SCIENCE NEWS

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THE CAUSE OF PERNICIOUS ANEMIA

A HITHERTO unknown substance found in the secretions of normal human stomachs, but conspicuously absent from the stomach contents of those suffering from pernicious anemia, may be the key to the medical riddle of the cause of pernicious anemia. Through researches of Drs. William B. Castle, Wilmot C. Townsend and Clark W. Heath, of the Thorndike Memorial Laboratory, Boston City Hospital, it is now known that by an interaction of certain proteins contained in beef muscle and a new substance secreted by the normal stomach this peculiar anemia may be promptly alleviated.

From the standpoint of the anemia sufferer, the disease came under medical control four years ago when Dr. George R. Minot and Dr. William P. Murphy, of the Harvard Medical School, showed that the eating of liver in large quantities allowed the formation of red blood cells by the person with pernicious anemia. Thousands were benefited by this discovery which was followed by a collaboration with Dr. Edwin J. Cohn, of the department of physical chemistry, of the Harvard Medical School, with the result that now small daily doses of liver extract supply the necessary principle which in the early days of the treatment could only be obtained through the consumption of more liver than pleased the palate of the average patient.

One incidental result was that beef liver, once mere cat food, became a high-priced meat since normal red-blooded people who really did not need it thought it would benefit them. Recently Dr. Cohn has been able to prepare experimental fractions of liver which have been successfully used for intravenous injection, the effect of a few tenths of a gram of this material equaling that of many grams of liver.

Not content with producing a virtual cure for the disease, science has pushed onward to determine the nature of the substance that prevents this type of anemia and the reason for the development of the disease. Dr. Castle and his associates found that beef muscle acted upon by normal human stomach juice formed a curative substance. In a recent report to the American Society for Clinical Investigation, Dr. Castle discusses the meaning and possibilities of this new work.

The known constituents of normal human stomach secretions are hydrochloric acid and the ferments, pepsin and rennin. Although all these are conspicuously absent from the stomach contents of pernicious anemia sufferers, Dr. Castle proved by experiments that no one of these can react with beef muscle to produce a curative substance. An unidentified substance appears then to be responsible for these results.

Dr. Castle called the new substance, shown to occur in the normal stomach, "the essential factor of the normal gastric juice," and observed that none of the existing tests for stomach function would detect its presence specifically.

When the new substance is given to the patient with beef muscle in a solution that is neither acid nor alkaline, an effect is produced which promptly benefits pernicious anemia exactly as does liver.

Interesting experiments that may lead to a test for the potency of liver extracts have been made by Dr. Janet M. Vaughan, of England, who has been working at the Thorndike Memorial Laboratory with Dr. Gulli Lindh-Muller and Dr. George R. Minot, of the Harvard Medical School.

A suggestive resemblance to the characteristic condition of the bone marrow in pernicious anemia is found in healthy grain-fed pigeons. This condition in man is changed when the anemia is relieved by feeding liver or potent liver extract. If the condition can also be changed in pigeons by feeding the liver and liver extracts, this would be a method of testing the anemia-relieving power of the extract, it was thought.

Dr. Vaughan's preliminary studies indicated that this might be possible, but the results were not as yet consistent enough to allow final conclusions to be drawn as to the value of such experiments as a test for the potency of liver extracts.

IMMUNIZATION OF NEW-BORN CALVES

THE control of bovine tuberculosis by immediate isolation of new-born calves from infected mothers is the latest victory of the Rockefeller Institute scientists, a victory equivalent to many million dollars of agricultural relief, it appears from a recent report of work done by Drs. Theobald Smith and Ralph R. Little, at the institute's department of animal pathology at Princeton, N. J.

Calves born from tuberculous cows are at birth usually free from the disease. A large percentage of them soon acquire it, however, from contact with infected mothers. Attempts to prevent the spread of tuberculosis to the second generation in an infected herd by immediately separating the new-born calves from the diseased mothers have not been successful heretofore.

In spite of the most careful hygienic care, practically all the calves thus isolated developed gastro-intestinal disease, joint disease, or blood-poisoning. Fully four fifths of them died within the first few days.

Bacteriological examination of these calves has shown that death is usually not due to the common contagious diseases, but to invasion of the living tissues with the ordinary colon bacillus, dung bacillus or other presumably harmless environmental micro-organisms. Evidently the calf at birth is unprepared to resist invasion by ordinary harmless bacteria, micro-organisms causing practically no disturbance in adult cows.

It has been found, however, that calves thus isolated will remain free from such infections if they are allowed one natural feeding before separation from a diseased mother. In this first feeding they do not obtain the

usual milk, but a specially secreted pre-milk, or colostrum. One colostral feeding is usually sufficient to immunize a new-born calf against the usual non-pathogenic environmental bacteria. Practically all calves thus fed may be successfully raised by artificial feeding.

Veterinarians have concluded from this that there is present in the pre-milk or colostrum some highly efficient natural antidote, specially designed to overcome the birth-handicap. The nature of this colostral antidote has been the subject of intensive research. Now the Rockefeller Institute scientists have found that the normal colostral antidote is identical with, or at least similar to, the normal biological antiseptic in adult cow's blood. Calves may be protected from the usual post-natal infections by one or more initial feedings with adult cow serum. They lost but one calf out of ten after such a preliminary serum meal.

Dr. Smith, who with his associate, Dr. Little, has just made this important contribution to the control of bovine tuberculosis, has likewise to his credit the discovery of the cause of the disease. He was the first to distinguish the bacillus from that causing the disease in human beings. He has been called the first American bacteriologist, and he was responsible for much of the development of the U. S. Bureau of Animal Industry.

PLUTO

THE new planet, Pluto, known as Planet X before its christening by its discoverers at Flagstaff, Arizona, has a juvenile godmother in the person of an eleven-year-old girl of Oxford, England, Miss Venetia Burney. Shortly after the discovery of the new planet by Lowell Observatory, Professor H. H. Turner, the Oxford astronomer, cabled to Professor V. M. Slipher, director, Miss Burney's suggestion that the planet be named Pluto and in the official announcement of the naming Professor Slipher acknowledges the suggestion as the first to be received.

Minerva was another popular suggestion, but as it has long been used for one of the asteroids this prevented the new planet from bearing the name of the goddess of wisdom. Professor Slipher suggests that a fitting symbol to go with the name will be a device made of the two first letters of the name Pluto capitalized, an L partially superimposed on a P. Incidentally, these are the initials of the late Professor Percival Lowell whose studies inaugurated the search that resulted in the discovery of Pluto.

Other astronomers, notably Professor E. W. Brown, of Yale University, in a recent communication to the National Academy of Sciences, have concluded that Professor Lowell's computations of some twenty years ago did not precisely predict the location of Pluto. Professor Slipher answers this criticism indirectly when he writes in a Lowell Observatory Circular that Pluto "appears to be a trans-Neptunian, non-cometary, non-asteroidal body that fits substantially Lowell's predicted longitude, inclination and distance for his Planet X. Lowell considered his predicted data as only approximate, and a one to one correspondence between forecast and find would not be expected by those familiar with the problem. As he himself said in his Trans-Neptunian Planet Memoir: 'Analytics thought to promise the precision of a rifle and finds it must rely upon the promiscuity of a shot gun.' This remarkable trans-Neptunian planetary body has been found as a direct result of Lowell's work, planning and convictions and there appears present justification for referring to it as his Planet X."

THE PHOTOELECTRIC CELL AS A COLOROSCOPE

A NEW use for the photoelectric cell has been found in which the "electric eye" again proves its superiority to the human eye for comparing colors. Textiles of slightly varying shades are now classified by the photoelectric cell more expertly than can be done by manual operatives.

This cell is also the heart of television, it picks cigars of choicest color, and warns when the exhaust smoke in Holland vehicular tunnel under the Hudson River becomes dangerous. Its new application was publicly demonstrated for the first time recently before the New York Electrical Society by the inventors, Dr. H. H. Sheldon and Dr. W. A. Schneider, physicists of New York University.

Dr. Sheldon explained that two cells are used which create a balanced circuit and hold a deflecting needle at zero when both receive the same amount of light. But when the color of the article under one cell is different from that of the article under the other, different amounts of light are reflected to the cells, different currents pass through them and the needle becomes unbalanced and swings away from zero. The needle will vary even when the shades look exactly alike to the human eye.

Error may be introduced by the effects of weave and sheen. Weave effect is overcome by rotation, which melts the pattern into one solid mass of color. Sheen is counteracted by the use of a spherical photometer in which light is reflected from the cloth in all directions so that a concentration of light at any one point is eliminated.

THE CRICKET'S CHIRP

THE ordinary little black cricket can play a full-tone slur in a fiftieth of a second, and that on a pair of notes that a master-violinist can reach only by sliding his finger down on the E-string. And he repeats the feat four times at every stroke of his bow.

Some of the musical secrets of these insect virtuosi have been discovered by Dr. Frank E. Lutz and W. R. Hicks, of the American Museum of Natural History. They assisted at the production of the first "talkie," or more accurately the first "chirpie," of a performing cricket that has ever been made. Afterwards they made a study, with a microscope measuring device, of the alternating shadows and clear bands on the edge of the movietone film that record and reproduce the sounds.

They found out some things, by sight, that the human ear is too sluggish to hear as sound when a cricket chirps. They learned that the insect does not slide the tiny file near the edge of his wing clear across the other wing-

edge at one stroke to produce a chirp. Each chirp, as recorded on the film, separates itself into about four subdivisions, which Dr. Lutz calls "pulses," with imperceptible pauses in between. Each "pulse" lasts on the average a fiftieth of a second, and each pause somewhat less than that. But the human ear, because of its innate sluggishness, perceives the whole performance as a single sound.

A closer examination of a single "pulse" shows that it starts at the high pitch of fifth "D" above middle "C" of the piano keyboard. It rises momentarily a little higher, then slurs downward approximately a whole tone. And all in about a fiftieth of a second.

BY SUBMARINE TO THE NORTH POLE

ASSURANCE that the first submarine expedition to the North Pole will become a reality next summer is seen in the recent action of the U. S. Shipping Board requesting the transfer of the submarine *O–12* from the Navy Department to the Shipping Board to be chartered for use by the Polar expedition which will be headed by Sir Hubert Wilkins.

The Navy Department has previously announced that should this request be made it would recommend to President Hoover that the transfer be made. No objection is anticipated at the White House.

The submarine to be used, the *O–12*, has been on the de-commission list of the Navy for four years and is now in the back channel of the Philadelphia Navy Yard. It is to be chartered at one dollar a year to Lake and Danenhower, Inc., of Bridgeport, Connecticut, and will be remodeled to adapt it to Arctic exploration. Captain Sloan Danenhower, president of Lake and Danenhower, Inc., and a former naval reserve officer, will captain the vessel.

A trolley to indicate open water, powerful searchlights, forward and upward observation glasses, saws and drills for cutting through the ice and an inverted mast to which nets will be attached for collecting specimens of ocean life are among the ingenious devices which Sir Hubert is planning to install in the submarine. The vessel should be able to run for 125 miles without having to come to the surface for charging its batteries.

But Sir Hubert is certain that during the summer months of July and August he will find open places possibly as close together as every five or ten miles. He says that his experience of 15,000 miles of Arctic flying and 5,000 miles of walking over the ice has shown him that there are many patches of water in the Arctic even in winter.

The trip will be made across the Pole from Spitsbergen to Alaska, and will cover an area about which there is least scientific knowledge. The submarine offers greater possibilities for scientific observation in this region than any other means of transportation, according to Dr. Harald U. Sverdrup, of Norway, who has been asked to direct the scientific work of the expedition.

This work will include analysis of ocean water at all depths, study of ocean currents, collection of plant and animal life, collection of bottom samples, measurement of gravity, magnetic observations and sonic depth sounding.

ITEMS

AN earthquake shook the bottom of the Pacific a short distance off the northwestern corner of the United States on Saturday, May 31, beginning at 5:21.4 A. M., Eastern Standard Time, and lasting for about two hours. Using data supplied through *Science Service* by the Canadian seismological station at Victoria and the Alaskan station at Sitka, scientists of the U. S. Coast and Geodetic Survey located the point of its greatest activity at 46 degrees north latitude and 132 degrees west longitude, about 400 miles southwest of Victoria.

A NEW comet has been discovered in the southern heavens by a veteran amateur comet discoverer, David Lamont Forbes, of Rondebesch, South Africa, according to information received by the International Bureau of Astronomic Telegrams at Copenhagen. It is of ninth magnitude, too faint to be seen by the unaided eye, and is not far from the bright star Fomalhaut in the constellation of Piscis Australis, now visible only from the southern hemisphere. On Monday, June 2, when the discovery was made it was located at right ascension 23 hours 33 minutes 56 seconds and declination south 32 degrees 48 minutes 33 seconds. It has no plainly visible tail. It is moving slowly southward in the sky at the rate of 24 seconds a day, but its future course in the heavens can only be told after more observations are obtained.

MAKING two trees grow where one or none grew before will shortly become the task of the U. S. Department of Agriculture, when President Hoover signs the reforestation bill, authorizing large sums for tree nurseries in which young seedling trees will be brought to such maturity as to be suitable for replanting cut-over lands, or areas suitable for forests throughout the country. Mounting sums for the work are authorized, ranging from $250,000 for this current year to a maximum of $400,000 annually by 1934. Young trees after they are planted on these reforested areas are to be given governmental protection and care. The Secretary of Agriculture is given authority to require any purchaser of national-forest timber to deposit enough money to provide for the reforestation of the area he intends to cut over, in addition to payment for the timber itself. A number of governmental tree nurseries are planned to be located in various states. The largest will be at Cass Lake, Minnesota.

DOGBANE or Indian hemp, a common weed, has been given a place in the society of plants of economic value. Scientific research, according to the Missouri Botanical Garden Bulletin, has revealed that the weed, known scientifically as *Apocynum*, has rich rubber content. "One of the most significant factors concerning the study of the latex of *Apocynum*," says the Bulletin, "is that the rubber content increases to a large extent with drought and infertility of the soil."