SCIENCE NEWS

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THE WORK OF MEMORIAL HOSPITAL, NEW YORK

CANCER patients in New York City and in tiny hamlets thousands of miles away will be helped by Memorial Hospital, which opened its new $5,000,000 building on June 14. They will be helped, even though they never cross the threshold of this, the world's first and now largest exclusively cancer hospital, and even though they never have rays from the hospital's new, pocket-edition million-volt x-ray machine trained on the malignant growths that are sapping their lives.

This is true because from this hospital every year there go forth young men trained to detect every variety of cancer, even in the earliest forms, and trained, also, to give the most effective cancer treatment known to science. These young doctors, ready to devote themselves to the fight against cancer and picked for the ability they have already shown during hospital training, are given three and a half years of special training in cancer-fighting under the Rockefeller research fellowships established at Memorial Hospital in 1925. Details of their training were told by Dr. Lloyd F. Craver, chairman of the fellowship committee, at the dedication and opening of the new building. These young men and additional fellows getting the same training at Memorial Hospital under grants from the National Advisory Cancer Council, will not for some time to come constitute a large enough band of cancer-fighters to see all cancer patients throughout the nation. But patients the world over are getting other help from the activities of Memorial Hospital.

New ways of fighting cancer or improvement of old and tried ways and new knowledge about cancer that might lead to its prevention are constantly being developed at the hospital. The new pocket-edition million-volt x-ray machine, described by Dr. William D. Coolidge, of the General Electric Company, whose researches developed it, is an example. Heretofore the benefit of these powerful and penetrating x-rays from million-volt machines had to be limited to hospitals or other institutions that could afford a building 62 feet long, 32 feet wide and 36 feet high to house it. In addition, many tons of lead were needed to protect operators and patients from the cumulative effects of the x-rays.

By improvements described by Dr. Coolidge, a pocket-size edition was developed for Memorial Hospital which can be housed in a grounded metal container four feet in diameter and seven feet long, and complete with its lead protection, this million-volt machine, which is equivalent in radiation to $90,000,000 worth of radium, weighs about 4,000 pounds, including about 1,000 pounds of protecting lead. Many hospitals which could not afford a special building for giant x-ray machines can find room for such pocket-size giants of cancer-killing power.

ANTI-BLEEDING VITAMIN K

THE tuberculosis germ, often a cause of severe and fatal bleeding, may shortly give doctors a weapon against bleeding. This surprising possibility seems promised by the discovery that the yellow crystals which give the TB germ its color are a form of vitamin K, called the anti-hemorrhagic vitamin because it prevents or checks tendency to fatal bleeding in obstructive jaundice. The discovery, by Drs. H. J. Almquist and A. A. Klose, of the University of California at Berkeley, is reported in the current issue of the *Journal* of the American Chemical Society.

Although the germs in the body of the tuberculosis patient make this life-saving chemical, which is both coloring matter and vitamin, the patient can not get it from the germs that are making him sick and boring through his blood vessels to cause hemorrhage. Nor would it do him any good if he could, because lack of vitamin K is not the cause of hemorrhage in tuberculosis, and the TB patient does not suffer from lack of blood-clotting substance. Patients with obstructive jaundice, the ailment that turns the skin yellow, do suffer from lack of the blood-clotting substance because in their condition the flow of bile to the intestines is blocked. Without bile, the patient can not absorb vitamin K from his food.

Fortunately, however, the chemical has been extracted from the TB germs and has even been made synthetically by Professor R. J. Anderson, of Yale University, who christened it phthiocol. Some of Professor Anderson's synthetic phthiocol was used in these experiments. "The compound has been definitely shown to be a form of vitamin K. It has physical and chemical properties similar to those known for vitamin K. Fed to chicks with a vitamin K-less diet, the synthetic TB chemical kept the clotting time of the chicks' blood from being dangerously prolonged just as vitamin K itself would.

This discovery essentially completes the vitamin K problem, according to Drs. Almquist and Klose. They believe phthiocol is probably the simplest member of a homologous series of anti-hemorrhagic substances. Their discovery of its identity as vitamin K is considered an amazing outcome of the tedious and even dangerous chemical studies of tuberculosis germs which Professor Anderson has been making for ten years under a grant from the National Tuberculosis Association, made possible by Christmas seal sales.

Professor Anderson believed when he discovered phthiocol that it was a stimulus to growth and might prove valuable some day if scientists could learn how to use it. Firm in this belief, he persuaded Yale University to patent his synthetic phthiocol. It has not yet been made commercially but probably soon will be, and it is expected to be available at a low cost.—JANE STAFFORD.

HURRICANES

HURRICANES are accepted as inevitable in the Caribbean region, which quails beneath an average of three of these tropical storms in a year, and the hope for the future lies in engineering to provide more adequate protection against wind and flood and in the perfection of weather forecasting methods to provide warning far in advance of the storm.

Various attempts have been made to stop the winds or to divert them from their path, but none of the experiments has been successful, and scientific men generally are skeptical of suggestions that any power now within the hands of mankind is sufficient to cope with the wild force of a hurricane. The terrific strength of the winds may be gauged from scientific calculations which indicate that such a storm will expend in a single day enough energy to run all the power plants of the earth for several years. Small wonder that great ships flee from its path and that cities take refuge behind stout walls.

Atlantic hurricanes all have their birth in the doldrums bordering the equator. That much is known, as is the fact that the high temperatures and humidity and the calm air peculiar to this region during the late summer and early fall are the conditions essential for conjuring up this type of storm. Just what provides the "trigger" action that sets the hurricane in motion has not been entirely explained, but the release of latent heat of condensation is believed to supply the necessary energy. Once started, the hurricane winds gather speed from their own impetus and sometimes reach a velocity as high as 130 miles an hour.

In the Caribbean, the course of the hurricane is usually in a northwesterly direction, the storm turning northward at the Atlantic seaboard and imperiling coastwise shipping if it does not strike land.

The most destructive hurricane of modern times in the western Atlantic region was the Galveston disaster of 1900, in which 6,000 persons lost their lives. Since that time, Miami and Palm Beach have been among the places to feel the whip of the West Indian hurricane.

On September 3, 1930, Santo Domingo was visited by a hurricane in which upwards of 2,000 persons perished and property worth millions of dollars was destroyed. The toll of dead was increased by deaths due to disease which spread because of the disruption of sewer systems and the contamination of water, notwithstanding the fact that airplanes and ships were rushed to the scene with food and medical supplies that prevented the epidemics from running their full course.

Twin to the hurricane of the western hemisphere is the typhoon of the Orient. Like the Caribbean hurricane except in name and direction of its whirl, the typhoon is held in even greater dread, but the vastly larger number who suffer its tyranny do so because the East has not built the strong defense of sea walls and stout buildings that guard the West from the seasonal invasion of tropical storms.

LIQUID COAL

FORESHADOWING a time when man's immense coal resources, which far outstrip other sources of power available at present, may be put to work in the automobile in place of gasoline, a stock car changed only in one minor respect made a first demonstration at Chicago. Made of finely pulverized coal suspended in an oil "carrier," the new fuel, whose development has attracted the attention of scientific men and engineers during the last twenty years, has enabled the car, an eight-cylinder 1939 sedan, to accelerate up to 35 miles an hour within a block.

Applied to a standard automobile by Dr. Francis W. Godwin, director of the coal research division of the research foundation of the Armour Institute of Technology, the fuel is more economical than gasoline, although the cost per gallon is about the same, because it contains far more energy. Neither the carburetor nor the ignition system of the car was changed in any way. One fine-screened filter was removed from the fuel system to accommodate the colloidal fuel.

Because coal itself is essentially inconvenient to handle and bulky, scientific men have been trying to devise a workable "liquid coal" such as this for many years. Thus far, however, it was stated in Washington, all such fuels have been impossible to use economically in an internal combustion engine because of the ash which coal leaves and which causes great wear and tear on the moving parts of the engine. It is not known whether the new development has overcome this difficulty.

Dr. Godwin stated that three different types of liquid coal have been successfully used in the tests on the stock model automobile. The first was a suspension of a specially prepared coal ground to 300 mesh in a mixture of gasoline, fuel oil and lubricating oil. The second was a similar suspension of the coal in a Diesel oil. The third test was made with a very light oil. In each case, the liquid coal was chemically stabilized to hold the coal in suspension. The demonstration car was started on gasoline. The liquid coal was fed to the motor from an auxiliary tank after the motor had reached "driving heat."

The fuel can be marketed for about ten cents a gallon. Dr. Godman foresees its most immediate automotive usefulness in the Diesel field.

A NEW TYPE OF GLASS

A REMARKABLE new type of glass which can be heated cherry red and then plunged into ice water without danger of breaking—the latest advance in the science of glass making—is announced by the Corning Glass Works at Corning, N. Y. It will be two years before vessels of this new glass can be offered to the public. In the meantime a small pilot plant will be in operation to test the commercial manufacturing problems.

The secret of the new glass is its extremely low coefficient of expansion with temperature change. It virtually rivals expensive quartz in this vital property. The synthetic "quartz" was developed by H. P. Hood and Dr. Martin E. Nordberg under direction of W. C. Taylor, chief chemist of the Corning Glass Works.

While products of the new glass show virtually no change of dimensions when heated or cooled, because of its low expansion, it is quite a different story in the manufacture of the glass itself. Articles made of it, for example, must be made one third larger than the desired final volume. Thus to get a nine-inch dish you first make one ten and a half inches in diameter. It ends up as a nine-inch dish as follows: First, the dish is molded in the usual way, but with the special glass formula to start with. Then by a series of steps, involving a final stage of leaching with dilute nitric acid, part of the structure

of the glass is removed, leaving behind a "skeleton." By further heat treatment this skeleton shrinks down to a volume which is 35 per cent. smaller than the original size. The acid treatment removes 36 per cent. of the body of the glass and leaves 64 per cent. behind. At this stage the glass dish feels rough to the touch, but does not feel porous. Actually at this stage it is filled with sub-microscopic air spaces. By final heat treatment the glass body shrinks just a bit more to a transparent, homogeneous state in which it is practically 96 per cent. pure silica. In this completed state it can be heated red hot and then dipped in ice water without cracking.

For all practical purposes the new low-expansion glass is equal to fused quartz and fused silica in its resistance to thermal shock. Fused quartz is costly because it is extremely difficult to fabricate, requiring a very high temperature for melting. Further difficulties arise from lack of suitable refractory materials in which to melt it and from the fact that the melting and vaporization points are close together. The new glass surmounts these difficulties. To give an idea of contrast between the old and the new glass, the following comparative figures for expansions are given: ordinary window glass 80, Pyrex baking glassware 32, and the new glass only 8. The goal is zero expansion. The new glass, it can be seen, has dropped nine tenths of the way to zero.

ITEMS

ORGANIZED medicine, already on record by American Medical Association resolution as opposing the Wagner Health Bill, expressed itself through its witnesses at Senate committee hearings as suspicious of the proposed Federal aid to states in providing more hospitals, giving compensation to those temporarily disabled by illness, and giving grants through states for medical care of those who can not pay for it themselves.

BUBONIC plague, like other forms of death in these days, has apparently taken to air travel. Not on the man-made wings of airplanes, but on the wings of hawks, owls, crows and other predatory and scavenger birds is reported by the U. S. Public Health Service. The suggestion comes from William L. Jellison, assistant parasitologist at the Rocky Mountain Laboratory of the Service. Thirty years ago, Dr. W. C. Rucker made a similar suggestion, but limited it to one species of burrowing owl that shares habitations with the ground squirrels and other rodents that carry fleas which are in turn the ultimate carriers of the plague germs. Mr. Jellison, however, greatly extends the list of suspected birds, to include two species of hawks, two of falcon, three of owl and one species each of eagle, magpie and crow. All these birds prey abundantly on the plague-carrying rodents. The scavengers, like crows, devour their catches on the spot, but predators, like hawks and owls, carry the carcasses to their nests, with the possibility of distributing the fleas either on the way or after they arrive. In several cases, these flesh-eating birds were observed in attacks on rodents dead or dying of the plague.