

NUTRITION

Protein Quality Equally Important Over Age 50

QUANTITY of proteins is one thing—quality is another.

And while the diets of most Americans more than 50 years old usually contain a sufficient amount of protein, the quality may not always be adequate.

This may pose a serious and little-recognized nutritional problem, according to Dr. Stewart G. Tuttle, Dr. Marian E. Swendseid, Dorothy Mulcare, Dr. Wendell H. Griffith and Dr. Samuel H. Bassett of the University of California Medical Center and the Veterans Administration Center.

An early experiment indicated that males over 50 have a higher requirement for essential amino acids (protein constituents) than young adults. Further studies have suggested that increased intake of proteins of low biologic value (those deficient in certain essential amino acids) may even increase this requirement in those over 50, or in other words cause a nutritional imbalance.

The investigators point out that the self-selected food of elderly persons has frequently been found to be deficient in proteins of high biologic value. So amino acid deficiencies may indeed occur among these individuals.

In biologic protein values nutritionists generally rate eggs at 100%, meat slightly lower. Vegetables, cereals, breads and the like rate much lower down the scale.

It has been suggested that long term amino acid deficiencies occurring over the years after 50 may be related to degenerative processes. The UCLA-VA Center research team is investigating the possibility of such a relationship.

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MEDICINE

Memories Relived By Brain Stimulation

J.T. CRIED out in astonishment: "Yes doctor, yes doctor! Now I hear people laughing—my friends in South Africa!"

Why was J.T. astonished? He was wide awake on an operating table in a Montreal hospital.

Under local anesthesia, with his skull laid open for brain surgery, he had become one of a series of subjects for a brief, harmless and fascinating digression. The doctor had, with gentle electrical impulses, stimulated part of his cerebral cortex. The memory and interpretive or emotional responses elicited by the stimulations to J.T. and other subjects (all brain surgery patients) are helping scientists map the human brain.

As reviewed in *Science* (June 26) by Dr. Wilder Penfield, director of the Montreal Neurological Institute, McGill University, certain areas of the temporal lobes can be artificially stimulated to bring forth whole memory sequences.

"It is as though a wire recorder . . . had been set in motion within the brain," he said. "The sights and sounds, and the

thoughts, of a former day pass through the man's mind again."

In stimulating the same general areas, Dr. Penfield has also found that sometimes emotions rise to consciousness. The patient may suddenly feel afraid, as though possessed by some nameless, formless dread or panic. Another patient may feel lonely and aloof, and seem to be observing himself from a distance.

It is conceivable, he hypothesized, that the recall and interpretive (emotional and otherwise) mechanisms may be part of a single mechanism in the brain.

The ability of the brain, stimulated by some present experience, to scan itself and bring forth memory and interpretive responses is a remarkable characteristic of humans. A full understanding depends on future experiments.

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ROCKETS AND MISSILES

Society Calls for End To Amateur Rocketry

THE AMERICAN ROCKET SOCIETY has called for an end to rocket experimentation by amateur rocketeers.

It has taken this stand largely on the claim that the accident rate among non-professional rocket enthusiasts is proportionately higher than among the nation's motorists.

Of an estimated 10,000 persons engaged in amateur rocket experiments during a six-week period, the Society said, 162 rocket-incurred injuries were inflicted.

In a similar period, 140,000 motorists were injured in automobile accidents. Based on the 1950 population of 150,700,000 and 48,600,000 registered automobile drivers, this indicated a motorist accident rate of 22 per 10,000, far less than the rocket accident rate of 162 for 10,000 persons.

In a 76-page booklet, the Society directed its 46 member sections and 35 student chapters that "all practical means must be taken to prevent the manufacture of propellants of rockets by amateurs." It also said the launching of rockets by amateurs must be prohibited.

"The somewhat debatable loss in opportunity for intellectual development which might be suffered by foregoing experimentation is small compared with apparently unavoidable and appalling losses of eyes, fingers and lives," Col. John P. Stapp, ARS president, said.

The ARS program for eliminating accidents and deaths from live rocket experiments is centered in a request to chemical suppliers to refuse to sell certain hazardous chemicals to minors or organizations that have no license, liability insurance or permit.

This effort will be backed up by an education campaign to key sections of the public to gain their support of necessary laws and programs. In addition, the Society will prepare a 16-page brochure for widespread dissemination among amateur rocketeers and their parents and teachers, acquainting them with the dangers in attempting to build and fire home-made rockets.

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IN SCIENCE

HERPETOLOGY

Rattlesnake Disproves Snake Age Theory

THE NUMBER OF RATTLES a rattlesnake shakes are no indication of how old he is.

For more than 14 years, Prof. Howard Evans of Cornell University has been observing a pet rattlesnake. In all that time, he said, the number of rattles has shown no relationship to the snake's age.

The five-foot long, two-inch thick Texas diamondback is 15 years old this month, close to the record of 22 for a rattler in captivity.

Prof. Evans is attempting to keep a record of the number of teeth the snake sheds each year for the rest of its life. Observations so far indicate fangs are lost at least once a month.

Normally, the snake is inactive, Prof. Evans said. In the spring, its mating time, and in the fall, the time it searches for a den, the snake is more active. Apparently the reptile can distinguish seasons by differences in the sun's light. Many animals can interpret the polarization of light as it changes with the seasons, Prof. Evans believes.

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PUBLIC HEALTH

Paralytic Polio Climbs At Rate of Early 1957

THIS COUNTRY is experiencing more paralytic polio than it did last year, the chief of the poliomyelitis surveillance unit of the U. S. Public Health Service reported.

The latest figures for paralytic polio during 1959 follow more closely the higher figures of the first six months of 1957 than those of 1958, Dr. Harold Wylie at the Communicable Disease Center in Atlanta, Ga., told SCIENCE SERVICE.

Whether or not the polio outbreak will claim more victims this season than it did last year will depend primarily on how many epidemics occur in large cities.

Already this year 20 cases of polio have been reported to the P.H.S. from Des Moines, Iowa. Fourteen of these cases were paralytic, two resulted in death and the remainder were nonparalytic, he said. Small outbreaks have also been reported in Miami, Fla., and in Texas. There appears to be a rising trend in Virginia and other states.

Currently, some 40,000,000 Americans under the age of 40 are still without the three recommended polio vaccine shots. There are areas in the U. S. where no one has had any of the inoculations, Dr. Wylie explained. Finding these areas and getting the vaccine to the people of these areas is crucial to the eradication of polio.

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E FIELDS

TECHNOLOGY

Coatings on Wires Have Insulation Value

FLUORIDE COATINGS have been formed on copper, aluminum and other metal wires to provide exceptionally high insulation value at elevated temperatures, while still retaining flexibility and freedom from porosity.

This new insulation development could provide the answer to some of the problems in missile re-entry guidance systems, as well as in other high-temperature electrical applications. Presently, many potentially important applications of electrical circuitry at high temperatures are hindered by the lack of high-quality flexible wire insulation.

Developed by Bell Telephone Laboratories, New York, the insulating coatings are formed directly on freshly cleaned copper or aluminum by exposing them to oxidizing carriers of fluorine such as hydrogen fluoride or elemental fluorine at temperatures from 300 to 600 degrees centigrade.

The thickness of the resulting copper fluoride and aluminum fluoride films depends on the temperature at which they are formed, the concentration of fluorine and the time of exposure.

Electrical insulation values are very high for both copper and aluminum films, and both films retain their excellent insulating properties at high temperatures.

Aluminum fluoride films show good resistance to oxidation even above 600 degrees centigrade, and show no tendency to hydrate or dissolve on exposure to high humidity.

Fluoride coatings should be satisfactory almost up to the melting point of the conductor, whereas the best organic insulating coatings cannot be used continuously above 300 degrees centigrade. Although some inorganic insulators may be used as high as 830 degrees centigrade, they are generally porous and non-flexible.

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OCEANOGRAPHY

Miniature Sound Buoys To Aid in Ocean Study

A MINIATURE buoy containing a tiny radio transmitter and a hydrophone to permit rapid study of the ocean from an airplane is being developed. It offers a fast way to study marine life, ocean depth, and contour of the ocean floor.

J. J. Coop, of the U. S. Naval Air Development Center, Johnsville, Pa., told the Acoustical Society of America meeting in Ottawa, Canada, that by use of transistors and subminiature components, the so-called sonobuoy could be made so small that one

plane could carry several hundred. This would enable underwater sound measurements to be made over thousands of miles of ocean on a single flight.

If small explosive charges were dropped near the sonobuoys, the depth of the ocean could be determined by measuring the time required for the sound to travel to the ocean bottom and back to the buoy. The hydrophone, or sensitive underwater microphone, would pick up the sounds in the water, and the radio would transmit them to the aircraft.

Various sound conditions, such as sea noise, marine biological noise and thermal sound barrier effect, differ widely in various ocean areas. With the sonobuoy, scientists could record these varying effects over vast areas of ocean.

The acoustic nature of the ocean bottom can also be determined by measuring the intensity of the bottom-reflected sound.

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MEDICINE

Glue Treatment Means Fast Fracture Repair

A SPLASH of glue, three days setting time, and you can walk out of the hospital on a fractured leg.

The bone glue that makes this rapid recovery possible is being tried out at medical schools and hospitals throughout the United States and Canada.

The broken bones of about 250 trial patients have been glued together in the past three years. Had these people undergone conventional treatment for fractures, they might have spent as long as six months in plaster casts, either bedridden or stumbling along on crutches.

Tougher than bone itself, the glue is a plastic polyurethane foam that becomes rigid as it dries.

For surgical use, the glue is provided in a sterile kit containing two jars of yellowish viscous fluids and a wire beater. The fluids, a polyurethane and a catalyst, are mixed and beaten, and the fast-drying foam is formed.

It was developed by Dr. Michael P. Mandarino, Hahnemann Medical College and Hospital of Philadelphia, in cooperation with the Wm. S. Merrell Company, Cincinnati, Ohio, a drug firm.

Surgical gluing techniques are still under development. But, in general this is how a fracture is treated with the glue:

The bone is exposed and little plugs of bone are removed from each of the broken ends. Plastic foam is poured on the ends. The plugs are replaced in such a way that the two ends of the bone dovetail. After a few hours of immobility, while the glue stiffens, the repaired limb can be moved.

Dr. Mandarino, an orthopedic surgeon, said normal bone eventually grows through the glue and in about a year the ends join. During this time, the glue is absorbed and completely disappears.

Called "Ostamer," the glue will not be distributed for general use until clinical trials provide sufficient proof of its utility.

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COMMUNICATIONS

Static-Free Radio To Link NATO Nations

THE DEFENSES of Western Europe's North Atlantic Treaty Organization countries soon will be linked by a 6,500-mile network of static-free, long-distance wireless connections.

The wireless system works by a technique known as "tropo scatter." This is a method by which powerful ultra-high-frequency radio signals are beamed upward over the horizon and then partially deflected downward, beyond the horizon, by the troposphere, the lower layer of the atmosphere.

At each of the 41 stations, which will dot Europe in a line from Turkey to Norway and Great Britain, as many as 132 voice messages can be "scrambled" into a single radio signal. At the next receiving station, which can be up to 250 miles away, a small fraction of the original beam is picked up. It is then unscrambled into the individual voice or teletype messages, or instantaneously re-amplified, and sent on to the next relay station.

The European "tropo scatter" system, known as "Ace High," will be built by Radio Engineering Laboratories, a subsidiary of Dynamics Corporation of America. REL developed the system in 1952.

Besides its value for quick military and defense communication, "tropo scatter" soon may be used for commercial transmission of telephone and teletype communications and even television. Not hampered by the use of wires and cables, "tropo scatter" can leap across impassable jungles and deserts to give reliable communication systems to many of the underdeveloped regions of the world.

Small systems similar to the NATO installation are currently in use in Canada, Libya, and in a Florida-to-Cuba connection.

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AERONAUTICS

Jet Plane Takes "Swimming Tests"

IN THE SPACE of one minute a huge jet transport will taxi, fly in a storm, descend, and land—all underwater—as part of a six-month safety testing program.

The Convair 880, to be the world's fastest airliner, is being subjected to strenuous underwater tests in a 895,000-gallon water tank to evaluate its structural "integrity." The one-minute cycle of simulated taxiing, flying in a storm, descending, and landing will be repeated 50,000 times, the equivalent of 880 flights.

In addition to its "swimming tests," the jet has undergone laboratory load testing—done with a complicated system of hydraulic rams—and has been subjected to extensive regular flying.

Developed by Convair Division of General Dynamics Corporation, the jet, whose maximum cruise speed is 615 miles per hour, is expected to go into service next year.

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