likely, the rewards of a successful operation of this kind would be exceedingly great.

In the meantime we have followed the initiative of Dr. George Kennedy* and practiced the art of drilling into hot substances by exploring the lava lake formed during the eruption in 1959 in the crater of Kilauea Iki. We have succeeded in drilling a 1-7/8-inch hole through the solid lava surface and found liquid lava at a depth of 21 feet. The solid lava floats on the underlying liquid due to the buoyancy provided by the bubbles contained in the solid. The experiment gave us the first really reliable measurement of the temperature of liquid lava in its natural state, which was found to be about 1075°C. We also were able to analyze the gases released from the lava, which turned out to be to a great extent water vapor with small quantities of argon, carbon dioxide, sulfur dioxide, and hydrogen.

Another and potentially more powerful application of nuclear explosions is connected with a strange variety of mining. It has been emphasized, particularly by Dr. John Grebe, that in deep underground nuclear explosions the earth can be considered as a retort, the nuclear power as the heat source, and that we may in this way execute chemical reactions on a very big scale. As a result we may change the minerals before we extract them from the earth and make them available in a much more useful form.**

*George Kennedy and Gary Higgins, Water and Power from Earth Heat, Part I, Institute of Geophysics and Planetary Physics, Univ. of California, Los Angeles 24, Calif. Feb. 1, 1962. D. E. Rawson and W. P. Bennett, Results and Power Generation Implications from Drilling into the Kilauea Iki Lava Lake, Hawaii. United Nations Conference on New Sources of Energy, E/CONF/35/G/5 April 1961.

**John J. Grebe and E. V. Luoma, Dow Chemical Co., Large Scale Chemical Reactions Underground; Proceedings of the Second Plowshare Symposium, May 13-15, 1959. Part IV, UCRL-5678.