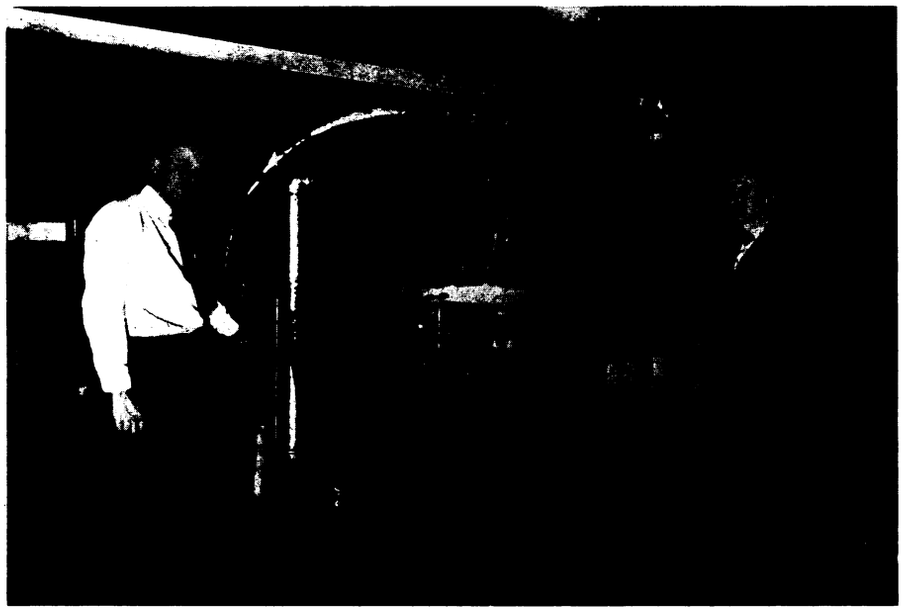

GIANT ATOM MERRY-GO-ROUND

Here is the powerful cyclotron or atom gun used for record-making high voltage experiments at the University of California. Note the great 85-ton magnet. Prof. Ernest O. Lawrence, who invented the powerful apparatus, stands at the left. Dr. Donald Cooksey, scientist working with Prof. Lawrence, is at the right.

that amounted to the capture of a fundamental building block of matter that is known as the neutron. And radioplatinum disintegrates into gold.

The picture on the front cover shows the great activity caused by a neutron beam from the Lawrence giant atom gun or cyclotron at the University of California. This cloud chamber was photographed in 1/1000 second by Dr. F. N. D. Kurie. A multitude of hydrogen atoms are shown speeding after collision with neutrons, although the test chamber was a full six feet away from the giant machine. The photograph shows an effect equivalent to that which would be produced by one hundred grams of radium worth approximately $4,000,000.

Science News Letter, May 2, 1936

PHYSIOLOGY

Carbon Dioxide a Vital Need; Once Thought Mere Waste

CARBON dioxide, commonly looked upon as nothing but a "waste" product of bodily processes, is "almost as essential to the normal functioning of the body as is oxygen."

This challenge to a long-established tradition of biology was thrown down before the meeting of the American Philosophical Society in Philadelphia, by one of the world's leaders in research on respiration, Prof. Yandell Henderson of Yale University.

True, carbon dioxide is a waste product of respiration, just as it is of the burning of coal, oil or wood; most of it must therefore be got rid of. But it is an error to think that any considerable residue left in the body is a poison, Prof. Henderson contended. A certain amount is absolutely necessary, because carbon dioxide is "the normal stimulus to the circulation as well as to respiration."

Supporting evidence for Prof. Henderson's claim was found in troubles sometimes encountered with hospital patients going under anesthesia. Some patients breathe excessively in the early stages of anesthesia, and thereby decrease the carbon dioxide concentration of the blood. This condition, called acapnia, may result in failure of both circulation and respiration. This tendency to collapse is now counteracted and prevented by the inhalation of carbon dioxide, diluted with oxygen or with air. Also, at the end of the operation, inhalation of carbon dioxide is now the accepted means of speeding up the elimination of the anesthetic and preventing difficulties with the patient's lungs. The same means of stimulating breath and circulation is now used in resuscitating victims of carbon monoxide asphyxiation, and as a better substitute for the time-honored method of spanking newborn babies who fail to start breathing.

The American Philosophical Society, whose annual meeting Prof. Henderson thus inaugurated, is the oldest scientific body in the United States. It was founded in 1727 by Benjamin Franklin, in the days when "philosophy" was considered as embracing all natural knowledge, and hence, as properly including all the sciences. In keeping with this tradition, therefore, the three-day meeting in the Philosophical Society's building, immediately alongside Independence Hall, featured discussions of historical, economic and literary matters, as well as an impressive array of strictly scientific papers.

Science News Letter, May 2, 1936

MEDICINE

New Detection Method for Dangerous Radium Poisoning

THE unfortunate victims of often fatal radium poisoning can now be studied and a new treatment applied through use of a new radioactivity detection method that is 10 to 100 times as sensitive as the older and usual methods. Dr. Robley D. Evans, Massachusetts Institute of Technology physicist, told the National Academy of Sciences of his new way of finding out how much radium the poisoned persons are carrying around in their skeletons.

Persons who drink radium water nostrums, or who submit to injections of radium chloride, as well as girls and others working in factories with radium and similar substances, sometimes get the reactive substances into their systems. There, fixed in the bones, such substances slowly disintegrate into lead, giving off a radioactive gas called radon and bombarding the body with penetrating gamma radiation which is so harmful that the victim often dies.

Dr. Evans used a sensitive kind of radiation detector that was developed during the present push of physicists to discover all about radiations and the make-up of atoms. His new type of "screen-cathode quantum counter" for detecting radium's gamma rays discovered radium in one fatal case that had

been erroneously reported as free from radium when the conventional electroscope detector was used. The breath of patients can also be analyzed to determine how much radon emanation is being exhaled.

Treatment for radium poisoning by the methods used to treat lead poisoning has been tried in collaboration with doctors at Harvard's Huntington Memorial Hospital. Used upon a typical case, it gave promising results. It consists of replacing some of the radium contaminated calcium in the patient's bones by fresh clean calcium through the use of special medication.

Science News Letter, May 2, 1936

CHEMISTRY

Powerful Explosive Made from Cornstarch By-product

Inositol From Farm Wastes Is Basic Material for Blasting Agent More Powerful than Nitroglycerine

AN explosive more powerful than nitroglycerine can be made from the corn product wastes of the nation, it was revealed by Prof. Edward Bartow, president of the American Chemical Society, in an interview at the Society's meeting.

No mere dream is the new explosive and blasting agent which outdoes dynamite in potency. Powder companies are already investigating the new material, and if the costs can be lowered America will not only find its corn a valuable industrial commodity in the explosives field but a line of defense in time of war.

Basic material of the new explosive is a sugar-like substance, inositol, made from the waste "steep" waters in which corn is soaked as a step in the manufacture of cornstarch. Inositol, said Prof. Bartow, can be converted into an explosive known as hexanitroinositol, containing six nitrogen atoms. Nitroglycerine is technically known by the chemical name of trinitroglycerine and has three nitrogen atoms.

The explosive hexanitroinositol, Prof. Bartow pointed out, has advantages over nitroglycerine because it is a solid compound instead of a liquid and can thus be used directly as a blasting agent, like dynamite. Its explosive properties are essentially the same as those of nitroglycerine.

Dynamite is useful because it is a solid material and can be more easily handled than a liquid explosive. The inherent disadvantage of dynamite, Prof. Bartow indicated, is that while it contains powerful nitroglycerine, the latter must be soaked up by sponge-like, non-reacting rare earths. Thus the solid dynamite is only part nitroglycerine. The rest is absorbent material.

The basic material inositol, from which such a super-explosive could be made, has been known for many years as a laboratory curiosity, said Dr. Bartow. It could be purchased on the open market in gram amounts for a cost of about $500 a pound.

Working at the State University of Iowa, where he is chairman of the Department of Chemistry, Prof. Bartow and his assistant, Dr. W. W. Walker, have improved the process for making inositol, so that the cost per pound is only a fraction of the former price.

On a production basis demanded by the potential explosives market, the cost should be reduced to forty cents a pound, which would meet competitive figures, Prof. Bartow indicated.

Inositol is commonly but incorrectly called a plant sugar. Slight traces of it are found in the human body in the muscle and liver tissues. Its physiological significance to the body is yet unknown but the University of Iowa Medical School is now studying the problem.

Almost all the inositol in the world just now consists of a stock of 25 pounds, which Prof. Bartow keeps locked in a safe in his laboratory.

Science News Letter, May 2, 1936

PHYSIOLOGY

Shock Causes Ebb of Blood Turning Face White

SUFFERERS from shock, turning white as the proverbial sheet, have good physiological reason for their pallor. The blood from their cheeks, and the blood even more vitally needed elsewhere in the body, has ebbed into the smallest blood vessels, which have become unnaturally dilated. Further, much of the fluid part of the blood has oozed out of the blood vessels altogether, and is in the other tissues, making them watery or "edematous." It is possible for a patient suffering from shock to "bleed to death into his own blood vessels."

These are the outlines of the physiological set-up of shock, as pictured before the American Philosophical Society by Dr. Virgil H. Moon of Jefferson Medical College.

All the tissues of the body have more than they need of capillaries, the microscopically fine, thin-walled vessels that connect the ends of the arteries with those of the veins. The muscles alone, Dr. Moon said, have capillaries enough to contain all the blood of the body. When shock occurs, these dilate, and also the tiniest of the vein-branches. Into the extra space thus created a great share of the blood ebbs. Furthermore, much of the plasma, or blood fluid, oozes out through the walls, leaving the remaining blood "thicker," or more concentrated.

The heart, not receiving the return stream of blood it normally should, cannot keep up the blood pressure. Body temperature drops, and the fires of life burn dangerously low.

Science News Letter, May 2, 1936

MEDICINE

Make Advance in Search For Monoxide Antidote

WHAT is claimed to be a marked advance in the search for an antidote for carbon monoxide poisoning was reported to the American Chemical Society by Drs. Samuel and Joseph Seifter of the University of Oklahoma Medical School.

In studies on rats, Drs. Seifter found an injection of the compound known as hexahydroferric chloride resulted in 75 per cent recovery after the animals had been poisoned with carbon monoxide gas. It is this gas which appears in the exhaust gas of motor cars and leads to deaths when drivers run their motors in closed garages.

The new antidote chemical, it was found, is too drastic in its action to be useful on animals higher in the scale of evolution than rodents. Already a search is being made for variations of the chemical which are less irritating and might thus be used for higher animals. The hope, of course, is that the new line of investigation will eventually lead to discoveries having applications to human beings.

Science News Letter, May 2, 1936