

PHYSICS

California Physicists Split U-235 Into Equal Parts

High-Speed Neutrons of 16 Million Electron Volts Used for Fission; Got Energies of 100 Million Volts

BY SHOOTING high energy atomic bullets, or neutrons, at them, University of California physicists have succeeded in breaking the nuclei of both uranium and thorium atoms into equal parts. Importance of this is that the form of uranium used is of mass 235, the kind that, it is hoped, will make possible practicable atomic power with such a splitting or fission process.

In previous experiments, by using slow-speed neutrons, uranium was divided very unevenly, into a light element and a heavy one.

However, Dr. Emilio Segre, of the

University's Radiation Laboratory, and Dr. Glenn Seaborg, instructor in chemistry, used high-speed neutrons, with energies of 16 million electron volts, or more than three times that used earlier. These neutrons are produced by bombarding atoms in the cyclotron, or "atom-smasher."

In the splitting process, energies of 100 million or more volts are produced. Difficulty of separating uranium of mass 235 from the ordinary kind, which contains it in rather small amounts, has so far prevented actual tests of uranium power.

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in the Radiation Laboratory, and Gerhart Friedlander, graduate student in chemistry.

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CHEMISTRY

Colors of Thin Films Used to Detect Viruses

DIAGNOSING disease may in future be aided by a new method which makes use of the changes of iridescent colors reflected from very thin films of transparent material.

Details of the new method which is expected to detect viruses, toxins, poisons and other tiny and invisible substances were explained in an announcement that a patent covering the method had been issued to Dr. Irving Langmuir, of the General Electric Research Laboratory.

Thin films of transparent material such as barium stearate, an insoluble soap, reflect iridescent colors, it is known. The color depends on the thickness of the film. A film with a thickness of 47/10,000,000 of an inch reflects a purple color when illuminated by a white light. If the film is made slightly thicker the color changes toward blue. The changes in thickness can thus be measured by observing the changes in color.

To detect viruses or other tiny, invisible substances, slides are first conditioned by applying the thin barium stearate film and then dipping in a 1% solution of thorium nitrate. Then it is possible to apply to the slide a substance that has a specific reaction toward the particular toxin or virus or poison or other substance for which the test is to be made.

If the suspected substance is present in the solution tested, adsorption of a single layer of uniformly thick atoms or molecules of the substance will take place on the slide surface, producing an increase in film thickness and a corresponding change in color.

Each type of substance in solution is expected to produce a characteristic increase in film thickness and corresponding change in color of the conditioned slide. Once these characteristic thicknesses and colors for known substances have been determined, identification of suspected substances will be a matter of check and comparison. Dr. Katharine B. Blodgett and Vincent J. Schaefer of the Research Laboratory staff have assisted Dr. Langmuir in the investigations, which started in 1935.

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PHYSICS

Radioactive Substances Made With California Atom-Smasher

Germanium, Element Similar to Lead, Used in New Experiments; One of Last of Elements Studied

FOUR new artificial radioactive substances have been added to those known to man, bringing the known total to about 360, it is announced by three University of California scientists.

An artificial radioactive substance is one which is made to emit rays somewhat as radium does. They are made by smashing atoms in the Berkeley cyclotron. When the atom of an element is smashed it often changes into another element and emits rays which can be detected by the use of sensitive instruments.

Four radioactive specimens of germanium, an element similar to lead, were reported by the California scientists. Germanium is one of the last of the 92 elements to be investigated in detail for radioactive species.

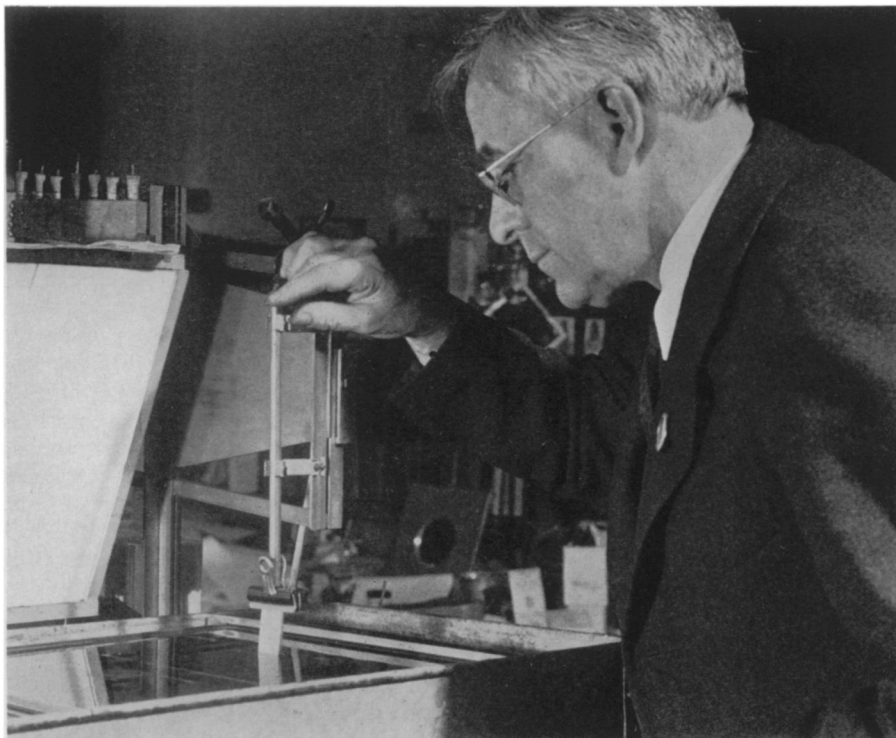
More than 100 of the known artificial radioactive substances have been discovered at the University of California with Prof. Ernest O. Lawrence's cyclotron.

Some of the radioactive elements have

proved invaluable in medical and biological research. Radio phosphorus is being used in experiments on the treatment of leukemia, the dread disease of the blood cells. The growth of teeth and bones is being studied by the use of radioactive strontium, radioactive iodine is revealing valuable facts about the thyroid gland, and several other elements treated by the cyclotron are literally throwing new light on biological processes.

Plant growth and nutrition are being studied also by feeding a solution of radioactive elements and following their course through roots, stems and leaves. The use and value of various basic food elements are being studied in animal and poultry nutrition with "tagged" substances.

The four radioactive germanium species were reported by Dr. Glenn T. Seaborg, instructor in chemistry, Dr. J. J. Livingood, former research associate



VIRUS DETECTION

Dr. Irving Langmuir, of the General Electric Research Laboratory, demonstrates his new method of revealing the presence of invisible viruses through changes in the colors of very thin films.

MEDICINE

Anti-Measles Vaccine Will Get Trials in This Epidemic

Many Children Are Already Being Vaccinated; Army Considering Use Among Selective Service Trainees

MANY children in New Jersey and Philadelphia are now being vaccinated with a new and promising anti-measles vaccine, and Army medical authorities are about to consider the advisability of its use among selective service men now in training camps, where measles cases are on the increase.

The vaccine is not yet ready for general distribution and use. Dr. Geoffrey Rake, of the Squibb Institute for Medical Research at New Brunswick, N. J., with Dr. Morris F. Shaffer, developed the vaccine from measles virus grown on fertile hen's eggs.

The first vaccinations on a small group of children in Philadelphia, reported as successful last fall, were conducted under the direction of Dr. Joseph Stokes, Jr., of the University of Pennsylvania Medi-

cal School. Dr. Stokes is directing the present trials of the vaccine on a wider scale and is also director of the U. S. Army's measles commission which is just being formed and at its first meeting is expected to consider the use of the vaccine in Army training camps, according to information from Lieut.-Col. J. S. Simmons, chief, preventive medicine division, office of the Surgeon General.

The vaccination of children in New Jersey and Philadelphia orphan homes, schools and similar institutions had been planned before the present outbreak of measles started. It was delayed for six or eight weeks, however, by the influenza epidemic which struck all the institutions selected for the measles vaccine trials.

The program is now going ahead and

a good start has already been made. It is hoped the vaccinations, in spite of the eight weeks set-back due to the flu, will be completed in time to protect the children during the present epidemic. Children in homes and similar institutions usually get their measles six to nine months after children in the rest of the population, because the children in the homes are relatively isolated.

The vaccine will be given to one-half the children in the selected institutions, the other one-half remaining unvaccinated. This will give scientists a control group against which to check the protective value of the vaccine. Only children who have never had measles have been selected for both control and vaccinated groups. Permission of parents or guardians is being obtained before the vaccination is done, and just about one-half of the parents or guardians have given this permission, so there has been no need to draw lots or follow any other method for division of the children into vaccinated and not-to-be vaccinated groups.

Among the questions the scientists hope to have answered by the vaccine trials are how long and how completely the vaccine protects against measles. Until such questions are answered, the vaccine will not be released for general distribution.

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PUBLIC HEALTH

Measles Cases Increasing Throughout Nation

LOTS of measles cases between now and the middle of April are expected by the U. S. Public Health Service. The number reported by the states for the week ending March 1 totalled 31,489. The total for the entire nation for the preceding week was 24,079.

These figures show that in one week there are more than one-tenth the number of cases that occurred during the entire year of 1940. That was a low year for measles, with only 276,000 cases reported during the entire year. Last big measles year was in 1938, when the year's total reached 822,800 cases.

The trend for measles is always either low or high, but U. S. Public Health Service records for the past 20 years do not show any regular measles cycles. The ups and downs in measles depend on the fact that nearly everyone is susceptible until he has had an attack. Once all the children who are old enough to