than of deep-seated structures. This change in style is abrupt and provokes speculation as to a possible cause. A fundamental difference between the western and eastern parts of the plain is the relative youth of volcanism in the east. Although some relationships remain ambiguous because of a lack of sufficient control, there is still a suggestive coincidence between the locations of the most youthful volcanism and gravity lows. For example, the youngest event (Craters of the Moon) is marked by a distinct gravity low and a somewhat older event (Hell's Half Acre) is associated with a low gravity trough between two highs. It is hypothesized that the shallow-structure character of the eastern plain may be in part caused by thermal effects relating to recent volcanism. Models combining gravity with thermal history are used to evaluate this hypothesis.

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RATIONAL MODELS FOR GEOTHERMAL SYSTEMS

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Design of a rational exploration program to locate geothermal systems requires the use of physical and geological models which have some chance of actually existing. When many geothermal prospects have been drilled, we will have reliable information about the physical nature of geothermal systems. In the meantime, we must rely on intuition to construct models which serve as the target for an exploration program. One model which is currently popular is that of a large magma chamber shallow in the crust providing heat to convective geothermal systems lying above this chamber. The "big cave" model is attractive because of its simplicity, but geophysical data from known geothermal fields do not support its existence. Other models in which heat is transported and trapped close to the earth's surface by fluid transport in ground water or by refraction of heat flow by rock masses having widely different thermal conductivities can also be developed to explain the presence of geothermal systems in areas with low volcanicity. These models do not require the presence of molten rock in the section, although volcanism may accompany such systems coincidentally. The tactic used in exploration are quite different, though, when there is no need for a molten rock mass than when the heat source is a cave filled with molten rock.

BEAR BUTTE, A QUATERNARY LAVA CONE, BLAINE COUNTY, IDAHO

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Bear Butte is a basaltic lava cone located about 50 km south of Arco, Idaho on the Snake River Plain. The cone has resulted from multiple eruptions. It stands approximately 60 meters above the surrounding younger flows and covers an area of about 19 km^2. Although covered by varying thicknesses of soil, primary geomorphic features are well preserved. Among these features are collapse depressions, lava channels, and spatter ramparts. Bear Crater is the triangular summit vent of Bear Butte and is approximately 780 meters long and 250 meters wide. The irregular shapes of the butte and the crater are the result of a southward migrating eruptive center. There appears to have been a sequence of three major eruptive periods and several minor eruptive intervals. The first two major periods were cone building stages with flow unit thicknesses of 1 to 3 meters forming flows from 25 to 30 meters in thickness. These are exposed in the crater walls. The lava from the third major period breached the southeast corner of the cone and flowed to the south forming two

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arge lava channels. Each of these channels exte
outh to the younger flows where they are obscure
ve a depth of 2 to 10 meters and varying widths
e minor eruptions resulted in the formation of
its at several stratigraphic levels and also i
te stage spatter ramparts.

HE GEOLOGY AND MINERAL DEPOSITS OF THE CUDDY MOU
DAHO

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The close association of composite plutons with
olybdenum deposits in the Pacific Northwest has
study of the Cuddy Mountains in West-Central Ida
faulting, folding, and Recent glacial and stream
River Basalts have exposed Mesozoic sedimentary,
rocks. The Mesozoic rocks present include Trias
olcanics, Triassic and Jurassic limestone, silt
porphyritic rhyolite tuff, and Jurassic Lucile S
clinal assemblage is intruded by a Jurassic comp
sequence of emplacement of the intrusive phases
diorite, and porphyritic granodiorite (200 m.y.)
temporally and genetically related to the most s
porphyritic granodiorite. The IXL porphyry copp
tourmaline breccia are localized in the pluton n
porphyritic granodiorite phase. Sulfide mineral
contact metasomatic zones and quartz veins in th
plutonic complex. Regional metamorphism has af
older rocks. Cretaceous(?) rhyolite porphyry d
show no associated mineralization.

Miocene Columbia River Basalts cover at le
complex. A well-developed erosion surface exis
basalts and any supergene enrichment in the old
preserved.

GEOTHERMALLY-PRODUCED ICE CAVES, MOUNT BAKER, W

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Approximately 1 km of geothermally-produced ice
base of the ice mass partially filling the subs
clad Mount Baker in the North Cascades of Washi
localize cave entrances near the west edge of t
by meltwater streams creates additional passag
larged by warm fumarole gases moving upslope f
Cave air temperature is 5°C. Gas masks provid
H_2S-rich atmosphere except in localized chambe
air pockets.
A narrow gap on the east side of the subsummit
crater lake spillover along a hydrothermally-a
Avalanches may also have been important. The
from the east cave entrance, flows into an une
ice and avalanche debris in the east gap, ente
and reappears at the snout, 2.3 km away, 3 hou
thermally-induced avalanches may temporarily d