MEDICINE

New Kind of Vaccination Will Prevent Lockjaw

Toxoid May Be Given in Advance to Protect Against Injuries of War, Automobiles, and Fourth of July

ON M-Day the men of our fighting forces will probably be rapidly turned into walking factories of tetanus, or lockjaw, antitoxin. Then, if wounded, they need not as in the past depend for protection against lockjaw on the speed with which they can be taken to dressing stations for injections of this antitoxin.

This new kind of protection against lockjaw, or tetanus, that takes effect before the danger of tetanus germs getting into wounds arises is due to development within the past few years of a tetanus toxoid.

The tetanus toxoid, unlike the antitoxin, is made directly from the germs themselves. The poison or toxin of the germs is treated with formalin and heat so that it cannot produce disease but still has the power of stimulating the body to produce its own defense against the tetanus germs.

In this it is like the diphtheria toxoid which has protected thousands of children against diphtheria. Many baby doctors are now giving tetanus toxoid with diphtheria toxoid to six-months-old babies. When these infants reach the run-about age, their mothers need not worry about the danger of stepping on rusty nails. Such an injury now means the child should be rushed to the doctor for injections of anti-toxin to protect against any tetanus germs that may have been driven into his foot. The child who has had tetanus toxoid, however, already has such protection.

All the midshipmen at the U. S. Naval Academy have now been given this new type of tetanus vaccination. Medical officers of the Army and Navy believe, though it has not yet been officially stated, that this vaccination will be given, along with "shots" of antityphoid fever vaccine, to all men drafted for the services on M-Day.

The tetanus toxoid has been given to all French soldiers and, according to reports received by medical officers of the U. S. Army, there has been no tetanus in the French army since the start of the war in September. Men of the Italian army have also been given this protection, but no reports of its success have been received. Up to two years ago the Germans had not adopted the procedure but there has been no direct word since then on the subject.

Peacetime counterparts of war wounds —automobile accident injuries and Fourth of July casualties—also bring danger of lockjaw. For protection against these, doctors now rely on injections of tetanus antitoxin. The new tetanus toxoid can also be used at the time, it is claimed, of injury to reenforce the antitoxin.

One important advantage of toxoid over antitoxin is the fact that toxoid is not made from horse serum. Antitoxin is made from the blood serum of horses that have been given immunity to tetanus. Although this is effective, it sometimes makes people sick with what is called serum sickness. Those who suffer from allergy, or who have had previous injections of horse serum, are particularly likely to develop severe serum sickness.

Science News Letter, June 29, 1940

PHYSIOLOGY

Chewing While Talking Aids Deaf to Speak

CHEWING and talking at the same time—frowned on by etiquette books —is an effective new method of helping deaf people to overcome unnatural speech, Dr. Emil Froeschels reported to the American Association for Promoting the Teaching of Speech to the Deaf.

Formerly one of the University of Vienna's notable physicians, Dr. Froeschels is now applying his methods of improving speech at the Central Institute for the Deaf in St. Louis.

Over-exertion of muscles is responsible for many defective voices, both among deaf and hearing people, Dr. Froeschels said. Since voice muscles cannot be used so actively when a person tries to eat and talk at the same time, Dr. Froeschels evolved the practise method of having speech patients make simple chewing movements while articulating words.

"What then proceeds from the mouth," he said, "is a language—which is, to be sure, no longer in use—but which in my opinion was the primitive language of man."

Accustoming deaf patients to talk with less muscular force and stiffness, the chewing practise leads to more flowing and natural speech, he explained, thus correcting the tendency of the deaf to split speeches up into isolated words and sounds.

To demonstrate his method, the Viennese physician asked the Rhode Island School for the Deaf to bring to the meeting two boys and two girls particularly in need of voice improvement.

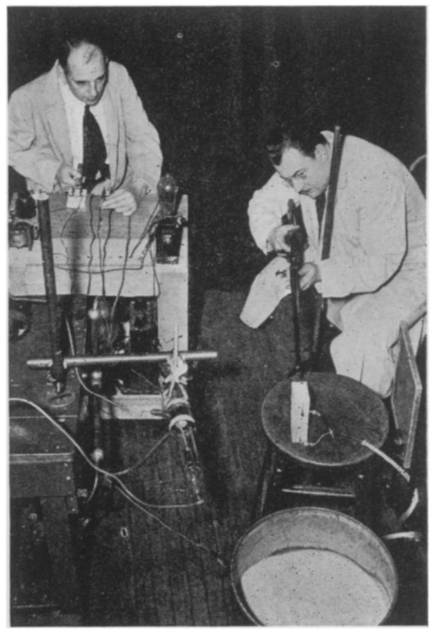
Science News Letter, June 29, 1940

PHOTOGRAPHY—PHYSICS

X-Ray Pictures Taken In Millionth of a Second

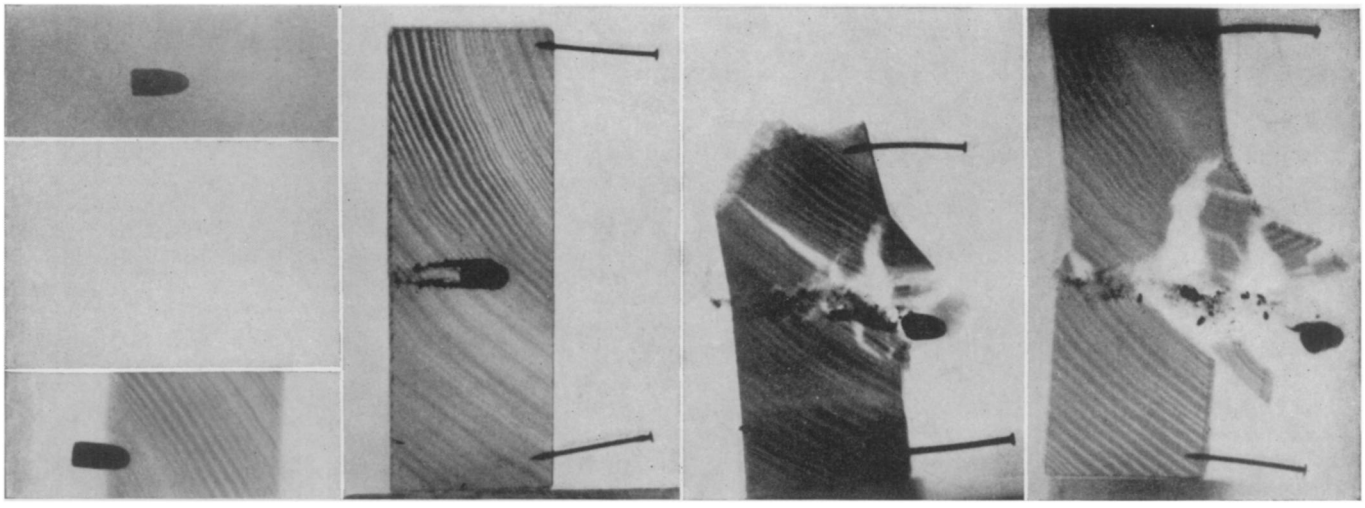
X-RAY photographs taken with an exposure short enough to show a moving bullet while passing through a block of wood were shown to members of the American Physical Society at Pittsburgh. The method was described by Dr. Charles M. Slack, research physicist for the Westinghouse Lamp Division, who developed the new X-ray tube with the collaboration of his associates.

A very brief electrical surge of high voltage and amperage is obtained by charging a condenser, in several seconds,



SHOOTING AN X-RAY

As Dr. Charles M. Slack stands at the control switch, his associate, L. F. Ehrke is about to fire a rifle that will take an X-ray picture of the bullet going through wood.



SPEED X-RAYS

These photographs, taken at a millionth of a second permit the scientist to look through a block of wood and see the damage done by the bullet on its way through. The two pictures at left show the bullet in the air and entering the wood. The others shows how the wood "seals" itself after the bullet has entered and show the shattering action of the bullet as it makes its way out.

and discharging it through the X-ray tube. The voltage is about 100,000, somewhat less than that often used in ordinary tubes. But the current is far greater. The ordinary tube takes about half an ampere, this new tube uses about 2,000 amperes.

In use, the bullet, golf ball, or other object being studied, is made to break a fine tungsten wire. This is connected to a timing circuit, which releases the energy stored in the condensers.

Possible practical applications of high-speed X-rays are in studying internal strains in rapidly moving machine parts, detection of slight deflections in a bullet passing through a gun barrel, or finding out what happens to the bones in a football player's foot as he kicks the ball.

Science News Letter, June 29, 1940

● RADIO

Recent experiments on dental caries will be described by Dr. J. R. Blayney, director of the Walter G. Zaler Dental Clinic of the University of Chicago, speaking as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, July 4, 4:00 p.m., EDST, 3:00 EST, 2:00 CST, 1:00 MST, 12:00 PST.

Listen in on your local station. Listen in each Thursday.

PHYSICS

Water Softening Method May Separate Uranium 235

Patent Is Issued for Running Potassium Chloride Through Zeolite and Then Salt, Increasing Isotope

POSSIBILITY that a method esentially similar to that now widely used for softening water may provide a new means for separating the uranium isotope of weight 235, hailed as a source of practicable atomic power, is foreseen in a patent just granted. The patent, number 2,204,072, has been given to Dr. John G. Dean, director of the laboratory of the research division of the Permutit Company at Birmingham, N. J.

Dr. Dean's method makes use of interesting substances called zeolites. These are chemical compounds containing aluminum, calcium and sodium in combination with silicon. The material looks like sand, except that it is green in color, so it is sometimes called "greensand." Hard water contains calcium and magnesium salts. When this is passed through a zeolite, calcium or magnesium is taken out and sodium put in. Thus, if the water has calcium sulphate in solution before it passes through the zeolite, it has sodium sulphate when it comes out.

When the zeolite has given up all of the sodium, it is no longer effective, but it can be regenerated. This is done by passing through it a strong solution of ordinary salt, which is sodium chloride. Then the reverse of the softening process takes place. The solution is changed to one of calcium chloride, and sodium is put back into the zeolite.

Dr. Dean's patent applies this to the separation of isotopes, which are elements very similar chemically and physically, but with atoms of different weights. Ordinary potassium, for instance, contains three isotopes, of atomic weight 39, 40 and 41; 40 is in extremely small amounts. Of the others, number 39 is a little more than 14 times as abundant as 41.

He passed a 2% to 3% solution of potassium chloride through a 35-inch column of zeolite. In the solution which emerged, the 39 isotope was even more plentiful than normally. But when a salt solution was passed through to regenerate the zeolite, it yielded a potassium chloride solution in which the percentage of the rarer isotope was increased about 5%. By further passages, the percentage could probably be enlarged still more.

In the case of lithium solutions, he increased the relative abundance of the rarer isotope about 9%. With nitrogen compounds, the increase was about 10%.

Uranium of atomic weight 235 makes up about one one-hundred-fortieth of ordinary uranium, the rest being an isotope of weight 238. The former is the one believed to be a possible source of atomic power, if it can be separated in sufficiently large quantities. One method already used to separate it, however, the mass spectrometer, is exceedingly slow, so it is estimated that 75,000 years would be