

of the earth's crust and interior as revealed by the peculiarities in the *time-distance curves* for earthquakes.

A time-distance curve, as its name implies, shows the relation between the arcual, surface distances from the origin of the earthquake to the various recording stations and the elapsed time required for the initial impulses and their various reflections to reach each station from the origin concerned. Of late years, these time-distance curves have been greatly improved. It may be said that their further improvement must be through taking account of the depth of the origin—the *focal depth*. The point within the earth from which the energy of an earthquake is liberated is called the *focus*; the point vertically above the focus, on the surface, the *epicentre*.

The records of seismographs within five hundred miles of an earthquake are used to determine the epicentre, focal depth, and focal time. These same stations, together with the others at distances up to the antipodes of an earthquake, are used to determine arrival times for making up the time-distance curves. The curves themselves are the point of departure for the earth's crust and deep interior.

Previous to the beginning of the present century, seismological records for Canada are mostly to be found in historical documents. Such are our only reports of a great earthquake which disturbed Eastern Canada from above Montreal to below Quebec during the first part of the year 1663. Other earthquakes in Eastern Canada, for which similar records alone are available, occurred in 1732, 1791, 1860, and 1870. In 1925 another earthquake took place in the same region. It was the subject of careful study by the seismological division of the Dominion Observatory and several reports were published. Another, on Nov. 1, 1935, which occurred near Timiskaming, Que., was also carefully studied. It is known that the earthquakes of 1925 and 1935 were felt over wide areas. The former was reported from Duluth to Halifax and from the Arctic to the Carolinas. The latter was felt even farther west and as far south as Virginia. Many smaller earthquakes are experienced in Eastern Canada from time to time. Those previous to 1906 are listed from historical records. The subsequent ones have been recorded on seismographs.

The only other regions of Canada where earthquakes are sometimes experienced are British Columbia and the Arctic. The earthquakes in the west have been mostly centered near the Queen Charlotte islands and, within the brief span during which records are available, none has been severe. A severe earthquake occurred off Banks island in the Arctic in 1920 and three of great intensity have since been centred in Baffin bay. The first of these occurred on Nov. 20, 1933. It is suspected that many small shocks, recorded on seismographs in Canada, originate in the almost uninhabited regions of the north but this has not, as yet, been established.

Previous to Dec. 1, 1936, two government departments carried on seismological investigations in Canada. Seismological stations were established at Toronto (1897), and at Victoria (1898), each under the auspices of the Meteorological Service. Stations at Ottawa (1905), Halifax (1915), Saskatoon (1915), Shawinigan Falls (1927), and Seven Falls (1927) were established by the Dominion Observatory. The stations at Halifax and at Saskatoon are maintained, respectively, with the co-operation of Dalhousie University and the University of Saskatchewan. The stations at Shawinigan Falls and at Seven Falls are maintained with the co-operation of the Shawinigan Water and Power Company. On Dec. 1, 1936, the Toronto and Victoria stations were taken over by the Dominion Observatory which now has charge of all seismological work—routine and research—being carried on.