

## CHAPTER 1

# PHYSICAL SETTING

### 1.1 Structure and development

The bedrock foundation of Canada and its submarine continental shelves seem rigid and unchanging to most human eyes, yet to a geologist these rocks and their mineral wealth record the evolution of a continent begun more than 4,000 million years ago. Geological study has shown that at various periods and in various regions molten rocks rose from great depths, volcanoes erupted on the ancient land and seafloors, and thick sequences of sediments accumulated. Granites were either intruded as molten magma or derived from earlier rocks during intense folding and mountain building. Erosion wore down or subdued the older mountain chains. Shallow seas repeatedly encroached on the continent of today and continental glaciers accumulated and receded. As part of these geological processes, valuable minerals and fossil fuels became concentrated under exceptionally favourable conditions. These interrelated processes produced the buried crust and present face of Canada. They control the distribution of its economic mineral deposits, its physiography and, in large part, its present and potential land use.

#### 1.1.1 Dimensions

Canada is the largest country in the Western Hemisphere and second largest in the world. Its territory is diverse, ranging from wide fertile prairies and farmlands, great areas of mountains, rocks and lakes to northern wilderness and Arctic tundra. The greatest north-south distance is from Cape Columbia on Ellesmere Island to Middle Island in Lake Erie, 4 634 km. The greatest east-west distance is from Cape Spear, Nfld. to the Yukon-Alaska border, 5 514 km.

Although the area is recorded as 9 970 610 km<sup>2</sup>, for land and freshwater, Canada also encompasses the Canadian continental margin. The offshore areas of the margin, including Hudson Bay, cover over 6.5 million square kilometres, an area equivalent to over 60% of Canada's total onshore area.

#### 1.1.2 Regional geography

Politically, Canada is divided into 10 provinces and two territories. Each province administers its own natural resources. The resources (except for game) of Yukon and Northwest Territories are administered by the federal government, because of the extent and

remoteness of the territories and their sparse population. Land and freshwater areas of the provinces and territories are given in Table 1.1. Throughout the *Canada Year Book* the provinces are listed from east to west, followed by the territories. Populations quoted in this section are from the 1981 Census, conducted by Statistics Canada.

**Newfoundland** is Canada's most easterly province (population 567,681). The larger part, Labrador, borders the north Atlantic Coast to Hudson Strait and extends inland about 750 km toward its southern end. The surface is mostly a barren mosaic of rocks, swamps and lakes; its rugged coastline has promontories rising directly from the sea. The extreme northern area is dominated by the Torngat Mountains, rising to 1 650 m. Labrador has a rigorous climate and is snow-covered for more than half the year. Many of its river valleys are well forested. Rivers have numerous falls suitable for hydro development such as Churchill Falls. Coastal waters abound in fish. The Precambrian rocks have mineral potential; iron ore is Labrador's greatest source of wealth.

The Island of Newfoundland is also rugged. The Long Range Mountains parallel the western coast and rise to heights of over 800 m. Old, worn-down fold-ridges have axes trending northeast to southwest. Much of the surface is barren and rocky and has innumerable ponds and swamps, the drainage having been deranged in the last glaciation. The moderating influence of the sea is reduced by the cold waters of the Labrador current sweeping along the east and west coasts. Summers are cool and winters relatively mild.

The capital city is St. John's (population 83,700), on the east coast of the Avalon Peninsula. Other urban areas are Corner Brook on the west coast and Grand Falls in the central part of the island, both pulp and paper centres.

**Prince Edward Island.** The smallest province (population 122,506) is cradled in the Gulf of St. Lawrence, east of New Brunswick and north of Nova Scotia and separated from them by the Northumberland Strait. It has no pronounced upland but attains an altitude of about 140 m above sea level. The coast is greatly indented and has many bays and inlets