

PHYSIOLOGY

Experiments Hint Existence Of Paternity Chemical

Ability To Become Fathers Lost By Human Volunteers Living on Arginine-Lacking Diet; Is an Amino Acid

EXISTENCE of a paternity chemical, without which fatherhood is impossible, is hinted by researches now under way at the Johns Hopkins Hospital and Medical School.

Arginine, a basic constituent of certain foods, is the substance suspected of being the paternity chemical. This chemical is one of the ten essential amino acids, which are the building blocks of protein found in meat, fish, poultry, eggs, cheese, milk and some vegetables.

Its possible role as a paternity chemical was revealed in studies with human volunteers. When these young men lived on a diet otherwise adequate but lacking arginine, the number of male reproductive cells, the spermatozoa, were greatly reduced and those that were produced showed scarcely any motion, indicating that the men on the arginine-lacking diet had lost the ability to become fathers. When arginine was restored to their diet, spermatozoa production returned to normal.

Arginine was discovered in 1895 and it has long been known that spermatozoa are four-fifths (80%) arginine. The present studies are the first, however, in which human need for this chemical and the symptoms of its lack have been shown. Hitherto human need for this and the other essential amino acids has been assumed from the fact that rats require them. Knowledge of the rat's need for amino acids came from research initiated by the late Professors Thomas B. Osborne and Lafayette B. Mendel, of Yale University, and recently completed by Prof. W. C. Rose, of the University of Illinois.

The studies on the role of the amino acids in humans are being made at Johns Hopkins by Dr. Anthony A. Albanese, Dr. Joseph E. Brumback, Jr., Dr. Marjorie Hayes, Dr. L. Emmett Holt, Jr., Dr. Charlotte Kadji, Dr. Landrum B. Shettles and Dr. Dorothy M. Wangerin.

Two other amino acids, tryptophane and lysine, are also required by humans, the Johns Hopkins scientists found.

Lysine may be a maternity chemical. The studies show that in women as well as in female rats the female reproductive cycle is upset by lack of lysine.

The experimental diets were made up of Crisco and other fats, sugar, starchy foods, and fruits and vegetables selected for their low protein content, such as tomatoes, mushrooms, carrots, asparagus, apples and oranges. Satisfactory meals, including such items as banana flour muffins (wheat flour which contains protein could not be used) were devised by Miss Anne Lyddane, dietitian of the Johns Hopkins Hospital.

In order to eliminate all the amino acids except the one being studied, a mixture of the other acids was given. This proved very unpalatable, so it was given in a vegetable juice cocktail which the men gulped down like a dose of bitter medicine.

During the diet experiments, the human volunteers kept a good appetite, slept well and lived essentially normal,

active lives. During hot weather they were allowed two beers a day or its equivalent in other alcoholic beverages. They found, however, that their tolerance for alcohol was lessened, and that one beer or none at all was all they could take.

Details of the studies thus far have been reported to the American Academy of Pediatrics and the Society for Experimental Biology and Medicine.

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ZOOLOGY

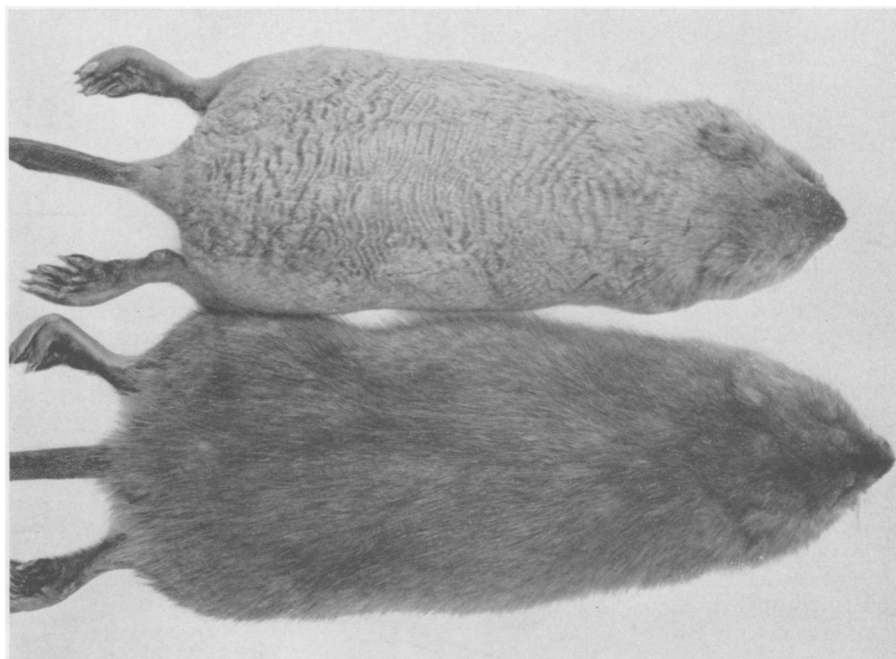
Find Muskrats With Fur In "Permanent Waves"

TWO muskrats with their fur in "permanent waves," trapped on the Blackwater National Wildlife Refuge near Cambridge, Md., are the novelty reported by Dr. Herbert L. Dozier of the U. S. Fur Animal Field Station (*Journal of Mammalogy*, February).

The animals, a male and a female, lacked the long, coarse guard hairs that have to be plucked in preparing the higher-priced grade of muskrat pelts. The soft fur was rippled or wavy, with a beautiful silky sheen.

"That of the female," Dr. Dozier states, "was distinctly more waved and in a manner quite similar to the permanent wave that is usually obtained only in a beauty shop."

Trappers and fur buyers were very



NATURAL "PERMANENT" (ABOVE)

much interested, as nothing closely resembling the character has ever been reported out of the millions of muskrats that have been trapped for fur.

Unfortunately, the two animals were

killed in the trapping, so that breeding experiments are not possible. If living duplicates can be secured and the new type of fur fixed by breeding, it might prove valuable in the fur trade.

Science News Letter, March 7, 1942

GEOPHYSICS

Hoover's Son Invents Way To Locate Oil Deposits

Invention Uses Artificial Earthquake Method of Prospecting; Seismic Wave Produced by Explosion

HERBERT HOOVER, JR., son of the former President, has been awarded U. S. Patent 2,272,201 for an invention that will make for the more accurate location of oil or other mineral deposits buried deep in the earth. Mr. Hoover has assigned his patent rights to Consolidated Engineering Corporation of Pasadena, California, of which he is president.

The invention applies to the seismic or artificial earthquake method of prospecting. The earthquake wave is produced by an explosion of dynamite. The seismic waves travel downward and are reflected back to the surface from harder or softer layers at different depths. Receptors placed at different points along the ground pick up the waves and record them on a moving strip of photographic paper. From the times of arrival of the different "reflections," the depths of the various reflecting beds can be calculated.

The invention consists of an electrical network which Mr. Hoover calls a "dispersion compensator." It corrects for the fact that seismic waves of different frequencies travel at different velocities through the earth—an effect called dispersion.

The original impulse produced by the explosion consists of a mixture of many frequencies. These become strung out into a "spectrum" as the pulse travels through the earth. Thus, if the high frequencies outrun the low frequencies and arrive first at the receptors, followed by the others in succession, the result on the photographic record is a long-drawn-out, indefinite wave that may not be distinguishable from the general commotion that is always present. In short, it is a blur.

The compensator, which is inserted between the receptors and the recorders,

retards the waves in proportion to their frequencies. Thus, the high-frequency waves which arrive first are retarded the most, the others less and less. The stretched-out wave is pushed up together again. The result on the record is a sharp definite wave, easily distinguished from the general commotion, a wave whose time of arrival can be accurately measured (to a thousandth of a second or better) and the depth of the reflecting bed from which it came, accurately calculated.

This is important now that all the easy prospecting for oil has been done. The days when an error of a hundred feet or so didn't matter are gone. Today a difference of ten feet may be significant.

Due to dispersion, Mr. Hoover states in his patent, low frequency waves from one reflecting bed may arrive at the receptors at the same time that high frequency waves arrive from another reflecting bed separated from the first. Without the compensator they are hopelessly mixed and indistinguishable.

Mr. Hoover's method of correcting seismic dispersion is exactly analogous to the correction of an optical lens for chromatic aberration. In this case, a second lens is added, the dispersion of which is opposed to and equal to that of the first lens, and therefore corrects it.

Since the dispersion of a seismic impulse will be the greater the longer its path in the earth, Mr. Hoover provides a control box which by the corrective effect of the compensator may be regulated to suit the conditions.

Science News Letter, March 7, 1942

Army quartermasters required glass-makers and designers to figure out a special kind of *jar* for preserves—soldiers had to be able to clean it out with a spoon!



SIMPLE CAMERA

These few common objects enable the metallurgist to look into steel and see what's wrong with it.

METALLURGY

Coffee Can Camera Aids Improvement of Steel

See Front Cover

ATIN CAN, two small brass disks and a screw clamp compose a camera that sees into steel with the aid of radioactive atoms, and may point the way to better steel making.

The camera was devised by Dr. William E. Shoupp of the Westinghouse Research Laboratories to find out whether phosphorus added to molten steel is well distributed or bunched together in spots. To disclose its location, the phosphorus was made artificially radioactive by bombardment in an atom smasher before it was added to the molten steel. A small disk was then molded of this steel.

In a darkroom a piece of photographic film was laid on each side of the steel disk, two small brass plates were placed outside the film and the whole stack was clamped together and put in the tin can to keep out the light. After being left overnight, the film was developed.

The result of one such test is shown on the front cover of this week's SCIENCE NEWS LETTER. The light and dark blotches are caused by rays from the tracer phosphorus atoms. The light areas correspond to little air pockets or blowholes in the steel and show that the phos-