

MEDICINE

New Weapon Against Cancer Possible in Neutron Ray

Streams of Atomic Particles Unknown Before 1932 Found More Effective Than X-Rays for Animal Tumors

BECAUSE latest animal tests indicate that neutron rays (powerful streams of atomic particles totally unknown before 1932) are more effective than X-rays in killing animal tumors, it is possible that medicine is on the verge of applying a new weapon to human cancer.

Dr. John H. Lawrence of Yale University and Prof. Ernest O. Lawrence of the University of California reported to the American Society for Clinical Investigation, meeting in Atlantic City, the scientific data that raise the hopes of medical science for a more powerful weapon in its fight against cancer.

The Drs. Lawrence are brothers. Both are young men, in their thirties. Ernest is a physicist and he invented the giant cyclotron for producing high voltage atomic radiations with which he has obtained striking transmutations of the elements. John is a physician on the staff of the New Haven Hospital and he has pioneered in testing medically the new radiations produced.

Dr. John Lawrence explained to the medical scientists that new tests just completed in the University of California's radiation laboratory have indicated that, per unit of ionization, neutron rays are more effective than X-rays in killing one type of tumor in mice. The results will have to be confirmed by other experiments before definite conclusions can be drawn concerning the application of neutron radiation to human beings.

The Lawrence brothers are anxious not to arouse unjustified hopes among cancer sufferers. They emphasized that the application of neutron rays to human cancer is distinctly in the future. Even if all goes well in the experiments to be made it will be months and perhaps years before it will be possible to treat patients. They would not be talking now about their progress if they did not consider it important to inform fellow scientists.

Yet there is no question but that the outlook is enticing. Here is the way the scientists reason:

It is believed that the X-ray is relatively more lethal for cancer cells than

for normal cells of the human body. Often it is impossible to give a large enough dose of X-rays to kill the malignant growth without doing damage to the patient. With this differential effect of X-rays, about 15 per cent of the cancer patients treated are cured or benefited. Suppose a radiation even relatively more lethal for cancerous than for healthy cells were obtained. The story would be different. A larger percentage of cancer patients treated could be saved. Neutron rays open up this possibility.

The tests reported by Drs. Lawrence were performed on a series of 600 mice of a strain which is peculiarly susceptible to a type of tumor known as Sarcoma 180.

The preliminary experiments indicate

that the neutron ray is four times as lethal as the X-ray on this mouse tumor, but apparently only three times as lethal on healthy mice. This latter figure is less definite. Seven hundred to 750 roentgen units of neutron discharge will reduce the virility of Sarcoma 180 to a point where it will not grow when implanted in mice. On the other hand 3000 roentgen units of X-ray are required to accomplish the same result. This tumor resembles cancer in mice. Further experiments with true cancer in mice are in progress. There is a distinct possibility that neutrons will prove to be relatively more effective on tumor tissue than X-rays.

The idea that neutron rays might show a wide differential in their effect on different tissues was suggested by preliminary tests in the summer of 1935. The Lawrence brothers found that in changing the blood picture of rats the neutron ray was about five times as powerful as the X-ray. At the same time Paul C. Aebersold, who also was associated with the Drs. Lawrence in the present researches, and Dr. R. E. Zirkle of the University of Pennsylvania, demonstrated that in its effect on the tissues of wheat seedlings, the neutron ray was about ten times as powerful as the X-ray. From this it was sug-



GEOLOGY IN CARDBOARD

Thin slices of the western Wisconsin landscape, each represented by a cardboard profile with the vertical elevations much exaggerated, formed a striking exhibit at the spring meeting of the National Academy of Sciences in Washington, D. C. The tremendous job of cutting and measuring, and the exacting topographic research behind it, were the work of Drs. Douglas Johnson (at right) and Robert E. Bates, of Columbia University. The area represented is the region where western Wisconsin, southeastern Minnesota, and northeastern Iowa touch corners. This region was not plowed over by the great glaciers of the Pleistocene, so that the landscape is now very deeply eroded.