



Always Four-Leaved

**I**T LOOKS LIKE a four-leaved clover, but it's really a cousin to the ferns. You are likely to find it in almost any marshy meadow, or even along the shallow margins of ponds, its roots in the mud below and its leaves coming up into the air above to breathe. Its name is *Marsilia*, and it is one of the most attractive of the many odd members of the fern clan.

There are five well-recognized species of this plant in the United States, and scattered over the world some forty-five more. But all the species look so much alike that it takes a well-trained botanist to tell them apart. Prof. Willard Clute of Butler University, who has made a special study of the fern allies, says of them: "There is scarcely a genus of plants anywhere whose species have a more general resemblance than the genus *Marsilia*. The four-leaved clover is the unvarying pattern after which the leaves are cut, and when the collector has once seen a single species he will have no trouble in referring subsequent finds to the proper genus at least."

Although so little resembling ferns, the *Marsilias* acknowledge relationship in at least two ways. If you can find a leaf not yet fully expanded you will discover that it spreads itself out by unrolling, fern-fashion, rather than by unfolding, after the manner of the leaves of the flowering plants. And the veins of the leaves divide by forking into even pairs, like fern leaf-veins. There is, of course, the further matter of the fruiting bodies, for *Marsilia*, like the ferns, produces no seeds. Instead, it has little pea-like lumps that are really modified leaves, in which its spores are grown.

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## MEDICINE

## Difference Between Cancer And Healthy Cells Found

**T**HE DISCOVERY of a positive difference between the cells that make up cancers and healthy cells that occur normally is reported from the Kracow (Poland) Institute of Pathology by Dr. Z. Zakrzewski. There is hope that the understanding of cancer will be aided by this discovery.

When the multiplication of a cancer cell is prevented, Dr. Zakrzewski finds that it fails to exhibit any differentiation in structure, while when a normal cell is treated in the same way, it changes its structure.

The cancer cell is a sick cell in the sense that some of its normal functions are altered or destroyed, and Dr. Zakrzewski thinks that it is this property or principle of differentiation that is lacking, while the property of proliferation or growth is retained. His conclusions are based upon cell-culture experiments in which bits of the cancer tissue were allowed to grow outside the body in a suitable medium kept under proper conditions and protected from contamination and infection.

Many observers have grown cancer-cells in this way, especially in this country, and much is known about their characteristics, but so far no decisive difference has been found between them and normal cells grown under similar conditions. The differences are in degree rather than in kind, quantitative rather than qualitative. The reason for this negative result, Dr. Zakrzewski believes, lies in the fact that in the cell-culture experiments the conditions sought for and maintained are those that favor active multiplication of the cells. Growth-stimulating substances are added to the medium in the form of extracts of embryonic tissue, and when cells are multiplying rapidly they do not show differentiation in structure. There is an incompatibility between the two processes.

Dr. A. Fischer of Berlin has found that if heparin is added to the blood-plasma in which normal cells are being cultured their multiplication is prevented. The culture will remain for months without cell growth although the cells are in a living condition and capable of showing differentiation in

structure. If the bit of normal tissue that is being cultured was taken from an embryo it may produce cells of different kinds, such as bone, cartilage, fat, and muscle.

On the contrary, if cancer cells are cultured in a heparin plasma, neither multiplication nor differentiation takes place. The fragment may lie for months without increasing in size and with no change in structure of the cells, although it is still living and retains its malignancy. If inoculated into a living animal it grows rapidly and causes the death of the animal. It is not known what has happened to the cancer cell to cause it to lose its power of differentiation while retaining the property of unlimited multiplication, but Dr. Zakrzewski feels that he has established one definite characteristic of the cancer cell whose further study may lead to important results.

The heparin used to prevent proliferation in the cell cultures is a substance discovered in this country by Dr. W. H. Howell, then at the Johns Hopkins University. It is obtained from the liver and it prevents the clotting of blood.

Dr. Zakrzewski's report appears in the *Zeitschrift für Krebsforschung*.

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## CHEMISTRY

## Sulfur Dioxide Not Hazard To Refrigerator Workers

**E**XPOSURE to the fumes of sulfur dioxide, used commonly as a refrigerant, does not constitute a health hazard to workers, in the opinion of Drs. Robert A. Kehoe, Willard F. Machle, Karl Kitzmiller, and T. J. LeBlanc of the University of Cincinnati.

After a study of 100 men who had worked in the fumes for varying periods, some as long as 12 years, these scientists concluded that frequent and more or less continuous exposure to endurable amounts of the fumes causes no permanent damage to the system, and that the effects of exposure to unendurable concentration, when workers can escape quickly, are negligible.

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