PHYSICS—MEDICINE

Most Penetrating Artificial Gamma Rays From Sodium

Radiation Expected to Have Great Usefulness In Treatment of Cancer and Medical Research

DISCOVERY of a way to make the common element sodium give out the world's most penetrating gamma rays by artificial means was announced at the University of California. The radiation, it is believed, will have great usefulness in medicine for the treatment of diseases like cancer and in a study of how radiation acts on living tissue.

Prof. Ernest O. Lawrence who made the discovery declared: (*Physical Review, October* 20) "In the biological field radio-sodium has interesting possibilities that hardly need be emphasized here."

Sodium is one of the constituents of familiar table salt and occurs in certain of the fluids of the human body. Saline solution, for example, can be injected into the blood stream of the human body without disastrous effects.

The new gamma radiation produced in Prof. Lawrence's laboratory from sodium is more penetrating than any ever before obtained. Sodium gamma rays have energies of 5,500,000 electron volts. Most penetrating of the naturally produced gamma rays are those of thorium C" (thorium C double prime) having energies corresponding to only 2,600,000 volts.

Most powerful and penetrating of the hitherto man-made gamma rays are those created by Drs. C. C. Lauritsen and H. R. Crane of California Institute of Technology from carbon. The carbon gamma rays had energies of 3,500,000 volts. Prof. Lawrence's radiation, therefore, exceeds the previous records for gamma rays produced both naturally and artificially.

More important still, from the standpoint of possible medical use as in cancer therapy, the radio-sodium gives out its rays for a long time. The half life of the substance is 15 hours, that is, the original amount disintegrates to half in this time. Most of the elements with which artificial radioactivity has been produced do not last nearly as long. Two hours has been a long time hitherto; a few minutes of activity was the general rule.

Prof. Lawrence creates his artificially radioactive sodium by bombarding sodium with deutons, the charged nuclei of the new, heavy hydrogen. These deutons are shot at the sodium with energies of 1,750,000 electron volts.

Besides the very penetrating gamma rays, beta rays or electrons come off from the radio-sodium. This happening indicates, Prof. Lawrence suggests, that the radioactive substance is a form of sodium which disintegrates into magnesium. Chemical tests confirmed this suspicion, he declares.

The way gamma rays from sodium are absorbed in lead suggest the radiation emitted is probably all of one wavelength, or monochromatic. This finding will make the new radiation extremely useful in physical experiments.

"It perhaps should be mentioned," declares Prof. Lawrence, "that many uses of radio-sodium will probably be found. In the physical laboratory it provides a presumably monochromatic source of high energy gamma-radiation of great intensity. In the biological field radio-sodium has interesting possibilities that hardly need be emphasized here."

Science News Letter, October 27, 1934

WATER BOY

"Where did you come from, water boy?" This is the question that Mexican archaeologists would like to ask this image that they unearthed from Tomb Number 50, at the ruined city of Monte Alban. Where Indians of the prehistoric mountain city got water to drink is a mystery, considering that the mountain ridge today is quite lacking in springs or streams. The sturdy little Indian with the heavy jar strapped to his head looks as if he might speak any minute, to tell whether he brought his load from a near-by source, since dried, or whether the Monte Albanians had to haul their water supplies a long way. The statue, which stands about 18 inches high, lay in a jumbled pile of clay gods, food dishes, and incense burners in the tomb.

CHEMISTRY

"Super Caustic" Stronger Than Lye Now Available

ENTER sodium monoxide, new superchemical of American industry. Experts of the Niagara district, long accustomed to wresting queer substances from common minerals by the aid of electricity, now offer one of the most powerful forms of soda known to science.

Sodium monoxide, rarely prepared as an academic curiosity by a few inquisitive professors, proves to be readily available as an intermediate in peroxide manufacture. Known also simply as sodium oxide, it is described as a "super-caustic" which exceeds even caustic lye in chemical vigor. In the form of a dry powder it acts first as a powerful desiccant, or artificial drying agent. It virtually tears water out of most organic matter, and is thereby transformed into highly concentrated lye, or sodium hydroxide. This de-watering process is attended with production of heat. As a result the normal action of the lye is accentuated, and speedy chemical action assured. (*Turn to Page* 260)