



volcano, 80 mi. NE of Prince Rupert.

One of the most majestic and spectacular volcanoes in British Columbia is the Mount Edziza complex which covers an area of about 200 sq. miles (520 sq. km), along the eastern margin of the Coast Mountains in northwestern British Columbia. Mount Edziza has erupted at least three times during the last 1800 years. This volcanic area was designated as a provincial park in 1972.

Numerous small, perfectly preserved cinder cones in central British Columbia are less than a few hundred years old.

Although volcanoes may be violent destroyers of man and his industry, they may be benevolent also to mankind when they create new land, provide building materials, create natural protective barriers, contribute to the formation of ore deposits and provide a source of energy.

Ancient volcanoes play an important role in estimating Canada's mineral resources. Many volcanic belts bear ore deposits that are related to the volcanism. Consequently geologists map and study volcanic belts to understand the nature of the volcanoes and the environment in which they erupted, and thus provide a working model for mineral exploration.

With the recent energy crisis emphasizing the limitations of fossil fuel resources, volcanoes and their associated near-surface magma chambers (large reservoirs of molten rock) are being looked to for sources of geothermal energy. Geothermal energy is the heat trapped below the earth's crust.

Temperature increases with depth below the surface of the earth. The average temperature gradient in the outer crust is about 1°C per 100 ft. (30 m) of depth. In certain regions, however, the temperature gradient

*Top: lava flow has built a plateau up around the peak of Mount Edziza some 19 miles wide, 25 miles long and 1 mile thick (16 km x 40 km x 1.6 km). Bottom: south of Mount Edziza.*

## Evidence of volcanism in Canada and prospects for geothermal energy

Volcanism has taken place since the earliest stages of the formation of the earth's crust. Major episodes of volcanism occurred many millions of years ago. Most volcanism during recent times occurred along major fracture zones in the earth's crust, such as the mid-Atlantic ridge (a great submarine mountain range) and the Pacific "rim-of-fire" (a zone of active volcanism and earthquake activity around the margin of the Pacific Ocean).

Remnants of some of the most ancient volcanoes are found in the vast

area of the Canadian Precambrian Shield, which underlies most of Quebec, Ontario, northern Saskatchewan and Manitoba, and the Northwest Territories. Recent volcanism is restricted to western British Columbia, where there are 128 known Pleistocene (ice age) and younger volcanoes.

One of the youngest eruptions in Canada is the Aiyansh volcano that erupted about 220 years ago in the vicinity of the Nass River. Indian legends tell of the engulfment of a village by the lava flowing from this



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may be as much as 100 times the normal. Such "thermal" regions are commonly closely associated with volcanic activity and earthquakes.

Production of electric power is the most important application of geothermal energy. A geothermal plant can provide a cheap and reliable supply of electrical energy. In contrast to energy derived from fossil fuels or from radioactive sources, geothermal power is nearly pollution-free and there is little resource depletion. Geothermal power is a significant source of electricity in Iceland and New Zealand and has been furnishing electricity to Italy since 1904. Experts have estimated that 20% of the U.S. power needs could be supplied by untapped geothermal energy sources.

Geothermal energy is versatile. It is being used for domestic heating in Italy, New Zealand and Iceland. In 1969, 40% of Iceland's population lived in houses heated by geothermal energy. It is being used for forced raising of vegetables and flowers in green houses in Iceland, in parts of the U.S.S.R. where the climate is too harsh to support normal growth, for animal husbandry in Hungary and Japan, and for fish hatchery and feeding in Iceland.

Geothermal energy can be used for simple heat processing, drying or distillation in every conceivable fashion, refrigeration, de-icing, tempering in various mining and metal-handling operations, sugar processing, production of boric acid, salts from seawater, pulp and paper and wood processing. Geothermal desalinization of seawater holds promise for abundant supplies of fresh-water.

Geothermal energy should no longer be regarded as an interesting freak of nature, as a tourist attraction in the form of fumaroles (holes or vents from which fumes or vapors issue) and geysers, with the only practical application of curing various human ailments. In some areas it is a real alternative to fossil fuels, and in the future it may help in meeting the demands for more energy.

— M.B. Lambert



*Above and below: volcanic cones on the plateau in the provincial park. An old Indian woman at the beginning of this century told white visitors to the Mount Edziza area of her childhood memories of seeing the skies turn red and feeling the earth shake, of thunderous roaring and ash clouds blotting out the sun — possibly memories of a volcanic eruption. Mount Edziza, apparently, is still alive and could erupt again.*

