

became available, the experiments were repeated, and unexpectedly showed that biotin favored the production of the cancers.

Meanwhile, Dr. Rhoads and associates had pinned down the anti-butter yellow diet substances to riboflavin and casein. They also saw in the butter yellow cancers another important lead on the cancer problem.

It had previously been discovered that mice, rats and rabbits were able to change other powerful cancer-producing chemicals to harmless substances. Dr. Rhoads and associates suspected that the change was effected by means of enzymes, chemicals known for their role in the body's conversion of foods into simple chemicals used for body building and body fuel.

Riboflavin, which gives little protection against butter yellow cancer, is one of the B vitamins. Like others in the vitamin B group, it is a necessary part of one of the body's enzymes. Pellagra-preventing nicotinic acid is a necessary part of another enzyme, coenzyme one. The activity of this enzyme can be easily measured, and so can the effect on it of butter yellow feeding.

Following this lead the scientists discovered that butter yellow breakdown stops the activity of coenzyme one, which is needed by normal liver cells. The process is very complex, but in simplest terms, a chemical released from butter yellow in the body displaces the nicotinic acid in the enzyme. The result is that normal liver cells are strangled, as it were, being deprived of life-essential oxygen. But the cancer cells are able to live and thrive, because they apparently do not need the enzyme.

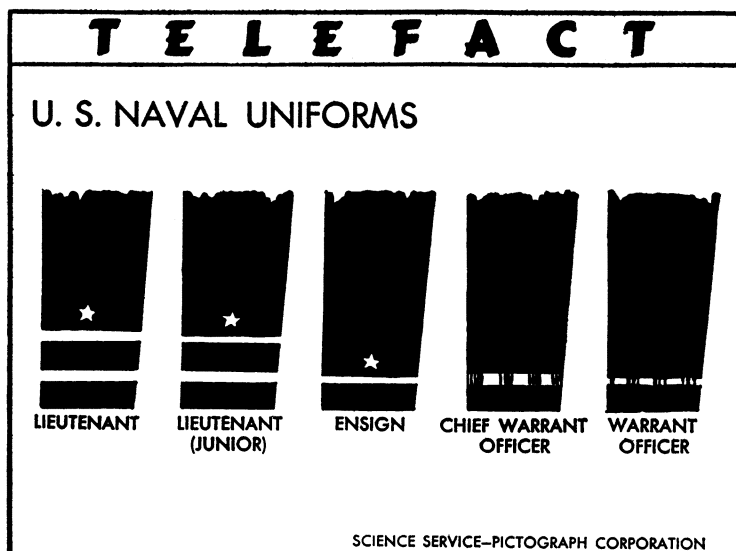
Next step is to find a chemical which will interfere with cancer cells, strangling them by combining with some enzyme they need, while it leaves normal cells alone.

Scientists believe that it may not be impossible some day many years hence to follow this lead to the development of a compound which will damage cancer cells and not normal cells, thus providing a chemical, if not a dietary, means of controlling cancer.

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Large flocks of *cormorants* chase whole schools of fish, while small flocks hunt individual fish.

Blackout problems raised by easily visible steam were solved in England by adding finely divided carbon to the steam, forming "black steam."



MEDICINE—NUTRITION

New Vitamin Hunger Disease Is Found; Cured By Biotin

Experimental Diet Lacking Vitamin Produces Symptoms In Human Volunteers Similar to Those From Poor Diet

DISCOVERY, with the aid of four human volunteers, of a new vitamin hunger disease previously known only in laboratory animals is reported by Dr. V. P. Sydenstricker, Dr. S. A. Singal, Dr. A. P. Briggs and Dr. N. M. DeVaughn, of the University of Georgia School of Medicine, and Dr. H. Isbell, of the National Institute of Health (*Science*, Feb. 13).

The disease results from lack of biotin, and was cured by daily doses of biotin. This is the same vitamin just reported to have a cancer-promoting effect in rats under certain conditions.

The symptoms and signs of the new vitamin hunger disease, biotin deficiency, were "strikingly similar" to those seen in patients suffering from vitamin lack arising spontaneously, presumably from poor diet, but not from an experimental diet.

Biotin is found in liver, yeast and a number of plant and animal tissues. The only known way of creating a biotin deficiency is by giving raw egg white or avidin, a substance in egg white which combines with biotin. Consequently the human volunteers were given dried egg white up to about one-third (30%) of

the calories in their experimental diet. The rest of the diet was made up of polished white rice, patent white flour, farina, cane sugar, butter, lard, and lean beef, plus adequate supplements of vitamins and minerals.

While on this diet, the volunteers developed dry, peeling skin, a pronounced grayish pallor, muscle pains, lack of appetite, nausea, distress around the heart, and, after the fifth week, symptoms strikingly like those in experimental deficiency of thiamin, the morale vitamin.

"Mild depression progressed to extreme lassitude, somnolence and in two instances a mild panic state," the scientists report.

The depression, muscle pains, lack of appetite and distress around the heart were abolished within three to five days after doses of biotin were given. The striking ashy palor of the skin and mucous membranes disappeared in four days.

Science News Letter, February 21, 1942

"Visible whistles" which emit visible puffs of aluminum stearate have been developed by the American Cyanamid & Chemical Company, of New York.