

MEDICINE

## Cosmic Rays in Cancer

Cosmic rays may cause cancer. Experiments link these rays to the disease, and further study will tell more about their role in cancer.

►COSMIC RAYS, which continually bombard us, piercing our bodies from head to toe at a rate of more than 20 times per second, may be the invisible guns that start off cancers.

Experiments which for the first time link cosmic rays with cancer are reported by Dr. Frank H. J. Figge, of the University of Maryland Medical School, in *Science* (March 28).

We will not have to spend our lives in underground shelters to escape cancer-causing cosmic rays, although Dr. Figge does suggest some change in the structure of our buildings. Plastic material might be better than steel and concrete.

The cosmic rays start cancer, he believes, by activating certain chemicals in the body. Some persons may apparently have greater amounts of these chemicals in their bodies than other persons. After all, Dr. Figge points out, not everyone gets cancer.

### Avoiding Cancer

The way to avoid cancer, if Dr. Figge's theory proves correct, is to identify the chemicals the rays act on and then to find some way of eliminating or counteracting them.

These chemicals, which Dr. Figge calls sensitizers, are what led him to his new theory of the way cancer starts. Porphyrins, for example, which form the basis for the respiratory pigments such as the hemoglobin of red blood cells, are sensitizers to radiation on the electromagnetic spectrum. Porphyrins occur in abundance in animals susceptible to experimentally induced cancer. About 10% of women produce large amounts of them around the neck of the uterus, or womb, at regular periods. And cancer of the neck (cervix) of the uterus is responsible for about one-third of all cancer in women.

To test his theory, Dr. Figge injected mice with the cancer-causing chemical, methylcholanthrene. He placed some of them in cages with one and two lead plates over the cages. Others were in cages without lead plates. The cages were placed some on the first and some on the fifth floors of a steel and concrete building. The arrangement of cages and plates was such that some mice, those under

the lead plates, would be subjected to showers of more intense cosmic radiation, while others would get only the amount usually found in the atmosphere.

All but two of the 67 control mice and one of the 111 lead-covered mice got cancer. This was to be expected. But the mice under the lead covers developed cancer three weeks earlier, on the average, or in about two-thirds the time, than the mice not under lead covers.

Next week Dr. Figge is going to put on what should be a more conclusive experimental test of his theory. He is going to inject mice with the cancer-causing chemical and then take them 700 feet below the surface of the earth in three coal mines near Pottsville, Pa. At that depth, the mice will not be reached by any cosmic rays. If they fail to develop cancer, it will prove that cosmic rays start off cancers by acting on certain chemicals in the body.

For the duration of the experiment, probably six months, Dr. Figge will go down into the mines every week to examine the animals. Some of the miners

will feed and water the animals and clean their cages in between his visits. Both miners and operators, he says, have been very cooperative.

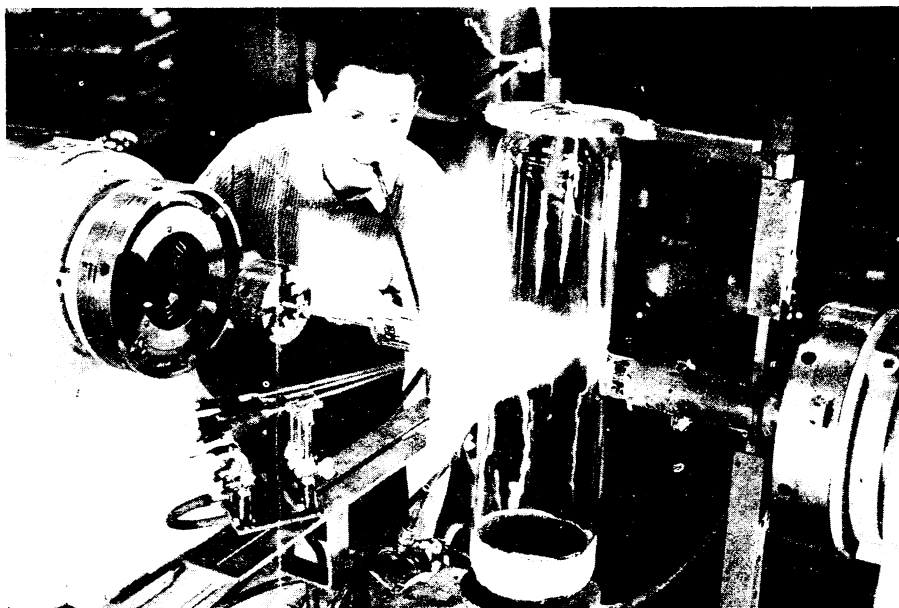
The fact that the total energy received by the earth as cosmic radiation is no greater than that of starlight has led many to assume that cosmic rays could have little, if any, effect on plant and animal life. Yet a number of known facts support the cosmic ray-cancer theory.

### Most Attacks

Cancer attacks people in greater numbers the farther one gets from the magnetic equator of the earth. This equator, which lies near but does not exactly parallel the equator of school geography books, is where cosmic radiations are least intense. They grow more intense, and cancer is more frequent, the farther one gets both north and south of the magnetic equator.

Farmers and others who live most of their lives outdoors are less subject to internal cancers than persons spending most of their lives in buildings which produce cosmic ray showers and thus intensify the radiation. The skin cancers to which farmers, sailors and others living largely outdoor lives are most subject, are primarily due, Dr. Figge explains, to rays from the sun. And the amount of skin cancer increases as one approaches the equator.

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**BLOWING ARMS**—Glass-blower's skill is still needed in making intricate radio transmitting tubes. Here a grid connection arm is being attached to a 100,000-watt tube in a General Electric laboratory.