

## World Attack on Cancer

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Warnings of danger from radiation to humans are posted ominously about the animal laboratories where different dosages are being given to determine amounts and their effects.

"We shall soon have a reactor here," Dr. Brues said, "and neutrons will be used in the same way as gamma rays."

Mice are being bred for experiments to find out how small a dosage of radiation can cause cancer.

"It has been well established that large radiation doses cause cancer, but despite what one hears, it has not yet been established that small doses are appreciably dangerous."

Bone marrow protection is one of the aims in treating cancer with radiation. It is possible to give larger doses of radiation to an identical twin, for example, because bone marrow of his same type can replace what is lost.

"Radiation is a two-edged sword," Dr. Brues said. "It can induce tumors and kill malignancy. The basic mechanism is the same."

The medical benefits to be expected from radiotherapy, he believes, justify disregarding the hypothetical risk even in view of the present pessimistic view.

As for diagnostic irradiation, Dr. Brues said people who are worried about genetic effects should realize that the milliroentgen or so delivered to the gonads is the same as would be received in a transatlantic flight at 20,000 feet.

The most disturbing data so far, he said, are those concerning childhood leukemias after irradiation of the fetus. Of the 500 or so leukemia cases found annually in England and Wales in children up to ten years of age, about 50 a year represent damage from diagnostic pelvimetry (pelvic X-ray). Even so, there are times when pelvic X-ray is necessary and should overrule such danger.

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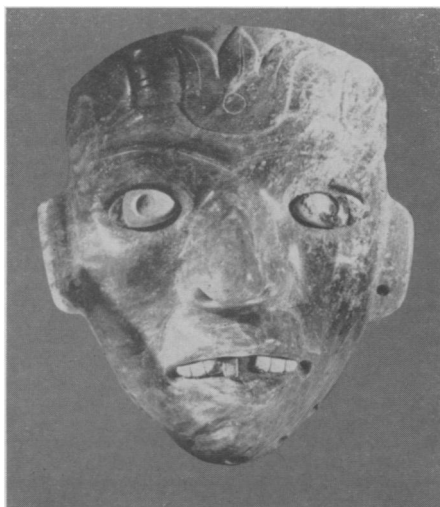
## Hope Seen for Leukemic Children

► LONDON—Hope for children with leukemia, the fatal cancer affecting the white cells of the blood, is seen here at the Chester Beatty Research Institute, named for an American-born mining engineer now living in retirement in Dublin.

As part of the hundred-year-old Royal Cancer Hospital (also called the Royal Marsden Hospital after Sir William Marsden, who founded it in 1851), the Research Institute has close contact with cancer patients.

When I arrived, Prof. Alexander Haddow, the director, who is president-elect of the International Union Against Cancer, was just leaving for Moscow to help with preliminary plans for the Eighth International Cancer Congress to begin there on July 22.

"Such meetings are important because of the impressive cancer work being done in countries all over the world," he told SCIENCE SERVICE as he introduced his assistant, the director of chemistry, Prof. Franz



**ANCIENT AMERICAN MASK—**  
*This mask carved in jade with eyes and teeth made of inlaid shell was buried before the Christian era in the grave of a 50-year-old man. Ashes of burned pine wood, found in the ancient tomb, were given a radiocarbon date of 221 B.C. The tomb was found at Tikal, in Guatemala, ceremonial center of the ancient Mayas, by archaeologists of the University Museum of the University of Pennsylvania. The tomb was found to be vaulted, a fact that pushes back by almost 500 years knowledge concerning the use of the corbelled vault, a major characteristic of Mayan architecture.*

Bergel. It was Prof. Bergel who revealed the hope about leukemia. It is so far only a hope, of course, for clinical trials are only just beginning with leukemic children in London.

"We can't even tell you the names of the drugs being used," the chemist said, "but the treatment is a combination of compounds that have been thoroughly tested in our laboratories."

A new respect for the squirming white rats I saw in the experiment room was inevitable as I realized that the blood painlessly extracted from their tails had been analyzed as a possible preliminary step to curing a tragic childhood disease.

A 32-year-old pharmacologist, Dr. V. M. Rosenoer, who is also a medical doctor, is the newest staff member at Chester Beatty. With his supervisor, Dr. L. A. Elson, biochemist, he explained the experimental work being done on normal blood cells in the effort to find more effective drugs against cancer.

There are two types of white blood cells, the lymphocytes and the granulocytes. Working with rats, which had been fed liquid drugs dripping onto their food from bottles all day long, the experimenters discovered that certain drugs have different effects on these two types of white blood cells.

Myleran, for instance, which is one of the leading treatments for chronic leukemia,

has more effect on the granulocytes than on the lymphocytes.

The nitrogen mustards, however, show predominant effects on the lymphocytes. Through patient tests with animals, drugs—and there are between 1,000 and 2,000 of them tested at Chester Beatty every year—are being sought that will be more specific for the various types of cancer.

Dr. Bergel, who worked with Dr. Heinrich Wieland, the Nobelist in chemistry, at the University of Freiburg in Germany until the Hitler regime led him to go to Edinburgh, is enthusiastic about a little-considered possibility in cancer assault.

Instead of directing all treatment to killing the malignant cells and unfortunately including the host in many cases, with lethal drugs thought of as magic bullets, Dr. Bergel has a theory that delinquent cells can be converted back to normal ones.

"At least it might be possible to restrain a tumor in its three main activities," he said, explaining that cell division, invasiveness and metastasizing activities were the things he had in mind.

The answer, Dr. Bergel believes, lies in enzymes. He has recently written a book, following a leave of absence as a visiting lecturer in the Department of Biological Chemistry, Harvard Medical School, titled "Chemistry of Enzymes in Cancer," which explains his theories.

Among his experiments, Dr. Bergel has been encouraged by results with one of the "degrading" purines, xanthine oxidase, used with animals in an attempt to replace deficient enzymes. The differences between cancer and normal tissue, he pointed out, are largely of a quantitative nature.

"In view of the great success of replacement therapy in the case of nutritional deficiencies (vitamins, minerals and amino acids), along with hormonal shortcomings shown in the action of insulin versus diabetes, and in the action of cortisone in various ailments, we are speculating that malignancy can be controlled by supplying natural factors found to be at lower level in tumor tissue."

Dr. Bergel interrupted his enzyme theories to point out that the American Medical Association is all wrong in thinking that Britain has anything like socialized medicine.

"Our national health program is for socialized benefit but it is not socialized medicine," he said emphatically. "This was shown back in 1951 when the Chester Beatty Institute became a part of the British Postgraduate Medical Federation, which is under the government and a school of London University.

"There was no confiscation of Chester Beatty funds or property at that time. That would have been socialized medicine."

Many of the research funds are being given to the Chester Beatty Institute by the voluntary British Empire Cancer Campaign. Many legacies and voluntary donations are also given for the use of the Institute, and some grants have come from the National Institutes of Health through the National Cancer Institute in Bethesda, Md.

The work at Chester Beatty embraces many aspects of the assault on cancer, including radiobiology, experimental path-