GENERAL SCIENCE

Defect In Body's Use of Fat May Cause Artery Hardening

Arteriosclerosis May Be Fat Disease in Same Way That Diabetes Is a Sugar Disease, Study Indicates

HARDENING of the arteries, technically termed arteriosclerosis, may be a fat disease in the way that diabetes is a sugar disease, it appears from studies reported by Dr. Lester R. Dragstedt, of the University of Chicago, to the National Academy of Sciences meeting in Madison, Wis.

The condition is not a necessary part of the aging process, Dr. Dragstedt said, since not all old people develop it.

When the pancreas fails to produce enough insulin, the utilization of sugar is defective and diabetes results. Failure of the pancreas to produce another hormone, called lipocaic, disturbs the utilization of fat and arteriosclerosis results. This is the case in dogs and maybe humans.

A high percentage of dogs developed arteriosclerosis when deprived of lipocaic by removal of the pancreas, Dr. Dragstedt found.

Hardening of the arteries occurs with abnormally high frequency in patients with diabetes, Dr. Dragstedt pointed out, and occurs not infrequently in young persons. Diets rich in fat are especial'y apt to produce the artery hardening in diabetics and, conversely, low fat diets have a protective effect.

Further experimental evidence for the theory of arteriosclerosis being a result of disturbed fat utilization was obtained by feeding rabbits an excessive amount of cholesterol. This fatlike chemical constitutes a large part of the most frequently occurring type of gallstones and occurs in the thickening in the artery walls in a certain type of arteriosclerosis. The rabbits fed the excessive amounts of cholesterol developed an artery hardening which resembled very closely the human disease.

Science News Letter, October 25, 1941

Hope For Noise Hardening

HOPE that blitzed populations and soldiers under fire may in future be trained to withstand the nerve-shattering effects of battle's din was seen in a report to the National Academy of Sciences by Dr. Norman R. F. Maier, of the University of Michigan.

Dr. Maier's experiments, conducted with animals far from Europe's bursting bombs, nevertheless may contribute very directly to the lessening of war's horrors. Rats were used in his experiments because certain noises—the shrill blast of a whistle, the rush of compressed air or even the annoying jingle of keys—will throw rats into jitters, convulsions or fits, and even coma.

But with repeated exposure to the noise that causes this devastating effect, the rat adjusts himself and is less likely to go into a seizure, Dr. Maier told the Academicians. And leading up to the fit-producing noise with a less violent one will temporarily rob it of its damaging effect.

Shocks to the nervous system apart from the noise itself, can act to make an animal additionally sensitive to noise, however, Dr. Maier found.

Metrazol, the powerful drug used to shock the mentally ill back to sanity, when given in doses too small to produce its characteristic convulsions, will nevertheless make a rat which ordinarily can stand up to noise collapse under it.

The tendency to be hypersensitive to noise can be inherited, Dr. Maier said.

Science News Letter, October 25, 1941

Preventing Mental Old Age

THREE rules for fighting off oncoming mental old age were proposed before the National Academy of Sciences by Dr. George D. Stoddard, University of Iowa psychologist. They are:

1. Avoid bad health conditions—nutritional, endocrinal or infectious. Such conditions may retard children mentally but they bring adults to a full stop.

2. Avoid the mechanisms of escape from life and reality — retrospection and rigidity. These carry you back to more primitive intellectual patterns.

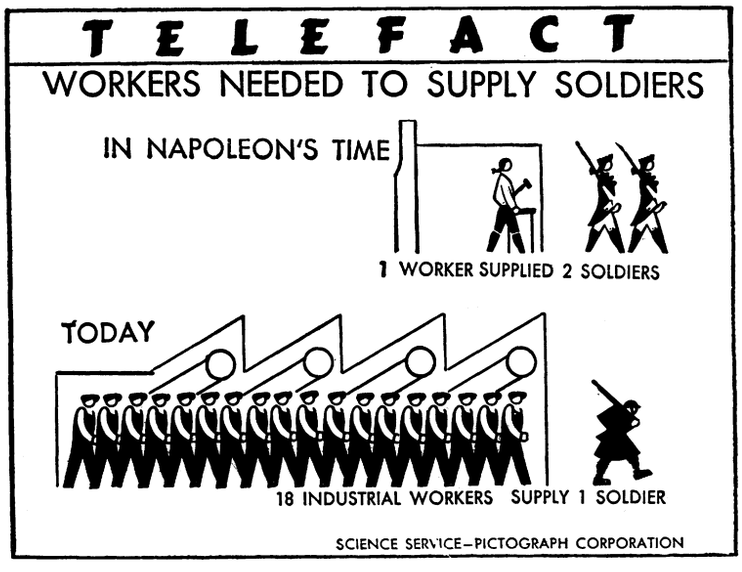
3. Avoid lack of mental exercise — failure to undertake new abstract learning which is as appropriate to adults as school and college are to the young.

You cannot know from any study of your heredity or your childhood development just what are the limits of your mental ability, but, by following these rules, you can fight off the forces of mental enfeeblement, Dr. Stoddard told the Academicians.

Study of records of adult achievement may fill the psychologist with hope or despair, depending, not on the objective data themselves, but upon his own temperament, Dr. Stoddard said.

"For some," he declared, "it is encouraging to note the existence of high scientific and artistic attainment in the sixth and seventh decades of life. What men have done, they may do again in intellectual as in other spheres."

Dr. Stoddard ex- (*Turn to page 268*)



Committee, revealed in a phonographically recorded message sent to the "Science and the New World Order" conference of the British Association for the Advancement of Science in London.

Approximately 1,000 scientists are at work for the NDRC in universities and 700 in industrial laboratories, Dr. Conant said. Three-quarters of the most distinguished research physicists of the nation are now at work on war problems, he added, and the remaining 25% will be at work in a few months.

"We have found that the nature of the problems in this present war are such that physicists and certain types of engineers are in greater demand than chemists."

Dr. Conant gave no hint as to just what secret weapon was developed by the large group of scientists working at M.I.T.

Science News Letter, October 25, 1941

BOTANY

Radioactive Carbon Reveals Secrets of Photosynthesis

New and As Yet Unidentified Substance Discovered That Does What Formaldehyde Was Supposed To Do

TEXTBOOK theories of photosynthesis have been upset by the use of radioactive carbon, a product of the atom-smashing cyclotron, in tracer studies at the University of California. This product was used by Dr. S. Ruben of the Department of Chemistry, and Dr. M. D. Kamen of the Radiation Laboratory, to test former theories of plant chemistry.

A new and as yet unidentified compound that does what formaldehyde was supposed to do has been discovered.

All animal life depends on the ability of plants to convert inorganic elements into organic forms that can be assimilated by animal organisms. Any animal, from man to microbe, would starve if soil, water and air, primary storehouses of nature's supplies, were his only source of food. But plants can use elements in the raw and by a mysterious chemical process involving chlorophyll, a green coloring matter, change basic elements into sugars, starches, proteins, vitamins and other organic foods according to their kind. This process is known as photosynthesis.

The mystery of photosynthesis has long baffled and intrigued scientists, and though theories on the process have been offered, none could be proved because chemical methods of proof were inadequate.

The most widely accepted theory of photosynthesis was that plants take carbon dioxide, light and water and produce formaldehyde. This process, common to all plants, was supposed to be an intermediary step, preceding the chlorophyll action that produces carbohydrates and other nutritive substances.

Dr. Ruben and Dr. Kamen placed algae plants in chambers containing radio-active carbon in a carbon dioxide compound. Leaves of the plants literally pulled the charged element from the air and its course through the plant could then be followed. If the old theory were true, the tagged carbon should appear in the formaldehyde formed by the plants, but this substance extracted from the test plants contained none of the active carbon.

An unsuspected compound was discovered, however, that contained most of the charged carbon the plant "breathed"—the true intermediary step in photosynthesis. The chemical formula of this important compound has not yet been determined, but scientists are hard at work on this problem.

Dr. Ruben, Dr. Kamen and their associates also disproved the theory that photosynthesis is a process carried on exclusively in the light. They found that some phases of the process may be independent of light, for plants continued to assimilate charged carbon dioxide in total darkness.

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pressed the "practical hope" that intellectual peaks may in future be reached and maintained on a less opportunistic basis through a systematic program of research by biological and social scientists of the factors that tend to maintain and restore mental vigor.

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Find Cancer-Causing Rays

IDENTIFICATION of rays from the sun that cause skin cancer was announced by Dr. H. P. Rusch and Dr. B. E. Kline, of the University of Wisconsin, to the National Academy of Sciences.

The rays are 2,900 to 3,341 Angstrom units in length and lie in the ultraviolet part of the sun's spectrum from which also come skin tanning and rickets healing rays.

White mice exposed to these rays developed within two and one-half months tumors which were "true malignant cancers of the same type found in humans," the Wisconsin scientists reported.

Very little radiant energy was needed to start the changes which ended in cancer.

The sun's rays have long been suspected of playing a part in causing cancer. The high incidence of skin cancer in sailors has long been known, and nearly 50 years ago, Dr. Rusch pointed out, "seaman's skin" was described as a precancerous condition due to continued exposure to sunlight.

Strong experimental support for the theory that sunlight is a direct cause of cancer has, however, only come within the past decade.

Science News Letter, October 25, 1941

Better Cancer Treatment

HOPE that practical methods may be developed for making healthy tissues resist X-rays that fight cancer cells is raised by experiments reported to the Academy by Dr. Titus C. Evans of the University of Iowa.

A great problem in cancer therapy is to give a large enough dose of the roentgen rays to have effect upon the cancer and leave the tissues around it unharmed.

In one experiment Dr. Evans found that the resistance of the skin is increased when the circulation of the blood is blocked during irradiation.

Science News Letter, October 25, 1941

Star Caught in Evolution

A STAR that has been caught in the act of changing from one kind to another was reported to the Academy by Dr. Otto Struve and Dr. P. Swings of the McDonald and Yerkes Observatories.

This spectacular case of speedy evolution concerns a Gamma Cassiopeiae, which a few years ago was a normal emission line B star and had a tenuous shell around it. The shell started to close in toward the star, and finally about the first of this year, the shell seems to have fallen into the reversing layer of the star.

In the case of several other stars, notably Z Andromeda and AG Pegasi, opposite events have taken place. New shells have recently formed and expanded.

Science News Letter, October 25, 1941

Microbe Armies in Soil

THE POSSIBILITY of so controlling the microorganisms of the soil that they do their job of destroying waste matter and even harmful parasites when it is most beneficial to the farmer was presented to the Academy by Dr. Charles Thom of the U. S. Department of Agriculture's Bureau of Plant Industry.

Soil organisms are known to vary from comparatively small totals to fabulous numbers. There is the possibility of controlling this speedy multiplication so as to rob a root parasite of available food or actually destroy the parasite, Dr. Thom indicated. This may prove effective in the case of take-all of wheat and cotton root rot.

Science News Letter, October 25, 1941

Immunizes Chickens

A WAY to immunize chickens against a serious disease, coccidiosis, was reported to the Academy by Dr. C. H. Herrick of the University of Wisconsin.

This ill is caused by a protozoan parasite which is transmitted by oocysts or egg bodies. Dr. Herrick X-rayed these oocysts and in this way reduced their power to produce illness.

By feeding day-old chicks with X-ray attenuated oocysts the fowl were made resistant to the disease without bad effects on their growth or development.

Science News Letter, October 25, 1941

Nicotine Made in Roots

THE NICOTINE in tobacco is manufactured in the roots of the plant, Dr. Ray F. Dawson of the University of Missouri reported.

Tomato tops were grafted upon tobacco plants and tobacco stalks were made to grow on tomato stocks in order to locate where the "kick" chemical in tobacco actually originates.

Tobacco leaves and stems grown on tomato roots did not increase in nicotine content and new leaves after the graft was made were nicotine free. When grafted on tobacco plants, tomato leaves gained much nicotine.

Science News Letter, October 25, 1941

Gives 4,500,000 Volts

AT LITTLE cost the electrostatic generator or atom smasher of the University of Wisconsin has been increased in power from 2,600,000 volts to 4,500,000 volts, a research team consisting of Drs. R. G. Herb, C. M. Turner and A. O. Hanson told the Academy.

Science News Letter, October 25, 1941