SCIENCE NEWS

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PROTEIN FOOD FACTORS

THE discovery of the vital factors in food is progressing. To our knowledge of vitamins, calories, etc., science in the past decade has added information about the building stones or units of proteins, the amino acids. Protein is found in such foods as meat, bread, cheese, etc. But proteins differ very widely on account of the different proportions of the amino acids constituting them as well as the arrangements of the amino acids in the large protein molecule. By varying the amounts and positions of these eighteen amino acids like eighteen blocks of a puzzle it is possible to build a few million different kinds of protein.

One of the most interesting of these amino acids is that one containing sulphur, known as cystine. Nutritional chemists have shown repeatedly that this is a necessary constituent of the protein food of young growing animals where growth and maintenance of health and body function are to be established. This proves that this amino acid can not be synthesized in the animal body.

Some time ago Professor Carl P. Sherwin, of Fordham University, and coworkers proved this point by poisoning a dog with brombenzene. As this compound requires cystine for its detoxication it was thought that the dog might be able to manufacture cystine in this case of dire necessity. But the dog was unable to do so even when the experimenters furnished it with carbon, hydrogen, oxygen, nitrogen and sulphur as compounds with its food.

Professor H. B. Lewis, of the department of physiological chemistry of the University of Michigan, who has uncovered the chemical fate of cystine in the animal body has recently carried out an interesting experiment. Quoting a report to *The Journal of Biological Chemistry:* "It has long been known that cystine is contained in hair, nails, hoofs, horns and feathers in large amounts. Professor Lewis, in connection with R. H. Wilson, has carried out a most painstaking experiment in which he analyzed various samples of human skin and human hair, comparing them with sheep wool, feathers, rabbit hair, cat hair, dog hair and even tortoise shell.

"He finds that this amino acid, cystine, is exactly the same compound from any one of these sources, but that there is a decided difference in the proportion: human hair, fifteen and one half per cent; sheep wool, twenty-one per cent; feathers, seven to twelve per cent; rabbit hair, eleven to twelve to fourteen per cent; rat hair, fourteen per cent; cat hair, thirteen per cent; dog hair, nineteen per cent; tortoise shell, six and one half per cent. The most interesting part of this experiment is that sex, color and race have little to do with varying the content of cystine in human hair."

DINOSAUR EGGS AND ASIATIC HISTORY

THE discovery of the dinosaur eggs in the Shabarakh Usu Desert of Mongolia means much more to the world of science than the fact that they may now be viewed in a glass case in the dinosaur hall of the American Museum of Natural History. By means of the eggs the ancient climatic history of that part of the world may be read more easily. And as climate is always a basic factor in economic progress the prehistoric story of early animals and early man may more easily be deduced.

As Fredecick K. Morris, one of the geologists of the Central Asiatic Expeditions of the museum, explains, the dinosaur eggs form part of the evidence of the beginning of a gradual change in climate from the warm wet of lush, swampy country to desert aridity. The torrid swamplands were a paradise for the large dinosaurs. But with the gradual drying up of the country these giant reptiles, in spite of their size, found themselves unable to cope with the situation and slowly died out. The approach of aridity foretold the beginning of the end of the living conditions of the dinosaurs of that period. The swamps were replaced by upland conditions and arid to semi-arid climate and the giant reptiles by small, light, rather speedy dinosaurs. It was this smaller species that laid the eggs.

It had long been known that this change in climate took place with its resulting change in fauna. But the dinosaur eggs helped geologists to fix the approximate date of the beginning of this change, at least in Central Asia. And the eggs contributed this evidence by the manner of their preservation. They were preserved in sand. Such sand, so bedded, meant the encroachment of marching dunes on the rookeries where the dinosaurs nested.

The eggs, it was found, had been lightly crushed by a force so slight that it had not completely disrupted the inner lining of the shell under the hard outer shell. The outer shell had been cracked, but the fragments had remained in place, sticking to the inner lining which was evidently almost intact. Only one force could crack the eggs without breaking them and that was the gradually growing weight of sand blown by the wind. The weight of sand blown over the eggs would slowly become sufficient to crack the outer shell and puncture the inner lining without much displacing it. Grains of sand would sift inside the eggs through the punctures till the eggs were completely filled and were solid enough to withstand all further pressure without breaking.

The decision that the eggs were those of dinosaurs was reached by a process of elimination. Dinosaurs, being reptiles, laid eggs. But so did the birds and tortoises of that period. It was deduced, however, that the eggs could have been laid only by dinosaurs as the only skeletons of egg-laying animals found near the eggs were dinosaur skeletons and there were many of those. No bones of birds were found in that spot and none of tortoises except little fragments, while there were countless dinosaur skeletons. Prehistoric bird bones have been discovered in other places, while everywhere else in Mongolia tortoise bones have survived and their eggs have not, showing that where the creatures were present their bones

have remained. It is unthinkable that their delicate eggs should survive while their bones were destroyed.

Thus those eggs left so long ago by the female dinosaur were filled with sand, buried and lost. As ages passed they were fossilized. Found at last by man, they now point the way to still further knowledge of the history of the earth.

CAMOUFLAGE IN NATURE

THE principle of camouflage by broken color dates for its origin farther back than the late war. In fact, certain reptiles and amphibians have long had arrangements of broken coloring which appear as exotic on close view and conceal as effectively at long range as the most grotesquely painted battleship ready for war tactics.

Some of these strikingly marked creatures are on view in the new Hall of Reptiles of the American Museum of Natural History. Placed in natural settings, they illustrate the camouflage principle by melting into their background. To bring out more clearly the peculiar ability of the camouflaged animal to merge into the scenery, a solid colored specimen is placed beside each camouflaged specimen. Thus the vivid yellow splash down the back of a certain frog catches the attention, making one forget the outline of the frog itself, while a neighboring frog of solid green can be seen at once for just what he is. Likewise the coral snake is shown beside a green water snake in both the daylight and the dark. Being spotted red, black and cream, the coral snake shows up much more distinctly than his companion in the daylight group. But the brilliant creature is a nocturnal animal and in the dark his broken coloring makes him indistinguishable while the outline of the solid-colored snake can easily be traced. Another exhibit shows the happy effect of a light-colored belly in breaking up the outline caused by shadows on the ventral side of an animal. In whole-colored specimens these ventral shadows bring the animal's outline into conspicuous relief.

COFFEE DRINKING AMONG CHILDREN

How much milk and how much coffee did you drink at meals yesterday? This question has been put to 80,000 children of the first eight grades of school in and around Pittsburgh, with results which the investigators describe as "almost startling."

The survey was made by John C. Fetterman, of the Pittsburgh District Dairy Council; M. Lillian Conwell Shillinger, nutrition specialist, and R. Roy Irvin, of the Mellon Institute of Industrial Research. Results just announced show that the average city public school child, in this city at least, drinks 1.47 glasses of milk and .81 cups of coffee a day at meals.

"The average city parochial school child," the investigators state, "drinks .93 glasses of milk and 1.52 cups of coffee, the average county public school child 1.58 glasses of milk and .72 cups of coffee, and the average county parochial school child .89 glasses of milk and 1.37 cups of coffee."

Only a small proportion of the children drank neither milk nor coffee at meals. Comparatively few drank both milk and coffee at the same meal.

The teachers of the children were asked to classify their pupils according to whether they were good, fair or poor in scholarship. These marks were then compared with the beverages drunk by the children.

"There were more 'good' pupils among those who drank only milk than 'fair' or 'poor' pupils," the survey indicates. "On the other hand, there were more 'fair' than 'good' or 'poor' pupils among those who drank coffee exclusively or among those who drank neither, the one exception to this last statement being the city parochial school children, among whom there was a slightly greater number of 'good' than 'fair' or 'poor' pupils in the subgroups consisting of those who drank both beverages or neither."

Children of the better sections of the city averaged 2.13 glasses of milk a day and .31 cups of coffee, as contrasted with 1.19 glasses of milk and 1.10 cups of coffee among children of the industrial sections where laboring and foreign elements predominate.

THE VELOCITY OF SOUND IN LIQUIDS

THE blinking of a red neon light is the index by which physicists can measure accurately for the first time the speed of sound waves in liquids. This has been accomplished by Dr. John C. Hubbard and Alfred L. Loomis, working in the latter's private laboratory at Tuxedo Park, N. Y. It is one of the side products of the researches by Dr. R. W. Wood, of the Johns Hopkins University, and Dr. Loomis on "super-sonics," waves similar to sound waves, but vibrating many times too rapidly to be detected by the ear.

In the new apparatus, which will be described by the experimenters in *Nature*, and is called a "Sonic Interferometer," these same super-sound waves are used. A disc cut from a crystal of quartz, like that used in modern radio stations to keep the wave length constant, only much larger, furnishes the waves. This disc is placed between two metal plates which are connected to a vacuum tube also like that used in radio broadcasting. The tube furnishes a rapidly oscillating electric current. However, while two kilowatts of electrical power were used to run the tubes in the earlier experiments, the sonic interferometer uses only 50 watts, about the same amount of power as used by an ordinary electric light bulb.

When the current is turned on the quartz crystal oscillates, giving off waves which vibrate from 200,000 to 400,000 times a second and from an eight to five sixteenths of an inch in length in a liquid medium. The human ear can not hear sounds which are in faster vibration than about 20,000 a second. The middle C on the piano vibrates only about 256 times a second, and the waves from it are about four feet in length.

A vessel containing the liquid to be tested is placed over the vibrating crystal and the waves travel up through it. Immersed in liquid, parallel to the quartz plate is a metal disc which can be moved up or down by a very small amount. At certain positions of the upper disc, the waves from the quartz are reflected back so that they are exactly in step with the waves coming up from the bottom. In such positions the little neon lamp goes out. By measuring the position of the upper disc, the lengths of the

waves can be determined to within a twenty-five hundredth of an inch. The number of vibrations per second of the crystal is known, and so the speed of the sound waves can be measured with an extremely high degree of precision.

As a result of their investigations, Dr. Hubbard and Mr. Loomis find that the sound waves travel through pure water at a temperature of 60 degrees Fahrenheit with a speed of 4,850 feet per second. If the water contains one half of one per cent. of salt, the speed increases to 5,050 feet per second. Increasing the temperature of the pure water to 77 degrees increases the speed to almost the same figure. From previous measurements, the speed of sound in air has been determined at about 1,100 feet per second.

According to Mr. Loomis, this work opens a new field in studying liquids, for by no other method is it possible to measure so accurately sound speeds in them. From these speeds can be calculated the compressibility of the liquid and other important facts about its composition.

ITEMS

THOUGH chinaware and porcelain comprise one of China's gifts to the world, this famous industry has languished since the beginning of the republic, according to "China," a commercial and industrial handbook, just issued by the U. S. Department of Commerce. The patronage of the emperors did much to encourage manufacturers who took personal pride in the production of their porcelains, but, unfortunately, without this stimulus, the industry has declined. There were several imperial potteries under the old régime, the chief of which was founded 200 A. D. at Kingtechen in the Kiangsi Province. Exceedingly beautiful china is still made, according to Commercial Attache Julean Arnold, but it is difficult for tourists to make satisfactory purchases owing to the limited supply of pieces kept on hand. China, however, possesses not only the skilled potters but plenty of raw material in the shape of high quality kaolins and clays.

NORWAY and Sweden are planning to become independent of the rest of the world so far as their oil supplies are concerned. The coal mined at Kingsbay, Spitzbergen, has been found to be especially suitable for treatment by the German Bergius process for making artificial petroleum and a large plant near the mines is contemplated. A report received by the American Chemical Society also states that Sweden will use coal from the mines at Braganza Bay for oil production. The hydrogenation of coal as invented by Dr. Friedrich Bergius, the German chemist, produces gasoline, lubricating oil and an artificial anthracite coal from ordinary bituminous coal.

TWO hundred rare goldfish and fancy carp, a friendly gift from the Japanese Bureau of Fisheries to the U. S. Bureau of Fisheries, have been distributed among aquariums of this country as examples of what delicate and exotic creatures fish can be when they are bred for beauty rather than for food. A few of the fish have been retained for display by the U. S. Bureau of Fisheries. The Japanese fish were sent to this country in return for the American government's courtesy in sending whitefish to Japan. These whitefish have become established in Japanese waters, where they are expected to become a valuable food fish. The Japanese gift fish are from the famous center of carp culture, the village of Yamakoshomura. They are patterned in delicate red, black, gold, silver and opalescent colorings, and have long fluttering fins, a mark of great beauty in goldfish circles.

THREE great caves in a mountain of salt in Nevada have yielded relics of Indian miners who worked there as early as 1000 B. C., to an expedition headed by M. R. Harrington, of the Museum of the American Indian, Heye Foundation, New York City. The great natural salt mass stands near the town of St. Thomas, Nevada, in a desert where rain falls so seldom that it has remained for ages without dissolving, which would have been its fate in a monster region. Underground waters, however, have hollowed the caverns in its interior, and in these Mr. Harrington has found stone hammers with wooden handles, sandals of yucca fiber, carrying nets, and even corncobs, all perfectly preserved through the drying and antiseptic action of the salt. Most of the relics date since the beginning of the Christian era, but a carved club was found of a type used by the Basket-Makers, the forerunners of the present Pueblos, who inhabited the Southwest about 1000 B. C.

AN orchid farm in Panama, containing one of the most famous collections of the costly blooms in the world, has been presented to the Missouri Botanical Garden. It will be used as a tropical adjunct to the garden, according to the director, Dr. George T. Moore. To the 7,000 species included in the original gift orchids from all parts of the tropical world will be added. It is expected to become one of the most complete collections in existence. One of the great advantages of this tropical station will be its utilization as a sort of orchid hospital for the rescue of rare plants that have gradually succumbed to the adverse climate of Missouri. Some of these valuable plants have been sent to the Canal Zone to recuperate. Later, they will be shipped back to the United States.

DR. MIRIAM S. ISZARD, of the department of bacteriology at the University of Pennsylvania, reports that mayonnaise dressing, noted for its inability to "keep," can now be preserved as long as five months. Experiments in the bacteriological laboratory indicated that a spore forming bacillus was responsible for spoilage in mayonnaise. Since bacteria can not survive in an acid medium it was decided to try the effect of the addition of small amounts of lactic acid to the dressing. This acid is harmless from the point of view of health, and it was found that a small proportion would check the growth of the bacteria causing decomposition. It was used in preference to vinegar because it does not affect the taste of the dressing as would the amount of vinegar necessary to inhibit bacterial growth.