

MEDICINE—PHYSICS

Cancer Patients May Soon Benefit From Atom Smashing

New Method of "Reflecting" Atomic "Bullets" Increases Yield of Man-Made Radioactive Substances

MEDICINE, including the treatment of cancer, and other sciences may soon be able to benefit from useful quantities of many elements made artificially radioactive. The technique for producing such elements is rapidly developing, as is instanced by their production by a combination of neutron bombardment and paraffin bath, which acts as a neutron reflector and has raised the yield by 20 to 100 times.

This statement is made by Prof. Enrico Fermi, noted Italian physicist and discoverer of the unknown element numbered 93, who is lecturing at the summer physics symposium at the University of Michigan.

About two-thirds of the known elements can be made temporarily radioactive by bombardment with neutrons, which are particles of matter weighing the same as a hydrogen nucleus, but without any electrical charge. The neutron, however, must strike the nuclei of the atoms of the element being bombarded and be retained, to produce radioactivity. Because of the "vast" space, relatively speaking, between atoms, the great majority of the intended projectiles never find marks, with the result that infinitesimal amounts of the changed, radioactive elements are produced.

Fermi's Process

In the neutron reflector process used by Prof. Fermi, the source of the neutron "bullets" is surrounded by a cylinder of the element to be bombarded, and the whole apparatus is surrounded with water or paraffin. The secret of the increased production of an activated element is found in the fact that both water and paraffin contain much hydrogen and that hydrogen nuclei and neutrons have the same weight. Neutrons which do not hit their intended targets shoot on beyond, into the water or paraffin. Here they are very likely to strike a hydrogen nucleus. Being without electrical attraction, the neutrons may then bounce back into the cylinder of the elements being attacked and thus get a second chance at their marks, after the reflecting collision.

Not all of the neutrons get this repeat chance or chances, Prof. Fermi points out, but enough do to raise the production of the activated element 20 to 100 times. An added advantage of the method is the fact that after having bumped into a hydrogen nucleus the speed of the neutron is so slowed down that if it does bounce back and strike one of the desired atom targets it is more likely to be held.

Timed Treatments

Since the radioactivity of the artificially excited elements is essentially similar to that given by radium, but temporary in duration, medical men are watching developments with interest. There is definite possibility that in the future some cancers and other conditions may be treated by radioactive chemicals which will surround the diseased spot with a temporary field of curative activity and which can be closely controlled, both as to time and strength, by the physician. While some such treatment now seems likely, when radioactive elements are available in quantity and variety, a long period of experiment must precede practical application.

Uranium, of atomic number 92, is the heaviest radioactive element existing in nature, but it is unstable, slowly breaking down. By neutron bombardment,

some uranium atoms can be transformed into new elements which lie beyond uranium and are therefore numbers 93 and 94. These are, however, extremely short lived. While there is a chance that some elements of even higher atomic number might be found by bombardment, they are essentially so very unstable that they are not possibly last for a reasonable time, in Prof. Fermi's opinion. This is the reason why such elements are not found under natural conditions.

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ARCHAEOLOGY

Flesh-Hook Used By Biblical Priests Found

A FLESH-HOOK used by Biblical priests in sacrifices is one of the rare discoveries from Tell Duweir, Palestine, site of the Bible city of Lachish, unearthed by the Wellcome Archaeological Research Expedition to the Near East.

The flesh-hook, among exhibits brought from the Biblical site, is a three-pronged trident resembling "Old Father Neptune's" favorite weapon. According to the First Book of Samuel, it was used by the priest's servant who "when any man offered sacrifice" came "while the flesh was in seething," with a flesh-hook of three teeth in his hand. He struck it into a pan, kettle, caldron, or pot, and all the flesh-hook brought up the priest took for himself.

The ancient piece of equipment was rusted almost into pieces when found, and has had to be preserved in paraffin wax.

Science News Letter, July 20, 1935

To aid housewives in planning meals, Cornell University has compiled a vitamin chart to hang in the kitchen.



TOOL OF BIBLICAL PRIESTS

The servant of Priests Hophni and Phineas, sons of old Eli, in the Biblical Book of First Samuel, used a three-pronged fork like this to spear meat from the sacrificial bowl. British archaeologists found this iron flesh-hook in the ruins of Lachish.