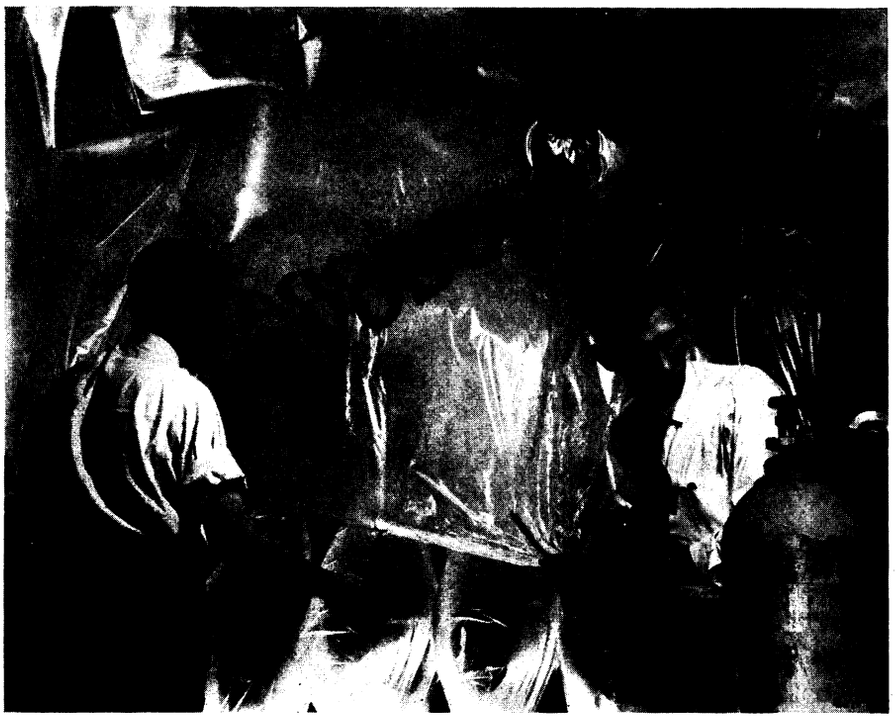

FREEDOM BALLOONS—These are the pillow-like plastic balloons used to send freedom messages to the people behind the iron curtain. "Svoboda" is Czech for freedom. Here the balloons are being inflated.

METEOROLOGY

Freedom Balloons Aimed

➤ BALLOONS carrying messages of freedom to people behind the Iron Curtain can be aimed at the desired target with a good chance that they will get there.

Knowledge of the upper air flow, the changes which might occur in it because of weather influences from over a wide area, and variations which already exist in the pattern can tell the balloon flyer where his messages will go and how long they will take to get there.

Various bursting devices, set for the proper time, can bring the messages to earth on the desired target. Some bursting devices operate on the pressure principle, bursting at a pre-determined height. By computing the trajectory of the balloon in advance, which can be done accurately, it is possible to know at just what altitude the balloon should burst so the messages will be brought to earth at the proper point.

Balloons can travel long distances, as the Japanese demonstrated during World War II, when they launched balloons designed to set fires in the American Pacific Northwest. However, the greater the distance, the less likelihood one balloon will hit the target. This can be solved by sending out a greater number of balloons.

American meteorologists and cosmic ray specialists use helium in the balloons they send into the upper atmosphere to collect information. Hydrogen is the gas being used in the balloons now being sent into the Iron Curtain countries.

Balloons are now being made of three types of material—plastic, natural rubber and neoprene, a synthetic rubber. This will probably be the first chance people behind the Iron Curtain will have to see this new American synthetic. Ultraviolet rays do damage to natural rubber, but the new neoprene balloons avoid this trouble.

Science News Letter, August 25, 1951

INVENTION

Grass Fires Put Out by Tractor-Trailed Dirt Blower

➤ FIRES IN fields of grass, grain or low brush may be extinguished with a trailer to a farm tractor which picks up fine dirt from the ground and discharges it on the burning materials. Scrapers positioned ahead of a rotary brush reduce the earth to a fine dirt which the brush can pick up. A suction fan blows the collection out through a discharge spout which is pivoted so that it can be swung from the rear to either side. Patent 2,561,701 was awarded to John E. Hurlbert, Dishman, Wash.

Science News Letter, August 25, 1951

● RADIO

Saturday, Sept. 1, 1951, 3:15-3:30 p.m. EDT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. W. Albert Noyes, Jr., chairman, Department of Chemistry, University of Rochester and chairman, Division of Chemistry and Chemical Technology, National Research Council, will discuss "World Chemical Conclave."

PHYSIOLOGY

2,000,000 Filters Function in the Kidneys

➤ MANY of you have read dramatic reports of lives being saved by artificial kidneys. You may have been surprised at the large, bulky apparatus which obviously is much larger than the kidneys in the human body. This is not so surprising when you learn that the two million little filtering units in the kidney would, if stretched out, extend about four miles. A simple explanation of the construction and functioning of the kidneys is given by the Illinois State Medical Society as follows:

The chemical waste products of the diet are eliminated by the kidneys. When these organs are not functioning properly, a condition develops which is known as nephritis. It is often called Bright's disease after the famous London physician, Dr. Richard Bright, who, in 1827, correlated swelling body tissues (dropsy) with coagulation of urine on boiling, and inflammation of kidneys.

Normally there are two kidneys, one on either side of the spinal column. They are bean-shaped, located in the upper part of the abdomen, beneath the diaphragm, behind the stomach and directly in front of the muscles of the back. The kidneys are each connected to the bladder by two long tubes, known as the ureters, and their primary function is to act as a filter in removing waste products from the blood stream.

The kidneys may be considered the most important chemical laboratory in the body, as they not only filter the waste products but conserve the body's minerals and salts and keep body fluids and chemicals in balance. They are so important that all the blood in the body, 11 to 13 pints, circulates through them every three minutes for the purpose of being freed of its waste products.

The filtering units of the kidneys are called glomeruli. They are clusters of blood vessels. As the blood circulates through the kidneys and finally through the little clusters or glomeruli, the waste products are selectively transferred from the blood into tiny funnel-like tubes, known as kidney tubules. In addition to the waste products, large quantities of water, sugar and salt pass into these tubules. This is known

as filtrate. As this filtrate passes down through the tubules, the water, salt and sugar essential to the body are reabsorbed through the walls of these tubules to maintain the normal body chemistry. The waste products, however, that cannot be used again continue to pass down the tubules and down the ureters into the bladder.

When anything interferes with these filters, such as blocking or plugging, the waste products are not properly processed, inflammation develops and we have the condition known as nephritis.

Science News Letter, August 25, 1951

MEDICINE

Young Heart Victims Old

➤ MEN WHO get heart disease before they are 40 seem at least 10 years older than they are.

This is "one of the most striking observations" made on a group of 100 heart patients aged 23 to 40 and reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 4).

The 100 patients came from all parts of the country east of the Rocky Mountains to be studied by eight medical scientists at the Massachusetts General Hospital and Harvard Medical School, Boston.

Besides looking older than their years, the under-40 heart patients were shorter and wider than a control group of healthy persons the same age. They were of mesomorphic (muscular) body build with an increased chest diameter from front to back, but they did not weigh more, on the average, than the healthy control group.

Most of the acute heart attacks in this group of patients occurred during the time of day when most people are at work, 7:30 a.m. to 7 p.m. This, the doctors state, does not prove a direct cause and effect relation between effort and heart disease but makes it reasonable to conclude that activity may influence the rate of occurrence of heart attacks.

Heart attacks occur more often in the late fall, winter and early spring.

Almost two-thirds, 64%, of the patients had symptoms before the acute attack. In 95% of the cases, pain over the heart or under the breastbone came on just before the acute attack.

Of the 97 men and three women, 32% were of British Isles mixture and 27% were Jews.

Each clue suggested by the findings on these patients must be carefully studied, the doctors stress, since each clue may bring closer the final solution of the cause of coronary heart disease.

Members of the research team are: Dr. M. M. Gertler, Comdr. M. M. Driskell (MC) U. S. N., Drs. E. F. Bland, S. M. Garn, J. Lerman, S. A. Levine, H. B. Sprague and P. D. White.

Science News Letter, August 25, 1951

NATURAL RESOURCES

Good Fuel from Lignite

➤ AMERICA'S vast deposits of lignite give promise of becoming a valuable fuel with a new process revealed by the U. S. Bureau of Mines that reduces it to a char of high heating value and at the same time yields crude coal tar from which many coal tar products can be obtained.

The process can be used also to make valuable fuel and obtain coal tar products from the low-grade non-coking bituminous coal with which the western United States is well supplied. According to V. F. Parry, chief of the Bureau's laboratories at Denver, Colo., where the process was developed, it is applicable to any coal of lesser rank than high volatile bituminous B, a bracket that encompasses 90% of all western coal.

The process, as described by Mr. Parry, consists in crushing the lignite or other non-coking coal into particles of one-quarter-inch or less in size. The material is then "boiled" at 350 degrees Fahrenheit in a fluidized dryer that uses the hot products of combustion or flue gas as the heating medium.

Then the hot dry fuel is moved to a carbonizing reactor, where it is burned with air at a temperature of 950 degrees Fahrenheit to extract the coal tar and obtain a char. The bone-dry char has a heating value about 50% greater than raw lignite containing 35% moisture. Also it has a weight of only 45% of the raw lignite.

Raw lignite, known also as brown coal, is now mined and used in the United States in a quantity approaching 3,000,000 tons a year. It is used, however, largely in regions relatively near where it is produced because it deteriorates rapidly in the air. As mined, it contains from 30% to 40% of moisture, and when dried in air it slacks and ignites.

The principal known deposit of lignite in the United States is in North Dakota and about two-thirds of that mined is produced in that state. South Dakota, Montana and Texas have considerable supplies. The new process will be given its first commercial application at a new aluminum smelting plant in Texas. The char obtained will be used to provide power to drive generators to make the large quantities of electricity required in aluminum making.

Science News Letter, August 25, 1951

METALLURGY

Aluminum-Magnesium Casting Alloys Made

➤ ALUMINUM-magnesium alloys, suitable for either chill or sand casting, which have high tensile strength and ductility, are made by a process on which Charles B. Willmore, North Aurora, Ill., received patent 2,564,044. William F. Jobbins, Inc., of Aurora, Ill., was awarded the patent.

The chief difference between chill casting and sand casting lies in the rate of heat loss through the mold walls. In molds of sand it is slower than in permanent molds of metals or other materials in which the so-called chill casting takes place. Chill casting usually has the effect of decreasing grain size of the cast alloys, particularly when they are composed of an aluminum base.

In these aluminum-magnesium alloys, the magnesium content is less than 9% by weight. The improved properties are secured by the addition of very small quantities of titanium, beryllium, boron, and manganese or chromium. The castings have the desired improved physical properties without any following heat treatment.

Science News Letter, August 25, 1951