

BIOLOGY

# Tuberculosis Germ Produces Anti-Bleeding Vitamin K

## Cause of Severe Bleeding Itself, It Nevertheless Gets Its Color From Anti-Hemorrhage Crystals

**T**HE TUBERCULOSIS germ, often a cause of severe and fatal bleeding, may shortly give doctors a weapon against bleeding.

This surprising possibility of good coming from the White Plague 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 *Journal of the American Chemical Society*. (June)

Although the germs in the tuberculosis patient's body make this life-saving chemical which is both coloring matter and vitamin, the patient cannot 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 cannot absorb vitamin K from his food.

Fortunately, however, the chemical has been extracted from the TB germs and has ever been made synthetically by Prof. R. J. Anderson of Yale University, who christened it phthiocol. The California scientists used some of Prof. Anderson's synthetic phthiocol in their experiments.

"The compound has been definitely shown to be a form of vitamin K," they state.

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," the California scientists state, adding that they believe phthiocol is probably the simplest member of an 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 Prof. Anderson has been making for 10 years under a grant from the National Tuberculosis Association, made possible by Christmas seal sales.

Prof. 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 is expected to be available at a low cost.

Soon after Prof. Anderson discovered phthiocol in TB germs, other scientists found it in other forms of life and it is believed to be fairly widely distributed throughout nature.

*Science News Letter, June 24, 1939*

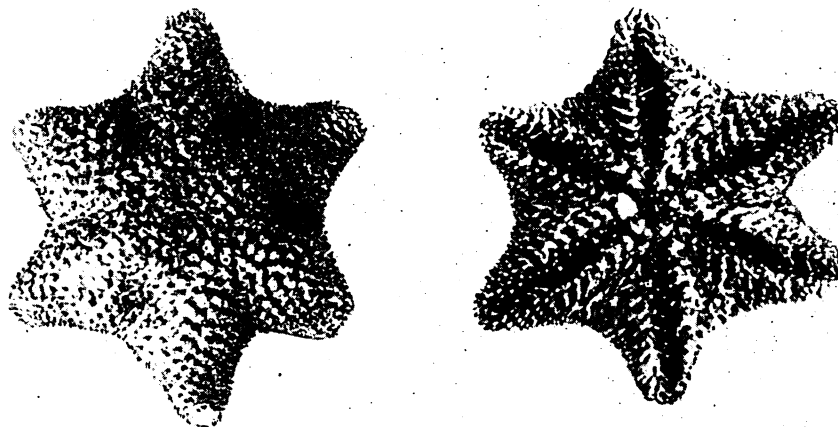
CHEMISTRY

## Elements' "Fingerprints" In Gigantic Catalog

**M**ILLIONS of "fingerprints" of the chemical elements, little lines in the spectrum of light, are being charted and listed under the direction of Prof. George Russell Harrison of the Massachusetts Institute of Technology to give science one of its most necessary and basic catalogs.

Design of machines which have made this work possible has won for Prof. Harrison the famous Count Rumford medal of the American Academy of Arts and Sciences to be presented this fall. Preparing the catalog is somewhat like compiling an unabridged dictionary, or the great fingerprint file of the Department of Justice in Washington. Its closest scientific counterpart is the Boss catalog giving the position and brightness of all stars in the sky down to 17th magnitude. But the catalog of spectral lines is even more important. It is a key to the basic stuff of which the universe is built.

Spectral lines have been listed and utilized from the middle of the last century when it was found that in Newton's



NEW STARFISH

*We are accustomed to thinking of starfish as being always five-armed, but this is by no means necessarily the case. An interesting genus of very small starfish, recently described by Austin H. Clark of the U. S. National Museum, is symmetrically six-armed, as the above pictures show. The actual diameter of the specimen, from tip to tip, is a little less than one centimeter. The new starfish, first collected in the Aleutian islands by Dr. Victor B. Scheffer of the U. S. Biological Survey, has been given the name *Aleutiaster schefferi*.*

rainbow of colors from light passed through a prism there are lines absolutely characteristic of the chemical elements producing them. Others have compiled famous lists of spectral lines, such as Rowland's measurements of all the solar lines. More recently Dr. W. F. Meggers of the National Bureau of Standards, with the collaboration of Dr. Henry Norris Russell of Princeton, a great authority on spectra, has compiled catalogs for numerous elements.

A tiny bit of an element placed in a flame or spark discharge can be instantly detected by its tell-tale spectrum as a result of such catalogs.

The great inclusive catalog at MIT is the result of Prof. Harrison's application of factory methods to the problem. The WPA has furnished skilled labor and funds to speed the task. Special machines were designed and built to reduce the labor and improve the accuracy of measuring microscopically the location of the "fingerprint" lines in photographs. Figures by the thousands are compiled to chart the results. First result is a publication containing about 100,000 of the strongest lines of all elements. Later will come complete catalogs.

*Science News Letter, June 24, 1939*

#### MEDICINE

### Cancer-Producing Substance Found in Roasted Foods

**C**ANCER-PRODUCING substances have been found in roasted foods, specifically in roasted horse meat, browned butter and roasted coffee. This discovery was made by Dr. E. M. P. Widmark of the University of Lund, Sweden. (*Nature*)

Whether eating roasted foods can cause cancer in man is not stated in Dr. Widmark's report of experiments with mice. Extracts of the roasted foods were painted on the backs of the animals' heads. None of the males developed cancers, but nine out of 23 females developed cancer of the breast.

The cancer-causing substances probably get into the animals' bodies through being swallowed, Dr. Widmark points out, because there was very little change in the skin where the extracts of roasted foods were applied, but the animals very quickly licked the substance off their skins.

Dr. Widmark is now trying to isolate the cancer-producing substances in roasted foods so as to learn what they are.

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#### MEDICINE

## Largest Cancer Hospital Aids Patients in Remote Villages

### New Ways of Fighting Dread Disease Are Being Developed And New Fighters Trained at New York Institution

**C**ANCER patients in the big city of New York and in tiny hamlets thousands of miles from there will be helped by Memorial Hospital which opened the doors of its new, \$5,000,000 building on June 14.

They will be helped even though they never cross the threshold of this, America's first and now the world's 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 one-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 hospital 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 researchers 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.

Very few persons, if they get cancer, are able to avail themselves of the best opportunities for diagnosis and treatment, Dr. Ludvig Hektoen, executive director of the National Cancer Advisory Council, stated at the dedication.

Even self-supporting persons in the moderate income brackets, Dr. Hektoen said, cannot meet the cost by their own means. In large areas of the country, moreover, adequate centers for diagnosis and treatment of cancer are not available.

To meet the needs of the people, cooperation between public and private agencies is necessary in Dr. Hektoen's opinion.

*Science News Letter, June 24, 1939*

## ● R A D I O ●

Dr. Reuben T. Shaw, president of the National Education Association, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, July 3, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.