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RADIOACTIVE MINERAL DEPOSITS IN WYOMING

by

H. D. Thomas
State Geologist

Three deposits of radioactive minerals, of interest because of their possible utilization as a fissionable material in the realm of atomic energy, are at present known in Wyoming. The chances for discovery of other deposits are good.

The occurrence of a uranium mineral in the Silver Cliff mine, near Lusk, was described in a technical paper published in 1918. The property had operated as a silver mine in the early days. The uranium-bearing mineral, known as uranophane, occurs as yellow rosettes scattered through quartzite and associated with copper and silver minerals. Uranophane is a hydrous calcium uranium silicate. Samples of the ore were taken for analysis during 1948, but the potentialities of the deposit remain to be determined.

The deposit of the uranium-bearing mineral called schroeckingerite, discovered by Mrs. Minnie McCormick in the Red Desert north of Wamsutter, has received considerable recent publicity. Schroeckingerite is a yellow salt of uranium and the material occurs disseminated through a coarse-grained sandstone. The mineral fluoresces bright-green under ultra-violet light. This deposit was studied by Dr. S. H. Knight, of the geology department of the University of Wyoming, and Professor O.A. Beath, research chemist, as early as 1937 and a paper on the occurrence was given in that year before the chemistry section of the American Association for the Advancement of Science. Development work was carried on during the summer of 1948 by Walter Byron, of Denver.

A promising deposit of a radioactive mineral, allanite, was discovered in the southern part of the Big Horn Mountains in 1948 through the curiosity of Mr. Al Herman, of Guernsey. Mr. Herman brought a specimen of a mineral, called "black garnet" by persons living in the region, to the Geological Survey at the University. The specimen was identified as allanite, a mineral carrying thorium, cerium, yttrium and other rare elements. Upon learning the identity of the mineral, claims were staked by Herman and his associates. Subsequently the deposit was mapped geologically by the State Geological Survey and a Geiger counter survey was made. The examination indicated that ore bodies are scattered over an area one and one-half miles long and a half-mile wide.

A mineral is radioactive if it spontaneously emits radiation. There are two main groups of radioactive minerals of interest in the field of atomic energy; the uranium-bearing and the thorium-bearing minerals. A half-hundred minerals containing these elements in various amounts are known.

To successfully search for radioactive minerals, the prospector should be familiar with the commoner ones. The usual colors are yellow, orange, bright-green, red or black. There are many common black minerals but the radioactive ones tend to be glassy on fresh fracture and to be very heavy. The black uranium-bearing minerals commonly weather with a yellow or orange incrustation.

The uranium and thorium minerals occur commonly in granite or in pegmatite dikes, which are tabular bodies of extremely coarse grained granite. The granite areas in Wyoming lie in the central parts of the mountain ranges and comprise tens of thousands of square miles. Since the Red Desert deposit and those in Colorado and Utah occur in sandstone, there are chances of finding radioactive mineral deposits in areas of sedimentary rock.

The most reliable tests for radioactivity are made with precision instruments designed to detect and measure radiation, such as the Geiger Counter or the electroscope. Many uranium minerals will fluoresce under ultraviolet light, but it must be remembered that not all radioactive minerals will fluoresce, nor are all minerals which fluoresce radioactive.

A simple test for radioactivity involves the use of photographic film. A key or coin is placed on a film-holder containing unexposed film. The mineral specimen to be tested is placed on the key or coin. After at least 72 hours, preferably more, the film may be developed. If the mineral being tested is radioactive, the outline of the key or coin will be shown on the developed film.

The Geological Survey of Wyoming, at the University, is prepared to identify and test mineral specimens which are suspected to be radioactive.

The following notes on prospecting may be valuable to those interested in searching for radioactive minerals:

1. Restrict the search to areas of granitic rocks, pegmatite dikes, quartz veins or areas in which deposits of copper, or silver have been found. There are possibilities, however, of finding deposits in areas of sedimentary rock, especially sandstone.

2. The black radioactive minerals are exceptionally heavy, commonly have a glassy or pitchy lustre and usually fracture conchoidally, like flint. A yellow or orange crust on a black mineral is suggestive of the presence of uranium.

3. Small patches of bright green or yellow platy minerals filling fractures in granitic rock suggest a nearby deposit of primary uranium ore.

4. Radioactive minerals are not uncommon, but rarely do they occur in large masses, hence the discovery of a radioactive mineral does not indicate that a valuable ore deposit has been found. The potentialities of a deposit can be determined only after detailed geological mapping and radiometric measuring have been done, perhaps followed by subsurface exploration.