

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 deuterons, the charged nuclei of the new, heavy hydrogen. These deuterons 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

CHEMISTRY

"Super Caustic" Stronger Than Lye Now Available

ENTER sodium monoxide, new super-chemical 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



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.

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)

In the manufacture of the new product metallic sodium, a well-known electrochemical material, is permitted to combine with oxygen in a restrained fashion, yielding a compound somewhat analogous to the rust of iron, but much more active chemically. Great care has to be taken not to allow too concentrated a supply of oxygen to reach the sodium. Even common air, containing scarcely 21 per cent. of oxygen, is too

rich in its undiluted state. The formation of peroxide, usually resulting in such a process, is avoided.

In view of the ability of the new oxide to attack not only common vegetable and animal matter, but metals, solvents, and a host of organic chemicals related to the dye, lacquer, drug and other industries, especially when in the molten state, a wide interest is being taken in its industrial future.

Science News Letter, October 27, 1934

MEDICINE

New Anesthetic, Evipan, May Be Useful in Childbirth

A WHITE crystalline tasteless powder which puts the patient to sleep in a minute or even less time is one of the new substances discovered in the search for the perfect anesthetic. It is called evipan in Europe and evipal in this country.

It was devised by German scientists. How well it has worked in actual practice was reported to the Congress of Anesthetists by Dr. Hans Widenhorn of the University of Freiburg, Germany, and Drs. Ronald Jarman and A. Lawrence Abel of the Woolwich War Memorial Hospital, England. In the form of a clear solution in water, evipan is injected into a vein and the patient goes quickly and quietly to sleep. There is none of the excitement and nervousness at the beginning of the anesthesia, or the vomiting and nausea afterwards that occur with some other anesthetics such as ether.

The patient awakens quickly from evipan anesthesia which usually lasts for about twenty minutes. When it is necessary to prolong the anesthetic period, Dr. Widenhorn augments the effect of evipan with ether or nitrous oxide. Drs. Jarman and Abel prolonged its effect by repeating the dose.

Evipan is not excreted from the body by passing into the air through the lungs, like ether, but by chemical breakdown in which the liver plays an important part. For this reason evipan is particularly useful for operations on patients suffering from lung disease but should not be used on patients suffering from liver or gall bladder disease. It may also be used in childbirth since with it "something similar to twilight sleep may be obtained," according to Dr. Widenhorn.

Science News Letter, October 27, 1934

MEDICINE

Childless Couple's Chance For Family Now Doubled

WOMEN who seek medical aid to overcome involuntary childlessness now have double the chance of realizing their natural dream of bearing children of their own, it appears from results obtained at the Evans Memorial Institute, Massachusetts Memorial Hospitals.

The secret of success in bringing the boon of children to previously childless couples lies in recognition of the fact

that childlessness may be due to multiple causes operating in both partners to the childless marriage. Dr. Allan Winter Rowe, director of the institute, told members of the American College of Surgeons at one of the "show me" clinics of their congress.

Fifty out of one hundred couples were helped to have children of their own by Dr. Rowe and his colleagues. Reports in medical literature show that

the best results previously obtained have enabled only twenty-five out of every hundred couples to achieve parenthood. Working with Dr. Rowe in his efforts to overcome involuntary infertility were Dr. Samuel R. Meaker, Dr. Samuel N. Vose and Dr. Charles H. Lawrence.

The first step in the proceedings to help the childless couples was a thorough study of the histories and physical condition of both husband and wife. These studies and examinations showed that both the men and the women were suffering from a number of constitutional and glandular abnormalities. Disorders in varying degrees in both men and women were found in thyroid, pituitary and sex gland functions. Anemia, over- and underweight, depressed energy metabolism, low blood pressure, signs of liver injury indicating toxic conditions, and venereal, tuberculous and other infections were found in both men and women.

Only nine of the men and three of the women were adjudged normal. With some exceptions, no one of the abnormalities found would by itself have prevented the couple from having children, Dr. Rowe explained. But the combination of several of the abnormalities in both partners to the marriage were in his opinion sufficient to cause the childlessness. In order to raise the chance of the couple for having children to its very highest, all the abnormal conditions had to be corrected. The constitutional factors such as anemia, focal infections, depressed energy metabolism, malnutrition and disordered liver function played a major role in contributing to the childlessness, he believes.

Success in "doubling the batting average" of involuntarily childless couples resulted from discovering and correcting all the abnormalities.

Science News Letter, October 27, 1934

ARCHAEOLOGY

Fingerprints on Pottery Aid in Tracing Past

FINGERPRINT science has come to the aid of archaeologists exploring the ruins of Bible cities. Fingerprints of potters who worked in a Bible town in Palestine have been found impressed in some of their work so plainly that earthen dishes which they made can be sorted out 2,000 to 3,000 years later.

This detective work has been done by Dr. William F. Bade, professor of Semitic literature and languages at the Pacific School of Religion and director