trons, electrically neutral particles in all matter, can tear the uranium atom asunder, releasing approximately 200,000,000 electron volts, gave hope that practical release of atomic energy might be achieved.

Since gamma rays are radiation like electricity, light, and X-rays, consisting of photons, Dr. E. U. Condon, Westinghouse's asociate research director, suggested in announcing the discovery that the new uranium fission phenomenon be called "phission."

Whether the new photo-fission or phission of uranium will bring closer to realization the actual release of atomic energy is problematical. The big task is still the concentration of enough uranium 235 (a twin or isotope of the commonest sort of uranium mass 238) to provide a real test as to whether the splitting and energy release is self-perpetuating, or what is called a chain reaction.

The new research has provided an alternate method of starting the disintegration. The form of radiant energy used is 6,000,000 electron-volt gamma rays, similar to, but more penetrating than X-rays.

The research will be reported shortly in a letter to the *Physical Review* communicated by Drs. R. O. Haxby, W. E. Shoupp, W. E. Stephens and W. H. Wells.

If uranium atoms could be used as an energy source in the same manner that coal is burned, their fission energy would be some 50,000,000 times as great as the combination of coal and oxygen, atom for atom.

Science News Letter, July 6, 1940

CHEMISTRY

Non-Poisonous Gas Is Also Important in a War Role

Carbon Dioxide Vapor Puts Out Incendiary Fires, Inflates Rubber Boats and Keeps Planes From Sinking

WHILE gas masks are slung on the shoulders of millions of European soldiers and civilians in expectation of deadly poison-gas attacks, a harmless and non-poisonous vapor so far has played a starring role in World War II. That vapor is carbon dioxide.

Those rubber boats used by German columns to swarm over water defenses are inflated by a twist of a valve on a carbon dioxide bottle. Fire in the engine of a fighter plane is snuffed out during combat by a cloud of carbon dioxide released from a tiny tank in the cockpit. Life vests of pilots forced down at sea are instantly inflated by this same gas.

Air field fires, from explosive or incendiary bombs, are blanketed and smothered with carbon dioxide carried in high-speed fire trucks. And at hundreds of English pilot-training centers, a blizzard of super-cold carbon dioxide snow is thrown over a crashed plane to beat back flames and enable rescuers to pull out the student crew.

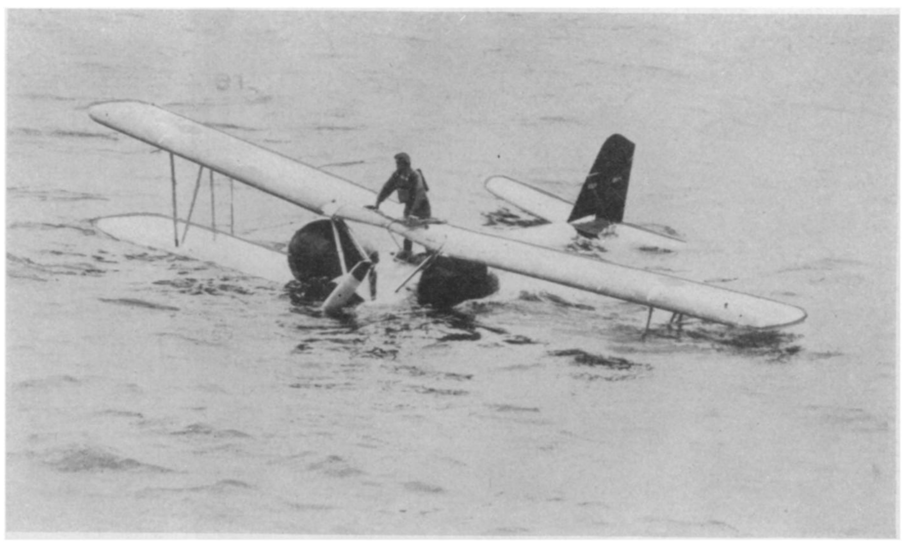
Two properties of carbon dioxide account for its usefulness in wartime: Its tendency to liquefy under pressure and expand quickly and safely when released, and its ability to smother flames by cutting off their oxygen supply. The first quality makes it ideal for a variety of inflation purposes, and the second accounts for its wide use on the fires which are a trademark of mechanized war.

Incidentally, the carbon dioxide thus used is basically no different from the vapor that makes our bread rise, forms the collar on our beer and the fizz in our soft drinks, and in solidified form is widely used to freeze and protect foodstuffs. We breathe tons of it every year, for it is part of the air itself.

All branches of the military machine now depend on this cheap and plentiful gas, which is derived from coal combustion and as a by-product of other industrial processes. Clouds of the gas are shot into engine rooms of battleships in event of fire from shells or bombs or from leaking fuel tanks, and it penetrates quickly through gratings and past obstructions to smother the flames.

Naval aircraft engineers have developed a number of vital uses for carbon dioxode. When a plane from an aircraft carrier misses the deck or is forced down at sea, two rubberized bags automatically pop from the fuselage to keep it afloat until help arrives.

Another naval device employing this gas is the rubber life raft, carried in folded-up form on overwater flying, but inflated in three seconds by a turn of a valve on the light steel gas bottle attached to the stern. The naval flyer's rubber lifevest is similarly inflated by a tug on a cord which dangles at his waist, and



FIRE AND WATER ALIKE

Both are fought with carbon dioxide. The picture on the cover shows a fire in an airplane engine being smothered with clouds of carbon dioxide "snow" from a portable fire truck. Here is an official U. S. Navy photo showing a flyer who has been forced down at sea awaiting rescue. Visible just in front of him are the two "water wings" which were automatically inflated when the plane hit the water, and now keep the plane afloat.

which releases the gas compressed in a tiny steel vial.

On both navy and army planes, engine fires caused by bullets or backfires or leaking oil lines now can be smothered in full flight miles above the earth. A bottle of the compressed carbon dioxide is connected to perforated piping which loops around the engine, and a quick pull of a control handle shoots a cloud of the gas into every crevice of the engine compartment, smothering the flames despite the force of the slipstream. Some military planes have fire detectors which discharge the gas automatically, thus leaving the pilot's hands free. Engineers explain the action of the gas by saying that it cuts the air's normal 21% oxygen content to 14% or 15%, at which point gasoline or oil cannot burn.

Thus has a non-poisonous gas become one of the most useful adjuncts of a modern army and navy. And while research continues on other uses for this versatile vapor, so far much of the credit for perfecting the high-pressure uses of this gas goes to a New York engineer named Walter Kidde. His firm first demonstrated the commercial use of this fire-smothering vapor by invading the shipping capital of London, England, and renting an old cargo ship for a dramatic demonstration. After inviting London shippers aboard the vessel, they drenched the hold with gasoline, set it afire, and smothered the roaring blaze with a quick discharge of the gas.

Peacetime uses for carbonic gas are quick to develop, too. New York's Municipal Airport protects its commercial traffic with a counterpart of a gas truck designed for the navy. Factories and oil refineries are installing similar trucks and trailers which carry large quantities of carbon dioxide. Plant interiors are being fitted with wheeled gas extinguishers and, in many cases, with automatic built-in systems that flood whole rooms with the gas in event of fire. Already, commercial planes are protected against engine fires in the air by carbon dioxide systems.

Science News Letter, July 6, 1940

• RADIO

Prof. Ernst A. Hauser, of Massachusetts Institute of Technology will describe a new synthetic mica in discussing "New Materials from the Earth," 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 11, 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.

IN ASBESTOS SUITS

Fearsome looking figures are these members of the Navy's mechanized fire-fighting unit, using carbon dioxide to battle flames.

NUTRITION

Japan's Rice Shortage May Bring Crisis in Fall

Nature, Not China, Dealt Heaviest Blow at Nippon When Different Regions Suffered Rain and Drought

THE WAR of hunger is creeping near to Japan's door, as officials struggle to outwit a rice shortage, the first in Japan's experience in twenty years. If they can skimp till the new harvest in November, without a repetition of 1918 rice riots, they may be on firmer ground.

Nature, not beleaguered China, shot this damaging bolt at Japan, when too much rain and too little rain fell on different regions of the empire in the past growing season.

The result, analyzed by agricultural economists, spells a serious outlook for Japan's "staff of life." Ordinarily one of the world's most self-sufficient nations as to her entire food supply, Japan consumes about 25 billion pounds of rice a year, grows four-fifths of it on farms of Japan proper, gets the rest from her colonies of Chosen (Korea) and Taiwan (Formosa), plus a little from Thailand (Siam).

But the past season's rice crop in Chosen was 40% less than the previous year, and Taiwan's crop the smallest in five years. By rigid economy, Japan is trying to reduce rice consumption this year by a full billion pounds, while banking on larger plantings and a better crop in the 1940-41 season.

Pinching and scraping to feed the Japanese includes such prospects as these:

Importing about three billion pounds of rice, some of which may force drawing on Japan's credits abroad, which she prefers to spend on war material. Some of the rice is being bought from Thailand (Siam), and some is reported coming from central China, despite China's own rice shortages.

Reducing Chosen's rice consumption 25% by a proposed rice distribution system there, and substitution of other foods.

Rice is being polished only about 70%,