## Do You Know?

Some *bacteria* emit enough light to photograph objects.

*Turkeys* would be nearly extinct if they had not been domesticated.

The best pasture for *hogs* is alfalfa, experts claim.

North American Indians had no *beasts of burden* prior to the coming of white men.

*Licorice* has its characteristic taste due to the glucoside, glycyrrhizin, which is sweet in alkaline, but not in acid liquids.

*Devil's shoestring,* a wild American plant of the legume family, may be a source of rotenone for insecticides, according to studies in progress in Texas.

War-developed *walkie-talkies* are promised for reliable two-way communication between farms and town.

*Butterflies* that give off repulsive odors do so as a protection from birds and other enemies, and are found in both sexes; attractive scents are confined to the males.

*Old rooster meat* is tender and juicy if, six weeks before killing, a tiny pellet of synthetic chemical diethylstilbestrol was inserted under the skin through a small cut; it causes fat to form in the muscles.

A *cereal beverage,* recently patented as a coffee-substitute, is made from bran, poplar bark, molasses and vinegar; it has a coffee-like flavor, it is claimed, and acts upon the membranes of the throat in the manner of coffee.

**NEW "PICK-UP" CANE**

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amounts of scholarships granted under this program are much smaller each year, 300 of the most scientifically talented boys and girls in the nation have been located and, with the exception of the boys who were inducted in the armed services, most of them have been given opportunities for intensive scientific or technical study.

The Science Talent Search utilizes the newest psychological selection techniques, and combines a science aptitude test rating with searching evaluation of personal qualities and scholastic record. These methods of selections are proposed for use in the larger federal plan, which would use national examinations leading to selection by boards of judges in each of the states.

Although the first Science Talent Search was held at the beginning of America's entry into the war, some of the winners have already graduated from college and are doing research for advanced degrees, in some cases on military problems.

These Science Talent Searches for the past four years (the fifth one is being conducted this fall and every high school senior is eligible to compete) have shown that science talent may be found in the big cities, the small towns and the farms, in those whose parents are poor and in those with millionaire fathers or mothers, in those born here and those who came to our land as refugees.

Good science teaching in school from the first grade through the high school is needed to be sure that the scientifically talented do not go through the educational mill without their interest in science being awakened.

The intelligent reporting by American newspapers of scientific news is of major value in bringing the importance, method and possibilities of science to the attention of young people who possess scientific talent but who, except for the press, might never know of the opportunities and needs in this important field.

There exists in America the largest science organization in the world, the more than 150,000 members of Science Clubs of America, organized in some 7,500 clubs in the nation's high schools. From among these boys and girls who make science their serious hobby, many of America's scientists of the future will come.

How good a job they will be able to do in building us all a better future will depend in large measure on how thoroughly America searches for latent science talent and whether this search is supported with the necessary dollars and intelligent planning.

*Science News Letter, August 25, 1945*

CHEMISTRY

# Transmutation Preferred

➤ TRANSMUTATION, for centuries the alchemists' goal, has suddenly become the laboratory method of choice of the group of scientists who worked out the chemistry of the atomic bomb. The account appears in the report, released by the War Department, written by Dr. H. D. Smyth, of Princeton University.

The problem was to separate two or more kinds of the rare metal uranium, which differ from each other in no discoverable way except that one is slightly heavier than the other. To separate them by this difference would have been a slow, tedious and unsatisfactory task, especially since the part that would be valuable for the project makes up less than one part in a hundred in any quantity of the ore.

Here the knowledge and skill of chemists who have studied the behavior of radium and other radioactive elements was put to good advantage. It has been found in work with such elements that their weight and their chemical nature depend on two kinds of minute particles which make up the hearts of their atoms.

The number of one kind of particle, the proton, in the atom heart is responsible for the nature of the element. One proton makes hydrogen, 26 protons make iron, 92 protons make uranium. The other kind of particle in the atom heart is the neutron. Uranium 235 has a net result of 92 protons and 143 neutrons, adding up to 235, according to the chemists' calculations, while uranium 238 has three more neutrons than its lighter isotope.

These two uraniums had to be separated, because only U235 would split up the way the scientists wanted it to for use in the atomic bomb. U238 would not. By lucky chance, the very property of U238 which made it useless for the purposes of the bomb provided the clue which solved the separation problem.

The more plentiful form of uranium, U238, could be made to undergo transformation into another kind of element

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by first adding to the nucleus of its atom a neutron, to make it so heavy that it would become unstable, then by allowing this heaviest uranium atom to shoot an electron out of its structure. This loss of electrons from the total quantity of uranium showed itself as a phenomenon familiar to scientists as the beta ray. It is the peculiar nature of radioactive elements to change into something else when they emit beta rays, and that something else is, oddly enough, not a lighter but a heavier element.

Accordingly, when uranium 239, formerly the heaviest known element, emitted its beta ray it changed into a still heavier element, which the scientists working with the material named neptunium. Neptunium proved to be a rather unstable element, and emitted a beta ray in its turn. This change in the atom turned neptunium into another new element, which was named plutonium. The names of these three elements are taken from the three farthest planets of our solar systm.

Plutonium turned out to be a fairly stable element, about whose chemical properties enough was soon learned to prove that chemical separations of this new material from its parent uranium would be a relatively easy task. Plutonium does not readily follow the pattern by which it was formed, but makes the opposite transformation by which it gives off an alpha ray and turns back into uranium 235. This, however, happens so slowly that there is plenty of time for the atom-splitting reaction of plutonium to do its work.

*Science News Letter, August 25, 1945*

CHEMISTRY

## Rubber Goods Produced In Tremendous Quantities

➤ SOME idea of the tremendous wartime production of rubber goods for the armed services may be gleaned from a report by the Rubber Manufacturers Association. Tires are but a single item. Equally essential, perhaps, are rubber boots for troops, battery cases, rubberized textiles, heels and soles for shoes, and rubber pads for tanks, aircraft and battleships.

More than 30,000 different rubber products were manufactured for war uses. Some were made from the limited supply of natural rubber, some entirely of synthetic rubber, and others of a combination of the two. The production program was hampered to some extent by the necessity of manufacturers and workmen learning how to use the new synthetic raw material.

Tens of millions of tires for land, air and amphibious vehicles have been produced since the beginning of the war, the report states. Over 45,000,000 pairs of rubber boots and shoes have been made, and some 10,000,000 hard rubber battery cases. More than 150,000 pounds of rubber compound is used in each new battleship. Over 360,000,000 yards of rubber-coated fabrics have been produced. Thousands of other rubber needs have been met.

Rubber industries had considerable natural rubber to use the first two years after Pearl Harbor, with some 600,000 tons of it on hand in December, 1941, and additional on boats on the sea. In three months the Japs controlled 90% of the world's sources of natural rubber. The first pound of synthetic rubber from the first plant in the joint government-industry program was produced on May 18, 1942. New synthetic rubber is being produced at a rate of over 700,000 tons a year. War needs have been met, and some rubber is available for the more essential civilian needs.

*Science News Letter, August 25, 1945*


# *In the Maintenance of Water-Balance*

**The dynamic equilibrium between intravascular and tissue fluids derives its stability and its adaptability to the body's flexible demands from the plasma protein of the circulating blood. Unless this regulating influence of the plasma protein is maintained, the normal interchange of fluids between blood and tissue becomes disturbed, and edema ensues.**

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