SCIENCE NEWS

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LIVER EXTRACT FOR PERNICIOUS ANEMIA

BEEF liver may be the means by which science will eventually succeed in finding a cure for pernicious anemia, a disease that almost invariably terminates in death. Scientists at Harvard University have established that a diet rich in liver promptly increases the number of red blood corpuscles in patients with this disease and they are now endeavoring to isolate the active principle in liver. Lack of this principle apparently prevents patients with pernicious anemia from manufacturing red blood cells.

Last year Drs. George R. Minot and William P. Murphy, of the Collis P. Huntington Memorial Hospital of Harvard University and the Peter Bent Brigham Hospital, reported the successful treatment of patients with a diet containing large amounts of liver. Over 50 patients have now been successfully treated for from 1 to 3 years with a diet containing approximately 200 grams of liver a day. Even though the individual with pernicious anemia knows that he is the gainer thereby, a daily diet of liver in the quantities necessary to replenish the blood with red corpuscles is difficult to take for a long time. Consequently, a small dose of liver extract daily, that does as much good as 300 grams or more of the whole liver, represents a big advance in the treatment of this disease. The causes of this fairly common malady are unknown, though it is believed by some that a predisposition toward it is inheritable. This disease should not be confused with anemia due to common causes.

Dr. E. J. Cohn and his collaborators in the department of physical chemistry in the Harvard Medical School have isolated a non-protein-, non-fat-containing fraction of liver that promptly produces young red blood cells, and permits the total number of red blood cells to increase. Drs. Minot and Murphy are determining the effectiveness and the clinical uses of the successively purified extracts that are being prepared.

The most concentrated preparation that has thus far been administered produced about four times its weight of erythrocytes, or red blood cells, within a fortnight. An effective daily dose amounts to about one third of an ounce, or 10 grams. Nine patients with pernicious anemia have been fed the extract with entire success during the past months.

The chemists are still uncertain as to the exact amount of the effective substance in the liver extract, since, despite the fact that the purification has proceeded far, a large part of the material in the present mixture may eventually prove to be inert. After further purification it may be possible to isolate the chemical substance, or substances, that are specifically involved, and thereby learn more of the reactions and of the physiological mechanisms that are disturbed in this disease.

The development of the use of liver extract in the treatment of pernicious anemia may be as important in its way as the outstanding achievement in the treatment of diabetes three years ago by the use of insulin, an extract of a particular part of the pancreas. Physicians and scientists are watching the clinical trials of the Harvard liver extract with great interest. Further reports of the treatments are to be made at the coming meeting of the American Medical Association in Washington beginning on May 16.

THYROID EXTRACT AND CATARACTS OF THE EYE

THE much-discussed thyroid gland has a new use. Drs. William J. Kerr, George N. Hosford and H. C. Shepherdson, of the University of California, have found that several of their cases of cataracts in elderly people have improved vision after the administration of thyroid extract.

Senile cataracts are thought to occur in individuals in whom a general break-down of the body forces is under way and consequently any agent, such as thyroid substance, that tones up the whole system, is likely to be helpful in improving the impaired vision. The doctors are careful to state that cataracts may remain stationary for years and even clear up upon occasion without treatment, thereby making it difficult to prove the actual value of any curative procedure that may be undertaken. They have, however, obtained such good results from this method that it may develop into a new weapon of attack against this insidious form of blindness.

The general condition of the patient should be carefully studied, says Dr. Kerr, and it is well for the practitioner or internist to cooperate with the ophthalmologist while the extract is being given. "There is no great danger in the administration of thyroid substance, if the patients are carefully studied before treatment and watched for toxic symptoms."

"When the metabolism of cholesterol is better understood we may find a relationship between it and formation of cataract in the senile as well as the diabetic patient. Further studies are needed on the metabolism of sodium, potassium, magnesium and calcium in relation to the changes in the lens in senile cataract."

ANIMAL TISSUE AFTER DEATH

IMMUNITY to disturbing disease invasions from the outside does not need to end with the death of the animal that possesses it, but will live on in a part of its tissues if these can be kept alive by artificial means. Dr. William Bloom, of Chicago, Ill., describes, in the *Archives of Pathology*, an ingenious experiment in which he showed that bits of a rabbit's lung, kept growing in a glass vessel after the rabbit's death, were still able to kill off disturbing elements against which the rabbit had been rendered immune during its lifetime.

In his research, Dr. Bloom substituted alien red blood cells, taken from a pigeon, for disease germs. He was able to do this because the blood of any animal will react toward many outside substances, especially proteins, very

much as though they were hostile germs. He made the rabbit immune to the injection of these blood corpuscles by suitable physiological treatment. Further injections of pigeon blood corpuscles had no effect on the rabbit; they were simply destroyed by the white cells in its blood. Then the rabbit was killed, and a bit of its lung kept going as a tissue culture. Pigeon's blood was placed upon it, and the conduct of the white blood cells in the culture watched through the microscope. These minute "policemen of the blood" acted as though they were still in the living animal, seizing upon the alien corpuscles and devouring them.

As a further test, a tissue culture was made from the lung of another rabbit which had not been immunized. When pigeon's blood was added, its white cells did nothing. But when a little blood serum from the immunized rabbit was added, there seemed to be something in it that stimulated the white cells to action, for they then eagerly went after the pigeon corpuscles and soon destroyed them.

THE CHEMISTRY OF LIFE PROCESSES

CHEMISTRY on a factory scale, using tons of raw material where the investigator has hitherto used pounds or ounces, offers the most promising line of attack on some of the stubborn secrets of living animals and plants. This was one of the theses advanced recently by Professor Lafayette B. Mendel, of Yale University, in an address upon the occasion of his presentation with the American Institute of Chemists' Medal, in recognition of his brilliant work on the chemistry of life processes.

Professor Mendel said, in part: "The inorganic chemist has long realized that the identification of the radioactive elements resulted only through the use of tons of ores in which they are hidden away. It remained for the biochemists, often engaged without success in studying the nature of the potent iodine-containing substance of the thyroid gland, to observe Kendall, in this country, and Harrington, in England, apply the processes of separation and purification to hundreds of pounds—not a few grams or kilograms—of animal tissue before the worthwhile discoveries regarding thyroxin were made. Willstätter's classic researches on chlorophyll called for the use of enormous amounts of green leaves. The quest of the antirachitic vitamine—vitamine D—has already involved the saponification of a few tons of cod-liver oil without as yet yielding in a state of requisite purity sufficient of the potent factor to establish its actual chemical nature beyond question. The epinephrin of the adrenal medulla remained elusive until it was prepared in adequate amounts for critical study. Unless a wealth of pancreatic gland is made available for the separations, the complete story of the chemistry of insulin is not likely to be written. The chemistry of both animal and plant cells—materials rich in unknown numbers of unidentified substances, some of which are presumably of large biological significance—awaits the employment of factory-like operations affording better opportunities to attempt the difficult separations of unrecognized compounds."

Professor Mendel also expressed some concern over the present highly optimistic popular feeling toward the possibilities of science. Before the war, he said, chemists complained, with cause, of the indifference of peoples and governments. After seeing what could be made of applied chemical knowledge, public opinion has swung to the opposite extreme, and now confidently expects a chemist to retire to his laboratory and prepare wonder-working new compounds to order as easily as an engineer plants and erects a skyscraper. In order to forestall another reversal of the pendulum, the people should be informed concerning the obstacles confronting the investigator, as well as his own human limitations, quite as freely as they are now told of the remarkable possibilities that may come from the laboratory test-tube and the factory retort.

EXTREME TEMPERATURES

DAYS are coming when we shall enjoy thinking of the coldest spot on earth. That imaginary comfort may be enhanced by a knowledge of the exact time and location of the coldest known temperature. Verkhoyansk, Siberia, just within the Arctic Circle, experienced 90.4 degrees below zero Fahrenheit on January 15, 1885. It was unofficially reported that this same place recently broke the above record with 97.6 degrees below.

However, do not start for Verkhoyansk, for your vacation, for the temperature rises to 80 degrees during the two-month summer. Miles City, Montana, holds the low record for the United States, with 65 degrees below.

It may help the fellow who must enjoy the sea breeze of an electric fan to know of a hotter spot than his own chair. The Italian meteorological station of Azizia registered 136.4 degrees Fahrenheit, in the shade, on September 13, 1922. Azizia is in the semi-desert plain of Jefara, northern Africa. The mean annual temperature for this region is 70.8 degrees.

Before Azizia established her hottest day, California's similar arid inland plain held the world's record with 134 degrees in the shade. This was at Greenland Ranch, on the edge of Death Valley, where the thermometer goes higher than 120 degrees every summer. Officials at the weather bureau question Azizia's record because the conditions under which the 136.4 degrees were obtained were not certainly proper. However, this may be the American desire for bigger and better climate, as Professor Filippo Eredia saw to the establishment of the meteorological station at the Italian settlement in 1913 and took great pains to insure the accurate functioning of the instruments after approved methods.

Though summer out-of-doors recreation is tempting, the need for vacation is apparently greater in winter than in summer. Scientific investigation has discovered that it is a great mistake to speed up at the end of January while in May nature lends her aid and human energy is increased. We are still more energetic in October.

Nervous America might well change her habit and relax in winter vacations when the need for slowing up is greatest.

COSMIC DUST

THAT the earth, the sun, and all the nearby stars may be surrounded by a cloud of cosmic "dust," or some sort

of absorbing matter, which extends from the sun for 600 trillion miles or more, is the idea advanced by Professor Edward S. King, of the Harvard College Observatory.

Professor King makes this suggestion after a study of the color of the stars, and points out that such clouds of absorbing matter are not unique. In many parts of the sky they hide the stars behind them, and they surround some star clusters. One of these is the famous group, the Pleiades, a number of stars loosely gathered together, and mixed in with such a "dust" cloud.

It has been suggested before that such a cloud extends through all space, and that its effect is to make stars look redder, as their light passes through a greater thickness of it. This effect is similar to the red sunsets which appear when the earth's atmosphere is full of dust.

If the clouds were present throughout the universe, the most distant stars would look intensely red, but this is not the case. Professor King does find that up to a certain distance, stars do get redder, the farther away they are; but beyond this distance, about a hundred light years, as the astronomer measures it, there is no increase in redness with distance. The light year is the distance that a beam of light will travel in one year, or about six trillion miles.

His observations may be explained, according to Professor King, if the sun and all the stars within that distance are in a dust cloud, so that the farther away they are, the more of the material their light has to penetrate, and the more of the blue rays they lose, making the light proportionally stronger in red. But the light from stars outside the local cloud has to penetrate the same amount of dust, regardless of how far the stars are.

THREE INDIAN CULTURES

CAMP sites thousands of years old on the plains of Texas and ancient funeral mounds in the wooded regions of the state may hold the secret of the relations of three of the greatest Indian civilizations of the American continent.

The Aztecs of ancient Mexico, the pueblo dwellers of southwest United States and the mysterious mound-builders of the Mississippi Valley form a triangle at the apex of which lie the remains of a little-known culture of prehistoric Texas, according to Dr. J. E. Pearce, professor of anthropology of the University of Texas.

Ancient camp sites, known as the "Burnt Rock Mounds," are found on the plains and prairies of Texas along streams and waterholes. These mounds are from four to five feet high and are made up of superheated limestone, with bones and other kitchen refuse. Nowhere else in the world are mounds of just this type found. Dr. Pearce found not only the bones of many animals and birds, such as the buffalo, deer and turkey, but also many human leg bones split for getting at the marrow. These Indians, with their at least occasional taste for human flesh, must have built one fire on top of another until, after thousands of feasts cooked on limestone slabs, the mounds piled up.

There is no doubt of their great antiquity because many of the mounds contain as much as 1,500 cubic yards of refuse, and one cubic yard of material piled up in a year is a fair estimate. The chances are that they are still much older than this accumulation rate would indicate, because the Indians were a nomadic race and the camp sites may only have been occupied for a few weeks all told in a year. The Texas Indians of historic times knew nothing of these mounds or where they came from and they were no longer used when the white man arrived. Dr. Pearce believes that their beginnings may go back from 2,000 to possibly 5,000 years.

Another group of prehistoric Texas Indians had established a civilization in the wooded parts of the state and built mounds in which to bury their dead. They were clever potters and rivaled the earthenware of the Mississippi Valley mound-builders. A study of the remains of these two civilizations may yield valuable data on the migrations and origins of early American cultures.

ITEMS

RADIO predictions of storms crossing the Atlantic Ocean steamship and airplane routes, broadcast from Greenland several days before they get where they can do any damage, is a possibility of the future, according to Professor W. H. Hobbs, of the University of Michigan. Professor Hobbs, speaking before the recent meeting of the American Philosophical Society, described the work of an expedition from the University of Michigan to Greenland to study the effect of weather conditions there on Atlantic storms. He believes that these storms originate over the great ice cap of this northern island. Last year preliminary studies were made, which will be continued this summer. A meteorological observatory, equipped with weather instruments as well as radio apparatus, will be established in southwestern Greenland, as near as possible to the ice cap, where two investigators will remain for a year. One of these is Professor J. E. Church, Jr., who has been in charge of the Mt. Rose Meteorological Observatory, two miles high in the Sierra Nevadas of California. He is an authority on snow surveys. The expedition this year will be in cooperation with scientists from Iceland, Germany and Roumania.

A DRUG that is designed to treat both syphilis and leprosy simultaneously is reported to have been successful in Calcutta. It was developed under the direction of Dr. T. A. Henry, at the Wellcome Chemical Research Laboratories in London, and consists of a mercury derivative rendered soluble in one of the complex compounds of chaulmoogra oil. Arsenical drugs are dangerous to administer to syphilitic lepers, so that some form of treatment for patients afflicted with both diseases that does not produce harmful reactions is highly desirable. Thirty lepers with syphilis were treated with the new compound by Dr. E. Muir, of the School of Tropical Medicine and Hygiene in Calcutta, with considerable success. After the course of treatment sixteen showed negative Wassermann tests, two were doubtful and only eight remained strongly positive, while the whole group showed improvement so far as the leprosy was concerned. The drug is said to be safe to administer and in none of the cases did it give rise to undesirable symptoms.