

## PHYSICS

# New X-Ray Use Forecast

Production for the first time of 100,000,000-volt X-rays makes available a new sort of ray with extraordinary penetration. What they can do is not known.

► THE PRODUCTION for the first time of 100,000,000 volt X-rays through use of the new giant induction accelerator of the General Electric Company promises to usher in a new era of X-ray utilization.

In one stupendous step from about 2,000,000 volts to fifty times that potential, X-rays of a new sort with extraordinary penetration will now be available, first for experimental work and then for industrial and possibly medical use.

The scientists operating the new machine have noted that it may be easier to protect people against the hundred million volt X-rays. This is possible because whereas the lower voltage X-rays are spread out fan-like, the super X-rays are produced in very narrow beams. No one yet knows just what the world's most powerful X-rays can do.

The induction accelerator, or betatron, as it is also called, operates on a principle different from the customary X-ray tube now in wide industrial and medical use. Developed by Dr. D. W. Kerst of the University of Illinois, the induction accelerator was first built in a 2,300,000 volt version and then as a 20,000,000 volt machine which was turned over to Dr. Kerst and the University of Illinois for research use. Meanwhile construction of the 100,000,000 volt machine was hurried along as fast as more urgent war work would allow because of the expectation that the X-rays it makes possible might prove practically useful in inspection of large metal castings.

In principle the new X-ray machine gives electrons, particles of electricity, a continuous push so that a potential of a few thousand volts is built up to one hundred million volt energy, which is allowed to smash into a target to produce the super-powerful X-rays. In the conventional X-ray tube based on the pioneer work of Dr. W. D. Coolidge, G.E. research director, under whose direction the new machine was also built, the electrons from a hot filament are given the impulse of a high voltage current separately generated.

About 50 conventional X-ray tubes of

a million volt energy are in industrial use today. The only other device creating such energies in particles is the cyclotron which has been placed under construction at Berkeley, Calif. This machine uses a different principle and instead of accelerating electrons to give X-rays applies high speeds to the hearts of atoms, such as the protons of hydrogen and the deuterons of heavy hydrogen or deuterium.

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## GENERAL SCIENCE

## American Science Teaching Facing Crisis in Schools

► SCIENCE TEACHING in American public and private high schools is facing a crisis because of a lack of properly qualified teachers. Many former instructors are now in the Army. Large numbers of teachers, both men and women, particularly in physics and chemistry, are employed in war industries where salaries far above school levels are obtainable.

The so-called defense training classes,

operating on an around-the-clock basis in many high schools, are using in many cases part of the time of regular high school science instructors, leaving less time available for their regular classes for high school boys and girls. The same is true for instructors in shop, drafting, and stenography and typing.

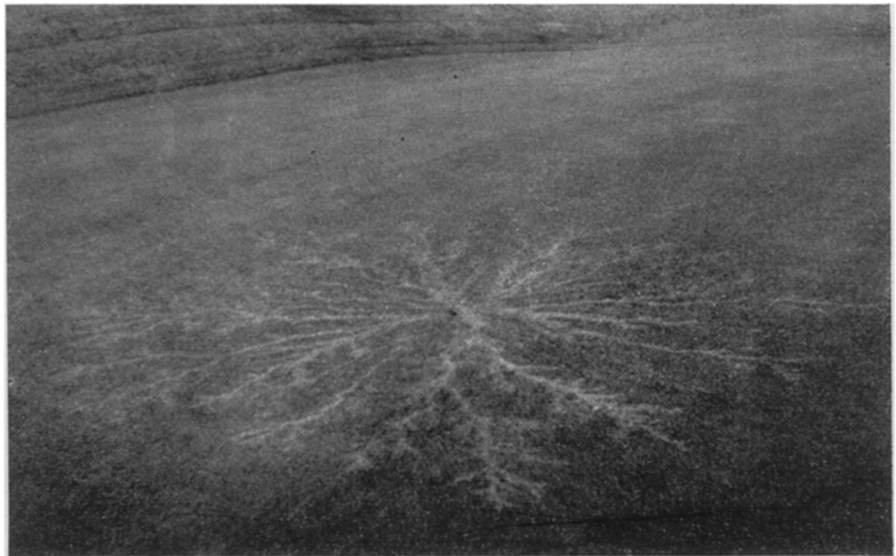
In fact, all schools are suffering from a shortage of qualified teachers in all subjects and in all grades. Low salaries are partly responsible.

Special study has been given to what he calls the deterioration of the American public schools by Prof. Willard Waller of Columbia University. He feels that the loss of the younger and better qualified teachers will result in a generation of poor education ahead. He recalls conditions during and following World War I. Juvenile delinquency and increased immorality resulted then and may be expected now, he claims.

Prof. Waller suggests that to cut down youth problems and mass hysteria every effort be made to defer younger men teachers from draft, and to raise salaries to keep the more competent teachers, both male and female, in the school.

"Any man who can keep boys from committing crimes and off the streets is in essential work," he declares. "A whole generation of boys and girls, otherwise, will grow up with sub-standard education which will have permanent and far-reaching effects when they enter the adult world."

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**LIGHTNING STRIKES**—A hole seven inches deep and this interesting pattern of burned grass were made by lightning striking the golf course green of a Pittsburgh country club. The photograph was made by Dr. J. M. Conway, physician of Pittsburgh.