

NUTRITION

Death From Deficient Diet May Not be Starvation

Rats Deprived of Magnesium, For Example, Die Because of Faulty Use of Fats by the Body

DEATH from an inadequate diet may not be starvation.

The old scientific idea, that when an animal did not get enough of a vitamin or other essential food factor in his diet, his subsequent death was really a form of starvation, has been completely upset by studies of Drs. E. V. McCollum, H. D. Kruse and Elsa Orent of the Johns Hopkins School of Hygiene. Dr. Kruse reported the studies to the National Academy of Sciences.

When an animal does not get enough vitamin B in its diet, the changes in his body as seen after death are identical with those seen in starvation, Dr. Kruse explained. Reasoning from this, scientists have believed that death from any dietary deficiency was the same as starvation.

But the Johns Hopkins scientists have found that when the animal gets too little magnesium in the diet, the picture after death is not one of starvation but of faulty use of fats by the body.

Therefore they believe it is no longer possible to say that death from any and every dietary lack is starvation. So far, they pointed out, this has actually been proved only for vitamin B, and even here the evidence is weak, it appears. The chief symptom of lack of vitamin B is loss of appetite. Animals getting too little B in their diet do not eat enough and actually do die of starvation.

Use of Fat

Whether or not faulty use of fat is the cause of death in other dietary deficiencies aside from magnesium lack is not known at present.

The study of rats fed a diet lacking in magnesium has also thrown light on another important scientific problem, that of the role of the fat, cholesterol, in the body, Dr. Kruse explained. Scientists are not even sure whether this fat has any function, though there is some recent evidence for it. The study reported gives another hint that cholesterol has a function in the body.

The remarkable changes in the rats

when deprived of magnesium, their turning bright red, becoming extremely nervous and subject to convulsions like those of tetany, and the effect on their sexual organs, were reported two years ago. At that time the study had been made in the interests of pure science, to determine whether magnesium was a dietary essential. Apparently it is, but very small amounts of it are required. No cases of illness from lack of it had been reported.

Magnesium Cures Cows

Since the first report of the Johns Hopkins investigators, however, a Dutch scientist, Sjollema, has reported that a complaint in cows of the Netherlands, after they have been in the stalls all winter, is apparently due to lack of

magnesium in the diet. The disease among cattle has been a source of considerable economic loss. By giving the cattle magnesium and calcium, Dr. Sjollema finds that he can relieve the condition, almost magically, he says, if he gives the treatment early enough.

While it is not known whether humans ever become ill from too little magnesium, there is no cause for alarm, Dr. Kruse commented.

"Certainly the ordinary individual is not likely to develop magnesium deficiency on the ordinary mixed diet," he said.

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PHYSIOLOGY

Daily Rhythm of Liver Found Due to Food

THE LIVER has rhythm. Food plays the role of band leader and sets the time for it. Experiments showing this effect of food on liver were reported by Dr. George M. Higgins and associates, Joseph Berkson and Eunice Flock, of the Mayo Clinic to the American Association of Anatomists.

Observations on animals first showed that the liver had rhythm, a slow rhythm



ARK OF THE COVENANT IN JEWISH ART

When archaeologists from Yale and the French Academy dug into a Jewish synagogue at Dura-Europos they found wall paintings such as this. The synagogue dates from 244 A.D., and these pictures are the earliest Old Testament scenes found in a house of worship. This painting represents the Hebrew ark of the covenant being returned after the Philistines captured it in a terrific battle. The Philistines had triumphantly set the captured ark in the house of their god Dagon, but terrible things happened. The painting shows the ark being returned to its owners. It was drawn by two "milch kine" on a cart containing "jewels of gold" which were a trespass offering. At right, Dagon's pedestal stands empty and below is the shattered idol. The story is told in I Samuel, Ch. IV.

of about two beats a day. Twice in every 24 hours the weight of the liver and of many of its analyzable constituents showed rhythmic increase a definite number of hours after the animals had eaten a standard meal.

When animals were fed at 9 o'clock in the morning, after going without food for several hours, an increase in the weight of the liver equal to about 30 or 35 per cent. had occurred by 5 in the afternoon, Dr. Higgins explained. At 9 in the evening the total weight of the liver had fallen so that its increase was about 16 per cent., but at 1 in the morning its weight was again as great as it had been at 5 in the preceding afternoon. Following this second increase in its weight during the night, the size of the liver gradually decreased until at 9 in the morning it weighed just what it did before the animal was fed 24 hours previously.

By shifting the hours at which the animals were fed, Dr. Higgins and associates found that the liver's rhythm was due to feeding and absorption of food constituents and not to the time of day. Six hours after eating a meal the animals' livers had increased essentially the same amount in weight, irrespective of whether the animals had eaten during the day or during the night.

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METEOROLOGY

Solar Radiation Said to Change Weather Map

VARIATIONS in the sun's radiation were credited with causing changes in the high- and low-pressure areas in the earth's atmosphere, by H. H. Clayton of Canton, Mass., who spoke before the National Academy of Sciences.

In a study of Smithsonian records extending back for twenty years, Mr. Clayton said he had discovered that pressure in high pressure areas was increased during periods of increased solar radiation, while the pressure of low pressure areas dropped. The centers of falling pressure, he continued, were in regions of low vapor content, while the centers of rising pressure were in regions of high vapor content, indicating activity by water vapor in determining the effect of solar radiation on the atmosphere. These centers were found to shift with the seasons. Correlations of solar radiation with rainfall have also been found.

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ASTRONOMY

Solar System Hurtling South At 450,000 Miles Per Hour

Long Search For Ether-Drift by Dr. Miller Reveals Influence of Earth's Motion on Velocity of Light

FOR THE FIRST time science is able to say whither and how fast the solar system is hurtling through space. Dr. Dayton C. Miller of the Case School of Applied Science, Cleveland, announced to the National Academy of Sciences that the sun with its earth and other planets is moving southward in the direction of the famous Great Magellanic Cloud of stars at the immense velocity of 450,000 miles per hour (208 kilometers a second or 125 miles per second) which is thousands of times faster than the ordinary airplane speed.

The First Time

For the first time also Dr. Miller has detected positively the effect of the motion of the earth in its orbit around the sun.

This means that he has detected an "ether-drift." This is expected to have reverberations in the field of theoretical physics and astronomy.

Einstein based his principle of relativity on the fact that Michelson and Morley, American physicists, years ago attempted without success to find an effect of an all-pervading "ether" upon the velocity of light. Over a long period of years Dr. Miller has repeated the famous Michelson-Morley experiment with great refinements at Cleveland and at Mt. Wilson, Calif. In one series of experiments he made about 200,000 single readings of his delicate instruments which measure the shift of light interference fringes caused by the difference in time required by two beams of light from the same lamp to travel equal distances in different directions.

Indirect Effect

The movement of the earth through the "ether" causes an indirect or second order effect in the interferometer used by Dr. Miller. So he concludes from a careful reanalysis of his extensive data just completed "without any presumptions as to the results." He at last finds in the ether-drift observations the effect of the orbital motion of the earth

which has been suspected and searched for over a period of 46 years. What effect this reversal of the first results of the Michelson-Morley experiment will have on the "new physics" so fruitful today is not yet determined.

Dr. Miller in his first interpretations was misled by attempting to make the result fit into what seems to be a general drift among the closer stars toward the north. Actually it turns out that the solar system is rushing southward, with the apex of its cosmic motion in the southern constellation of Dorado, the swordfish, about twenty degrees south of the second brightest star in the heavens, Canopus. This point toward which the sun and its family are moving is almost perpendicular to the plane of the ecliptic in which the planets move around the sun.

"This suggests that the solar system might be thought of as a dynamic disk which is being pulled through a resisting medium, and which therefore sets itself perpendicular to the line of motion," Dr. Miller told the academicians.

Efforts to verify certain predictions of the so-called classical theories and the influence of traditional points of view were charged by Dr. Miller with having delayed the discovery of ether drift and the cosmic motion of the solar system.

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ANATOMY

Childhood Characters Recall Simian Ancestry

REMINISCENCES of our tree-climbing ancestry are to be found in the physical structures of children as well as in the stages before birth, Dr. C. B. Davenport of the Carnegie Institution of Washington told the National Academy of Sciences at its meeting. He reminded his hearers that "at birth the child is still far from an adult in proportions of parts, and has still to pass through a series of changes shown by adult primates."

One of these childish characteristics