

so far been found present in all cancers and certain to produce them. Cancer is not, as commonly said, an exclusive disease of civilized man. It occurs among primitive peoples and animals, and has even been found in fishes. Cancer is apt to start at some point of chronic irritation yet not all such irritation causes cancer.

Three ways are known by which cancer is caused and by which it may be produced experimentally. One is by action of the penetrating rays of radium or the X-rays. These may either stimulate or destroy the cancerous tissue according to their intensity and duration. Another cause is a minute parasitic worm, carried by cockroaches, and when rats eat the cockroaches they are likely to get cancer of the stomach. The third cause of cancer is some substance contained in minute amount in the higher boiling fractions of coal-tar and petroleum. Workers about shale oil and tar stills are apt to get large warts on their hands that sometimes become cancerous and chimney sweeps may get cancer from the soot. Coal tar put on the skin of mice will cause cancer but not on rats.

Until the cause of cancer is discovered, a cure can hardly be hoped for. But there are a few well authenticated cases of spontaneous cures, and recent experimentation points the way to a possible conquest of the disease. In the Middlesex Hospital certain hopeless cases have been treated by injecting doses of cancer cells that had been killed by exposure to radium rays, and encouraging results are reported from this treatment.

ULTRA-VIOLET LIGHT FOUND DEADLY TO LOWER ORGANISMS

The invisible ultra-violet light beyond the upper end of the spectrum, which has come into general use in hospitals for the treatment of a number of human ills, kills many of the lower forms of life like a stroke of lightning, according to the results of researches made public by Drs. C. E. Barr and W. T. Bovie of Harvard University.

The efficacy of ultra-violet light has long been known to depend on its destructive effect on protoplasm, which is the living substance that forms the basis of all animals and plants, but the present experiments have shown for the first time with what rapidity this destruction takes place.

Drs. Barr and Bovie used living protoplasm in its simplest available form; the animals used in their experiments were amoebae, which are naked and unprotected bits of protoplasm of microscopic size that crawl about in stagnant water. Exposed to ultra-violet light for one-fourth of a second, an amoeba apparently suffered paralysis. It stopped moving and seemed dead, but after a time recovered. But if the exposure lasted three seconds, the animal was killed and its substance broken down at once. One second of exposure killed the animal, but the disintegration of its body was sometimes delayed for a short time. Successive exposures of a fraction of a second each, with intervals of one-half second between flashes, produced a cumulative effect, and the amoeba was killed when the sum of the successive brief exposures was approximately equal to one continued exposure long enough to be fatal.

The tips of trees begin to grow weeks and sometimes months before the trunks begin to expand.
