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(Editors: Science Service is able to give you in this bulletin in addition to new features, stories on the most important addresses and papers that will be delivered at the largest chemical meeting ever held in America. Please note and follow release dates.)

FIND VITAMINES IN MILK AND EGGS DEPEND ON FEED

(By Science Service)

Release, Thursday afternoon, September 8.

New York, September 8.- It is not safe to assume that all milk and all eggs are satisfactory unfailing sources of vitamins, Prof. J. S. Hughes, J.B. Fitch, and H. W. Cave of the Kansas State Agricultural College declared at the American Chemical Society meeting here today that the vitamin content of milk or eggs is determined largely by the quantity of vitamins in the feed given the cows or hens producing the milk or eggs.

They found that although a cow receiving dry feed low in vitamins may give a fairly abundant supply of milk, it is of such poor quality that if it is fed to her calves they will become blind and die.

In other experiments they discovered that eggs of low vitamin content laid by hens fed on low-vitamin food produce chicks that are not strong and vigorous. This fact, rather than the commonly-blamed methods of incubation, may account for a large portion of the annual loss of half the eggs that the poultryman sets each year. Probably 300,000,000 eggs out of the 600,000,000 set each year in this country fail to produce strong chicks, and this represents a loss of over \$12,000,000 a year.

These results indicate that as a rule the animal organism does not synthesize vitamins, but must obtain them from its food. If this is generally true, as seems probable from the experiments reported, it will not always be sufficient that the mother is nursing her baby, but she must be sure that she is obtaining sufficient vitamin-containing foods.

In the milk experiments it was found that the water-soluble or antineuritic vitamins and the fat-soluble vitamins were those that were lacking, but that the antiscorbutic vitamin content was sufficient.

THE CLOSEST APPROACH TO ISOLATING A VITAMINE

(By Science Service)

Release, Thursday afternoon, September 8.

New York, September 8.- The closest thing to a pure, identifiable vitamin has been obtained by Dr. Atherton Seidell, of the U. S. Public Health Service Hygienic Laboratory at Washington. At the meeting of the American Chemical Society here today, he told how after long research he had obtained

from brewers' yeast a compound that he believes consists of about half silver and half the illusive substance known as the water-soluble antineuritic vitamin.

This compound retains a large proportion, at least, of the vitamin properties of the yeast, while the other substances, separated simultaneously by the tedious chemical methods, do not contain the vitamin. But there has not yet been an answer to the question "What is a vitamin?" Dr. Seidell has attempted to separate the vitamin from the silver, and while he can remove the silver and get a crystalline product, it is found that this crystalline substance lacks the antineuritic properties that are possessed by the non-crystalline silver compound. He is hopeful that other methods of separation will give a vitamin substance that can be analysed, and labelled with a formulae just as the chemist has been able to do with most substances. That is what he is working on now.

Pigeons have been Dr. Seidell's assistants in his work. Vitamins can be recognized only by their effect of preventing some disease, such as polyneuritis or paralysis of pigeons, or beri-beri in man. The experimental compounds and polished rice, which contains no vitamins, are fed the pigeons, and if they remain in good health Dr. Seidell knows that his compounds contain vitamins.

Vitamins, or the lack of them, began to bother people's minds only a little over a decade ago. At that time investigations were made of the disease beri-beri, which occurred among people who consume rice as their chief article of diet. It was found that the disease could be prevented by adding to the polished rice the polishings or surface layers of the grain which were removed by the modern milling methods just introduced.

That the lack of something could make a person sick was a new idea. People had grown to believe that if they kept out of the way of germs, they would be safe. Now three well-characterized vitamins are differentiated. They are the water-soluble antineuritic vitamin, which Dr. Seidell is attempting to isolate, the fat-soluble, growth-promoting vitamin, and the antiscorbutic vitamin, which occurs in fresh cabbage, orange juice, tomatoes, etc., and prevents scurvy.

INSECT-EATING PLANTS DIGEST
THEIR PREY LIKE HUMAN STOMACH

(By Science Service)

Release, Thursday afternoon, September 8.

New York, September 8.- How insectivorous plants entice, trap, and digest their prey was told at the meeting of American Chemical Society here by Dr. Joseph S. Hepburn of the Hering Laboratory, Hahnemann Medical College of Philadelphia, who, with E. Q. St. John of the Philadelphia Clinic Laboratory and Frank H. Jones, of Wilmington, Delaware, has been studying these plants.

They have found that the traps of these plants contain digestive ferments that are very similar to those that occur in the human stomach. This is their story of the way in which the pitcher plant living in a bog, lures and devours unsuspecting insects.

"Glands on the lid and the outside of the pitcher pour out a nectar which attracts insects. As the insect sips the nectar, it gradually approaches and finally crosses the rim which forms the top of the pitcher. It now comes upon the extremely smooth lining of the upper zone of the pitcher, loses its foothold, and plunges downward. The insect falls into fluid the plant pours out and sinks in a remarkably short period of time. Should an insect be able to make the attempt to crawl up the lining of the lower portion of the pitcher,

downward-pointing hairs cause it to fall back into the liquid. "

Dr. Hepburn and his associates found sugar in the nectar. They detected in the pitcher liquid a digestive ferment which, in some species, resembled the pepsin of the animal stomach. In other species, it resembled trypsin which causes digestion in the animal intestine. The liquid was found to exert its digestive power when removed from the pitchers and tested under the proper conditions in the chemical laboratory. The absorption of the products of digestion by the pitcher walls was demonstrated in several elaborate series of experiments. Certain bacteria grow in the open pitchers containing prey; and these bacteria were shown to possess digestive power and to aid in the digestion of the prey.

The larvae or maggots of certain flies live in the pitchers and obtain their nourishment from the prey. These larvae were shown to be protected by anti-ferments from the digestive action of the pitcher liquid in exactly the same manner as tape worms are protected from the action of the digestive fluids of animals.

"The pitcher plants doubtless possess this power to capture, digest, and assimilate insects, in order to satisfy their requirement for nitrogenous food, for such food is present in extremely small amount in the bogs and is relatively abundant in the bodies of the insects," Dr. Hepburn said.

CAN THE CHEMIST MAKE FOOD
AND FUEL WITHOUT PLANTS?

(By Science Service)

Release, Friday, September 9.

New York, September 8.- When man learns the secret of the leaf and finds out how to make sugar, starch, and cellulose, by sunshine without the aid of plants, we shall enter upon a new era of chemistry with surprises and achievements equal to those that have marked the last half century of chemical history, Dr. Leo H. Baekeland, honorary professor of chemical engineering of Columbia University, and inventor of "Bakelite", predicted in an address at the international meeting of the American Chemical Society and the Society of Chemical Industry of Great Britain here this afternoon.

"The photochemical action of the sun rays under the influence of the chlorophyll, or green matter of the plant leaves, brings about the most subtle creative chemical synthesis," Dr. Baekeland explained. "Carbon dioxide, a product of combustion, one of the ultimate destruction products of plant or animal life, combines with water under the action of sunlight. The first, or one of the first products of this synthesis is formaldehyde; the latter, in its turn, inaugurates a succession of further chemical syntheses which result in the formation of sugars, starch, cellulose, and other carbohydrates. No sun, no photochemical synthesis, no crops - no life! So that, after all, the whole living world is dependent upon a delicate photochemical reaction. Starvation on one hand, or abundance of crops and foodstuffs, on the other, all within the range of photochemistry."

"In the same way, our vast coal beds and our petroleum wells and our natural gas, are merely the result of light energy stored up from the plant or animal life of former geological periods. This, in itself, ought to impress us with the enormous possibilities of photochemical synthesis. And yet, here is a field where the scientist or engineer has accomplished next to nothing. In the utilization of this marvelous energy, we have not gone much beyond the art of making photographs. "

"Where is the Faraday, the Ampere, the Leonardo da Vinci, or the Archimedes who shall show us how to use the sunrays for charging our electrical storage batteries, or who will teach us how to harness the photochemical action of sunlight, or to emulate nature in her delicate synthesis of plant life? Who will utilize this delicate method instead of our hitherto brutal processes

of synthesis. Nature in her methods of plant life synthesis does not treat with boiling solutions of alkalies or strong acids; she uses no high temperatures nor strong electric currents. If we want to be successful in this direction, we shall have to utilize equipment possessing large exposed surfaces similarly to the leaves of plants. We may have to operate in rather dilute solutions instead of the concentrations which are ordinarily used in our present methods. We may have to find means for rapidly separating the formed products as fast as they accumulate. We may be compelled to work within narrow ranges of temperature, perhaps not exceeding those outside of which plant life stops."

IMITATION OF CHEMISTRY OF LIFE
WILL OPEN VAST NEW FIELD

(By Science Service)

Release, Friday, September 9.

New York, September 8.- The chemical manufacturer of today uses expensive labor, expensive raw materials, and costly sources of high potential energy such as coal, oil, and waterpower, to produce the finished products of commerce, but when it is possible to understand and utilize the chemical methods like those of the plant and animal organism, chemical technology will be an entirely different proposition from what it is now. This is the belief of Sir William J. Pope, president of the Society of Chemical Industry of Great Britain, expressed in an address before the joint meeting of that society and the American Chemical Society here this afternoon.

"We must foresee the advent of entirely revolutionary consequences which have wide bearings upon human affairs. The task of the chemical manufacturer has generally resolved itself into the conversion of specific raw materials, with the aid of expensive human labor and the use of coal, oil, water-power or other costly source of high potential energy, into finished materials marketable at an enhanced price which includes the cost of labour and energy. In only a few instances has the technologist been able to avail himself of the activities of the living organism in the manufacture of his product; and in these, such as the production of alcohol, acetic acid, glycerol, and acetone by fermentation, labour and fuel have generally to be introduced as costly auxiliaries. When we possess full working details concerning the plant-leaf process for converting carbon dioxide and water into formaldehyde and oxygen by utilizing the sun's energy, when we can make indigo and quinine by the identical methods adopted by the plant, chemical technology will be an entirely different proposition from the one which it now represents," he said.

"It seems plain that modern science is called upon to find means for curtailing the expenditure of high potential forms of energy as human labor and mineral matter. The solution of this problem must come from the proper utilization of the radiant energy which comes to us from the sun. We require efficient methods for transporting solar energy from the tropics for use in our more temperate climes. It is perfectly possible that the scientific study of oil-bearing plants in tropical regions may lead to such improvements in yield and cost of production that vegetable oils will replace the ordinary fuels, coal and petroleum now used the whole world over."

CHEMICAL ADVANCES WILL
COMPENSATE WAR LOSSES

(By Science Service)

Release, Friday, September 9.

New York, September 8.- "Intensive development of chemistry probably by the control and utilization of the phenomena of catalysis, is the best hope for a speedy return of the general prosperity which has been destroyed by the war," declared Prof. Wilder D. Bancroft, of Cornell University at the Intern.

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tional meeting of chemists here this afternoon.

"As there is no territory to exploit in replacing the material losses of the war, the chemist must develop methods of decreasing costs and increasing efficiency," he said.

"The most promising way of doing this is by a better utilization of the possibilities of catalytic action. As you know, a catalytic agent is one that in some way speeds up a reaction without necessarily being changed itself. Speeding up a reaction means increased output in the same time and perhaps the possibility of using a cheaper raw material," Dr. Bancroft adds. "But we do not know as yet how a catalytic agent acts."

"The organic chemist is only just beginning to use catalytic agents with zest and we may expect at any time to hear of improved methods of manufacture. The problem of a future supply of motor fuel is a very serious one. Some believe that the solution lies in the hydrogenation of coal. Others think that a better yield of alcohol by fermentation will solve the problem. Still others hope to prepare some different combustible liquid from tropical vegetation and from cornstalks. I do not know which is the right solution, but all that have been suggested require the use of catalytic agents.

"If we could produce what is popularly known as cold light, equalling the firefly without adopting his methods, that would make possible an enormous decrease in the power necessary for lighting purposes. Cold light will come some day and we know enough now to predict that we shall make use of a catalytic agent to speed up the reaction which gives rise to the light. If we could cause the rain clouds which now pass tantalizingly over many of the arid regions to precipitate, we could increase the fertility and consequently the value of these lands to an unbelievable extent."

SCIENTIFIC RESEARCH WILL
MAKE NEW WORLD WE NEED.

(By Science Service)

Release, Friday, September 9.-

New York, September 8.- The application of science to all our processes and all our life and the ordered development of science and education will give us the new world that we must have to prevent the general unrest that is gripping the world, Dr. C. E. K. Mees, head of the research department of the Eastman Kodak Company, said at the international meeting of chemists held here last night by the American Chemical Society and the Society of Chemical Industry of Great Britain.

"Compare a typical American city with a Russian village of today and you can see the vast progress which has been produced by the application of science in the last few years," Dr. Mees pointed out. "Each great industry of the world today had its beginnings in some sort of fundamental research, and today, whether through the development of better processes of production or through devising of applications of the product that will aid its sale, the work of the laboratory is necessary for progress. The laboratory is the Intelligence Corps of industry as it provides the information on which decisions are made."

STUDY RAYS THAT RIVAL SUNLIGHT
IN CURATIVE POWERS

(By Science Service)

Release, Saturday, September 10.

Washington, September 9.- The sun, in addition to heating and lighting this planet sends down its so-called actinic rays, those of the violet and ultra-violet, which have beneficial effects in the treatment of some of our

bodily ills. But the sunshine cannot be obtained when and wherever it is needed. For this reason, scientists and physicians have been developing artificial sources of violet and ultra-violet rays which are like the sun in therapeutic action and which thus bring to suffering humanity one more simple means to aid in alleviating some of its ills.

"At the present moment, the mercury arc in a quartz enclosure appears to be the most promising device for producing ultra-violet rays," announced Dr. W. W. Coblentz, physicist and chief of the radiometry section of the Bureau of Standards at a meeting of the American Electrotherapeutic Association here tonight.

For some years Dr. Coblentz has been investigating these lamps to determine how closely they duplicate the beneficial rays from the sun. He has found that sunlight and the radiations from quartz mercury vapor burners have about the same total intensity of ultra-violet radiations, but the spectral quality of the two sources is entirely different. The quartz mercury lamp contains 15 per cent. more ultra-violet radiation of shorter wave length than are found in sunlight as transmitted by our atmosphere.

"But we know that sunlight has therapeutic powers, and hence it would appear that these very short wave lengths, found in the mercury lamp, which approach the X-rays in shortness are not absolutely essential in producing the curative effects," Dr. Coblentz pointed out. Other investigators have found that shorter waves are responsible for skin irritation and burning.

(Editors: This is the first of a series of four astronomical features that will arrive at your desk in the bulletin during the coming month. We want to know whether you like them, so that we can decide whether to continue the series for a longer time than this initial month.)

NEWS OF THE STARS

Watching the Behavior of the Planets in September.

By Isabelle M. Lewis,
of the U. S. Naval Observatory.
(Science Service).

By the end of September all the planets that graced the evening sky in the early spring and summer months will be found to the west of the sun before sunrise, having gradually departed from the evening sky during the summer. Venus, the first to leave the western sky, has been Morning Star since the last of April. It is now on the far side of its orbit as viewed from the earth and in the telescope shows the gibbous phase, resembling the moon between full and last quarter. On the thirteenth it will be in conjunction with Neptune. The latter planet is too faint to be seen without the aid of a telescope, however. Venus is, as always, the most resplendent object in the heavens.

Mars, also a conspicuous object in the heavens just before sunrise, is likewise on the far side of its orbit and so is below its average in brightness. On the fifteenth of September it is over 230,000,000 miles from the earth but its distance from us is now decreasing. Saturn and Jupiter the last to leave the evening sky are in conjunction with the sun on the twenty-first and twenty-second respectively. Neither of these planets, therefore, are visible this month, and will next be seen in the east before sunrise some time in October.

Mercury, though at its greatest distance east of the sun on the seventh and therefore in the evening sky, will have such a low altitude at sunset that it probably will escape observation. Uranus is now in the constellation Aquarius and as it is in opposition to the sun on August 31 it is most favorably placed for observation at the present time but as it is at best only a sixth magnitude star barely visible to the naked eye it can only be found with the aid of a star map and field glasses and when found is of no special interest to the observer.

The sun crosses the equator and autumn commences on September 23, 9:20, a.m. Eastern Standard Time.

(Editors: These short paragraphs can either be used as a daily feature, or they will come in handy as fillers.)

DO YOU KNOW THAT-

The lowest point of dry land in the United States is in Death Valley, California. It is 276 feet below sea level.

The Russian government coined ruble pieces of platinum in the year 1828.

The metal, zinc, in its various forms has several common names. The ore, zinc blende, is called "jack". Slab zinc until recently has been known exclusively as "spelter", while instead of saying "zincize", we say "galvanize".

The American Museum of Natural History, in New York, has a collection of wax models of different kinds of food, accompanied by explanations of their value in calories and other dietary properties.

DO YOU KNOW THAT-

Chaulmoogra oil, used for centuries in the treatment of leprosy, is obtained from a species of tree growing in Asiatic jungles that have rarely been penetrated by explorers.

"Transhumance" is the practice, common in parts of Europe, of transferring herds of cattle from the lowlands to mountain pastures in spring and bringing them back to the plains at the approach of winter. The journey is often performed by railway.

Great saving of fuel has been effected in blast furnaces by adding a small percentage of oxygen to the air used in the blast.

The number of swallows that have migrated during the summer months to England has decreased during the past four years, and because of the economic value of the bird steps are being taken to protect it and its eggs.

DO YOU KNOW THAT-

A well that emits a strong current of air from any small opening in its cover during a fall in the barometer is known as a "blowing well". Sometimes the orifice is fitted with a whistle, which thus gives a signal when the atmospheric pressure is falling, as before a storm.

An upward jolt experienced by an aviator, as if running over an obstacle, is described as a "bump", and air containing such irregularities, due chiefly to rising currents, is said to be "bumpy".

John Harrison, the inventor of the marine chronometer, received a reward of twenty thousand pounds from the British Government for his invention.

A British college has recently completed an industrial chemical laboratory in which medium scale manufacturing operations will be conducted not in the usual glass apparatus of the laboratory, but in metal apparatus such as is used in practical plants.

DO YOU KNOW THAT-

Carnotite ore, from which radium is produced in this country, is obtained from a desolate mountainous region of Colorado and Utah, scores of miles from a railroad. A gram of radium is obtained from five or six hundred tons of ore.

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The white alkali lands of Arizona can be reclaimed to large extent by leaching the soil, but the black alkali soils resist leaching tenaciously.

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The famous "river of doubt", which was explored by Col. Roosevelt, was named in his honor Rio Theodoro. By a decision of the Geographical Society of Rio de Janeiro its name has just been changed to Rio Roosevelt.

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Nearly everybody who has lost a limb or part of one has, at one time or another, the impression that the lost member is still there. After this impression has faded it can often be strongly revived by the application of an electric current to the stump.

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DO YOU KNOW THAT-

A waterspout recently measured from a British ship in the Indian Ocean was 4,600 feet high to the base of the overlying cloud. The column tapered from 500 feet wide at the junction with the cloud to 150 feet wide at the sea.

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Sparrows molest and persecute house-martins and this has been the principal cause of the decrease of this song bird in recent years.

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Home Economics students at the Oregon Agricultural College take a course in household management which includes taking care of two children.

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Diatoms, microscopic organisms inhabiting both fresh and salt water, have numerous industrial uses. Deposits of their cases or skeletons, laid down in past geological ages, constitute "diatomaceous earth," which is a valuable abrasive for metal polishes, scouring powders and tooth pastes.

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DO YOU KNOW THAT-

When the natives of Nauru, in the Pacific, go fishing they bring the fish home alive and put them in lagoons or small lakes in the hills. Every village owns a lagoon and every villager owns a portion of the water, fenced off with palm leaves, where the household supply of fish is kept alive until needed for food.

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Certain species of bacteria growing as parasites on the roots of higher plants have the power of extracting nitrogen from the air and producing nitrogenous compounds that are of value as fertilizers.

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India ink was invented by the Chinese about 1,200 B.C., and was made by mixing a very fine soot with a gelatine prepared from asses' skin.

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Excessive blowing of soil is sometimes as harmful a process as excessive erosion by water. The great dust storm of May 6-7, 1889, in the middle West, removed the soil in some places to a depth of 5 or 6 inches. A case is recorded from Australia in which a foot of soil was removed over an area of 100,000 acres.

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