A NEW SOURCE OF URANIUM

Caltech investigators find a way to extract the atomic energy fuels, uranium and thorium, from the ordinary granites of the earth's crust

CALTECH SCIENTISTS investigating possible new sources of the atomic energy fuels, uranium and thorium, have found that these elements exist in enormous quantities in the ordinary granites of the earth's crust. What's more, they can easily be extracted.

If atomic energy ever comes to supply much of the world's power requirements, the demand for uranium and thorium, already large, may amount to millions of tons. Looking ahead to this distant day, a group of Caltech scientists, under the direction of Drs. Harrison Brown and Leon T. Silver of the Department of Geochemistry, recently began a study of the possibilities of isolating uranium and thorium from ordinary igneous rocks.

An average granite, found in all parts of the world, contains only about 4 parts-per-million uranium and 12 parts-per-million thorium, but the Caltech researchers found that a large portion of the elements were usually present in easily soluble forms and could readily be removed by washing the pulverized rock with cold dilute acid.

If all the uranium and thorium could be extracted from one ton of rock, then converted to fissionable material and "burned" in a nuclear reactor, the energy released would be equal to that obtained from burning about 50 tons of coal. But the Caltech scientists found that, on the average, only about 25 percent of the uranium and thorium in granite rock is leachable, so that actually a ton of rock would produce releasable energy equivalent to about 10 or 15 tons of coal.

The energy required to process a ton of granite, leaching out the uranium and thorium, would cost within the range of 25 to 48 lbs. of coal—which is clearly less than the equivalent of the 20,000 lbs. of coal which could be extracted from a ton of average rock.

Solely from the energy point of view, then, our available reserves of uranium and thorium can power a highly industrialized world economy for a very long time.

From the monetary point of view, however, the cost of processing average granite is still prohibitively high. In the United States, today, uranium from an average granite might cost as much as $340 a pound, thorium as much as $147. But the Caltech research indicates that there are probably a number of igneous bodies in various parts of the world which possess higher-than-average concentrations of leachable uranium and thorium, and which might well be processed competitively in the near future.

In fact, this study makes it clear that no nation which needs uranium and thorium in quantity need be deprived of supplies of these elements.

Working with Drs. Brown and Silver on the research project were Wilbur Blake, Arthur Chodos, Richard Kowalkowski, Charles R. McKinney and Aiji Uchiyama, all of Caltech; and Dr. George Neuerburg of the United States Geological Survey.