

lava flows from distant vents have the possibility of being channeled into the storage area. Studies are currently underway to determine the K-Ar ages of approximately a dozen lava flows encountered in cored drill holes at the RWMC to determine the recurrence interval of flooding of the waste storage site by lava flows.

In a similar study, K-Ar dating of five basalt lava flows in cored drill holes at a proposed reactor site at INEL showed that the site had been covered by the flows over a period of about 350,000 years. The K-Ar age data indicate that the site has been covered by lava flows at irregular intervals from perhaps a few thousand to as much as 150,000 years, with an average recurrence interval between flows of approximately 50,000 years.

Field mapping of the Craters of the Moon lava field, Idaho

Field mapping of the Holocene Craters of the Moon lava field in south-central Idaho by M. A. Kuntz and D. C. Champion (USGS) and R. H. Lefebvre (Grand Valley State College) shows that a large part of the lava field was formed approximately $10,000 \pm 2,000$ years ago, by tube-fed pahoehoe and as flows erupted from large spatter cones at the north end of the Great Rift. Several flows traveled as much as 45 km from their source vents. The older flows are covered by extensive younger flows, erupted about 2,000 to 2,400 years ago, also from large cinder cones at the north end of the Great Rift. Samples of organic soil were collected from beneath about 20 lava flows for radiocarbon age determinations; the data should provide the information necessary to provide an evolutionary model for the lava field. In addition, the age data will provide a framework for evaluation of the secular variation of the Earth's magnetic field during the last 12,000 years. The chemical and age data currently available suggest that lavas ranging from olivine tholeiite (~45 percent SiO_2) to ferrolatite (~63 percent SiO_2) were erupted nearly simultaneously from adjacent fissures in the Great Rift volcanic rift zone during several periods in the evolution of the lava field.

Structurally complex roots of a caldera near Questa, New Mexico

Reconnaissance mapping by P. W. Lipman of a little studied upper Tertiary volcanic field in the Sangre de Cristo Mountains near Questa, N. Mex., has led to recognition of a volcano-plutonic assemblage of remarkable structural complexity. This assemblage may reflect formation of an ash-flow

caldera in an extensional tectonic environment, related to early growth of the Rio Grande rift. A single cooling unit of rhyolitic ash-flow tuff 1 km or more thick overlies a chaotically brecciated assemblage of intermediate-composition lavas and intermixed tuffs. This assemblage is cut by compositionally and texturally diverse high-level granitic intrusions (with published dates of 22-23 m.y.) analytically indistinguishable from a single date on the ash-flow tuff. Structural interpretation of this volcano-plutonic association, which may represent a caldera-fill assemblage, is complicated by repetition and rotation to near vertical dips along north-trending normal faults. These faults have displacements that are generally down on the west, a geometry similar to that of the Sangre de Cristo frontal fault system along the east boundary of the Rio Grande rift. Exposures along these fault slices and steep west slope of the mountain range appear to provide a vertical cross section of several kilometers through the interior of the caldera. This probable caldera is of economic interest because a large zone of major acid-sulfate alteration and molybdenum mineralization, which includes the open-pit Questa Mine, occurs along its south margin in the Red River area.

Initial strontium values of rocks from the Pioneer Mountains

Initial strontium (i-Sr) values of Cretaceous intrusive rocks of the Pioneer batholith, and of rocks within the Proterozoic X gneissic basement complex nearby, were determined by J. G. Arth in conjunction with the areal mapping and petrologic studies of E-an Zen. Arth found that the i-Sr values of the batholithic rocks fall into two groups, those at or near 0.7113 and those at or near 0.7138. Zen finds that these two groupings are compatible with an interpretation of the field relations, which shows these two groups to form two distinct intrusive series, even though on a Harker variation diagram the two groups are not distinguishable. Because the two groups yielded identical K-Ar ages by concordant hornblende and biotite determinations, they presumably coexisted as two distinct but contemporaneous magma bodies, and differentiation within each body could have given rise to various plutons within each series. The i-Sr values are much higher than those of the Boulder batholith (Tilling, 1973); the values are also sufficiently high as to suggest highly differentiated parent material such as sedimentary rocks, even though the rocks exhibit petrologic features suggestive of the I-series of igneous rocks according to the nomenclature of White and Chap-