of exploring and exploiting their natural resources, and so, within the confines of the continental slopes, Canada embraces 5,526,000 sq miles (15,000,000 sq km), about 3% of the surface of the globe.

For a full description of Canada's geology see the *1973 Canada Year Book* pp 8-14.

1.3 Climate and time zones

1.3.1 Climate

Shaped by the general movement of air from west to east and the geography of North America and adjacent areas, there are many climates throughout Canada. The climate of the Pacific coast is cool and fairly dry in summer but mild, cloudy and wet in winter. Interior British Columbia has climates which vary more with altitude than with latitude: wet windward mountain slopes where there are heavy snows in winter, dry "rainshadow" valleys which are very hot in summer, and marked day to night temperature contrasts on the high plateaus. A vast area of interior Canada, extending westward from Ontario to the Rocky Mountains, experiences a truly continental-type climate — bitterly cold winters, short but warm summers and scanty precipitation. The southern portions of Ontario and Quebec experience a humid climate with cold winters, hot summers and generally ample precipitation throughout the year. Similarly the four Atlantic Provinces have a humid continental-type climate although in the immediate coastal areas there is a marked maritime effect. On the northern islands, along the Arctic coast and around Hudson Bay true arctic conditions persist, with long frigid winters as only a few months have temperatures averaging above freezing each year. The precipitation is quite light in this tundra area north of the treeline. Between the arctic and southern climates a vast band of Boreal Canada from the Yukon Territory to Labrador has a transitional type climate with bitter long winters but appreciable summer periods. Precipitation is light in the west, but more generous falls occur in the Ungava Peninsula. Detailed studies of the climates of Canada and of the various regions are available from the Atmospheric Environment Service of the federal Department of the Environment.

Climatic data. Temperature and precipitation data for typical stations in various Canadian districts are shown in Table 1.7. Additional data from hundreds of stations and data dealing with other climatological elements are available in the statistical climatological data publications of the Atmospheric Environment Service, Environment Canada. Definitions, methods of observation, the instrumentation used and other information are also to be found in these publications.

1.3.2 Standard time and time zones

The rotation of the earth on its axis was considered at one time to be entirely uniform and the unit of time, which is the second, was defined as 1/86400 of the mean solar day. Improvements in clocks and in the methods of making astronomical observations demonstrated conclusively that there are irregularities in earth rotation too large to be neglected. So, in 1956 the International Committee on Weights and Measures defined the second in terms of the annual motion of the earth about the sun, called ephemeris time. In 1957 the first cesium atomic clock was calibrated with respect to ephemeris time, but not until 1967 was the cesium second adopted as the international standard. The second today is defined as the duration of 9,192,631,770 periods of the radiation corresponding to a transition of the cesium atom.

Based on atomic clocks, Canada's time is established by the National Research Council with a precision of one ten-millionth of a second per day, and co-ordination with other countries is maintained to the same precision through the *Bureau international de l'Heure* in Paris. Irregularities in the rotation of the earth give rise to a difference between mean solar time and atomic time, and a leap second is introduced to ensure that this difference, called DUTI, does not exceed ± 0.8 seconds. At present DUTI is decreasing by about one tenth of a second per month, and positive leap seconds were necessary on June 30 and December 31, 1972, and December 31, 1973.

A continuous broadcast of Canadian time is made on station CHU, Ottawa (3330 kHz, 7335 kHz, 14670 kHz), with a bilingual voice announcement each minute, and with a split pulse code to give the value of DUTI. Once a day the time signals are broadcast across Canada on the CBC networks.

Standard Time, which was adopted at a World Conference held at Washington, DC, in