MEDICINE

Anti-Atherosclerosis Diets

More rigid diets to prevent artery hardening are needed than those previously used. Diets must practically exclude lean meats, skim milk and dairy products.

➤ PATIENTS and their doctors trying to ward off the dangerous artery hardening condition, atherosclerosis, by a low-cholesterol diet will need to prescribe and follow a much more rigid one than generally used for this purpose, it appears from studies at the University of Minnesota in Minneapolis.

The anti-atherosclerosis diets are based on the assumption that the amount of the fatty substance, cholesterol, eaten is reflected in the amount of this substance in the blood serum. This, in turn, is presumably reflected in a tendency to develop atherosclerosis.

But the amount of cholesterol in the blood serum cannot be significantly reduced, the Minnesota studies show, by diets that allow ordinary amounts of lean meats and permit use of skim milk, and that do not rigidly exclude from every item of cookery and baking all dairy products, eggs and animal products.

The studies, by Dr. Ancel Keys with the collaboration of Dr. Olaf Mickelsen now with the U. S. Public Health Service, Miss Erma v. O. Miller and Dr. Carleton B. Chapman, are reported in the journal, SCIENCE (July 21).

The amount of cholesterol in the blood serum of normal men, these scientists found, does not vary with cholesterol intake from food over a range of something like 250 to 800 mg per day. In other words, one normal person can eat three or more times the amount of cholesterol as another person and still not have any more cholesterol in his blood.

If, however, cholesterol intake is completely eliminated, as in the rice-fruit diet for high blood pressure, the amount in the blood serum goes down markedly and rapidly.

Eliminating cholesterol and all animal fats, which could be a source of the chemical, but allowing vegetable fats caused a rapid return of cholesterol in the blood to a high level in one patient whose blood cholesterol had been markedly reduced. This suggests that vegetable oils in the diet promote accumulation of cholesterol in the blood.

"It is doubtful," states Dr. Ancel Keys who directed the studies, "whether most so-called low cholesterol diets in current use reach critical levels or have significant utility for the purpose of their use."

With a much more rigorous diet, he states, an effectively low level of cholesterol in the blood can be achieved, but "halfway measures may be useless."

Science News Letter, August 19, 1950

GEOLOGY

Study Evaporation Secrets

➤ THE case of the vanishing water—trillions of gallons licked up by evaporation each year from the nation's reservoirs—is being studied by government scientists at a saucer-shaped lake outside Oklahoma City.

Secretary of Interior Oscar Chapman announced the start of a 13-month survey of this guinea-pig reservoir by specialists of the U. S. Geological Survey, Weather Bureau and a three-man Naval team.

With complex electronic instruments to measure the sun's energy at lake surface, plus the effects of wind and humidity on evaporation, this "Oklahoma Navy" task force will provide basic data for a new method of measuring water losses from reservoirs in the West's rapidly-growing chain of reclamation and power projects.

Oklahoma's Lake Hefner was picked for the study because it most nearly met the scientists' specifications: a saucer several miles in diameter with a bottom that does not leak (red Oklahoma clay is virtually watertight). Every gallon of water going in or out can be accurately measured. The difference in a perfect system can be charged to evaporation.

This so-called "water budget" method of measuring evaporation is the old way, however, and none too accurate. The Weather Bureau uses evaporation pans, charting the rate water vanishes under solar radiation and wind and applying the figure to larger bodies of water. Scientists have long suspected that this method is not accurate either—that there is a big and varying difference between evaporation from a shallow pan and from a reservoir, lake or ocean.

Two new techniques will be checked by the new study: "energy budget" calculations based on the sun's radiation, and a "mass transfer theory" built on mathematical equations concerned with the physical removal of water to the atmosphere.

"Such data," said Secretary Chapman, "will be of tremendous importance for the planning of future water resources development in the western states." Engineers will use evaporation information in deciding where and how big future dams may best be built.

Science News Letter, August 19, 1950

PHYSICS

Cosmic Ray Bull's Eye Shot 100 Miles Above Earth

➤ THE first photograph at 100 miles above the earth of a cosmic ray smashing an atom to bits has been taken from a V-2 rocket.

The photographic plates recovered in this V-2 flight showed more than three times as many cosmic ray collisions at the 100-mile level than appear 20 miles up, preliminary results show.

Prior to the successful photograph from this V-2 rocket, most photographs of cosmic particles smashing atoms were obtained by using free balloons that did not travel higher than 20 miles. Several previous attempts to get good photographs of cosmic rays from rockets were unsuccessful.

The photograph was made possible by a special plate holder designed by Dr. Herman Yagoda and co-workers at the Experimental Biology and Medicine Institute of the National Institutes of Health in Bethesda, Md.

This container protects the fragile photographic emulsions so that they can withstand shocks in the firing and landing of the rocket. It also protects from the vapors of the rocket fuel. Hydrogen peroxide particularly causes rapid destruction of the images.

The energetic cosmic rays that made the stars on the photograph penetrated through the rocket to get a direct hit with the nucleus of an atom in the photographic emulsion. The tiny building blocks of which the smashed atom were made spattered out into the surrounding emulsion. Since many of the particles thus made are charged, they leave tracks in the emulsion that can be seen microscopically in the developed plate.

Science News Letter, August 19, 1950

AERONAUTICS-CHEMISTRY

Fire-Extinguishing Gases Cut Plane Crash Deaths

➤ MANY lives would be saved in airplane take-off and landing crashes if better automatic fire-extinguishers were installed, experts in Washington state. The fire-extinguishing gas now used is largely carbon dioxide. More effective gases are available.

In England, methyl bromide is being used exclusively for engine fire protection, Jesse W. Lankford of the Civil Aeronautics Board recently stated. He is an authority on airplane fire prevention and has inspected recently the British systems. Methyl bromide is more effective than carbon dioxide.

In America, little methyl bromide is used for this purpose because the gas is toxic. However, when used within the engine housing, where crash fires start from broken fuel lines and highly heated engines, there is relatively little danger to passengers and crew.

However, another gas, said to be equally as effective and not as toxic as methyl bromide, is now coming into use in American planes. Technically, the gas is monochlorobromomethane, called C-B for short. Both civil and military authorities are fully aware of the need of better fire protection in planes and are pushing forward plans to convert from carbon dioxide to C-B extinguishers as rapidly as practical.

At the present time, as well as during the past few months, giant Air Force bombers of the B-29 type are being converted to C-B. The same distribution system is being used, with the C-B in liquid form stored in a steel sphere with the fuselage. It requires only one-fifth the operating pressure needed for carbon dioxide.

In the British system utilizing methyl bromide, according to Mr. Lankford, separate containers for the chemical are located in each engine housing, the nacelle. This localizes the supply, in contrast to the more common American system of a central supply piped to the nacelles. In a crash such pipelines may become inoperative.

In the British system the fire extinguisher in each nacelle is connected with an impact switch which triggers automatically at a given deceleration force. However, they can be discharged selectively from the cockpit when it is desirable to do so.

Science News Letter, August 19, 1950

METEOROLOGY

Atmosphere Study Aid

➤ WIND velocities and temperatures of the little-known part of the earth's atmosphere 20 to 40 miles high will be studied by sound waves in the first large-scale, long-term program of its kind.

In an area 300 miles wide in diameter, explosions of 200 pounds of TNT will shoot sound waves 40 miles into the sky. When these waves reach a heated area of atmosphere, the inversion point, they will be refracted, traveling back to earth 150 miles from their starting point.

Here they will be picked up on specially constructed microphones and recorders. These waves will be in the low frequency range, so low that people cannot hear them. The rarefied upper atmosphere screens out the high frequency waves, Col. Victor Huffsmith, supervisor of the program for the Denver University Institute of Industrial Research in Denver, Colo., explained. A grant from the Air Forces Cambridge Research Laboratories has made the project possible.

In a way similar to that by which seismologists can learn about the structure of the earth's interior by the nature of the waves sent out by earthquakes, so these men will be able to tell certain conditions of the atmosphere by the nature of the waves sent out by TNT explosions. The air velocity and temperature of the particular area of the atmosphere will be determined by the time of travel and by the angle at which the waves return to the earth.

The nine-man staff of Institute researchers will be divided into four teams: Three in the field and one at the Institute in Denver. In the area around Wray, in northeastern Colorado, nine stations with the TNT will be set up. They will be 25 miles apart, in the shape of a cross. One field team will detonate the TNT in one arm of the cross, while the other two teams, traveling in a circle 300 miles in diameter, will pick up the sound waves as they travel back to earth.

These field teams will be in constant touch by radio with each other and with the Institute in Denver. Data will be calculated, analyzed and evaluated in Denver.

The technique of measuring sound waves from the upper atmosphere was worked out recently by the Cambridge Research Laboratories and given a short-range test in Panama and Alaska. At that time, army planes dropped bombs in the ocean and stationary teams recorded the sound waves.

This sound wave technique is superior to the use of either balloons or rockets in atmospheric research. Balloons sent skyward to radio back weather conditions can reach maximum elevations of only 20 miles. Although V-2 rockets can soar considerably higher, the expense of the missile and radio equipment is high, and both are often destroyed without providing the information sought.

Science News Letter, August 19, 1950

AERONAUTICS

New Omnirange Stations Near Completion

➤ OVER three-fourths of the new-type radio stations that provide "beams" for air pilots to follow are now in operation, officials of the U. S. Civil Aeronautics Administration state.

Slightly over 400 stations will be needed to blanket the entire country with these very high frequency radio beams. Over 300 are already erected and others are rapidly being installed.

This most modern pilot-guiding system, known as the omnirange, is so called because it provides radio beams in all directions, instead of only four as in the radio range system it is replacing.

Important, also, is the fact that the beams are of very high frequency which means that they are practically static-free. This is not the case with the beams of the older radio range.

Very high frequency radio waves follow a "line-of-sight" course. Thus they can be picked up by a ground station only some 40 to 50 miles from the ground station in which they originate, as owners of television and FM receivers have learned from experience.

But planes in the air can pick up very high frequency waves at much greater distances because hills and mountains do not cut their path. They can be received at 100 miles or more by planes at 5,000 feet altitude. The maximum reception distance from the stations being erected is approximately 200 miles for a plane at 20,000 feet.

These omnirange beams will be available for all planes—military, commercial and private. Planes must be fitted with special radio receivers that vary in price from $400 upward. The receiver is connected to four basic instruments in the cockpit.

One instrument is a radio dial for tuning, another is a bearing selector, the third is a round dial with vertical needle hinged at the top, and the fourth is an indicator to tell whether the bearing shown is to or from an omnirange.

For the benefit of pilots, public and private, the Civil Aeronautics Administration has issued a booklet to tell them how to use the omnirange. Information on local omnirange sites can be obtained from most of the CAA regional offices.

Science News Letter, August 19, 1950

Irish moss, a seaweed found on the coast from Massachusetts north, yields a gelatinous material called carrageenin, one use of which is to keep cocoa suspended in chocolate milk.