

CHEMISTRY

Carrots Lose Rank as Source of Vitamin A

► THE AMERICAN diet may be subjected to some overhauling as a result of University of California experiments which indicate that the transformation of carotene into vitamin A in the animal body is only one-sixth as efficient as has been assumed.

Until recently scientists believed that 100% of the carotene in vegetable foods such as carrots and lettuce was converted into vitamin A.

Preliminary experiments at the University of California by Dr. Agnes Fay Morgan, professor of home economics, and Lillian S. Bentley, a researcher, reveal that the guinea pig, who seldom eats anything but greenstuffs, can use vitamin A from animal products such as liver and butter six times as efficiently as he can carotene from vegetables.

After depleting two sets of animals of vitamin A, Dr. Morgan fed one group the same amount of vitamin A from animal products as she did carotene to the other group. Examination of their organs after they were sacrificed showed that the vitamin A group stored six times as much vitamin A as the carotene group.

Dr. Morgan says that the herbivorous guinea pig should be one of the most efficient users of carotene for vitamin A. In view of the facts, she adds, it is probable that other animals, including man, have the same difficulty in transforming carotene. This difficulty could be greater in an omnivorous animal such as man.

The experiments indicate it may be necessary to place less reliance on vegetables as a vitamin A source.

Science News Letter, April 6, 1946

BOTANY

Houseflies Used in Search For Better Celery Strains

► THE HOUSEFLY, one of our worst insect pests, is aiding man in research which promises to bring better celery to the American housewife's table.

Flies are being raised by plant breeders at Cornell University to cross-pollinate celery plants. Bees can be used, but flies are more easily handled.

When the flowers are in full bloom, the flies are transferred from the rearing cage into a cheesecloth cage which contains the two plants to be crossed. In going from flower to flower to obtain nectar, the only source of food, they bring about the desired cross pollination,

The effort at Cornell is to develop a blight-resistant celery. When experiments were begun, a celery was being grown in Denmark which was resistant to early blight but was poor in eating qualities. This has been crossed with American varieties to produce a celery resistant to early blight and with better eating qualities than one of the parent plants. Similarly, a Florida celery, resistant to late blight, has been used.

Results of these combined crosses are not yet fully completed, but Prof. R. A. Emerson is confident that within the next five years a blight-resistant celery will be produced which any housewife will be proud to serve on her table.

Plants are brought to Ithaca in October and stimulated into immediate spring-time growth by cold storage treatment under fluorescent lights for about a month. Placed in a greenhouse, they usually produce seeds for planting in April.

Science News Letter, April 6, 1946

PSYCHIATRY

Electric Shock Treatment Impairs Memory

► ELECTRIC SHOCK treatment, used widely for mental illness, causes an impairment in both memory and intellectual functioning, Dr. Joseph Zubin, of the New York State Psychiatric Institute, reported at the AAAS meeting. His conclusions are based on a five-year study of patients taking the treatment at the Institute.

The loss in both memory and intellectual functioning occurs after the third shock treatment, Dr. Zubin said. Except in a small proportion of cases, the memory loss is gradually restored after the treatments are stopped. In the case of the intellectual impairment, however, it is not yet known whether the patient ever regains his level of ability before the treatments.

There is a slowing up of learning ability after about the third treatment. Memory, in the sense of ability to recognize, is not much affected except for those things only recently observed. But ability to recall is severely impaired.

A patient may recognize a procedure without having any feeling of having done it or seen it before. When asked to do a task he has previously learned, for example, he will deny any knowledge of how to go about it. It is completely new to him and he claims that what he does is just guess. But his "guess" is correct more than 90% of the time.

Science News Letter, April 6, 1946

IN SCIEN

CHEMISTRY

DDT May Be Outmoded By Chemical Relatives

► DDT, ONLY NOW coming into general public use as a defense against insects, may presently be rivalled or outmoded by close chemical relatives that are even more deadly, it was suggested in a report of researches presented at the AAAS meeting by Dr. Eugene P. Odom and Prof. W. T. Sumerford of the University of Georgia.

What the two zoologists were hunting for was a chemical like DDT that would be less deadly to fish, and still able to kill insects. Fisheries men, and conservationists generally, are much concerned about ill effects of DDT sprays and dusts distributed over inland waters to kill mosquitoes.

Dr. Odom and Prof. Sumerford used compounds resembling DDT, except that the chlorine atoms in the DDT molecule were replaced with the related elements iodine and fluorine. The fluorine-containing compound was even more poisonous to fish than DDT when used in the same concentration. However, its deadliness to insects was increased to an even greater extent, so that there may be some hope of finding a concentration that will wipe out the mosquitoes and their "wigglers", and yet not prove fatal to the fish.

Science News Letter, April 6, 1946

GEOLOGY

Pearl Found in Mollusk Of Pleistocene Ice Age

► SHELLFISH made pearls a million years ago even as they do today. Evidence to this effect is set forth in the *Journal of the Washington Academy of Sciences* (March 15), by Dr. Roland W. Brown of the U. S. Geological Survey.

Some time ago, digging around in a stratum of Pleistocene ice age date in the face of a river bluff in southern Maryland, Dr. Brown found a big snail-shell, its cavity filled with mud, which in turn contained numbers of small mollusk shells. When these were taken out and cleaned up, one of them, a little less than half an inch long, presented a small nodule of pearly material grown fast to its inner surface.

Science News Letter, April 6, 1946

CE FIELDS

PLANT PATHOLOGY

Spinach Juice Used Against Plant Disease Viruses

► SMALL BOYS are not the only creatures that don't like spinach. Beings that are much smaller (invisibly small, in fact) are apparently paralyzed in the presence of juice squeezed out of spinach leaves. They are the viruses of three different plant diseases, whose reactions to spinach extract were reported before the American Phytopathological Society, meeting jointly with the American Association for the Advancement of Science, by Dr. J. E. Kuntz and Dr. J. E. Walker of the University of Wisconsin.

There appear to be two substances in the spinach juice that have inhibiting effects on viruses. They have not yet been isolated and identified, but they have differing chemical and physical behavior; moreover, each attacks one particular virus but does not harm the other.

The Wisconsin plant pathologists did not say that their unidentified spinach-juice substances are antibiotics, like penicillin and streptomycin, but their description suggests that their action at least resembles that of antibiotics. So long as they are mixed with the viruses in solution, the viruses appear to be without power to produce disease in plants. But the viruses are not destroyed, for if the substances are rendered inactive by suitable physical or chemical means their power to produce disease immediately returns.

Science News Letter, April 6, 1946

MEDICINE

Penicillin Can Help Check Streptococcus Diseases

► PENICILLIN can help check epidemics of streptococcus sore throat and possibly other streptococcus-caused diseases, which include scarlet fever, it appears from a report by Dr. Morton Hamburger, Jr., of Chicago, and Capt. Henry M. Lemon, of the Army Medical Corps. (*Journal, American Medical Association, March 30*)

The mold chemical can do this because it can in many cases promptly eliminate all the streptococci from the noses and throats of healthy carriers of these germs. Spread of the germs from patients can

be pretty well checked by isolation of the patients. Healthy persons who have the germs in their noses and throats are usually not known to be carrying the germs until they have spread them to many others.

Sulfadiazine can check the spread of streptococci from carriers if the streptococci are susceptible to the sulfa drug. Some strains of these germs, however, become resistant to sulfa drugs.

Penicillin in beeswax peanut oil, injected once a day for five to seven days, promptly eliminated the streptococci from both nose and throat of half the carriers in the group Dr. Hamburger and Capt. Lemon studied. In the other half, the streptococci were eliminated or reduced by more than 98% in number during the period the carriers were getting the penicillin, though after it was stopped, there was a relapse into the carrier state. Most of the carriers in whom relapse occurred, however, scattered very few streptococci into their environment.

"A method is now available," the two doctors conclude, "for controlling well over half the dangerous carriers in event of an epidemic."

Larger doses of penicillin, they suggest, may eradicate the carrier state from even more persons.

Science News Letter, April 6, 1946

ENTOMOLOGY

DDT Effects Studied on Cockroach's Nervous System

► DDT KILLS insects by poisoning their nerves, but it does not act uniformly on all insect nervous tissue. Its attack was found to be centered on the afferent, or "ingoing", nerves in experiments carried out by Prof. Kenneth D. Roeder and Miss Elizabeth A. Weiant in the biology laboratories of Tufts College. (*Science, Mar. 8.*)

The two researchers worked on the cockroach, because it is a large insect and has a nervous system that is comparatively easy to reach by micro-dissection and micro-injection methods. They got no results from minute quantities of DDT applied to the central nervous system, to special sense nerves, and to the nerves that carry outgoing impulses to the muscles, but when similar applications were made to the neurons, or action centers, of nerves that carry impulses inward from the muscles, they observed the characteristic reactions of DDT poisoning.

Science News Letter, April 6, 1946

CHEMISTRY

Nation's Penicillin Supply May Be Doubled

► THE NATION'S penicillin supply may be doubled as a result of ultraviolet treatment of the spores of the mold that produces the powerful anti-germ remedy, the Wisconsin Alumni Research Foundation announces.

Ultraviolet irradiation, it is explained, causes incompletely understood and unpredictable changes in the genes of spores and seeds with resultant changes in the characteristics of the plants or fungi springing from them. X-ray treatment does the same thing.

Treatment of succeeding generations of spores of penicillium has resulted in a strain that produces nearly 1,000 units of penicillin from every cubic centimeter of broth in which the mold is cultured. In 1940, the yield obtained by the British workers was about two units from the same amount of broth culture.

The two-unit yield was increased to an average of 169 by efforts at the U. S. Department of Agriculture's Northern Regional Research Station at Peoria, Ill. Then Dr. Millislav Demerec, director of the department of genetics at Carnegie Institution, Cold Spring Harbor, N. Y., developed a group of promising spore variants by X-ray treatment.

This stepped up the yield to an average of 369 units. Descendants of these spores were exposed to ultraviolet light by Prof. Myron P. Backus and Dr. John F. Staufner, University of Wisconsin botanists. The yield increased to an average of 761 units, with a high of 904.

The hunt is still on for an even more efficient producer of penicillin. A strain that can produce two or five times as much of the remedy is a possibility, because the present high yield probably represents less than 1% of all the chemicals produced by the mold, while other molds are known to produce chemicals as complex as penicillin in quantities equal to 5% or 10%.

Scientists besides those named who have worked on the project at the University of Wisconsin include: Prof. William C. Frazier, Prof. Elizabeth McCoy, Prof. W. H. Peterson and Prof. Marvin J. Johnson. The work has been supported partly by Federal funds and partly by the Wisconsin Alumni Research Foundation.

Soil cultures of the new high-producing strain, called Q176, and unpatented, are being supplied gratis on request to penicillin manufacturers.

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