THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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ISSUED BY
SCIENCE SERVICE
B and 21st Streets
WASHINGTON, D. C.

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SUBSCRIPTION: $5 A YEAR, POSTPAID

Vol. VII, No. 234 Saturday, October 3, 1925

SUNLIGHT ON HENS PUTS VITAMIN "D" IN EGGS

"Eggs from Sunkist Hens - Keep the Kids' Legs Straight". Such or similar may soon be the type of advertisements we shall see in the market place. Whether or not an egg contains vitamin "D", the substance that prevents "weak legs" in chickens and rickets in children, depends on the kind of life the hen that laid it has led. If she has been an out-of-doors hen, getting plenty of sunbaths, or even if she has been getting daily doses of ultra-violet light from quartz mercury vapor lamps, she will produce vitamin "D" eggs. But if she has lived a sheltered life in a glass house, her eggs will be of no use to prevent rickets.

Experiments conducted under the direction of J. S. Hughes, professor of chemistry at the Kansas State Agricultural College, give evidence for these conclusions.

An egg a day was included in a ration deficient only in vitamin "D" which was fed to forty-eight chicks divided into lots of a dozen each. Chicks fed on eggs laid by hens that had received both sunlight and artificial ultra-violet light grew up thrifty fowls without any indication of weak legs.

Eight of the twelve chicks whose diet included an egg a day from hens which had been kept in a room lighted only by glass windows but which received ultra-violet light treatment one-half hour daily developed mild cases of rickets. They were able to stand but had weak legs.

A third pen of chicks got eggs from hens which had received plenty of sunlight, but no ultra-violet light treatments. These chicks were thrifty.

All the chicks in the fourth pen contracted rickets and four of the lot died. Their diet included an egg a day from hens which received no direct sunlight but all the sunlight that penetrated a large south glass window. The glass in the window filtered out the ultra-violet light, the part of the sun's rays that is responsible for the production of vitamin "D" in the egg.

Vitamin "D" is stored in the yolk of the egg, it was shown by a supplementary experiment with chickens conducted by the department of chemistry.

SCIENTIST GOES ON JUNGLE FLAPPER HUNT

Where a flapper gets her "line" has puzzled scientists as well as parents, and now an enterprising biologist from the National Research Council in Washington, Dr. Margaret Mead, has left for Samoa to see if girls are just the same in the jungles. What she wants to find out is whether various character traits of the adolescent girl are due to heredity or to civilization. Upon the results of Dr. Mead's research in the South Sea island may depend the future courses of many social institutions which have to deal with juvenile delinquency.

"I intend to make a study of the adolescent girl in her native surroundings," said Dr. Mead, who is herself far from seeming a grim and bespectacled guardian. "The girls of the islands of the central Pacific are as yet uninfluenced by modern tendencies and it is from them that I must learn the facts which I hope to embody in a book."

"It is a popular subject just now - that of the adolescent girl, or 'flapper' as she is known - and if I can learn the reasons for the conditions found I shall have gone a long way in making clear the proper method of handling them in juvenile courts, schools and other similar organizations."

GLAND TUMOR MODIFIES SEX

How a beautiful, well formed girl of seventeen stopped flirting and grew whiskers is told by Dr. G. Holmes in the Quarterly Journal of Medicine. The cause was a large tumor growing in the right suprarenal region which destroyed her sexual balance and caused the development of many masculine characteristics. An operation removed the tumor and reversed the process, and femininity returned. Her whiskers fell out and so did the hair on her head until she was nearly bald. But in due time a new crop of luxuriant hair arrived, darker and more beautiful than before, and the only signs of her unusual experience were pits from the electric needle which had been used in the vain effort to keep down the growth of whiskers.

FLAPPER "PEP" MAY BE THYROID DISEASE

The girl with too much "pep" and the woman who scolds all the time may both be merely victims of a disease of the thyroid gland which afflicts women more often than it does men. Such is the opinion of Dr. C. Macfie Campbell of Boston, who has made an extended study of the psychical disturbances in diseases of the glands of internal secretion. Thyroid happiness resembles more the stimulation produced by strychnine than that of alcohol, and the excessive talkativeness differs from the aimless ramblings of a crazy person by the fact that it is intelligent and directed. Too much thyroid activity often causes irritability and Dr. Campbell says, "It is not to be wondered at that in the home of the hyper-thyroid woman marital complications are not infrequent, even with a long suffering husband."

WHAT MAKES WATER FLOW UPHILL?

By Dr. Frank Thone,
Science Service Staff Writer.

State a paradox and people will stop and stare. Repeat it a thousand times and nobody will pay any attention.

The ascent of sap in plants is so commonplace an occurrence that we seldom stop to consider what a truly amazing thing it is. Here is an apparent contradiction of the law of gravitation, going on all about us all the time. On every summer day, in every field and woodlot, water flows uphill, whether only a fraction of an inch in the humble mosses or a couple of hundred feet in a towering tree. A single full grown maple or linden will evaporate from its leaves as much as a barrel of water in a single day, and this must of course be replaced by sap flowing up the trunk. The water sent into the air by all the plants combined, must be comparable in quantity with the water carried off by the rivers.

How the water gets uphill in the trunks and stems of trees and plants has long been a sore puzzle to scientists. Several theories have been proposed, none of them very satisfactory. Until recently the one most commonly favored was known as the theory of "capillarity", which assumed that the water rose in a stem much as oil rises in a wick, through the natural tendency of liquids to climb up in narrow tubes and crevices. The trouble was, however, that ordinary capillary attraction could not raise water high enough or fast enough to account for all the losses through evaporation and use within the plant. Then there was another theory that took into account a supposed pumping action by the roots, or a so-called "root pressure". This theory, however, was always very vague, and even those who claimed to understand it could not explain it very convincingly.

A comparatively recent development is a theory that seems to explain the phenomenon and at the same time to be free from the objections that have overthrown the earlier ideas. This theory is largely the outcome of experiments by a British scientist, Professor Dixon. He found that by sealing a column of water in a glass tube and using appropriate experimental means, he could make the water carry a considerable weight without breaking. Ordinarily, of course, we think of a stream of water as a thing as unstable as a rope of sand, but the trick seems to lie in getting rid of all the air; for when this was done the water column could support a strain of several hundreds of pounds per square inch.

This is exactly the condition we find in the stems of plants. The fine fibers of which all stems are largely made up are really exceedingly slender tubes, in which water is carried as sap, but from which all air is excluded. These tubes are connected with each other from the ends of the remotest roots to the edges of the topmost leaves. It is thus possible to think of the evaporation from the leaves setting up a strain or pull on the water in the tubes, which is transmitted as through a system of slender silver wires, drawing the water up as rapidly as it is needed, and even reaching out into the soil in contact with the roots and obtaining a fresh supply from outside.

Sixty-two per cent. of the lighthouse stations in Alaska are operated automatically.

CARBON MELTS AND WE MAY ALL WEAR DIAMONDS

The long-sought-after process of melting carbon, whose lack has stood in the way of the manufacture of genuine diamonds, has been discovered by a group of German chemists, Drs. Alterthum, Fehse, and Pirani. Carbon has been one of the most heat-resistant substances known, and for that reason it has been used in arc lights and carbon filament lamps where a powerful current sent through this substance found such resistance that it raised it to white heat without melting.

But the existence of diamonds which are pure crystallized carbon tantalized chemists for years, because it proved that at some time in the past carbon had been in a molten state before it formed the transparent eight-faced diamond crystal. Graphite has been known for a long time and can be made artificially, but unlike the diamond, it is softer, opaque, and forms six-faced crystals.

Dr. Alterthum and his co-workers heated a graphite cylinder about five and a half inches in length and an inch and a half in diameter, the thickened ends of which were set in copper electrodes, by means of an electric current. The various temperatures attained were measured at the middle of the cylinder through an opening. It was definitely determined that some degree of melting actually occurrend within the bore of the cylinder, and the melting point was determined as about 6300 degrees Fahrenheit.

SMELTER ELIMINATED IN NEW MINNESOTA IRON PROCESS

A process eliminating the smelter from the process of changing iron ore into steel and employing the direct reduction process of iron ore to iron without smelting has succeeded in American laboratories, is now in use by a company at Oviedo, Spain, and is being perfected at the University of Minnesota Mines Experiment Station with a view to its introduction at the northern Minnesota mines.

Low grade ore, containing 30 to 45 per cent. iron, and low-grade fuel, such as North Dakota lignite, can be used in the process, according to specialists at the Minnesota station. Large savings will be effected, first, by using the cheap fuel, and second, by eliminating the shipment of the large percentage of waste matter that must be moved as part of low grade iron ore.

The ore is placed in one end of a long, rotating tube and the fuel, in gasified form, is forced into the other. A temperature of 1,800 degrees Fahrenheit, is maintained, and air is excluded. The fuel burns by combination with the oxygen of the ore. When combustion has been completed only silica remains as a foreign substance, mixed with the metallic iron, and the iron is separated from the silica by magnetism or some other physical process. The temperature at which this takes place is not sufficient to melt the ore, and it is unchanged in structure when taken out, although its color has changed from red to black. The metallic iron is then agglomerated into briquets by pressing, so that it will be easier to handle.

It is claimed that perfection of the process on a commercial scale will provide the most important method yet developed of utilizing the low grade ore of the Minnesota and Michigan ranges, estimated to exceed 1,000,000,000 tons, of which almost none is now used in the iron and steel industry.

TINY SNAIL CAUSES CUT IN SUGAR CROP

Discovery that a small snail causes the root-rot disease, which has almost wrecked the sugar growing industry of Louisiana is announced by Dr. E. W. Brandes, plant pathologist of the U. S. Department of Agriculture. Hitherto the mollusks, to which order the snails belong, have remained unconvicted as crop criminals.

Dr. R. D. Rands of the Office of Sugar Plant Investigation, however, found that Zonitoides arboreus, a snail so tiny that it easily travels through the tunnels made by earthworms, attacks the cane roots. As many as 150 of these little snails have been counted about the roots of a single plant. In their attack they leave minute cavities which are invaded by microorganisms from the soil. These latter complete the injury and often kill the plant.

It is estimated that there is a reduction in crop tonnage of at least twenty per cent. directly traceable to the subterranean attack made by these snails whose sweet tooth is literally cutting off the Louisiana cane industry at the roots.

IOWA ASTRONOMER SETS WATCH BY STARS

If you are out of doors on a clear night, and your watch has stopped, you can set it to an accuracy of within 15 minutes of the correct time by looking at the northern sky. Of course, the astronomer always finds his time by stellar observations, but this gives him star or sidereal time, and complicated tables are necessary to change this to the solar time which is in common use. By a method recently developed by Dr. Charles C. Wylie, assistant professor of astronomy at the University of Iowa, with the cooperation of Dr. W. W. Merrymon, of Bloomfield, N.J., approximate solar time may be found from the stars with relative ease.

"Consider the northern sky as a huge clock face," says Dr. Wylie, "with the Pole Star as the center and the Pointers of the Dipper as the hour hand. The numeral six will be directly below the Pole Star and twelve directly above. Then read the indicated time. With a little practice this can be done to the nearest quarter hour. To this figure add the number of months that have elapsed since January first, to the nearest quarter month; double this, and subtract the result from sixteen and a quarter. If the result is more than sixteen and a quarter, subtract this result from forty and a quarter. This answer is the time in hours P.M.

As an example, take an evening late in September. The pointers are in the position of a clock hour hand at seven o'clock. Eight and three-quarters months have elapsed since New Year's day, which is added to seven, making fifteen and three quarters. Doubled, this is thirty-one and a half, which, subtracted from forty and a quarter, gives eight and three quarters, or 8.45 p.m. This is solar time and, of course, does not take daylight saving time into consideration.

Great Britain, Germany, Canada and the Scandinavian countries buy about five-sixths of all American apples exported.

The discovery of a hitherto unknown race of people on the river Pura in Western Siberia has just been announced by the Russian Academy of Sciences.

LOWELL OBSERVATORY DEVOTED TO MARS

By James Stokley,
Science Service Staff Writer.

Whenever one mentions the Lowell Observatory, he thinks first of investigation of the planet Mars, for this institution has probably watched the warrior's planet over a longer period and more carefully than any other in the world. Last summer Mars was closer to the earth than it had been for many years, and in the period from the spring of 1924 to July of this year, when the planet reached a line with the sun, and was lost to view, hundreds of drawings, and tens of thousands of photographs were made with the 24 inch telescope, chiefly by Earl C. Slipher. These show seasonal changes, doubtless similar to what would be observed on the earth itself from a like distance; clouds, which appeared, moved across the Martian surface and disappeared, like terrestrial storms, and also those strange dark, straight markings which have been called the canals and over which so much controversy has waged.

Many astronomers, some of great repute, have expressed the opinion that these are mere optical illusions, and that those who claimed to have seen them were mistaken. To anyone who has paid a visit to the Lowell Observatory and has had the pleasure of seeing Mr. Slipher's actual photographic negatives on which the "canals" distinctly show, such a view is unthinkable. The markings are there, but whether or not they indicate the presence of intelligent life is another and still undetermined question.

Direct photography and visual observations of Mars are not the only methods used by the Lowell astronomers last summer, for with the cooperation of the U.S. Bureau of Standards, accurate measurements were made for the first time of the amount of radiation from the planet, and from this it has been possible to judge accurately its temperature. This was done with a very delicate instrument known as the Coblentz radiometer. Last summer Dr. Coblentz, and Dr. C. O. Lampland, of the observatory staff, worked on this problem, and since that time Dr. Lampland has continued the research, applying the radiometer not only to Mars, but to Mercury, Venus, Saturn, Jupiter and Uranus as well.

The instrument is used with the observatory's reflecting telescope, which has a mirror 40 inches in diameter to gather the light from the planet. They have found that the Martian temperature is surprisingly high, as much as 60 degrees Fahrenheit in summer. This is of particular interest because many astronomers have supposed that because Mars is so many millions of miles farther away from the sun, our common source of energy, than we are, its temperature would be continually below the freezing point of water.

However, the earth retains only a little over half the radiation that it receives, while Mars absorbs about 85 per cent. The study of Mars has now ceased temporarily, but next year, it will be resumed, when the planet, though not as close as in 1924, will be higher in the sky, and in a better position for observation.

Meanwhile, Dr. Lampland is studying the other planets. Jupiter, he finds, gives practically no radiation that can be detected with the instrument, while Venus most surprisingly, radiates strongly from the dark portions as well as the bright. With this planet, which now shines brightly low in the western sky just after sunset, the problem is complicated, because we do not see the surface. It is perpetually covered with clouds, and we do not yet know how far we can penetrate through them.

CLAIMS WORLD CULTURE EXISTED 5000 YEARS AGO

That the East and the West met as long as 5,000 years ago and that a fairly identical culture extended at the end of the stone age from Sicily in the Mediterranean through Egypt, Greece, Mesopotamia, Southern Russia, and China as far as the Pacific Coast is the claim of the Swedish archeologist, Prof. J. Gunnar Anderson, who recently returned to Stockholm after serving eleven years as official mining adviser to the government of China

In cooperation with the Chinese authorities, for which he has the highest praise, he has explored the prehistoric cities of northern China, and after dividing his finds equally with the University of Peking, he has sent home during the past few years no less than 2,200 cases containing fossils, as well as contents of graves, chiefly pottery articles, which show that the inhabitants of China about 3,000 B.C. practiced virtually the same arts as did the peoples living in southeastern Europe and southwestern Asia.

Until Prof. Anderson began his excavations the easternmost point at which traces of this common European-Asiatic culture had been found was at Anau in Russian Turkestan, but now they have been located within 30 miles of the Pacific coast of China as well as in southern Manchuria.

It was in 1914 that Prof. Anderson obtained leave from the University of Stockholm to become adviser to the Chinese government and from 1915 to 1919 he was occupied chiefly with technical geologic work in locating mineral deposits. At the same time he observed the opportunity for archeological explorations and in 1918 he obtained the necessary permits. Part of the expenses, amounting to more than $100,000, have been paid by the Swedish government and part by a Swedish China Committee of which the Crown Prince of Sweden is chairman.

ULTRA VIOLET LIGHT AFFECTS INSULIN

That exposure to the ultra-violet rays first increases and then destroys the potency of insulin, is the report of Drs. M. M. Ellis and E. B. Newton, of the University of Missouri, to appear in the American Journal of Physiology.

An accepted grade of commercial insulin was exposed to the action of ultra-violet rays from a powerful mercury vapor lamp for periods of time up to 48 hours. The insulin was exposed in an atmosphere of nitrogen in order to eliminate free oxygen and ozone, for it has been shown that insulin is destroyed by oxidation.

It was found that exposures for more than four hours destroyed the power of insulin to reduce the sugar content of the blood and the longer exposures even produced an opposite reaction, increasing the sugar content. On the other hand, exposures of less than four hours seemed to increase the potency of the insulin, adding to its power to reduce the concentration of blood sugar.

A monument to Robert Fulton, American inventor of the steamboat, is to be erected in a small French town where he conducted tests with a miniature steamboat in 1802.

DENIES ANTIQUITY OF MAN IN FLORIDA

The opening gun in what may develop into a scientific battle over the human relics recently found in Florida has been fired by W. H. Holmes of the Smithsonian Institution. Mr. Holmes challenges the claims of these remains to great age, and characterizes the idea that human beings have existed on this continent for a long period of time as "the antiquity phantom in American archeology".

The Florida finds, Mr. Holmes declares, were all made too close to the surface to belong with any certainty to the Pleistocene or early post-Pleistocene times, when the ice sheets were disappearing from the northern parts of the continent. Neither does he regard as conclusive the finding of broken parts of rough instruments associated with the bones of extinct animals. He points out that Indians have inhabited this region for many centuries, and he believes that they made use of these fossilized bones as they did of any other conveniently-shaped pieces of stone and bone. Hence a stone implement could easily have been left among the fossils where an Indian was "mining" them.

The rough and unfinished condition of the chipped stone tools found with the fossils, Mr. Holmes states, does not necessarily indicate their great antiquity. He points out that Indians and all peoples who use stone tools do not bring all their work to the finest finish at their command, and that the rough and half-finished tools would be the ones they would be most likely to use in digging operations.

When questioned regarding the recent finding of a crushed human skull associated with the Florida fossil layers, Mr. Holmes stated that in fairness to the discoverers he prefers to withhold comment until their report appears, and to examine the evidence at that time.

NITROGEN FIXATION STILL A PROBLEM

Scientists are still on the grand nitrogen hunt. It isn't that nitrogen is so very rare or even hard to get, for the air is full of it and it is relatively easy to separate it. But it is that this gas, which is absolutely indispensable to modern agriculture and industry, is hard boiled. It has to be civilized before it can be used and it is only after it has been persuaded to associate with other substances that it is of any use to man. This is the "nitrogen problem" that physicists and chemists gathered at Chattanooga for the forty-eighth annual meeting of the American Electrochemical Society were so much concerned over.

The electrical arc process of "fixing" nitrogen has been a commercial success in Norway but the cost of production is too high, claims Dr. Sebastian Karrer, chief of the physics division of the Fixed Nitrogen Research Laboratory, Washington. He has estimated that only two and a half per cent. of the total energy consumed in this process is resident in the nitric oxide formed, but says that it is possible to increase this yield when the process is better understood.

Key West, Florida, is the only weather bureau station in the United States where frost has never been registered.

SCOPES TO STUDY GEOLOGY AT CHICAGO UNIVERSITY

John T. Scopes, the young science teacher of Dayton, Tennessee, who was the defendant in the famous test case of the Tennessee anti-evolution statute, will begin his graduate study at the University of Chicago at the opening of the fall term, specializing in geology, it is announced by Dr. Frank Thone of Science Service, who is acting as treasurer of the scholarship fund being raised by the scientists of this country in recognition of Mr. Scopes' services. Mr. Scopes, who has been at the home of his parents in Paducah, Kentucky, since the close of the trial, has had several leading American universities under consideration, but finally selected the Chicago institution.

Mr. Scopes, with the modesty and reticence that has characterized him from the beginning of his trials, had no statement to make, other than that he was very anxious to begin his graduate training, so that he might the sooner become better qualified to do his bit in advancing the cause of science.

Commenting on Mr. Scopes' decision, Dr. Thone remarked that since the young scientist is especially interested in geology it is in a way quite appropriate that he should begin his graduate work at the University of Chicago, since two Chicago professors, T. C. Chamberlin and F. R. Moulton, have revolutionized modern concepts of the evolution of the earth itself with their planetesimal hypothesis.

The Scopes Scholarship Fund, Dr. Thone stated, is already about one-third complete, although its collection was started in the summer, when most scientists are away from their homes. Thus far, indeed, laymen interested in the cause of science have contributed the larger part of the sum received; the generous response of persons outside the field of science and not under any immediate threat of loss of position or of legal penalty from laws similar to the Tennessee statute has quite surprised the scholarship committee.

WEARABILITY OF STEEL TESTED ELECTRICALLY

How different kinds of steel will wear under all sorts of conditions can be tested accurately in the chemical laboratory. Dr. H. Beeny, a metallurgist from Sheffield, England, who spoke before the recent American Electrochemical Society meeting at Chattanooga, told how he used the method to test the effect of manganese in the corrosion of steel.

A piece of steel and a piece of gold, connected by copper wire, were immersed in a weak salt solution, and the corrosion taking place on the steel set up an electric current which was measured. Dr. Beeny claims that corrosion in the air as well as corrosion in a solution is never "purely chemical", but electrochemical.

Iron, copper, nickel, zinc, lead, and tin are all shown to exist in the sun by means of the spectroscope.

Venus is both cold and slow. Astronomers claim her day is as long as her year, and her daytime temperature just above freezing.

TABLOID BOOK REVIEW

PHASES OF MODERN SCIENCE; by Sir Oliver Lodge, Sir Joseph Thomson, Sir William Bragg, Sir Ernest Rutherford, Dr. F. W. Aston, Sir Frank Dyson, and others. 232 pages. London: A. & F. Denny, Ltd., 1925.

The list of contributors to this little volume, which was published in connection with the Science Exhibit arranged by the Royal Society of Great Britain at the Wembley exhibition, appears like a list of the leading names in British science. With each one contributing an article on the field in which he is one of the leading authorities, the entire book forms an invaluable compendium of the latest work in science, and which so often does not get into a form available to a wide circle of readers until long after it is completed.

Sir Oliver Lodge's contribution on "Radiation" is the first in the book, and illustrating it is a very useful chart showing the complete electromagnetic spectrum, ranging from the short X-rays to the longest radio waves and the still longer waves of alternating currents. Sir Joseph Thomson writes on "The Electron", which he discovered, and Sir William Bragg tells of the work in which he and his son were pioneers, the study of crystal structure by X-rays. But other sciences than physics are represented, for example, Sir Napier Shaw, the British meteorologist, writes on "The Circulation of the Atmosphere", and Sir Arthur Smith Woodward on "The Human Brain". In fact, the 23 articles cover, as the name implies, practically all the "phases of modern science", and the book can be heartily recommended to anyone who wishes to know of them. The easy, non-technical style, of which the British scientists in general are past masters, makes the book easily comprehensible to the layest of lay readers.

ARCHEOLOGICAL INVESTIGATIONS IN THE ALEUTIAN ISLANDS; by Waldemar Jochelson. Washington, Carnegie Institution, 1925.

Delayed by war and revolution, this book now gives to the public for the first time the result of Dr. Jochelson's remarkable investigations of the Aleutian Islanders under the auspices of the Imperial Russian Geographical Society in 1909-10. It critically examines previous data on these people and rather definitely demonstrates their close cultural relationship to Eskimos. The author, however, disclaims having completely cleared up the Aleut mystery. In 1916, the original manuscript received the Akhmatoff prize of the Academy of Sciences of Russia.

Establishment of a trans-arctic Zeppelin airship line between Amsterdam and Tokio is under discussion in Russia.

About 85 per cent. of the farm houses in the United States are still heated by stoves.

The sea pasturage of green plants eaten by many fish shows greatest vigor and abundance in later winter and spring just as land pasturage does.
