SCIENCE NEWS

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SYNTHETIC VITAMIN C

SYNTHETIC vitamin C, called ascorbic acid, in its first actual use on medical patients is producing very striking and unexpected disease conquests, the British Association for the Advancement of Science meeting at Aberdeen was informed by Professor A. Szent-Györgyi, the Hungarian chemist who played a major rôle in the artificial manufacture of this important vitamin.

A certain kind of hemophilia, the mouth disorder known as pyorrhea, certain forms of hemorrhagic nephritis and several other diseases against which medicine was helpless are seemingly being cured by ascorbic acid. Ascorbic acid is not a cure for hereditary hemophilia.

"This is the more striking since these pathological conditions have not been thought to be connected with lack of vitamin," Professor Szent-Györgyi explained. "These curative effects suggest that humanity is suffering much more gravely from a lack of vitamin C than has hitherto been supposed." Disfiguring colorations of the skin brought on by illness are also made to disappear by ascorbic acid. Patients with Addison's disease, who have a yellow color, can be bleached out again by the use of this substance.

The complete exploration of the mysterious vitamin C, found most abundantly in citrus fruit, was one of the most fast-moving dramas in current science. In the short space of two years vitamin C has been identified, its chemical structure determined and it has been made synthetically in the laboratory. The pure, highly concentrated vitamin C acid has been made available for industry and medicine.

Hungary, represented by Professor Szent-Györgyi, who is director of Szeged University's Institute of Medical Chemistry, Switzerland, England and other countries have worked together in this great chemical conquest. "It is pleasant to note that this unparalleled advance is due entirely to the closest and friendliest international collaboration," Professor Szent-Györgyi said.

It is predicted that the rôle of ascorbic acid in life may be even more important than is now realized, for there seems to be no cell life in higher organisms without ascorbic acid.

Vitamin D, the sunshine vitamin present in liver oil and green vegetables, was called the salvation of teeth by Dr. May Mellanby, of the British Medical Research Council. It helps to prevent and arrest dental decay or caries even in imperfect teeth. Beautiful teeth are found in Eskimos who get their vitamin D from blubber and in natives of the tropics who get theirs through exposure of naked bodies to the ultra-violet rays of the sun.

THUNDERSTORMS SHATTER RADIO "MIRRORS"

THUNDERSTORMS shatter the radio "mirrors" of electrical particles hundreds of miles above the earth and bring "bad luck" to radio listeners in the form of poor reception. This, in substance, is the report of J. A. Ratcliffe, of the Cavendish Laboratory of the University of Cambridge, before the British Association.

The radio "mirrors," which reflect radio waves and make possible transmission over long distances, are in the ionosphere. Each mirror is a layer of air atoms split apart and in this way electrified. Radio waves bounce off the under side of these layers and are reflected back to earth.

Mr. Ratcliffe used radio signals to study the height of such reflecting layers during thunderstorms. The method is essentially an "echo" one and similar to the system of determining the depths of the ocean by sending sound waves and waiting for the echo. The one difference is that radio instead of sound waves were employed.

It was found that one electrical layer, designated by the symbol E, was 78 miles above the earth before a thunderstorm arrived. During the storm the electrical discharge pushed the layer down to 65 miles. With the cessation of the storm the height of the layer rose again to 78 miles, but within fifteen minutes it mounted to 93 miles. The electrical reflecting surface, therefore, undergoes great oscillatory motion during the storm.

Because of the up and down motion the fidelity of radio reception varies during the thunderstorm just as a beam of light reflected from a still pool is greatly different from that reflected by the water in the pool when waves are stirred up in it.

DYSENTERY AND NATIONAL HEALTH

AMEBIC dysentery continues to threaten the health of the American people, in the opinion of Dr. F. W. O'Connor, of Columbia University, who pointed out the importance of tropical diseases in the United States at the meeting of the American Public Health Association in Pasadena.

In the future greater attention should be paid to the question of amebic dysentery because the usual number of carriers of the parasite in this country has doubtless been augmented by a number of persons in different parts of the states who became carriers as the result of the Chicago outbreak but did not develop symptoms.

From six to twelve million persons in the United States are subjects of this disease, according to an estimate made by Dr. Alfred C. Reed, of the University of California Medical School.

The danger from carriers of amebic dysentery is twofold, Dr. O'Connor pointed out. Not only are they probably spreading the disease to others who may become seriously ill, but the carriers themselves may at any time develop the disease in malignant form. Development of liver abscess as a result of amebic dysentery infection is a particularly grave complication which threatens the so-called healthy carrier and the apparently cured case. Dr. O'Connor emphasized the danger of relapse in patients who had been treated and apparently had been cured of the disease. The recent epidemic in Chicago shows that the very progress of mankind may not only

bring new evils in its train, but may upset the biological balance between parasite and man.

The Chicago epidemic was traced to sewage contamination of drinking water in two hotels as a result of faulty plumbing. But such conditions probably exist in other cities. Outbreaks of amebic dysentery as severe as the one in Chicago last year may occur in other parts of the country at any time, especially under conditions of guest strain such as large conventions bring.

THE DISEASES OF MIDDLE LIFE

MAN'S chance for long life now depends on the conquest of diseases of middle life, namely cancer, diabetes and the diseases affecting the heart, blood vessels and kidneys, according to Dr. Louis I. Dublin, of the Metropolitan Life Insurance Company, speaking before the American Public Health Association at Pasadena.

No headway has been made in the fight against these diseases since 1920, Dr. Dublin said. In fact, among persons of advanced age, almost twice as many deaths in a unit of population are attributed to these diseases to-day as in the early years of the century. The increase in deaths from these diseases is only in part due to better diagnosis and reporting of the ailments. Some of the increase is an actual one.

About six hundred thousand fewer people die every year at present than would if the health conditions of 1900 still prevailed, Dr. Dublin pointed out. For every thousand of the population, five more survive under present conditions who would have died under the old régime. But this improvement has been achieved almost entirely among persons under 45 years of age and more particularly among infants and children.

Increased control over tuberculosis, pneumonia, typhoid fever, diphtheria, scarlet fever and, more lately, measles and whooping cough has been a big factor in adding eleven years to the expectation of life at birth and even as many as four years to the expectation at the age of twenty years.

ANTHRAX AND GASOLINE POISONING

ANTHRAX is definitely on the increase among agricultural workers in this country and is a definite menace in the wool industry in several manufacturing areas, Dr. Henry F. Smyth, of the University of Pennsylvania, reported to the American Public Health Association. The death rate for this disease, except in a few states, shows no tendency to decline, the committee, of which Dr. Smyth is chairman, found in studying the anthrax situation during the past five years. The best method of treating the disease is by large doses of anti-anthrax serum applied locally and injected into the veins. This treatment must be kept up until definite improvement is evident.

The increasing numbers of deaths from this disease are due in part to its increase among agricultural workers where the serum is not available. Wool and wool clothing are frequently sources of this infection. Machinery in a textile mill may become infected and transmit the infection to subsequent materials. A distinct hazard of both acute and chronic poisoning from gasoline and benzine exists in the petroleum industry, Dr. Smyth reported. These substances act as narcotic poisons and produce injuries to the nerves in chronic cases.

Treatment with calcium, the substance which gives bones their hardness, is the "sheet anchor" in cases of carbon tetrachloride poisoning, the committee found on investigation of this industrial hazard. Carbon tetrachloride is the chief ingredient of many cleaning solutions.

However, because it is used as one of several ingredients in certain mixtures, in the opinion of the committee, it has often been unjustly blamed for causing harm when some of the other ingredients in the mixture have probably been the real cause of the poisoning.

VARIATIONS IN PITCH OF THE VOICE

OPERATIC and concert singers, even the most noted artists, habitually sing off pitch, according to Dr. Harold G. Seashore, Eastman fellow in psychology of music at the State University of Iowa, at the meeting in New York City of the American Psychological Association.

Such variations from the true pitch of a song are probably unconscious on the part of the singer, Dr. Seashore indicated, although they may not be errors, either. Certainly the listener hears the performance as correct and artistic; the variations are not detected by the ear. In fact, Dr. Seashore considers it probable that if the singer were to sing rigidly in true pitch, his performance would be considered thin, mechanical and lacking in feeling.

The singers studied included such well-known concert and operatic artists as Richard Crooks, Louise Homer and Lawrence Tibbett, as well as two college voice instructors. The songs were in legato style and varied in difficulty from "All Through the Night" to two Handel arias. The voices were recorded by means of a sound photographing device called the strobophotograph which recorded graphically each variation in pitch and intensity, however minute.

The photographic records showed that what is heard as a single note when sung by the artist is really a vibrato or oscillation between two pitches which may be as much as eight tenths of a musical step apart. From 78 to 85 per cent. of all tones are off-pitch part of the time, with an average deviation of one tenth of a step.

"Apparently singers to a degree 'hunt' for the correct pitch and interval extent," Dr. Seashore said. He concluded, however, that the errors found are not due to motor skill deficiency or to auditory misjudgment, but are deviations necessary for the legato flow of the song.

Gliding attacks, or the sliding up to the note sung, were found to be more common than musicians are willing to admit. "Gliding attacks are universally condemned although we can now demonstrate that all good singers sing many tones with a rising pitch glide, sometimes as great as several whole tones," Dr. Seashore said. With Miss Homer, 13 per cent., and with Mr. Crooks, 33 per cent. of all the tones in the songs were begun with rising pitch glide. Falling gliding attack was found to be rare.

ITEMS

IN the future, the investigator experimenting with anthropoid apes may have his laboratory material standardized. This is the prophecy made to the American Psychological Association by Dr. Robert M. Yerkes, of the Yale Laboratories of Comparative Psychobiology. It will require years to achieve this ideal, but ultimately the investigator who wishes to study the behavior or physiological reactions of these apes may select a subject accompanied by a pedigree, life-history and characterization. This is one of the primary objectives of the breeding colony maintained by Yale under the direction of Dr. Yerkes. On May 1, 1934, the breeding colony consisted of three mature male chimpanzees, twelve mature females, four children and ten infants under three years. Between May 14, 1933, and May 2, 1934, eight normal births occurred at the station.

LEARNING can take place, to a limited extent at least, when the brain cortex is completely missing. Cases of dogs who had lost their brain cortex through injury to the brain and yet could be "conditioned" or taught to modify their behavior, were reported by Dr. Elmer Culler, of the University of Illinois. When a bell is rung or a light is flashed at the same time that a healthy animal is given an electric shock, he will soon learn to pull back his paw as soon as the bell or light signal is given and thus avoid the shock. The animal who has lost the brain cortex can not learn to avoid the shock, but he does learn to show general symptoms of annoyance at the signal alone. This shows that he does make a connection between the signal and the shock.

THE case of a child who at two years had the mental age of an infant of less than seven months, or an intelligence quotient of only 28, but who while being fed pituitary gland extract gained in mental ability until at five and a half years it equalled children nearly six years old and had an I.Q. of 103, was reported by Dr. Florence Mateer, director of the Merryheart Schools, Columbus, Ohio. For 34 children under treatment at Merryheart for diseased pituitary glands, the gain under pituitary feeding has been from 5 to 22 points in intelligence quotient in a year, the gain continuing throughout the period of study.

YOU feel a flatiron as hot or a piece of ice as cold not because of the action of a special temperature mechanism in the skin but through the action of your blood vessels. The heat dilates or enlarges your blood vessels, while cold, on the other hand, contracts them. This theory, opposed to the commonly held one of a special skin mechanism for feeling temperature, was proposed by Dr. John P. Nafe, of Washington University, St. Louis, Mo. The cornea of the eye, which contains no blood vessels, can not feel temperatures, Dr. Nafe reported. The fact that warmth is perceived gently as a gradual flowing in while cold seems sharp and quick also points to the origin of the sensation in the blood vessels, he believes. When you place your left hand in cold water, the blood vessels in your right hand also contract and within three seconds your right hand becomes more sensitive to heat and less sensitive to cold.

SALT is not a taste. Evidence that this common food ingredient is not tasted but rather felt by some special skin mechanism was presented by Dr. Samuel Renshaw, of the Ohio State University. Thus the four traditional primary tastes—sweet, salt, sour and bitter—are probably now narrowed to three. At a neutral temperature of about body warmth, tastes diminish. Salt, however, does not follow this rule: it is noticed more in lukewarm foods than in hot dishes. Also it can be noticed on the lips and gums of the mouth where there are no taste organs.

PICTURES of how atoms of helium, neon and argon would look if scientists could really see them are presented by Dr. E. O. Wollan and Professor Arthur H. Compton, of the University of Chicago, in the *Journal* of the Optical Society of America. The atom photographs, for they may be called such because they are made by one form of photography, look like the moon with a ring around it. The rings are the swarms of electrons flying around the atom's central core. X-rays were used in taking the atom pictures. When the rays are passed through helium gas a characteristic pattern of scattering occurs. The trick of photographing atoms was to study the distribution of the x-ray scattering and then make a paper pattern, or template, which would reflect visible light just as the atoms scattered the x-rays. Such atom patterns were made for each of the gases studied. When cut in the proper shape the patterns were rotated and allowed to reflect light. A photograph of the reflected light produced an image on a photographic plate similar in appearance to the atom studied, except that it was some 100,000,000 times larger.

ONE of the less-known experiments performed by the Japanese scientists during the total eclipse of the sun in the Pacific Ocean last February was to determine if the cutting off of the sun's rays by the moon would change the magnetic field of the earth. Commander Akiyosi, of the Japanese Naval Hydrographic Office, found such an effect, according to a report by Dr. Josef J. Johnson, of the California Institute of Technology, who was one of two Americans accompanying the expedition to the Pacific. Dr. Johnson describes the experiment in *Popular Astronomy*.

THE wholesale slaughter of all wild mammals except deer over an area of 192,000 acres in Maine, will lose at least a part of its element of tragedy in becoming a study of the preservation of bird life. When foxes in the southwestern part of the state developed rabies, the only way seen by the U. S. Bureau of Biological Survey to prevent a wide-spread epidemic was to kill off all animals in the area that could possibly become infected. The fact that a great many of the doomed animals are those who by nature prey on bird life gives the bureau an opportunity to study the effect that complete extermination of natural foes will have on the game and song birds of the region. In the war against such animals as woodchucks, porcupines, squirrels, hares, bobcats, bears, skunks and foxes, cyanide gas is being used, in addition to the conventional traps.