MEDICINE

Cancer's Spread May Be Prevented By Discovery

Research at University of Pennsylvania Discloses That Disease Can Spread Through Valveless Veins

THE SPREAD of cancer from one part of the body to another, which frequently makes it impossible to save the patient's life even by removing the original cancer, may be prevented as a result of a discovery announced by Dr. Oscar V. Batson, of the University of Pennsylvania Graduate School of Medicine. (*Annals of Surgery,* July)

The discovery applies to the spread of germ diseases or infections. It is considered by medical authorities so important that the editors of the *Annals of Surgery* rushed Dr. Batson's technical report through the presses six months ahead of the usual schedule to make it available to the medical profession in the next (July) issue.

The new route by which cancer and germs can spread through the body is along the "vertebral veins," that is, the valveless veins about the vertebral column and their connections. The discovery was made by injecting opaque material used in X-ray diagnosis into the veins of cadavers and of living animals.

The injections showed that blood, and with it cancers and germs, can spread along the body through the vertebral veins, by-passing the heart and lungs. This is particularly likely to happen in coughing and straining.

As a result, doctors can no longer feel that as long as the lungs remain clear, the possibility of general spread of cancer or infection is remote. This idea was based on the long held view that the lungs are the filter for infections and tumors spreading in the body. According to this old view, cases of general spread without lung involvement were called "paradoxical," although the paradoxes might occur in as many as 50% of the cases.

"Routine examination of the lungs by X-ray is therefore not enough," Dr. Batson declares in view of his discovery of the new route of cancer and germ spread. "The entire spine and adjacent parts must be routinely and repeatedly surveyed. The importance of early diagnosis and treatment becomes much more important.

"Straining and heavy work may have to be avoided and prophylactic irradiation (by X-rays or radium) of large areas, particularly in pelvic, breast and lung tumors, may have to be introduced."

Dr. Batson explains his discovery as follows: "Ordinarily, tumors and infections are supposed to travel by lymph vessels and veins to the heart. Secondary tumors and infections may appear along this pathway. Before being spread to the rest of the body this contaminated blood stream must go through the lung capillaries (tiny blood vessels).

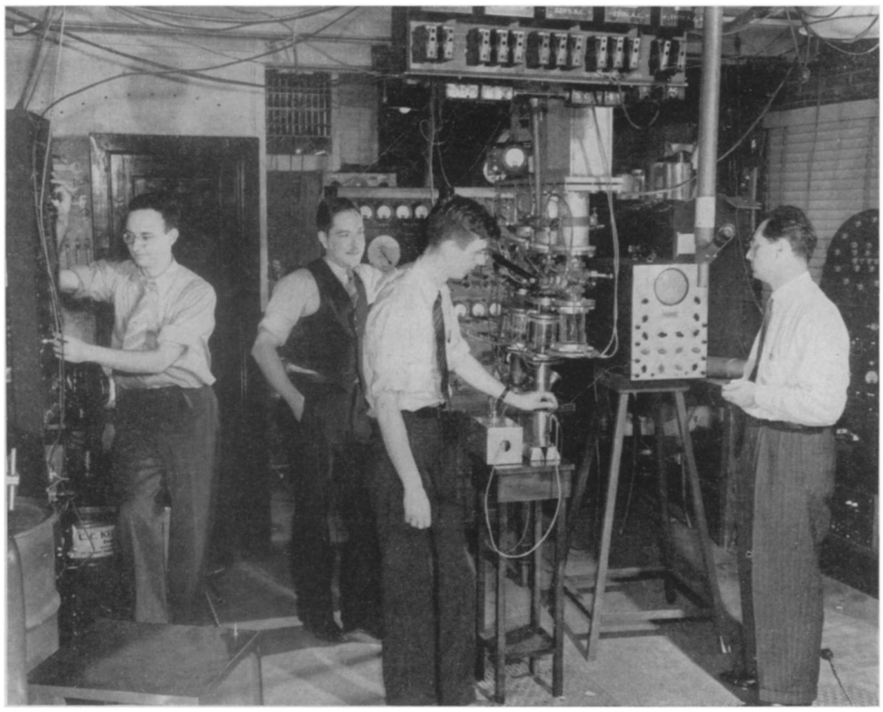
"But many times no secondary lesions (tumors or germ injuries) are found in the lungs, 50% to 70% in some instances.

"These secondary lesions are especially numerous in the spine and skull. There has been no adequate explanation for this 'paradoxical' spread.

"In an anatomic specimen, injection into the veins would be expected to, and generally does, follow the big veins to the heart and lungs. However, injection of breast veins and small pelvic veins results in the injection mass filling the valveless vertebral veins and their connections.

"In the living monkey the usual course of injected material is into big veins. But when the pressure produced by straining or coughing is imitated, the flow is along the vertebral veins."

Science News Letter, July 6, 1940



CAN RELEASE ATOM'S ENERGY

Drs. W. E. Stephens, W. E. Shoupp, R. O. Haxby, and W. H. Wells are shown here at work in their laboratory. These are the Westinghouse physicists who have just discovered that gamma rays can release atomic energy from uranium.

PHYSICS

New Way To Split Uranium And Release Energy Found

A NEW way to split the uranium atom with release of large amounts of energy within it was reported from the Westinghouse Research Laboratories.

Gamma rays, generated by proton bombardment of fluorite with the 95-ton electrostatic atom smasher, are found to split the uranium atom, releasing 30 to 100 times the energy expended in causing the fission.

Discovery in Germany early in 1939 that relatively slow and unenergetic neu-

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.

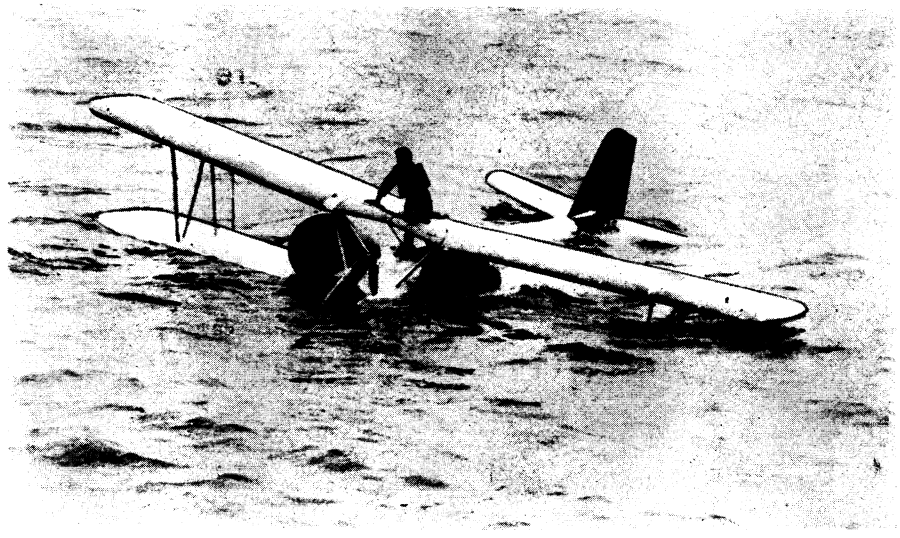
Two properties of carbon dioxide account for its usefulness in wartime: Its tendency to liquefy under pressure and expand quickly and safely when released, and its ability to smother flames by cutting off their oxygen supply. The first quality makes it ideal for a variety of inflation purposes, and the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