MILITARY SCIENCE

Atomic Death Belt Possible

Quarantining area between North and South Korea, as suggested by Rep. Gore (D. Tenn.) is possible, but application of radioactive materials poses difficult questions.

➤ THE IDEA of a radioactive death area to quarantine North Korea from South Korea has a firm basis of atomic fact. But the military application of invisible radioactive materials to a belt across Korea is something else again.

Use of some of the troublesome and highly dangerous disintegration products of uranium and plutonium "furnaces" of reactors is suggested in the plan of Representative Gore (D. Tenn.).

When nuclear fuels fission, either in reactors without explosion or in atomic bombs, the slow neutrons (atomic bomb trigger) acting on the uranium produce isotopes or varieties of some 34 chemical elements. These range from zinc through europium in the chemical elements table. These are produced as fission fragments of the uranium itself. Then there are elements heavier than uranium, such as neptunium, plutonium, americium and curium, that are produced directly or indirectly by transmutations caused by the neutrons.

Most of these isotopes are highly radioactive, giving off deadly gamma or X radiation, combined with beta rays (electrons). Some of this activity is short lived but much of it will continue for hundreds and even thousands of years.

Cerium and cesium have half lives of many months and years, for example. Iodine and barium produced, on the other hand, have radioactivity lasting in dangerous amounts a matter of days or less.

Presumably the poisonous chemical material of just the persistence and intensity needed would have to be separated out from the debris and waste of atomic reactors. It would be coated on very fine sand for spreading over the land. This would be a gigantic and dangerous task. The transportation of this lethal material to the radioactive death belt in Korea would be very difficult and hazardous.

If the zone of death were created, and properly labeled in various languages, people and animals who don't believe in signs or are willing to risk death could cross it. Suicide troops could cross it and live for a time to fight effectively.

It might prove much cheaper and militarily more effective to make a no man's land of explosive charges or barbed wire than with radioactive materials.

An end play around the death zone, by air, submarine or amphibious landings, would neutralize the radioactive defense.

United Nations' use of the new weapon would break the stalemate on poison gas, bacteriological and atomic warfare that now exists in the world. Use of radioactive death materials would be a signal that all curbs are off.

In the long run it might be more effective to drop a chain of atomic bombs to form the quarantine band, but this, too, would be likely to change a limited war into a general one.

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GEOLOGY

Heat Treatment Frees Pre-Cambrian Fossils

➤ A SIMPLE process for separating rock developed by Donald G. MacVicar, Jr., of Naugatuck, Conn., an Amherst College senior, has broken a barrier which has, up to now, limited the time period for study of remote life.

Until the present, the oldest authenticated fossil remains of living organisms dated back to 600,000,000 or 700,000,000 years ago. By the new method, specimens estimated by Dr. George W. Bain, Amherst geology professor, to be nearly 1,000,000,000 years old have already been identified.

Former attempts to separate pre-Cambrian specimens led invariably to destruction of the materials to be studied. All investigations of pre-historic life, therefore, have been confined to the last 500,000,000 years.

The young scientist came upon his process while attempting to assist a fellow student remove recalcitrant fossils from a piece of Nevada limestone. The usual "acid" method dissolved both the fossils and the matrix in which they were held. Mr. MacVicar, who had been conducting high temperature experiments in the chemistry laboratory, reasoned that by slowly heating the desired specimen to 1000 degrees Centigrade, its composition would be altered by loss of carbon dioxide and the confining rock removed. Upon trial, Mr. MacVicar's reasoning proved to be correct: the surrounding rock became soft and crumbling and was easily brushed away, leaving the phosphate-containing fossil intact.

Dr. Bain then suggested that the process be applied to a billion-year-old piece of African limestone, found near the great uranium mine in the Congo, to determine whether it contained fossils, and, if so, whether they could be freed. The method disclosed microscopic *Porifera* (sponges) remains described by Dr. Bain as "the oldest dated specimens to be identified up to now as remains of living organisms."

Mr. MacVicar's process is useful for breaking up rocks for geological study as well as for extracting fossil remains; it is especially useful for studying microscopic remains destroyed by other methods of separation.

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SEPARATING FOSSILS—Donald G. MacVicar, Jr., left, and Dr. George W. Bain of Amherst College talk over the new method of separating fossils from rock. By slowly heating the fossil-bearing rock, an intact specimen is obtained. Previous methods have led to destruction of materials being studied.