à la faim," (meaning hunger point) in memory of a hard winter endured by a group marooned there in the fall.

The place names of the Forillon region have similar associations.

The name *Gaspé* means "land's end" in Micmac and orginally referred to the area at the tip of the Gaspé. The place referred to as "Gaspey" in Champlain's time is the same one later called Grande-Grave. In 1603, Champlain wrote: "On the fifteenth day of the said month we arrived at Gachepay which is located in a bay about one and one half leagues on the northern coast." In 1626 he described the area in greater detail: "This Gaspey has a bay that is three or four leagues wide at its entrance, runs northwest for about five leagues, terminating in a river that runs fairly far inland; ships come here, to fish for dried fish. There is a pebble beach suitable for drying the cod and a freshwater stream that runs down to the sea, very useful for the ships that anchor a mere musket shot offshore. . . ." [freely translated from Old French].

Later Champlain refers to the tip of the Forillon Presqu'île which he rightfully calls *Cap de Gaspey:* "The said cape is a very narrow point, the terrain is quite high as it is for the land around the aforementioned bay; it is covered with pine, fir, birch and other low softwoods . . ." [freely translated from Old French]. A century and a half later, the name Gaspé was being used for the settlement far up the bay across from today's downtown Gaspé.

As for the name *Grande-Grève,* it is obviously a derivation of Grande-Grave. The earlier version dates from at least the eighteenth century and, in good French of the time, meant just what it said. The name describes a wide pebble beach where fish were laid to dry. The meaning of the word "grave" was later extended to include an entire fish drying area, buildings

included. In this context the name Grande-Grave takes on even greater significance, for it was here that the head offices of two important cod exporting companies were located. Twentieth-century records of the municipal council and headings of Hyman & Sons Company documents still carry the name Grande-Grave. No one really knows the reason for the change to Grande-Grève. It could be the result of someone's mistaken idea of improving on an already correct French designation, or an attempt to transcribe into French the English pronunciation of the word "grave." Whatever the reason, the new name Grande-Grève has nowhere near the significance of the older Grande-Grave. At Forillon, the name Grande-Grève is used to comply with the official list of Quebec place names. However, all documents used by the park's interpretation services use the name Grande-Grave when referring to the old village. Today, the history of Grande-Grave is recalled at Grande-Grève.

If we follow the old mountain road across the Forillon Presqu'île from Grand-Grève, we come to *Cap-Bon-Ami*. This area corresponds to the small provincial park of the same name, established in 1949 and which later (1970) became part of Forillon National Park. The area should not be confused with the Bon Ami cape, a rocky outcropping that marks the southeastern end of Cap-des-Rosiers cove. This cape was most probably named for one of the early Guernsey cod merchants established at Grande-Grave around 1770, one Helier Bonamy.

Cap-des-Rosiers was so named by Champlain because of the many wild rosebushes he saw there. The name is referred to in his journal of 1631 and appears on his 1632 map.

The origin of the name *L'Anse-au-Griffon* has given rise to some controversy. One version has it that the cove has "gris fonds" (grey bottoms). Another explanation is that the devil left the marks of his claws ("griffes") on a fishing boat there. But a more plausible explanation is that the cove was named for a ship called *Le Griffon* which anchored there in early colonial times. British cartographers called it Griffin Cove.

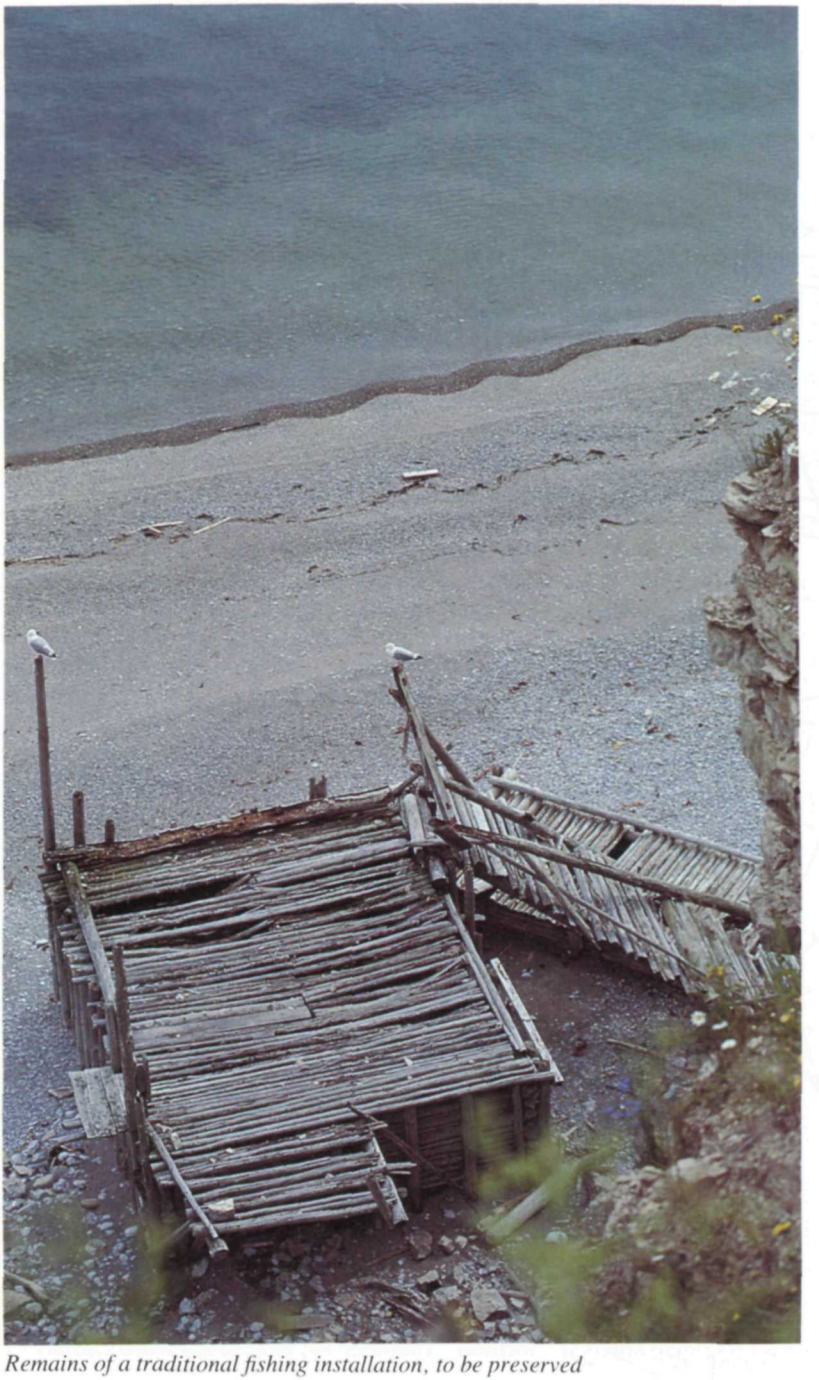
There is a degree of mystery surrounding the name *Penouille*. No one seems to know its meaning or origin. It has long been described as deriving from a Basque word meaning "peninsula." However, the director of the Basque museum in Bayonne, France, has personally informed the author that the word Penouille is not of Basque origin. The word could nevertheless mean "peninsula" or "presqu'île." The name has been given at various times to the long curved spit of sand called Sandy Beach across the bay south of today's Penouille; to a small point near the railway station in the town of Gaspé (the site where Pierre Révol settled in 1758); and finally to the large triangular sand spit on the north side of the bay.

The name *Cap-aux-Os* (meaning cape of the bones) appeared on a map for the first time in 1754. Apparently, whalebones were found on the beach at this site.

When the local fishermen say "ça brassait à *La Vieille*" or "the sea was stirred up at the Old Woman," they are referring to the tip of the Forillon Presqu'île at Cap Gaspé. Oral tradition has used this name for centuries.

Line trawler returning to the harbour at Grande-Grève

Reconstruction of a tackle with capstan



Remains of a traditional fishing installation, to be preserved

Passing Cap Gaspé by boat, one cannot help notice a human figure carved out of the base of the cliff, just at the cape's northern corner. Some insist that this is La Vieille, but it is not, for this feature is of fairly recent date. The name La Vieille originally referred to another rock altogether — a pillar of stone at some distance from shore that looked like an old woman's profile when viewed from a certain angle. It was located about 50 m offshore from the Cap Gaspé cliffs, near the Bay of Gaspé. The journal of a local resident tells us that the pillar toppled suddenly, for no apparent reason, one calm Sunday morning in August of 1851. Appearing on maps since the eighteenth century under the names of La Vielle, Old Woman or Flowerpot, the rock was undoubtedly an important landmark. Its base is still clearly visible. (See the photo of Cap Gaspé on page 110.)

Finally, we come to the origin of the name *Forillon*. Much has been written on the subject, often too farfetched to be taken seriously. Some English language writers, for example, have suggested that the word is derived from the verb "forer" (to drill), and that the long narrow peninsula looks like a bit while the action of the waves on the rocks imitates the action of a drill on wood. There is not really any need to look that far for an explanation. Toponomic logic does not call for such vivid imagination.

The word "forillon" does not appear in modern French dictionaries or encyclopedias. The word "pharillon" does, however. It means a small pot hung at the bow of a fishing boat, in which fishermen lit a fire to attract fish. A later meaning is "small lighthouse." A number of writers have suggested that the name Forillon is a corruption of the word "pharillon." The author disagrees.

The Robert dictionary gives 1755 as the date the word "pharillon" was first used. It also states that "pharillon" is a derivative of "phare," first used in 1553 or 1546 (depending on whether you refer to the Grand Robert or the Petit Robert. But the word "forillon" was used as early as 1534. Jacques Cartier's log contains an entry referring to sailing past the Magdalen Islands near the Iles aux Oiseaux: ". . . and we saw three islands, two of them small and so steep as to be impossible to climb; between them is a small forillon" [freely translated from Old French]. In a 1558 treatise on cosmography, Thevet describes a South African cape thus: ". . . the Christians who passed that way named the cape Cap des Aiguilles [meaning "needle cape"] because of the many points, headlands and 'forillons' that seem to be advancing into the sea." [freely translated from Old French]. These excerpts prove that the word "forillon" has been in use a very long time. It is foolish to insist that it is derived from the word "pharillon." A "forillon" is a small rocky island with a vertical profile.

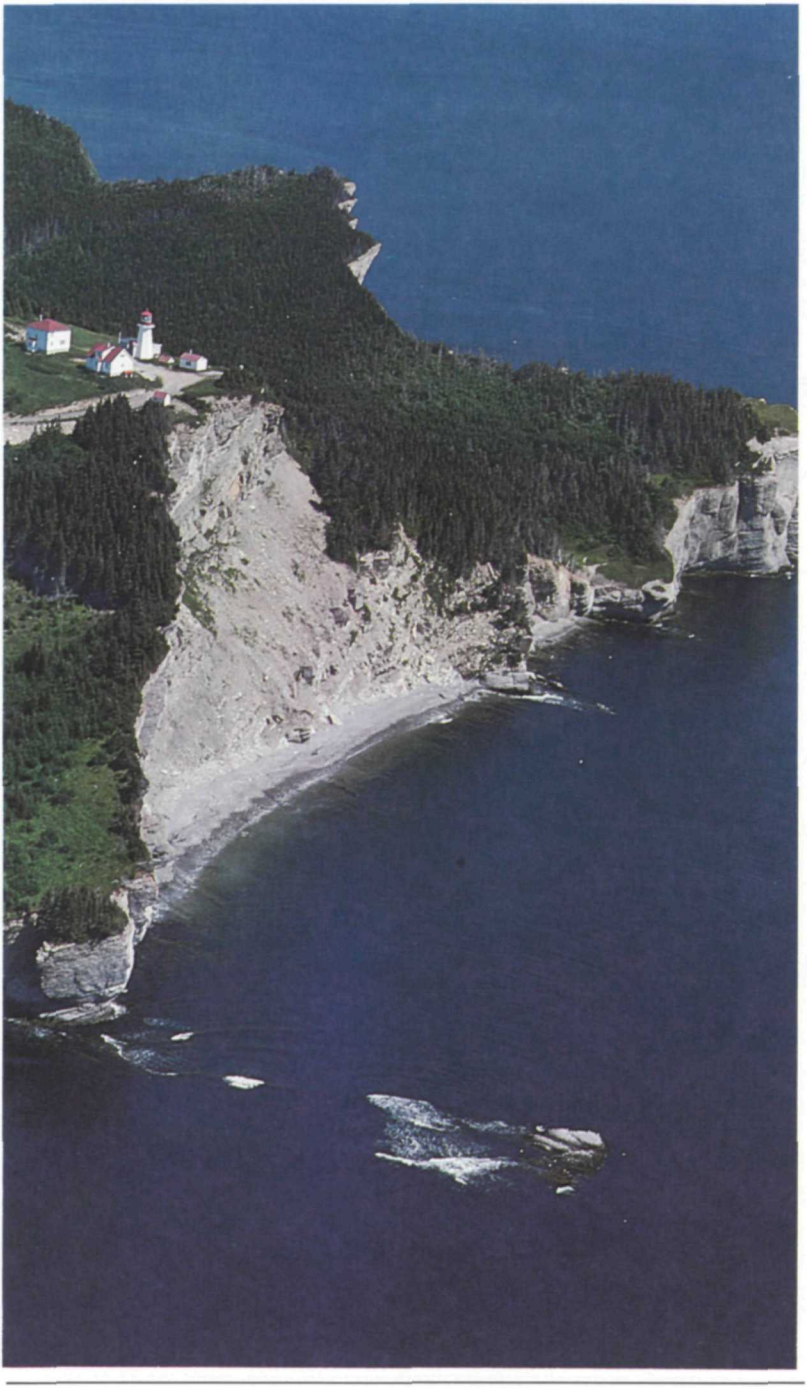
Champlain first applied the term "forillon" to our part of the world. In his text of 1626, in which he describes "Gaspey" and "Cap de Gaspey," he also adds: ". . . at a distance of one league from Cap de Gaspey, is a small rock that is called the farillon, separated from land by a stone's throw." In this text he spells the word "farillon." However, the legend to his 1632 map spells it "forillon" (number 74, next to the word Gaspay on

his map). The entry reads "Forillon, à la pointe de Gaspey." These entries give rise to several unresolved points:

1 The spelling "farillon" is most probably a transcription error since the word "forillon" was a word of current usage, and since Champlain corrects the spelling six years later on his 1632 map, where he also corrects other errors appearing on his 1613 map.
2 The exact location of the "small rock separated from land by a stone's throw" is not at all certain. It could be the rocky island at the extreme end of the Cap Gaspé promontory that various cartographers subsequently named Forillon, Fourillon, La Vieille, Old Woman or Flowerpot.
3 If La Vieille and Champlain's Forillon are one and the same rock, as a number of people agree and as Champlain himself seems to imply on his map ("Forillon, à la pointe de Gaspey"), it is difficult to reconcile the facts with Champlain's own journal, which clearly describes the rock as being at "une lieue du Cap de Gaspé" (at one league from cape Gaspé), i.e. either opposite Anse-Saint-Georges or on the other side completely, opposite the Bon Ami cape.

The above is a review of what the author has found on the origin of the name Forillon. The problem would be solved if it could be shown that Champlain's journal contained a second transcription error. If that all-important sentence did, in fact, say after describing Gaspé (i.e. Grande-Grave), "& à une lieue *au* Cap de Gaspé, est un petit rocher que l'on nomme le forillon . . ." instead of "& à une lieue *du* Cap de Gaspé, est un petit rocher que l'on nomme le farillon . . ." everything would concur ("au" meaning "at" and "du" meaning "from"). Then it would be clear that Champlain's Forillon was at Cap Gaspé, the same rock outcrop that later became La Vieille and the Old Woman.

Whatever actually happened, the name of the little rock was gradually extended to include the entire Presqu'île. With the establishment in 1970 of Forillon National Park, it was extended to cover an even larger peninsula, the whole expanse of the park's territory. There could not have been a better name, for Forillon truly reflects the park; it has both a natural and a historical touch.



FOR THE VISITOR

As with any place, a park may be visited hastily; you may be satisfied simply to "have seen it." In which case, your appreciation will be strictly limited to the obvious sights, and you will be sure to miss the many particular experiences such a place has to offer.

HOW TO VISIT FORILLON

At the turn of the century, the French philosopher Alain, in his *Propos sur le bonheur* (*Comments on Happiness*), made a number of suggestions for travellers about how to visit new places. He pointed out among other things that for the person who is on the run, everything looks the same; one has to be prepared to stop and look closely to truly appreciate.

In a natural environment, sometimes moving only a few metres is enough to give you a new perspective. Or stopping in a single spot for just a few minutes lets you perceive a bird, a smell or a noise you would have otherwise missed. Standing quietly allows your senses to become informed about your surroundings.

Whether you come to Forillon to enjoy the seaside with your children or to explore the rich landscape of these natural surroundings, your stay should be a memorable one. All that is required from you is a bit of curiosity, and you will be gratified. Nature here is both generous and accessible.

HOW TO GET THERE

Forillon National Park, which is at the very tip of the Gaspé along the south shore of the St. Lawrence River, can be reached by Highway 132 (see figure 1). At approximately 1000 km from Montreal, it can be reached by car in about twelve hours. Whether you choose to make the trip in a single long drive, as some regular visitors do, or prefer to stop once or twice along the way, the view along the river, sometimes bordering fields

Cap Gaspé and the base of the rock called La Vieille 111

Campground developed in the Cap-des-Rosiers plain

and sometimes high cliffs, is sure to whet your appetite for the charms of the Gaspé.

Gaspé can also be reached by bus, train and plane; a rental car gets you from the townsite to the park in about twenty minutes.

ACCOMMODATION AND RELATED SERVICES

Camping in Forillon Park is particularly enjoyable because of the absence of biting insects. There are approximately 350 developed campsites at Forillon, located in three main campgrounds, each of which has its own special landscapes of cliffs, sea and forest. Tent and vehicle sites with on-site picnic tables and fireplaces are available, and within easy reach of the sites are water outlets, firewood, kitchen shelters with tables and wood stoves, comfort stations, showers and toilets. There is also a group campground for tent camping, which can be booked in advance. Finally, there are a number of wilderness campsites located in the backcountry. A dozen attractive picnic sites are found along the roads and in the developed areas. (See figure 6.)

For visitors seeking a different sort of accommodation, the cities and towns bordering the park have campgrounds with electricity, motels, hotels, inns and cottages, as well as restaurants, garages, banks, laundry facilities and other services.

VISITOR RECEPTION CENTRES

Whether entering the park from the north or the south, we recommend stopping at one of the two visitor centres located at the park entrances along Highway 132 at the outskirts of Rivière-au-Renard and at Penouille.

The centres, open throughout the summer, are staffed by people who will provide leaflets, maps and other information about services available in the park, and help plan each visitor's stay to suit his or her tastes and requirements.

THE INTERPRETATION CENTRE

The interpretation centre, which is located near the Cap-des-Rosiers harbour where the road to Cap-Bon-Ami begins, should be visited as soon as possible after you arrive at the park. Its exhibits and slide show give an overview of the character of Forillon Park, as well as special information about the things to look for during your visit. Its aquaria will introduce you to the hidden world of the nearby sea. It is staffed by park naturalists who can inform you when, where and how to best see and learn about the wildlife and history of the park — in short, how to make the most of your stay.

THE INTERPRETATION PROGRAM

This book has made it clear that Forillon is an extraordinary region which requires a comprehensive and challenging interpretation program. This program has been designed to bring visitors into direct contact with significant features of Forillon, and at the same time to facilitate their understanding of these features in ways that are suitable for family members on vacation. The program does not treat nature in general but rather aspects of nature peculiar to Forillon, which means that visitors will not have seen such presentations elsewhere.

During the summer (from Saint-Jean-Baptiste Day — June 24 — to Labour Day) there is a daily program of guided walks and demonstrations and evening slide talks in the campground amphitheatres.

Finally, some fifty interpretive signs located in key areas explain the natural or historical significance of various important sites.

It is our hope that through this entertaining program we can increase your awareness of the wealth of the park's resources, and gain your support for our efforts to preserve all of the park's natural and historical heritage.

DISCOVERING ON YOUR OWN

Even though the interpretation program was designed to help visitors see more than they would have been able to on their own, there are nevertheless parts of the park that are excellent for individuals or families to

An interpretation event, to see more and understand better

An inspiring area for painters

Les Graves trail, Anse-Saint-Georges

Nature photography

Exploring for the joy of it

explore by themselves. The same is true of areas already covered on guided hikes, since returning to them allows you to savour the area in your own way. You can explore along *trails*, sections of abandoned roads or roads closed to motor vehicles, and also along *beaches*, those natural trails that border the sea.

We particularly recommend:

— the Cap-Bon-Ami area with its sculpted cliffs and pebble beach sheltered between two capes;
— the Grande-Grève area, where the cultural trail ''Une tournée dans les parages'' with its twenty exhibits recalls the local lifestyle of the past, as the harbour remains the site of traditional fishing activities.
— the whole southern coastline of the Forillon peninsula from Grande-Grève to Cap Gaspé along the Les Graves trail, especially the stretch from Anse-aux-Sauvages to Cap Gaspé;
— the Penouille area with its distinctive forest and its long sandy beach;
— the short La Chute trail for a brief walk in the forest to a refreshing waterfall.

The visitor can therefore travel up, down and across the park using the system of *trails* that caters to those who like long hikes as well as to those who would rather take shorter walks along easier paths. In addition to those we have just mentioned, the trails that best display Forillon's fea-

tures are the Chemin de la Grande-Montagne (which links Cap-Bon-Ami to Grande-Grève) and Mont Saint-Alban (from whose peak one can see the whole of the Forillon peninsula, and on a clear day, Anticosti Island).

Forillon, because of its powerful landscapes, and its ambience that from one location to another changes with the time of day, the weather and the seasons, kindles a feeling of wonder and inspiration in all who take the time to appreciate it. *Photography, painting*, or even mere *contemplation* are activities ideally suited to the park.

The neighbouring sea is also full of opportunities:

— you can *fish* for mackerel and flounder directly from the docks; no licence is needed;

— *cod fishing* requires an outing by boat; daily excursions are available from private companies during the summer;

— you can *swim*, especially where the water is warmest and the sand is at its finest; the Penouille beach was developed for this purpose, but sometimes there are currents warm enough to make swimming on other beaches possible, including Petit-Gaspé, Grande-Grève, Anse-aux-Sauvages, Cap-Bon-Ami and Cap-des-Rosiers;

— *scuba diving* or *snorkeling* make it possible to discover unexpected seascapes. The colours of the sea bottom and the abundant forms of life are always surprising (equipment can be rented in Gaspé and tanks refilled locally);

— boat *cruises* in safe craft are available along the northern coast of the Forillon Presquîle making it possible to see the colonies of seabirds and seals. These excursions are obviously enhanced by the presence of a park naturalist or trained guide.

For those who would like to try their hand at catching small trout, *freshwater fishing* is permitted if a park fishing licence is purchased. Nevertheless, fishing from the wharves is particularly recommended because of the variation in the size of the fish, and the surprising kinds of fish found in salt water.

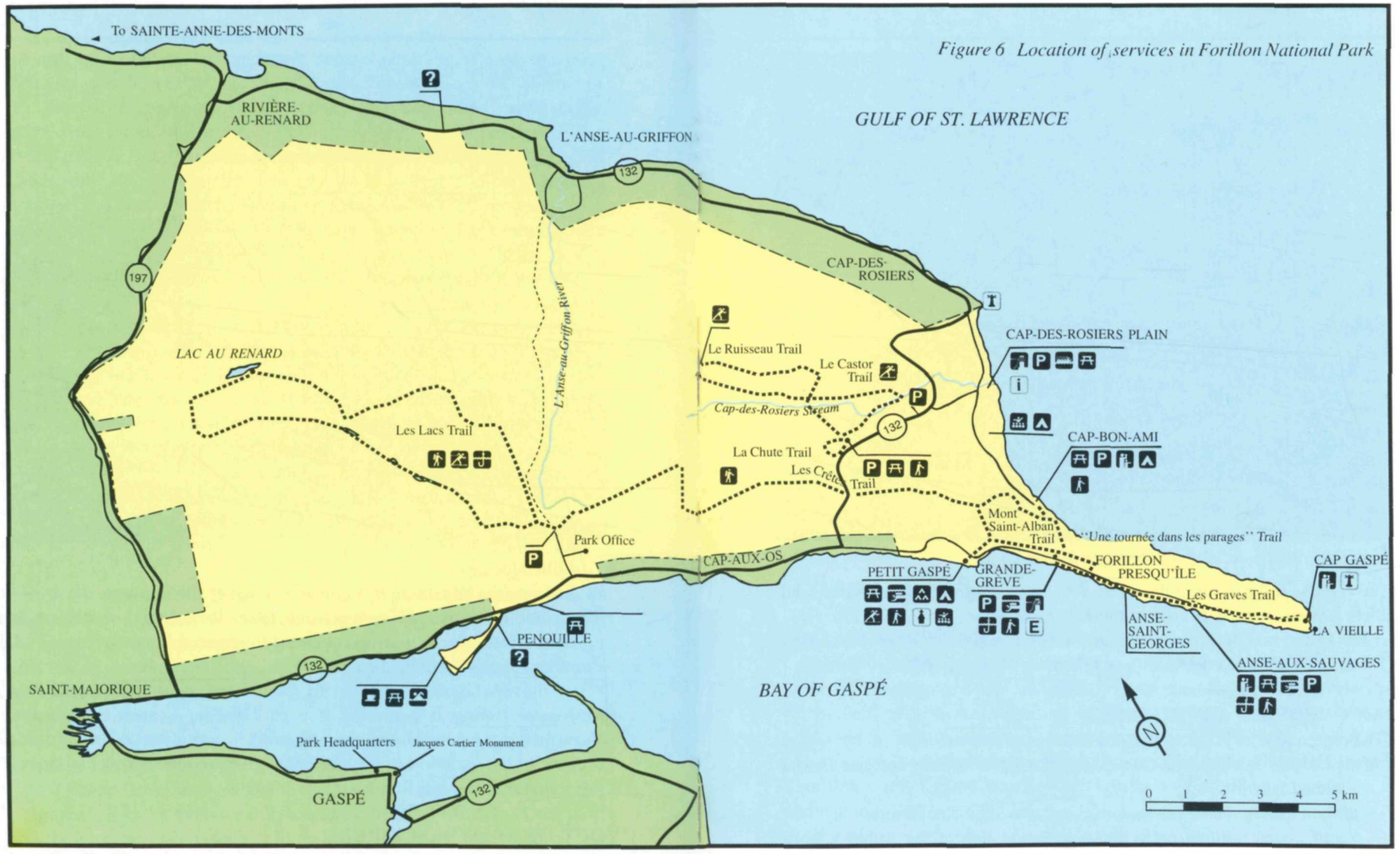
OUT OF SEASON SERVICES

In principle, *camping* is possible year round. One loop of the Petit-Gaspé campground is kept open until the end of the Thanksgiving weekend. After this date, the camping facilities become more primitive: once the road is closed by snow, campers must walk to the group campground.

Interpretation services are also offered year round. However, after Labour Day, visitors should reserve in writing or by telephone to allow the staff to co-ordinate visits to the interpretation centre, which remains open on request to school groups, social groups, organized tours and individuals.

In winter, *cross-country ski trails* of varying lengths extend the season

Figure 6 Location of services in Forillon National Park



Mooring	Group camping	Exhibit	Scuba diving
Amphitheatre	Snack bar	Park boundaries	Road
Bathing	Visitor Reception Centre	Parking	Secondary road
Viewpoint	Interpretation Centre	Fishing	Walking trail
Tour boats	Pedestrian road	Lighthouse	Hiking trail
Camping	St. Peter's Church	Picnicking	Cross-country skiing

Lighthouse at Cap-des-Rosiers, the tallest in Canada

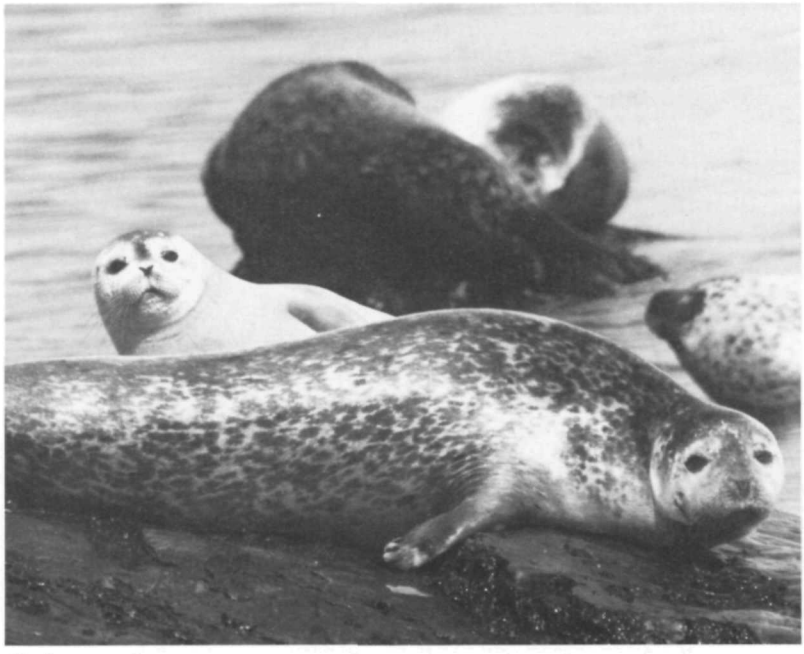
for visiting and exploring the park. The trails are groomed regularly, and there is a way station on each of them.

For additional information please write Forillon National Park, Box 1220, Gaspé, Quebec G0C 1R0, or telephone (418) 368-5505.

AN OVERVIEW OF THE AREA

The region around Forillon also has its own attractions:

— the Musée régional de la Gaspésie, in Gaspé, bordering Jacques Cartier National Historic Park;
— salmon fishing on the Dartmouth, York and Saint-Jean rivers;
— a golf course, dining room and accommodation at the Auberge Fort-Prével (a Quebec government school for the hotel trade);
— the Manoir Le Bouthillier, at L'Anse-au-Griffon;
— the seafood processing plant at Rivière-au-Renard and its large trawler harbour;
— the Anse-au-Griffon fishing harbour with its old-fashioned cod processing plant (salting and drying of the "Gaspé Cure");
— the Cap-des-Rosiers lighthouse, the tallest in Canada;
— a little farther away, some 90 km from Forillon, the Percé area and Bonaventure Island (visit the Canadian Wildlife Service's Interpretation centre).



Harbour seals

LENGTH OF STAY

According to the comments of numerous visitors we have had over the past several years, it appears that many of them were sorry they had not planned to stay longer at Forillon. They find that once they are here, it takes at least four or five days to truly savour what the area has to offer.

In fact, if you are interested in nature and the least bit curious to discover a multitude of new things about the sea, wildlife, geology or history, you will find plenty to keep you occupied here for a full week. Forillon is much more than a place to camp — it is truly an experience, an adventure.

SUGGESTED READING

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Pamphlets, brochures and other documents concerning the national parks of Canada, national historic parks and historic canals may be obtained at Parks Canada, Information Services, 10 Wellington St., Hull, Quebec K1A 1G2.

Everywhere in the park, wildlife is easily seen

PHOTOGRAPHS AND ILLUSTRATIONS

All the photographs in this book were taken by Maxime St-Amour and are part of his personal slide collection.

The maps were drawn by May Rousseau.

The sketch on page 91 comes from a geological report by J. M. Clarke.

INDEX

Located on a strategic finger of land pointing into the Gulf of St. Lawrence at the mouth of the St. Lawrence River, Forillon National Park is truly one of Canada's special places. Rocky headlands shelter secluded beaches, varied habitats teem with a diversity of plants and animals, and everywhere the generosity of nature invites discovery. For centuries the presence man has shown how it is possible to live here in harmony with the land and the sea.

Chief park naturalist **Maxime St-Amour** offers the reader an overall view of the park's features — its landforms, wildlife, marine context and human history — highlights that are guaranteed to intrigue the visitor.

A practical section on the services offered to the public, together with maps and enticing photos, compliment the text.

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