

## MEDICINE-PHYSICS

# Betatron for Cancer

Improvement in treatment will result when scientists find a way to canalize the high energy electrons outside of the vacuum chamber.

► **SUBSTANTIAL** improvement in the treatment of deep-seated internal cancers will be possible when scientists find a way to canalize the high energy electrons of the betatron outside of the vacuum chamber, Dr. G. Failla of Columbia University told members of the American Physical Society at their meeting in St. Louis.

In time it will be possible, he said, to achieve this canalization so that the electron beam will deliver its maximum energy to the cancer with very little beyond that depth. The danger of damaging by overirradiation normal tissues in the neighborhood of the internal cancer will then be less.

The betatron makes it possible to treat cancer with X-rays of 20 million to 100 million volts. With all X-rays available heretofore, Dr. Failla explained, the skin receives more ionizing energy than the underlying tissues traversed by the beam of radiation, but with the multimillion volt X-rays produced by the betatron, the situation is reversed. The highest concentration of energy occurs at a con-

siderable depth below the surface of the skin. Beyond this level the dose drops slowly. A beam of multimillion volt X-rays traversing the human body is therefore more apt to damage the skin area through which it leaves the body than the skin through which it enters it. All organs in between will receive larger doses than the skin on either side. Whether they are damaged or not will depend on the magnitude of the treatment and on their respective radiosensitivities.

Damage to normal tissues, therefore, will continue to be the limiting factor in the treatment of deep-seated tumors.

The importance of taking greater care to protect persons working with the betatron than is necessary for those working with ordinary X-ray machines was stressed by Dr. Failla. While the accepted permissible dose for continued exposure of the whole body to ordinary X-rays is one-tenth of a roentgen, the safety limit for betatron workers, Dr. Failla believes, should be put at one-fifth of this, or 0.02 roentgen per day.

*Science News Letter, December 15, 1945*



DR. HENRY B. WARD

the house of zoology, and was responsible for the training of scores of successful research workers in this perhaps messy but nonetheless important and necessary subject. He founded the American Society of Parasitologists and was editor of its journal for nearly a generation.

Honored by many American and foreign scientific groups for his achievements in the most difficult kinds of research, Dr. Ward was nevertheless no dweller in an ivory tower. He knew the need for bringing the facts and interpretations of science home to the common man, and understood something of the technique of doing so, too. He participated actively in the affairs of the Izaak Walton League and the National Wildlife Federation, both of which organizations correlate the efforts of scientists and laymen for the benefit of wildlife. For a decade before his death, he was a trustee of Science Service.

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In general *fishes* are boat-shaped, adapted for swift passage through the water, with their broadest part in front of the middle, leaving the compressed paddle-like tail as the chief organ of locomotion.

*Sticklebacks*, pugnacious fish of Hawaii, are used by natives to catch others; one, caught alive, is suspended by a string among the rocks where others live and those that come out to fight the captive are drawn out with a net.

## ZOOLOGY

# Dr. Henry B. Ward Dies

► **FISHES**—other wildlife, too, but especially fishes—lost a good friend when Dr. Henry B. Ward, emeritus professor of zoology at the University of Illinois, died in his Urbana home Nov. 30. The octagenarian scientist had spent a long working lifetime as their frequent advocate; since they have no voices of their own he spoke for them when their rights and interests were threatened. When a dam was planned that would cut off an important fish migration route, he could be depended on to put up a fight for a practicable fish ladder or other means to let his friends find their way up to their spawning beds. He had a great deal to do, too, with the growing public consciousness that neither we nor the fish need to put up with waste-polluted streams and lakes.

Dr. Ward's interest in fishes was not

merely that of a nature-lover or of a fisherman, though he was both of these. His acquaintance with fishes was the more intimate kind that comes of close and accurate knowledge of their way of living. He did pioneer research work, for example, in exorcising the mystery of salmon migration: salmon, he demonstrated, when confronted with the choice of two branches of a stream to ascend, always chose the one with the colder water. There is still dispute whether this choice is a simple temperature reaction or whether other factors are involved, but Dr. Ward did discover the fact.

Internal troubles of animals in general claimed Dr. Ward's major attention during his many years as head of his department at the University of Illinois. He led in the development of parasitology as a distinct discipline within