

# MEETING

GUEST NIGHT—JUNE 1, 1987

ROBERT I. TILLING—Biographical Sketch



Robert I. Tilling was born in November, 1935 in Shanghai, China. He received a PhD. in Geology from Yale University in 1963. His doctoral dissertation involved batholith emplacement and contact metamorphism in the Paipote-Tierra Amarilla area, Chili.

Dr. Tilling began working for the U.S.G.S. in 1962 where he was involved with geochemical and petrologic studies of

the Boulder batholith, southwestern Montana. In 1971, he was appointed Staff Scientist on the NASA Lunar Sample Program at NASA Headquarters, Washington, D.C. In 1972, he transferred to the Hawaiian Volcano Observatory, located on the rim of the Kilauea volcano, to study Hawaiian volcanism. He became Deputy Chief of the Office of Geochemistry and Geophysics in 1976, in charge of geochemical, geophysical, analytical and geochronometric research for the U.S.G.S. From 1977 to 1981, Dr. Tilling was chief of the office of Geochemistry and Geophysics where he was responsible for work at Mount St. Helens. He initiated the establishment of the Cascades Volcano Observatory at Vancouver, Washington.

Presently, Dr. Tilling is with the U.S.G.S. Branch of Igneous and Geothermal Processes, Reston, Virginia where he works on Hawaiian volcanism and eruptive processes. Dr. Tilling is involved in a dozen professional societies including GSA, Geochemical Society, American Geophysical Union, and the American Association for the Advancement of Science. He has published over 100 articles and abstracts in various technical journals.

## ERUPTIONS OF HAWAIIAN VOLCANOES

The Hawaiian Islands are the exposed peaks of a huge, mostly submarine, volcanic mountain chain formed by countless eruptions of fluid lava. The distinctive linear shape of this chain reflects the progressive northwestward movement of the Pacific Plate over a fixed and deeper "hot spot," which provides heat to partially melt the overriding plate, forming magma. The "Big Island" (Hawaii) still overlies the "hot spot" and taps the magma source to feed the frequent eruptions of Kilauea and Mauna Loa volcanoes and an active submarine volcano (Loihi) off Hawaii's south coast. Over a span of about 70 million years, the combined processes of magma formation, eruption, and continuous movement of the Pacific Plate over the stationary "hot spot" have left a prominent trail of volcanoes across the ocean floor called the Hawaiian Ridge-Emperor Seamounts Chain.

Eruptions of Hawaiian shield volcanoes are generally nonexplosive, in contrast to the explosive eruptions of composite volcanoes such as Mount St. Helens of the circum-Pacific "Ring of Fire." Because of their typically mild nature and accessibility, Hawaiian eruptions with their

spectacular fountains, cascades, lakes, and rivers of incandescent lava, can be observed and monitored systematically and safely. The frequent eruptions of the active volcanoes of Hawaii provide an ideal natural laboratory for studying eruptive processes and products. Most of the volcano-monitoring techniques currently in use at other active volcanoes of the world were developed and/or refined by researchers at the Hawaiian Volcano Observatory, founded in 1912. More important from a human standpoint, the nearly continuous volcanic activity over the Hawaiian "hot spot" has created a string of beautiful islands—home to about a million people and a popular vacation spot for many more millions each year.