PHYSICS

Atoms for Industry

Millions of tons of atom-yielding materials await use. U. S., Russia and Sweden have the largest deposits of secondary ores, so important to industry.

➤ MILLIONS of tons of uranium and thorium are waiting in the earth's surface for the future day when splitting atoms will mean horsepower rather than horror.

Where these atomic-age minerals are, what countries have them, will be published in detail this month in one of the most comprehensive surveys of the world's atomic resources yet to appear in a U. S. scientific journal.

When industrial use of atomic energy becomes feasible, fissionable materials in thousands of tons per year will be needed, writes Dr. George W. Bain in ECONOMIC GEOLOGY (June-July 1950), bulletin of the Society of Economic Geologists. The supply may be expected to come from large low-grade ore deposits, he says.

Dr. Bain, a geology professor at Massachusetts' Amherst College, was a member both of the wartime Manhattan District atom bomb project and the post-war Baruch Committee of the Atomic Energy Commission, which drew up the U. S. plan for international atomic control.

His paper, first prepared in 1946, has waited four years for clarification of U. S. government policy on publication of uranium information. It was reviewed by AEC for security.

The over-all amount of fissionable material—uranium and thorium—in the earth is about the same as tin, Dr. Bain estimates. The theoretical difficulties in recovering it from low-grade ores, for widespread use for industrial power, should peg its value at slightly less than the cost of silver.

Thorium, because it can be converted into a fissionable variety of uranium, is potentially as important to the age of atomic power as uranium.

Uranium, Dr. Bain explains, occurs in three types of ores: pegmatites and lode veins, the richest and the rarest finds; secondary deposits, including widely-distributed bituminous shales, and marine phosphate shales and irregular carnotite-bearing sandstones, as on the Colorado Plateau; and third, nearly useless oxidized offshoots of the secondary deposits. Thorium occurs almost entirely in an ore known as monazite.

The hope for industrial atomic energy rests on the secondary deposits, Dr. Bain declares. The primary sources now being tapped for the materials of atomic warfare, he says, would soon be exhausted if hundreds or thousands of tons of uranium and thorium were needed each year.

But the secondary ores are spread over much of the earth, Dr. Bain reports. The U. S., Russia and Sweden have the largest potential supplies of these ores. Both Russia and the U. S. have over 20,000 square miles of potential carnotite area, the paper reveals.

Whenever petroleum-bearing oil shale is found, there too is apt to be uranium and thorium. Thin layers of bituminous shale are not as rich in uranium as the lode veins. But they sometimes cover hundreds of square miles, and with one-third of a pound of uranium per ton of shale, Dr. Bain says, they can be utilized.

Very large deposits of such shales are reported in the Leningrad and Ferghana regions of Russia, according to the Amherst geologist. But there are two major drawbacks to the Russian deposits: climate plus topography.

The potentially valuable low-grade deposits, Dr. Bain says, occur either in deserts where water is scarce or in bitter cold climates where the ground is frozen seven months of the year. In a milling operation where 10,000 tons of rock must be treated to yield one ton of uranium mineral, these are the most unfavorable climatic conditions possible, Dr. Bain adds.

Right now the Belgian Congo, Canada and the United States lead in production of uranium. It comes largely from primary deposits or, in this country, from Colorado's carnotite.

The Congo has produced 4,442 metric tons of uranium oxide (85% uranium), Canada has turned out 1,440 tons and the United States 1,200. Russia, Dr. Bain estimates, has produced about 72 tons.

Of thorium-rich monazite, the U. S. has produced 5,443 tons. Brazil leads the world with 72,000 tons; India is second with 45,000 tons.

Other countries which Dr. Bain describes as having uranium or thorium in greater or lesser amounts include Czechoslovakia, England (Cornwall), Portugal, Bulgaria, Madagascar, Brazil, India, Ceylon and Australia.

He lists Sweden and the Union of South Africa as potentially-important uranium areas, although no fissionable materials are produced there now.

The entire coast of Africa, Dr. Bain says, is potential monazite territory for thorium production.

Of all the areas in the world best prepared to furnish the raw materials for an atomic future, Dr. Bain cites the Witwatersrand gold area of South Africa. Uranium exists in the same ores that give gold, he says. And since these gold mines mill over 60,000,000 tons of ore each year, Dr. Bain continues, "this is the largest ready source of industrial uranium."

"If uranium and thorium are available only in limited amounts, to be guarded jealously," writes the geologist, "they may continue to be only a material of war, suitable for dealing death. . . . Industrial uranium is necessary soon if man's decision is for peace and progress."

Science News Letter, June 17, 1950

STATISTICS

June Month for Brides; In South It's December

➤ JUNE is the month for brides in some but not all sections of the country. In Mississippi, South Carolina, Arkansas and Georgia, brides prefer December, Metropolitan Life Insurance Company statisticians in New York find.

It is in the Northeastern and North Central sections of the United States that June is the most popular marriage month.

May is the month for brides in Utah, while in Nevada, there is no pronounced seasonal pattern. Young divorcees, the statisticians suggest, probably remarry shortly after the dissolution of their previous marriage, whatever the month may be.

Older brides prefer October to June for the wedding month.

Science News Letter, June 17, 1950

LAW BY AIR—Three Bell 47D1 deluxe helicopters hover in formation at the plant near Niagara Falls, New York, before heading for New York City where they were placed in service with the police department's aviation bureau. Equipped with pontoons for over-water operation, these helicopters will be used for rescue, search and traffic control.

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