BIOLOGY

X-Rays Change Heredity

X-rays played a highly important part in the discussions of the biologists attending the American Association meeting. Within recent months many workers in various parts of the field have discovered this well-known type of radiation to have literally miraculous powers to change the course of events in the development of living organisms, and to leave so deep an impression on their substance that their descendants, even to the last generation, will show the effect of their ancestors' experience.

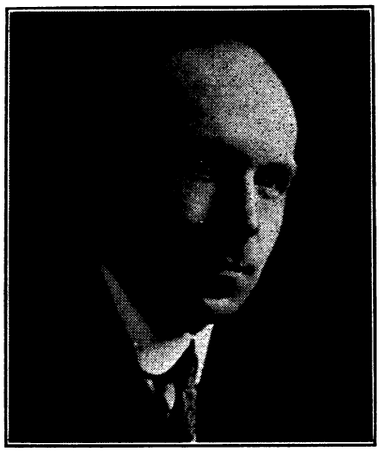
Prof. Winterton C. Curtis and Raymond A. Ritter, of the zoology department at the University of Missouri, told of their researches on the effects of X-rays on the development of growing tissue. They experimented on a small marine animal related to the jellyfishes, which reproduces itself by constantly budding off new individuals very much as a tree produces branches. After exposure to the X-rays for ninety minutes the animals lost the power of producing new individuals, although the original parent portion remained alive.

Prof. H. J. Muller of the University of Texas, who recently startled the scientific world by speeding up evolutionary processes over a hundred-fold with heavy X-ray doses applied to a small insect, the fruit-fly, reported further on his work and displayed specimens showing the results of his technique. Prof. Frank B. Hanson, of Washington University, St. Louis, who has been collaborating with Prof. Muller, reported on the effects of the rays on the rapidty with which the insects reproduce.

It was for his account of this work that Prof. Muller was awarded the $1,000 Association prize for one of the most notable papers presented at the meeting.

Prof. Robert T. Hance of the University of Pittsburgh told of some of the first results of X-ray experiments on warm-blooded animals. The hair color of mice exposed to very light doses of the rays in his laboratory was radically changed. Normally "mouse-colored" mice of mixed ancestry went completely white after being rayed, while pure-bred mice of the same color changed in the opposite direction and became darker.

Dr. H. J. Bagg of Memorial Hospital, New York City, and Dr. C. R. Halter, of Cornell University Medical College, working in collaboration, were also among the first to obtain positive results with warm-blooded animals. Their mice developed certain marked bodily defects, such as only one kidney instead of two, abnormal eyes, and legs in bad condition at birth. Such defects occur among mice bred under ordinary conditions, but not so often as among X-rayed animals.



PROF. H. J. MULLER of the University of Texas, awarded the $1,000 American Association Prize

Plants as well as animals respond to X-ray treatment. Prof. T. H. Goodspeed of the University of California has obtained results in the breeding of X-rayed tobacco plants which are comparable with those of Prof. Muller on fruit-flies. The new varieties produced in this way have a stronger growth and produce more flowers than their cousins descended from un-rayed parents.

Prof. L. J. Stadler of the University of Missouri has conducted similar experiments with corn and barley. In these, as in all the other animals and plants on which the treatment has been tried, the hereditary units or genes have been knocked out of place and more or less violently rearranged, resulting in forms of life wholly new to the universe.

It is agreed on all sides at the gatherings of scientific men that the past year has been one of revolution in the study of heredity among living things, comparable with 1859, when Darwin published the Origin of Species, and 1900, the year of the rediscovery of Mendel's law.

Science News-Letter, January 7, 1928

Recent studies of little children's vocabularies show that instead of using chiefly nouns, they use more verbs and pronouns, especially "I."

PHYSICS

New X-Ray Property

While the biologists were listening to accounts of newly discovered ways in which X-rays affect living tissue, physicists heard about another new property of these rays. Dr. Fred Allison, of the Alabama Polytechnic Institute at Auburn, Alabama, told the American Physical Society how he had found that they change the effect of certain liquids and other substances on light.

Many liquids, such as a sugar solution, have the property of turning the plane of polarized light. Ordinary light consists of vibration in an indefinite number of directions, but when polarized, the vibration is confined to one particular plane. If a beam of such light is passed through a sugar solution, it is still vibrating in one direction when it emerges, but in a different direction from that when it went in.

Dr. Allison has found that even liquids which do not ordinarily have this power gain it when exposed to X-rays. When liquids, or glass, are placed in the field of a powerful magnet, they gain this property, as discovered many years ago by Faraday. When X-rays are used in addition, says Dr. Allison, the rotatory powers of the liquids are increased, while in glass, it is made to rotate in the opposite direction.

Science News-Letter, January 7, 1928

X-Rays from Gases

"X-rays" obtained when high speed electrons hit atoms of gases, were one of the important new tools in physics described at the Nashville meeting by Prof. William Duane, of Harvard University. Prof. Duane delivered the address in relinquishing his office as Vice-President of the section on physics.

The subject of Prof. Duane's address was "The General Radiation," which he described as one of the two kinds of radiation given off when an electron hits an atom. The other kind is the line spectra, which are confined to certain particular wavelengths. In contrast, the general radiation covers a long band of wavelength, and carries much more energy than the line spectra.

Ordinary investigations of X-rays have been confined to those generated by electrons, which are the particles of which electricity is supposed to consist, when they hit solid matter. In the ordinary X-ray tube, a target of some heavy metal such as tungsten is used for them to hit. Investigations have been made

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X-Rays from Gases

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where they hit atoms of mercury vapor, and from which he has drawn conclusions of importance in modern physical theories.

"Although no completely satisfactory theory has been proposed for the radiation problem in general," he said, "it may be that we are gradually approaching a solution of it. A number of interesting physical theories have been proposed in recent years. A physical theory, however, does not represent what we might call real truth.

"A physical theory is a collection of fundamental hypotheses and general laws, which may be used to deduce particular laws that can be applied to concrete facts. Physical theories are useful, if they explain a large number of facts in simple ways, and if they furnish definitions of terms and a nomenclature to be used in describing phenomena.

"Physical theories are tools and not creeds, but one is at liberty to believe they represent reality, if one wants to. The belief in a physical theory, however, is a similar process of thought to the belief in religious tenets.

"The greater the number of useful physical theories that are proposed, the greater the number of good tools we shall have at our disposal, to use in discovering the real truth about the way in which nature acts."

Science News-Letter, January 7, 1928

Coating Helps Electrons

How a thin layer of atoms of caesium on the filament helps the vacuum tube of a radio set to work better was described by Dr. J. A. Becker, of the Bell Telephone Laboratories in New York. Dr. Becker told of work that he had done in collaboration with D. W. Mueller, of the same Laboratories.

The operation of a radio tube, he explained, depends on the copious emission of electrons from the hot filament. When coated with caesium, in the form of caesium oxide, the atoms of the metal arrange themselves over the filament in a single layer. But the atoms are ionized, which means that each of them has lost one of its quota of electrons, and so is positively charged. This atomic layer is then able to act in the same way as the grid of the tube, but being so close to the filament is particularly efficacious in pulling the electrons out of the tungsten of which it is made.

Science News-Letter, January 7, 1928