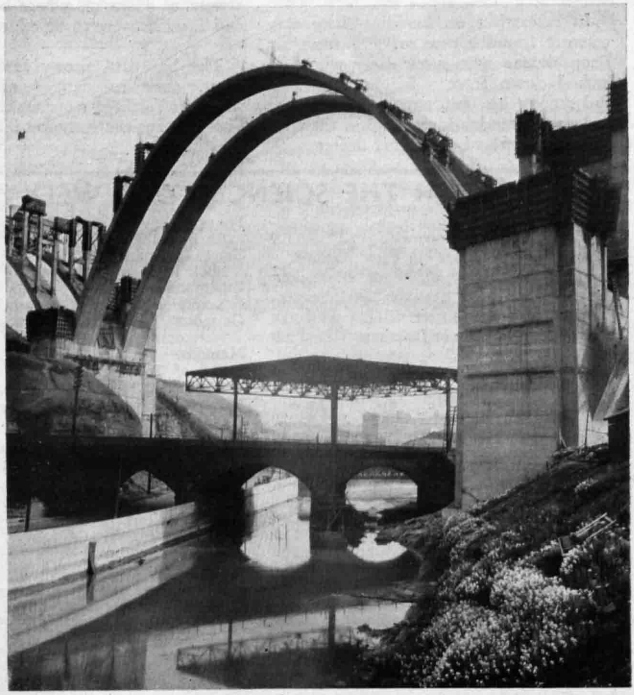
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



JANUARY 2, 1932

Arching Ribbons of Concrete

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SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

Road-building activities in this country give employment to 3,000,000 people, one million working on the roads and two million making materials and equipment.

How insects damage the potato crop is the subject of a new scientific moving picture, with slugs, beetles, and other pests as the villains of the piece.

The U. S. Government will pay almost $5,000 to move a giant magnolia tree in the course of the program for improving the Mall in Washington, D. C.

In researches on heredity there was recently found a case of a farmer in Pennsylvania who grew dizzy when he looked down from a height, and who had among his children, grandchildren, and great-grandchildren no less than 17 who also suffered from this defect.

Producing rare butterflies from pieces of common ones and selling the fake to collectors is a "racket" which has gained headway in Paris.

Circassian walnut grows in the Caucasus where the weather conditions are so rigorous as to gnarl and twist the wood fibers into beautiful patterns.

Snow creaks when it is too cold to melt under the pressure of footsteps, and the dry crystals slip over one another.

As early as 1611, the colony of Virginia set aside 10,000 acres for a University of Henrico, where both Indians and English were to be educated.

The beautiful snowy heron or little egret, once in danger of extinction when its feathers were fashionable millinery, is again a common bird in southern marshes.

WITH THE SCIENCES THIS WEEK

News From

THE SEASON'S LARGE SCIENTIFIC GATHERINGS

—is presented in this issue of the Science News Letter. Among the meetings reported are those of

American Association for the Advancement of Science	New Orleans
American Astronomical Society	Washington
Society of American Bacteriologists	Baltimore
American Statistical Association	Washington
Geological Society of America	Tulsa
Paleontological Society	Tulsa
Archaeological Institute of America	Richmond
American Chemical Society (organic symposium)	New Haven

MEDICINE

Prevention of Tooth Decay Accomplished for First Time

Quality of Saliva Found to Determine Whether Enamel of Teeth Will Break Down and Give Germs Entry

FOR the first time in history, dental caries or tooth decay has actually been prevented. This means that the end of toothaches and of rotting, decayed and infected teeth, with their attendant ills, is now in sight. The method found effective to prevent tooth decay in animals need only be applied to human beings.

This achievement, the result of ten years of work with hundreds of animals and representing an immeasurable boon to mankind, has been accomplished by Dr. E. V. McCollum, professor of biochemistry at the Johns Hopkins School of Hygiene and Public Health, and his associates, Dr. Henry Klein and Dr. H. G. Kruse. A preliminary report will appear in *Science*. The complete report will appear in early issues of the *Journal of Biological Chemistry* and the *Journal of the American Dental Association*.

Counteracts Acid

"The quality of the saliva is the important thing in determining whether teeth will decay and this is determined by the chemical composition of the blood," said Dr. McCollum.

The saliva, he has found, acts normally as a buffer solution so that acid cannot accumulate and break down the enamel of the teeth. When this enamel is damaged, germs that are always present in the mouth get a chance at the teeth and decay follows. The saliva, however, cannot act as a buffer solution, keeping the mouth at just the right state between acid and alkaline, unless it contains a certain proportion of phosphorus. There must be, in addition to a proper buffer quality for neutralizing acid formed by the fermentation of food residue, a proper calcium and phosphate ion concentration in the saliva in contact with the enamel to prevent disintegration of the surface molecules of that substance.

Phosphorus gets into the saliva from the blood. Blood gets its phosphorus from the foods eaten, specifically from such foods as milk, eggs, lean beef, beans and peas, which are rich in phosphorus.

Phosphorus is not quite all that is needed, however. Dr. McCollum and his associates found that no matter how much phosphorus is eaten in food, not enough of it will get into the blood and then into the saliva unless a certain amount of both calcium and vitamin D are also taken into the body.

It is not possible to say, Eat so many pounds of this or that food every day, Dr. McCollum pointed out. But plenty of the foods that contain these three substances and plenty of sunshine to insure an abundance of vitamin D will keep the phosphorus in the saliva up to the right level and thus prevent tooth decay or dental caries.

People with a "sweet tooth" will be delighted to know that they can eat sugars and starches in abundance, according to the Baltimore investigators, and still prevent their teeth from decaying, if they keep the calcium-phosphorus level of their blood right and get plenty of vitamin D from sunshine or cod liver oil or any of the foods that now contain it. Eating excessive amounts of starch, candy and sugar, tends to crowd out of the diet foods which are better

DR. E. V. McCOLLUM

—the Johns Hopkins University professor who has just won a ten-year battle against tooth decay.

constituted for the prevention of tooth decay and makes necessary a greater caution as to having the remainder of the diet of just the right composition.

Calcium-rich foods are milk; eggs; watery vegetables, especially spinach, lettuce, and cabbage; and to a lesser extent fruits. Vitamin D is the sunshine vitamin, occurring wherever the ultraviolet rays from the sun or from artificial light strike the fat, ergosterol. Vitamin D occurs naturally in fish oils, egg yolk, butter fat and whole milk. It has been put into certain other foods by an artificial process.

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CHEMISTRY

Non-Poisonous Alcohol Made In England from Sawdust

ALCOHOL made from wood—"real" alcohol, too, not wood alcohol—by an improved method in England, is declared commercially practicable where sawdust can be obtained at a dollar a ton or less, and a supply of 200 tons a day is available. The process, which will recover from 35 to 40 gallons of alcohol per ton of dry sawdust, was worked out by Dr. Harold A. Auden and Dr. Walter P. Joshua, of the Distillers' Company Research Laboratory at Epsom.

The process consists in forcing acidulated water, containing two parts of sulphuric acid per thousand, at a temperature of 180 degrees Centigrade and a pressure of twelve atmospheres, through sawdust packed in lead-lined vessels. Under these conditions nearly half of the sawdust is changed into fermentable sugars. The molasses thus obtained is fermented with yeast in the usual way to obtain the alcohol.

A preliminary treatment of the sawdust with superheated steam removes resins and other undesirable constituents.

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ASTRONOMY

Splitting of Primeval Star May Have Made Solar System

New Skyrocket Theory Holds Earth Was Born When Electromagnetic Winds Disrupted Mother Sun

A NEW THEORY of the formation of the solar system and the earth by the whirling of a great primeval star into two fragments, one the sun and the other its lost twin, was presented to science by Dr. Ross Gunn of the U. S. Naval Research Laboratory, speaking before the American Astronomical Society meeting at Washington.

The following consequences are implied:

1. There are thousands of other planetary systems in the universe, some of which may have life not unlike that on the earth.

2. The earth was born of a rather common occurrence in the heavens, not the rare accident of the collision of two stars.

3. The birth of the solar system resulted from a definite, orderly and evolutionary plan which was largely guided by electric and magnetic forces.

This new "skyrocket" theory of the origin of the earth is intended to supersede the Sir James Jeans-Dr. Harold Jeffreys version of the planetesimal hypothesis advanced by the late Prof. T. C. Chamberlin and Dr. F. R. Moulton, American scientists. This considers that a massive star came so close to the sun that it extracted the planetary system by tidal action.

Violent rotation of the mother star caused by thousand mile an hour electromagnetic winds blowing for millions of millions of years in its atmosphere finally resulted, Dr. Gunn concluded, in the splitting of the mother star when it rotated about once in six hours.

"The parent sun then broke up into two pieces," Dr. Gunn explained. "One piece became our present sun and the other piece went skyrocketing off through space toward an unknown destination."

The new theory will probably be called the Gunn skyrocket theory, with skyrocket used in a literal sense. Dr. Gunn explained that one face of each component star was far hotter than the other and that the hot face lost light energy and momentum much more rapidly than the cool one. This caused the star to shoot off through space propelled in just the way that the expelled gases of a skyrocket cause it to move.

The electromagnetic theory of stellar rotation was previously used by Dr. Gunn to explain the different rates of rotation of the sun at different distances from the equator. Previous theories attributed the rotation of the sun to its contraction as it radiated its matter away into space in the form of light.

The planets were formed, Dr. Gunn declared, by the cooling of small portions of the original mother star which were broken off by the tidal and centrifugal forces at the division. The same forces broke off the satellites or "moons" of the planets themselves.

Thus the entire solar system was formed in a very few days and at first it was compact in structure. The lost sun carried the new planets quite a distance from our present sun before its influence diminished.

Dr. Gunn pointed out that his new theory of the earth's origin may be reconciled with verses six and seven of the first chapter of Genesis in the King James version of the Bible, but he does not consider this to be of scientific significance.

By the splitting of single mother stars the multitudes of double stars that are very plentiful in the heavens were formed, Dr. Gunn declared. This process was similar to that which created the solar system but it did not continue quite so far. Dr. Gunn believes that his electromagnetic theory of catastrophic stellar spinning will solve other problems in astronomy.

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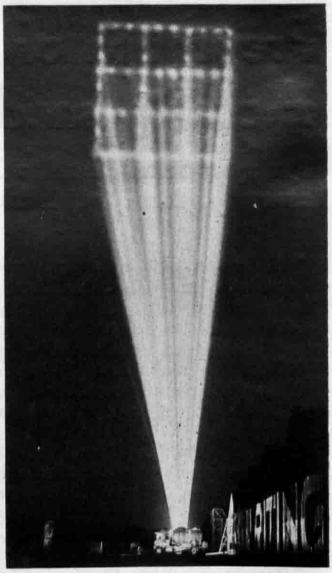

A CAGE OF LIGHT

—in which to ensnare airplanes at night; that is what a new form of searchlight invented by Major J. C. Savage of London, pioneer sky writer, might be called. Its light is broken up by a screen which throws a checkerboard design against the sky. Airplanes caught within the grid of light can be easily followed with the light and their height, speed and direction determined, it is said.

ASTRONOMY

New Stars Believed Limited To Few Definite Brightnesses

DESPITE the almost infinite number of stars in the sky, they are not of an equal number of brightnesses. Speaking at Washington before the meeting of the American Astronomical Society, Dr. Gustaf Stromberg of the Mt. Wilson Observatory declared that from a study he has made of 4,900 naked eye stars of different colors, he has found that values of the star's intrinsic brightness, or "candlepower," are grouped in a few definite values. Stars of a brightness intermediate between these values are either extremely rare, or absent.

"From the intrinsic brightness of a star one can compute the total amount of heat given out each second by the tremendous heating plant inside the star," he said. "Since this is equivalent to the total power output of the star,

it can be deduced that nature's stellar engines are so adjusted that they can have only certain definite horse-power ratings. There is evidence that if a star should accidentally have a forbidden horse-power rating, it becomes unstable and begins to pulsate, or may even explode, like a nova."

Ordinarily a star's intrinsic brightness, which the astronomer calls its "absolute magnitude," can be determined by measuring the star's apparent brightness, as seen in the sky, and its distance. Then one can calculate how bright it would appear from any given distance, that of the sun, for instance. There are only a relatively few stars for which accurate distances are known, so Dr. Stromberg has devised a new method of determining absolute magnitudes. To do this he must know the stars' apparent brightnesses, their motions towards or away from the earth, which are determined by the spectroscope, and their motions across the sky. From these data he can determine the number of stars within given limits of brightness.

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GENETICS

California Sheep Gives Birth to Sextuplets

A "LITTER" of six living lambs born to an ewe on the ranch of Dr. E. E. Brownell is the exceptional example of fertility in sheep reported to the *Journal of Heredity* by Prof. J. F. Wilson and D. W. Gregory of the University of California.

Twins among sheep are fairly common. It is estimated by officials of the Department of Agriculture that of 100 births in an average flock of sheep cared for under very good conditions, about 50 sets of twins might be expected. Once in a very great while there will be triplets. But births of numbers larger than three are extremely rare.

The ewe with this surprising record is a purebred Romney five years old. All six of the lambs were born living and normal, but the "peewee" of the lot died of pneumonia the day following birth. Their weights when two days old ranged from 4 to 7 pounds, the average for the flock being 10 pounds for singles and 8 to 8½ for twins.

Of the authenticity of this case there seems to be no doubt. The superintendent of the ranch, William R. Hosselkus, is a college graduate and known intimately by one of the professors making the report.

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MEDICINE

Germ Infection Within Body May Produce Mental Disease

Patient Sent to Hospital As One Hopelessly Insane Found to Be Suffering From Curable Physical Ailment

MENTAL as well as physical disease may be caused by poison from germs that have a stronghold in some part of the body, Dr. M. L. Townsend, Washington, D. C., physician, told members of the American Association for the Advancement of Science at New Orleans.

Many patients may have been given up as hopelessly insane and confined for the rest of their lives to institutions for mental disease, when searching physical examination might have revealed a removable physical cause for their mental ills, he suggested.

Physicians are used to looking for such a focus of infection in the tonsils or teeth or appendix as the cause of rheumatic or other so-called bodily ailments. They must also search for focal infections in various mental disturbances, Dr. Townsend advised.

He described the dramatic recoveries made by some of his patients when such foci of infection had been removed. A young man had been sent to the hospital for mental disease with the diagnosis of dementia precox, long regarded as an incurable mental disease.

"His behavior traits and mental manifestations fully justified this classification," Dr. Townsend said.

The patient's tonsils were enlarged and examination of his blood showed that there was a slight infection somewhere in his body. The tonsils and one tooth were suspected, but because of his mental state, removal of them was inadvisable. Instead he was given good hygienic care for six weeks and then increasing daily doses of a mixed vaccine. Within one week his mental condition had become quite normal, but the infection persisted as shown by the

NOT A BLACK ONE AMONG THEM

A "litter" of six bouncing lambs born to a ewe on the California ranch of Dr. E. E. Brownell. The occurrence is extremely rare and constitutes an example of exceptional fertility in sheep.

blood examination. Removal of tonsils and the doubtful tooth cleared up the infection. The mental condition continued entirely normal.

"He went to work, married and has been perfectly well and a hard-working man for three years and still is," Dr. Townsend reported.

A group of germs eliminates a toxin which has a partiality for a certain type of body cells, the endothelial cells, which it attacks, causing inflammation. Such an inflammation of endothelial cells is variously called rheumatism, growing pains, neuritis or what not, according to the particular group of endothelial cells affected, Dr. Townsend explained. His theory is that when these poisons attack the endothelial cells lining the tiny blood vessels of the brain cortex, they set up inflammation there that results in mental disease, instead of in growing pains. If the poison is present for only a short time, as is the case in typhoid fever or pneumonia, for instance, the cells are not permanently damaged or destroyed by it and the mental disturbance clears up quickly. But if the presence of the poison is unsuspected and continues for a long time, permanent damage to the tissues and consequent mental illness may result.

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THE DWARFS' FUNERAL FEAST

There is nothing "futuristic" or "modernistic" about the weird little toadstools that Cornelia Clarke posed in front of her camera. They are old, old. They are wizened little wood-dwarfs, gathered to feast luxuriously on four withered leaves. They were in the world before the earliest of now-forgotten "modern" artists were born, and when the last of them is buried they will feast again among the withered leaves on his grave. Not futuristic, not modern, they. They are dateless, they live in a world outside of time.

ECONOMICS

Money Collected Now Brings Creditors Greater Value

Great Britain's Debt to U. S., Though Reduced in Principal, Is Larger Than Originally, Prof. Fisher Tells Economists

WIDE-SPREAD liquidation such as has been going on in this period of depression does not have the intended effect of reducing debts but increases them in the sense of making every unpaid dollar more burdensome, Prof. Irving Fisher, Yale economist, told the American Association for the Advancement of Science at New Orleans.

Even the most discreet and conservative business men have greater burdens of debt forced upon them by the distress selling of enormous quantities of collateral and all other forms of security which deflates prices of things sold and wipes out currency, Prof. Fisher warned. Each remaining dollar becomes more valuable and harder to get.

Conscientious borrowers may find themselves carrying real debts far larger than they started with, although they have faithfully kept up interest payments and reduced principal. Prof. Fisher took Great Britain's debts to the United States as an example.

In 1925 Great Britain became bound to the United States in the sum of $4,600,000,000 and by punctiliously keeping up interest and reductions of principal now owes $4,425,000,000. It would seem that her debt has been reduced. But Prof. Fisher contended that due to the bloated dollar of today, Britain now owes us $6,700,000,000 in terms of the dollar of 1925, which is an actual increment of debt burden of 45 per cent. Each dollar of her debt has swollen at least 50 per cent.

"How would a farmer like his bushel basket to double in size after he has agreed to deliver a thousand bushels of wheat?" Prof. Fisher asked, arguing that the dollar fluctuates and is not a reliable standard of measure like the yard or ounce.

"If capitalism finds itself unable to clean the dirt of depression out of its very foundations, called profits, some form of socialism will devour capitalism," Prof. Fisher warned.

"It is an amazing fact that depressions swoop down upon humanity just when the world is rich in actual goods. The soil is productive, so are the mines and factories. Machines and methods are at the top notch of efficiency; men are as willing and as industrious as ever. There is more than enough of every good thing to go 'round; everybody is as fond of good things as ever; and nearly everybody is willing to work for them. Yet between the goods and the consumers is a chasm of emptiness that refuses to be bridged.

"What about the means of distribution? There are lots of bridges and the railroads that cross them are oiled. The ships and ship-canals are hungry for customers, who won't come.

"Some people allege that we are suffering from over-production. How do we know that goods are over-produced? Because there are more of them for sale than people will buy. Why will not people buy? Because they haven't the money? Why haven't they the money? Because they're not earning it? But now, just why aren't they earning? Because they are not producing? Men and machines are idle. But surely this isn't over-production! It sounds to me like under-production!"

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PLANT PHYSIOLOGY

Control of Environment Speeds Growth Ten Times

PLANT GROWTH indoors can be speeded up a thousand per cent. over that obtainable by ordinary hit-or-miss greenhouse methods, if exact scientific control of environmental factors is set up and maintained. How this was done with some little date palms in the laboratories of the Smithsonian Institution is revealed in the report of Secre-

tary Charles G. Abbot to the Institution's board of regents.

One of the research projects of the Smithsonian Institution is to learn more accurately the effects of such factors as light, temperature and moisture on the growth and behavior of plants. By using artificial illumination, regulated warmth and other environmental controls on little date palms, a growth was obtained that was tenfold better than the best they could do under ordinary greenhouse conditions. In fact, it was almost as well as young date palms do in the congenial desert climate of southeastern California.

Another plant that responded favorably to controlled environment was ephedra, a desert plant, the Chinese species of which yields a highly valuable drug. Under ordinary conditions of growth, this plant yields one cutting a year of the slender twigs that constitute its crop. But in the Smithsonian laboratories it grew so fast that it gave a doubled yield. Whether the increased yield is rich in ephedrin, the essential drug substance, has not yet been determined.

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EVOLUTION

Adaptation of Sea Crabs To Terrestrial Life Shown

HOW EVOLUTION repeats itself, widely divergent forms of animal life learning the same tricks at widely remote periods of time, was shown in an exhibit of shore life displayed by Prof. A. S. Pearse at the Carnegie Institution of Washington. Animal lines as diverse as fish, crabs and "pillbugs" are shown to have increasingly aquatic adaptations the more permanently they live in water, increasingly terrestrial adaptations the more they live on land.

The crab series is especially striking. Crabs that live always in deep water are the best swimmers, get their oxgen altogether with gills, have no better eyes than will serve them in their dim and turbid surroundings. Crabs that live most or all of their lives ashore have lost their swimming paddles and have even learned to climb trees; they have abandoned their gills partly or altogether, and their eyes are better developed than are those of their totally immersed brethren. Crabs that live just about or just below tide level, alternating between life at sea and life ashore, have adaptations intermediate between those of the seafaring and landlubber crabs.

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ZOOLOGY

Stars in American Flag Came from Bottom of Sea

Five-Pointed Fossil Stems of English Soil Inspired Stars In Washington Shield Which Later Entered the New Flag

ZOOLOGY, not astronomy, provided the five-pointed stars in the American flag and coat of arms. They came not from the heavens above, but from "the waters that are under the earth"; and they lay buried in rocks for geological ages before men found them and made use of their symmetrical design.

An exhibit of the ancient zoological basis for the American flag-stars, arranged by Austin H. Clark of the U. S. National Museum, is an attraction of much interest at the meeting of the American Association for the Advance ment of Science now in session at New Orleans. It shows the coat-of-arms of the Washington family, bearing the three "mullets," as the five-pointed star patterns were called in the language of heraldry. Beside it are shown a number of small white star-shaped bits of a limy substance. These are found on the surface of the ground in the part of England where the Washington family originated, as well as in other regions of the earth, and are known locally as "star-stones." Regarded in ancient times with superstitious awe, they were incorporated into the armorial bearings of the noble families on whose lands they were found.

But "star-stones" are no more stones than they are stars. They are really fossilized pieces of the stems of crinoids, or sea-lilies, animals belonging to the same great animal group as starfishes but less familiar to most of us. Mr. Clark, who is the author of a massive monograph on this zoological group, explains that in remote geological times great beds of these creatures waved on their long stems on the sea-bottom where now the midland shires of England are. Their matted remains were solidified into rock, which disintegrated into soil after the British Isles were raised above the sea. The bits of stem, with their five-pointed markings, were more resistant than the rest of the mass, and remained in the soil as "star-stones" after everything else had completely crumbled; and here they were seen and wondered at of men, and finally painted upon the shield of a chief, which later furnished the pattern for a new flag beyond the seas.

Mr. Clark draws a moral from this origin of the stars, which, like the ideals of the republic they represent, is an embodiment of the exaltation of the humble.

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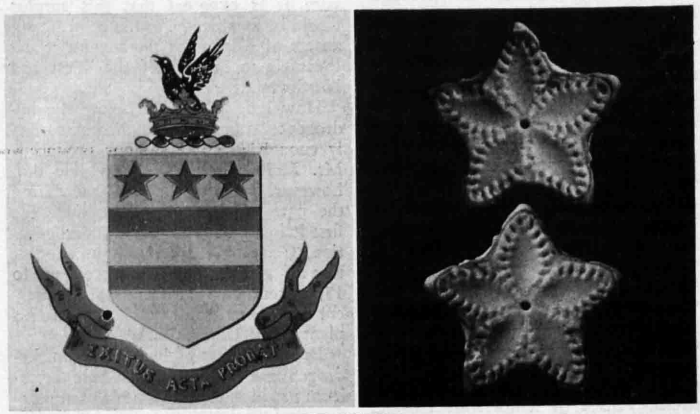

THE SHIELD

—of the ancient Washington coat-of-arms ("argent, three bars gules, in chief three mullets of the second"); with it, two sections of a modern crinoid stem, similar to the "star-stones" of the soil of England which were the originals of the "mullets."

PSYCHOLOGY

Mental Ability Increased After Period of Fasting

IF YOU wish to prepare to do your best at an examination or some other intellectual ordeal, it may pay to go without food for a while provided you take food again before attempting the mental work.

At least, so it would appear from experiments at the Universities of Chicago and Michigan in which three persons volunteered to go without food for 10, 17 and 33 days respectively. The results were reported to the American Association for the Advancement of Science by Dr. J. A. Glaze, of Kansas State Teachers College.

Starvation does not improve the mental processes during the actual period of the fast, but it does improve the steadiness of the hand and the ability to stand at "attention," Dr. Glaze told the meeting.

After the fast is broken, however, the persons who starved themselves were rewarded by greatly increased mental ability on all the tests taken. The improvement in performance over that before the fast was remarkable. Physically, also, they were much more fit.

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ENGINEERING

Concrete Ribbons to Carry Traffic of Great Highway

See Front Cover

THIN RIBBONS of concrete arching through the air, that will carry on a 42-foot wide pavement traffic of one of the country's chief east-west thoroughfares, the Lincoln highway, are skilfully depicted in this photograph of the George Westinghouse Memorial bridge nearing completion at East Pittsburgh.

The arches are more than half again as thin as those usually used. Their width is fourteen feet, and they are five feet thick at the top, or crown, and ten feet through at the ends, or springings.

Though it is surprising to the layman that such thin strips of artificial stone will even stand alone high up in the air, engineers find them sufficiently strong to carry not only their own weight but also that of the bridge above. And for such long spans as those of the Westinghouse bridge, thin arches are much better than thick ones. They are not subject to as great internal stresses caused by temperature changes as the deeper ribs.

The center span of this bridge, with a clearance of 460 feet and a height of 200 feet is the longest reinforced concrete arch in the country. The whole bridge, 1510 feet long, has five open spandrel, ribbed arches and will contain when completed 73,350 cubic yards of reinforced concrete and about 1850 tons of reinforcing steel.

As a memorial to George Westinghouse, pioneer in the electrical industry and founder of the Westinghouse Company, the structure spans a portion of this company's plant and two railroads in the Westinghouse valley to eliminate a five-mile section of road which, because of dangerous curves, steep grades and narrow city streets, has been called the worst spot from coast to coast on the Lincoln highway.

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CHEMISTRY

New Gasoline Process May Upset Sulphur Industry

THE NEW PROCESS of making gasoline by the hydrogenation of base petroleum products by which crude oil is made to yield more gasoline than is now economically obtained from it, may throw unintentionally another industrial monkey wrench into the smooth-running works of another industry, R. S. McBride, chemical engineer of this city declared before the Washington Chemical Society.

The new source of trouble lies in the fact that sulphur is an inevitable by-product of hydrogenation. If all the gasoline used in this country were obtained by hydrogenation one-third as much sulphur as the United States now requires would be made, Mr. McBride said. It is expected that this surplus would be as welcome to the present producers of sulphur as the present wheat excess is to farmers of the West and Northwest.

How long it will be before the hydrogenation process is applied extensively enough to affect sulphur producers, Mr. McBride could not say. He did, however, point to the fact that during the past two or three years, since the first industrial application of hydrogenation, Germany has brought its production of gasoline by this process up to 15 per cent. of what it uses. At the present time there is only one hydrogenation plant in the United States.

By the process of hydrogenation, hydrogen gas is passed over base petroleum products under very high temperature and pressure to force the formation of more useful petroleum products.

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IN SCIEN

PLANT PATHOLOGY

Corn Plant Afflicted With Hereditary Diabetes

CORN that is afflicted with diabetes —forming sugar in its tissues that it cannot use, and so much of it that the plants are seriously injured—was described before the meeting of the American Society of Plant Physiologists at New Orleans, by Prof. William H. Eyster of Bucknell University.

The condition is hereditary in a type of maize that has appeared among his pedigreed stocks, Prof. Eyster said. The symptoms are quite striking. Sugars accumulate in the leaves until the latter are ruptured and the sugar oozes in drops on their tips as they die. In certain strains, as yellow seedlings, this deficiency kills the plant long before the food reserve is used up.

Plants kept in the dark do not develop the diabetic condition. Preliminary experiments indicate that insulin tends to correct this inherited deficiency in metabolism.

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ECOLOGY

Rainy Seasons Bring Large Rabbit Families

MORE RAIN, more rabbits, seems to be the rule on the plateaus of the Southwest, where the long-eared jackrabbits lope.

This correlation appears in a study of the relation between the rate of breeding in jackrabbits and the seasonal precipitation made by Dr. Charles T. Vorhies of the University of Arizona and Dr. Walter P. Taylor of the U. S. Biological Survey, and reported before the Ecological Society of America at New Orleans.

The number of young jackrabbits per litter, when tabulated by months, is somewhat higher in the late winter, decreases in the arid fore-summer, and distinctly increases again in midsummer. Each of these increases comes during or immediately after the regular rainy seasons.

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E FIELDS

ARCHAEOLOGY

Pueblo is Meeting Point Of Three Indian Cultures

A PUEBLO where three types of prehistoric Indian life appear to have met has been partially explored by Dr. Byron Cummings of the University of Arizona. Dr. Cummings has returned from excavating the pueblo, which is at Fort Apache, Arizona.

The exploration party cleared several rooms in the pueblo, and obtained a large collection of articles from the ruins, Dr. Cummings reported. Pottery, stone implements, and various woods are among the relics. The pueblo is believed to have had hundreds of rooms, and to have housed 1,500 people. By use of the tree ring calendar, which enables archaeologists to date Southwestern ruins containing samples of timber, it has been estimated that the pueblo was at the height of its career between 1150 and 1200 A. D.

The three types of Indian life which met at the Fort Apache pueblo, in Dr. Cummings' opinion, were the San Juan culture of northern Arizona, the Gila culture of southern Arizona, and the Little Colorado culture of eastern Arizona. Dr. Cummings has in view further excavations, which may show more definitely the relationships of the different kinds of culture at this point.

Science News Letter, January 2, 1932

OCEANOGRAPHY

New Chart Contains Latest Valley on Ocean Bottom

THE OCEAN bottom replaces the heavens as guide to the navigator over Georges Bank, which lies off the New England coast, with the issuing by the U. S. Coast and Geodetic Survey of a new chart describing the floor of the ocean in this region.

Instead of "shooting the stars" to keep their ships on a true course, captains of trans-Atlantic liners during the most dangerous part of their voyage will compare readings of their echo depth-finders with maps of the bottom of the sea. So well does the map describe the hills and valleys beneath the water and so accurately can the depth-finder report their size that the navigators will be able to determine their positions by speedy soundings and so keep on the right course.

With this method of navigating the frequent fogs over Georges Bank will no longer make dangerous the many hills on the ocean bottom that rise close enough to the surface to ground ships.

The new chart is the result of surveys of the past two summers which have covered two-thirds of the 30,000-square-mile submerged continental shelf. Work on the chart was speeded up following insistent requests from shipping men.

A large submarine valley, longer and deeper than Corsair Gorge discovered during 1930, was found by surveys of the past summer and is shown on the chart. The new valley, which has not been named, cuts back into the southern edge of the Bank about eleven miles and is roughly two and a half miles wide and 2,000 feet deep. The tops of its ridges are only 600 feet below the surface of the ocean, while at its mouth on the edge of the shelf the depth drops off abruptly to 6,000 feet.

Science News Letter, January 2, 1932

AGRICULTURE

Scientists Seek Potatoes Resistant to Dread Wilt

POTATOES that will defy the terrible wilt disease that nearly depopulated Ireland by starvation and emigration in the middle of the last century, and that is still a perennial plague to potato growers, are being sought by hybridizing commercial varieties with blight-immune wild potatoes discovered on the highlands of Mexico. At the meeting of the American Potato Association, Prof. Donald Reddick, W. F. Crosier and Wilford R. Mills of Cornell University told of their work to date.

"The problem involved has been to hybridize wild and cultivated sorts and to search in the offspring for a plant in which is combined the desirable commercial qualities of cultivated varieties and the blight immunity of the Mexican species," Prof. Reddick reported.

"The wild potatoes possess a tolerance for frost at least to 28 degrees Fahrenheit and this character is heritable. With large enough numbers from which to select it is entirely possible that a plant can be found that is commercially satisfactory, that is immune to blight and that can stand the nipping frosts of late spring or early autumn."

Science News Letter, January 2, 1932

PHYSIOLOGY

Loud Noise Interferes With Speed of Vision

A MOTORIST will not perceive a warning red light quite as quickly as usual if at the same time he hears a loud noise.

This is a practical interpretation of experiments made by Dr. Wiley F. Smith, of the University of South Carolina.

It takes about three hundredths of a second to perceive a light observed at the same time that a faint click of a telegraph receiver is heard. But it takes more than four hundredths of a second when a loud sound is heard. Making the light brighter lowers the speed with which the sound can be heard.

Science News Letter, January 2, 1932

METEOROLOGY

Rochester Fog Equally Impervious to All Colors

FOGS are colorless in Rochester, N. Y., whatever they may appear to be in London, according to experiments of F. M. E. Holmes and Dr. Brian O'Brien of the Institute of Optics of the University of Rochester.

Many scientists have, since the time of Lord Rayleigh, a famous English physicist, believed that red or yellow light passed more easily through fog or haze than blue, green or violet. Most of the light scattered by the water droplets of the Rochester fog, however, contains all colors equally. Only a small fraction, that scattered by the air itself in the mile-long path of the light, obeyed the law given by Rayleigh. This would appear to upset the popular idea that red light is more easily seen through a fog. Red fog beacons for airports have, therefore, no special advantages, according to these experiments.

The blue of the sky and of cigarette smoke are successfully explained by Rayleigh's formula which states that the amount of any color scattered by fine particles is proportional to the fourth power of the vibration frequency of that color. This is true on clear nights, Mr. Holmes and Dr. O'Brien found, when only very faint haze in the air has to be taken into account.

For a fog, however, which consisted of droplets 1/500 inch in diameter, only one eightieth of the scattered light showed this behavior. The rest is absorbed by the fog to an extent which is independent of its color.

Science News Letter, January 2, 1932

BACTERIOLOGY

Germs Reported to Inherit Ability to Undergo Change

Transformation in Character of Bacteria May Also Be Due to Contamination with Substance Which Eats Them

THE JEKYLL-AND-HYDE changes in nature which some bacteria undergo depend on factors that are an inherent part of the germ, it appears from the report of Dr. Morton C. Kahn of Cornell University Medical College to the Society of American Bacteriologists meeting at Baltimore.

Dr. Kahn described his experiments with one single organism of the type that causes tuberculosis in fowl. By changing the food he gave this germ, he was able to make it reproduce organisms of two kinds. One of these was just like the parent germ, but the other type of offspring was entirely different. This process is called dissociation by bacteriologists, and is thought to be responsible for the development of disease in some cases.

"Our evidence," Dr. Kahn said of this phenomenon, "leads us to believe that the factors which determine dissociation may be present in the germ plasm of each individual cell. Whether the organism grows as an R type or an S type must be governed by a set of determining laws with which we are only faintly familiar at present."

Dr. Kahn believes that dissociation must be regarded as explaining partly how diseases spread and become epidemic, and also explaining some of the changes they cause in the body.

Transformations in the character of a germ, especially significant because they may affect its disease-producing power, depend on whether or not the germ is contaminated with the bacteriophage or bacteria-eater, Prof. F. d'Herelle and Ruth Beecroft of Yale University School of Medicine reported to the meeting.

Prof. d'Herelle does not agree with the theory that these Jekyll-and-Hyde changes in the nature of germs are due to the natural course of bacterial life. He finds that they are marked and definite changes which are hereditary. Furthermore, when a germ changes its nature the change is permanent, the report of the Yale investigators indicated.

"Bacterial transformations are not due to a 'life-cycle' but are true mutations, similar to those which have been described by botanists as occurring in plants under the action of parasitism," Prof. d'Herelle said of the phenomenon as he and Miss Beecroft observed it in their three-year study of one strain of a certain kind of bacteria.

Prof. d'Herelle showed first that bacteria undergo profound transformations under the influence of this bacteriophage, which is an ultramicroscopic parasite that preys on bacteria just as disease germs prey on men and other animals. Then he showed that a pure strain of bacteria without any phage does not show any modifications or changes and remains stable all its life.

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BACTERIOLOGY

Motion Pictures Used to Measure Growth of Germs

HOW MOVING PICTURES were used to measure the growth of organisms so minute that they cannot be seen with the naked eye was described by Prof. Stanhope Bayne-Jones and Dr. Edward F. Adolph of the University of Rochester at the recent meeting of the Society of American Bacteriologists held in Baltimore.

Individual bacilli and yeasts were photographed at the rate of two to thirty times a minute for several hours as they grew on a suitable medium at a constant temperature. Single frames or exposures of the film were then projected and measurements made of linear dimensions at frequent known intervals of time.

The object of the experiment was to measure the rates of growth of single individuals in the bacillus and yeast families and their progeny throughout a cultural cycle. The bacilli did not vary much in breadth during one generation, but increased in length. There was no measurable slowing in their rate of growth while they were dividing or getting ready for division which would produce the next generation of bacilli.

On the other hand, the yeasts' increase in size waxed and waned with each generation, being slowest just before a new organism was formed.

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BACTERIOLOGY

Freezing Food Does Not Kill Botulinus Germ

FREEZING fruits and vegetables to preserve them without first sterilizing them by heat does not kill the botulinus germ if it was present in the food originally, Dr. Lawrence H. James of the U. S. Bureau of Chemistry and Soils reported to the Society of American Bacteriologists at Baltimore.

However, there is no danger of botulinus poisoning if the frozen food is defrosted, cooked and used immediately when received from the store, Dr. James reassured housewives.

Dr. James subjected the spores of the botulinus bacillus to the same degree of freezing that is used in commercial cold storage methods. He found that the number of these spores, from which new botulinus germs could develop, was not reduced at all by the cold temperatures, regardless of the length of time the temperatures were maintained. On the other hand, no poison had developed from the spores while freezing.

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ARCHAEOLOGY

Jungle Ruins Yield Mayan Masterpiece

A MAGNIFICENT stone carving, the work of some unknown Indian Phidias, has been safely brought from a ruined Mayan city deep in the Guatemalan jungle to be displayed at the Museum of the University of Pennsylvania. The carving has been pronounced by some critics to be the finest known specimen of Mayan art in stone.

The sculpture is one of the fruits of the recent Eldridge R. Johnson Expedition to the old Mayan city of Piedras Negras in Guatemala.

Piedras Negras means "black stones." The ruins known by this name have been known to contain some of the most beautiful carvings wrought by Mayan Indians. The city was one of the older Mayan settlements, which flourished for a number of centuries from about 350 A. D.

The ruins lie on the Usumacinta River in the northwest corner of Guatemala,

in a region far removed from present centers of civilization. Because the carvings which remain are exposed to the disintegrating effects of the humid forest, the Guatemalan government sanctioned the removal of some of them. Half were to be sent to Guatemala City and half to be loaned to the University of Pennsylvania Museum.

The carving which is expected to attract greatest attention is a lintel from the doorway of a Mayan temple. Striking features of this Indian masterpiece are described by Dr. J. Alden Mason, archaeologist of the Museum who was with the party in the field. The lintel measures 25 by 24 inches and is of buff-colored limestone, Dr. Mason states. Almost the entire surface is covered with hieroglyphics and groups of Mayan Indians. Two of the figures are in full round carving, the others in high relief.

The poses are naturalistic and Grecian in quality, Dr. Mason says. Textile designs are clearly portrayed. Even the tasseled fringe of an altar cloth is carefully shown. Some of the Indians in the groups hold in their hands jars, fans, and unidentified objects. Some still have the ornamental headdresses of which the Mayas were so fond, though time has obliterated part of the carving. So fine is the detail that Dr. Mason declares: "Study of these figures will add tremendously to our knowledge of Maya ethnology."

Six dates on the lintel can be deciphered. All fall within a period of eight years, and according to the correlation accepted by Dr. Mason the latest of the dates would be Dec. 2, 757 A.D.

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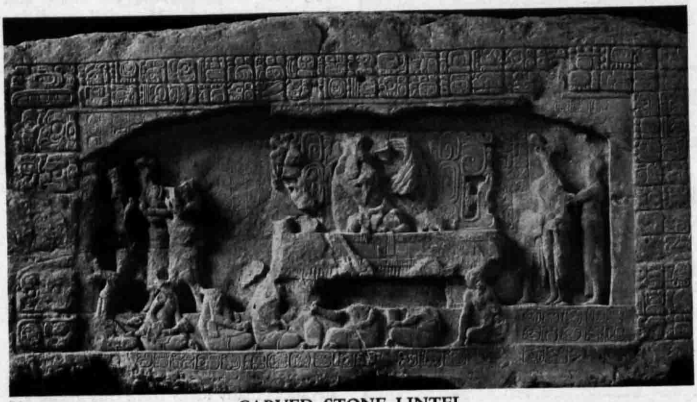

CARVED STONE LINTEL

Found by the Eldridge R. Johnson Expedition of the Museum of the University of Pennsylvania to the ancient Mayan city of Piedras Negras in Guatemala last spring. Authorities who have seen the lintel regard it the finest known specimen of Mayan art.

VITAL STATISTICS

Increase in Death Rate For All Ages is Predicted

Statistician Says Recent Downward Trends Will Turn up As U. S. Becomes Nation of Older People

AN INCREASE in the death rate of the country at all ages, in spite of the recent favorable downward trend, was predicted by Rollo H. Britten, statistician of the U. S. Public Health Service, at the recent meeting of the American Statistical Association held in Washington.

"To thinking people today, it has become manifest that death rates for all ages have reached a low point at which they cannot long remain," declared Mr. Britten.

"Unless some radical changes continue to give us a population abnormally high in the young adult ages—and with the abrupt reduction of immigration this seems entirely unlikely—the death rate for all ages is bound to rise, even in the face of improvement in the rates at specific ages.

"This statistical fallacy will no doubt perturb many well-meaning persons who have gloried in our falling mortality rates," he added.

Mr. Britten explained his prediction by reference to figures on sickness and death in this country since its first settlement. The reduction in mortality, he pointed out, has come entirely at the younger age levels. Within the last thirty years this reduction has been phenomenal, but has only pertained to ages below fifty years. Because the United States has been a nation of young people, the trend of mortality in those ages has largely determined that for all ages.

Even compared to ancient times, our present expectation of life at the higher ages is not favorable.

"From ages of the Egyptian mummies life-tables have been constructed, lacking data only for infants," Mr. Britten said.

"At five years of age the expectation of life was about 30 years, against our expectation today in this country of between 55 and 60; but from 70 years on the expectation at that period seems as great or greater than it is today.

"Ancient Rome showed an expectation at birth of about 21 years, against ours of about 55 years; but as age advanced the difference rapidly decreased, until from age 60 on the Roman expectation was definitely above that of today."

"The changes which appear to have been in progress in this country, as judged by available mortality records, are only an extension of tendencies which have been going on for centuries," Mr. Britten said.

For certain diseases, Mr. Britten's figures showed marked reduction in death rate, particularly during the last 30 years, for which period the figures are most reliable.

"One of the outstanding facts in our medical history is the decrease in mortality from tuberculosis. This is a world-wide phenomenon and has been in progress, one suspects, for at least a century," he declared.

At about the end of the eighteenth century the death rate from this disease in England and Wales seems to have reached the unexampled level of about 700 per hundred thousand. After that period it showed a continuous decline which is still in force at the present time.

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ANTHROPOLOGY

Primitive Magic Still Powerful in Civilized World

PRIMITIVE man's magic is still a power in this civilized world of ours, Dr. Clark Wissler, anthropologist of the American Museum of Natural History, showed in his presidential address at the annual meeting of the New York Academy of Sciences at New York City.

The civilized world clings to magic, like some child clinging to its faith in fairies. Men still carry rabbits' feet as luck charms, or feel that certain numbers on an automobile license bring good luck in driving. Rain makers rig up devices to bring down rain upon dry fields. Hex doctors may still be found in American communities, treating patients by weird formulas.

In the eyes of the anthropologist, these attempts at controlling nature by charms and hocus-pocus are evidence that man still has something of the primitive in him.

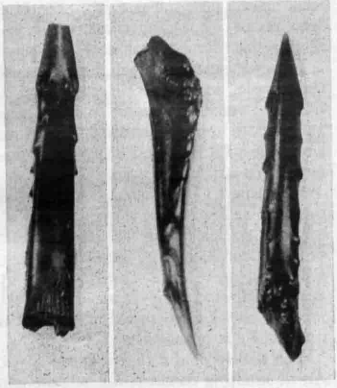
All savages are influenced by three groups of ideas, Dr. Wissler stated. These are commonsense, magic, and animism, or belief in the supernatural.

Due to Ignorance

"The difference between civilized people and savages rests largely in the relative richness of these three groups of ideas," he said. "Whereas the savage has many commonsense ideas, his ignorance of many natural phenomena leaves him no other method but that of magic. Civilized people also use magic in case they fail to understand the cause and agencies involved. Most folk medicine is magic."

Civilization is largely a reduction in the relative number of magical ideas, the speaker continued. Modern science belongs to the commonsense group of ideas. Science has found out how lightning strikes, and as a result civilized people take a commonsense attitude toward this natural phenomenon. To primitive people the power of lightning is always a mystery, and so magical formulas and supernatural explanations are offered to meet the situation.

Animistic beliefs, dealing with the supernatural and with the nature of the immaterial world, play an important part in civilized life. As civilization advances many ideas from this group are transferred to the commonsense category, Dr. Wissler declared.



DANGEROUS LOOKING

First specimens of the teeth of an extinct species of shark which were found by Dr. C. C. Branson, of Brown University, on a field trip in Wyoming.

PALEONTOLOGY

Ancient Sharks Had Teeth Like Fish-Spears

SHARK TEETH belonging to a species which modern fish—and men, too—may be thankful is long since extinct, were described before the meeting of the Paleontological Society at Tulsa, Okla., by Dr. C. C. Branson of Brown University, who found the only specimens so far known during a field trip in Wyoming.

He described the two specimens as follows:

Like Bakelite

"The teeth are narrow, slender, laterally compressed, and recurved at the tip. The tip is triangular and bears shoulders like those of an arrow head. Near the base of the front of the crown tip is a pair of blunt barbs directed downwards, and below these at regular intervals are similar barbs in rows extending diagonally backward across the lateral faces of the crown to the posterior face near the base, where there are numerous irregularly arranged barbs. It is apparent that here is a shark which literally stabbed its prey with its teeth in the same manner as an Indian uses a fish spear. The teeth have the appearance of a bakelite reproduction of such a spear."

Dr. Branson has given the name Rapidentichthys uncinatus to the new genus and species.

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GEOLOGY

Intercontinental Land Bridges May Have Been Isthmuses

MIGRATIONS of land animals and plants from continent to continent in ancient geological times probably proceeded over narrow isthmuses like the present Isthmus of Panama, rather than the broader land bridges which geologists have tried to trace. This thesis was advanced by Prof. Bailey Willis of Stanford University, speaking before the meeting of the Geological Society of America at Tulsa, Okla.

Narrow ridges, either submerged or appearing above the surface as dry land, are to be found in the neighborhood of most great oceanic "deeps," Prof. Willis pointed out. They appear to owe their existence to thrust forces in the earth's crust, radiating outward from the centers of such deeps; as the Caribbean deep has surrounded itself with a chain of islands on the Atlantic side, and the Isthmus of Panama on the Pacific margin.

Similar ridges, with only their highest points emerging as widely separated islands, are to be found between great deeps in the Atlantic, extending from South America toward Africa, and between deeps in the Indian Ocean, reaching from Africa toward India. Somewhat greater activity in the deeps might in past times have humped their whole lengths out as dry land, giving the continental faunas an opportunity to march into new territory along solid causeways.

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FORESTRY

Christmas Trees Should Fall As Martyrs to Better Forests

CHRISTMAS trees, looked upon with disfavor a few years ago by anxious conservationists, now receive the approval of the U. S. Forest Service, provided they are properly harvested and marketed. In a Christmas radio talk, broadcast over the network of the Columbia Broadcasting System under the sponsorship of Science Service, H. N. Wheeler of the U. S. Forest Service paid tribute to the Christmas tree and also discussed some of the practical matters concerned with getting the little evergreens from the forest into the home.

The speaker disapproved unregulated cutting, whether by individuals taking single trees from land that does not belong to them or by marketers who "dump" the trees in larger quantities than the predictable demand justifies. Some cities, he said, regulate the sale of trees and Christmas greens by requiring each dealer to pay a license and subject his wares to inspection, while in other places no tree may be sold unless it is marked with a tag, showing it was taken by permission of the owner. Each tree removed from a national forest has such a tag that says: "This tree brings a Christmas Greeting and was cut not in a destructive way, but to give room for neighboring trees to grow faster and better."

"With 400 million acres of land east of the Great Plains neither producing farm crops nor used for pasture on the farms, and primarily only valuable for tree growing, there is plenty of ground on which to grow timber for wood production and to produce Christmas trees," Mr. Wheeler continued. "All of these lands will not raise trees at a profit for lumber and other wood products, nor are they needed for Christmas trees, but must be kept in timber, brush or heavy sod to regulate the streams and prevent the washing away of soil. They will serve this purpose and here and there will produce little trees that may be removed and used at Christmas.

"Each year more trees are cut and put on sale than the market can absorb. Some effort might well be put forth to determine the approximate number of trees the community will require and gauge the number to be harvested by the amount needed."

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ARCHAEOLOGY

Limestone Slab Identified As Base of Famous Delphic Oracle

Pattern of Tripod on Which Ancient Priestess Sat Still Clearly Marked on Stone Discovered in Temple of Apollo

A SLAB of limestone lying in the Temple of Apollo in Delphi is actually the base on which stood the mechanism for the famous Delphic oracle. Numerous reasons for thus identifying the stone as part of the oracle equipment "almost miraculously preserved" were cited before archaeologists gathered at Richmond, Va., for the meeting of the Archaeological Institute of America. The identification of the stone has been made by Dr. Leicester B. Holland of the Library of Congress.

The stone slab was found in the temple by the French archaeologist Prof. Fernand Courby, who examined the site and concluded that the slab must have stood originally in the sanctuary of the temple. But Prof. Courby did not recognize the true significance of the stone, Dr. Holland stated.

The area of the slab is divided roughly into two parts. In one section are four holes. These were obviously for the attachment of the three legs and central support of a metal tripod, explained the speaker. The priestess who breathed the intoxicating vapor and who spoke the inspired messages is known to have been seated high on a tripod.

There are two more holes in the slab, on opposite sides of the tripod base. These, Dr. Holland said, may have held rods or may have been openings through which sprang laurel boughs of real or metal foliage. The priestess is said to have shaken the laurel when she prophesied in her frenzy.

The circular pattern of the tripod's base is still marked on the stone, as a result of incrustations of lime. Dr. Holland attributes these incrustations to the water, rich in lime, which the priestess brought to the place of oracle from a sacred spring. From the cup she drank and then poured out a libation of the water to Apollo. Around the circular base of the tripod runs a groove, or channel. This is the drain provided for the libation to run off.

The other section of the stone slab has on it a square base. On this, Dr. Holland concludes, was placed the very ancient sacred stone of Delphi, said to mark the center of the earth and also said to mark the grave of Python, early prototype of the god Dionysus. The sacred stone itself, a beehive-shaped block not very large or impressive, still exists and has been identified by Prof. Courby, Dr. Holland said.

Straight down through the sacred stone, and through a corresponding center in the stone slab base runs a hole. This, the archaeologist believes, must have been the device by means of which the inspiring fumes were made to rise about the priestess' head. A metal pipe would doubtless have lined the hole in the stone. The pipe would link with a crypt beneath the temple floor.

"The ancients believed that the vapor which came forth beneath the tripod issued from a hole in the earth," Dr. Holland stated, "but careful excavation has shown that there is not now and probably never was any such hole beneath the temple, and in the neighborhood of Delphi volcanic gases or volcanic springs are quite unknown. Therefore, since the vapor is well attested it must have been artificially created."

"I suspect," he added, "that when the Pythia, the priestess, went down into the crypt ostensibly to get the water of the sacred spring, she actually lit a brazier there, and then coming up again and mounting upon the tripod, inhaled the fumes piped through the floor and out beneath her feet."

The nature of the fumes is unknown. An ill-smelling combination of pine and laurel is said to have been used, but these are not things to produce delirium. The priestess may have added hemp seed to produce intoxication, Dr. Holland said. Or, possibly among the harmless laurel leaves which the priestess chewed there were poisonous oleander leaves. Oleander stimulates the heart, and when combined with the hashish fumes might have produced the delirious state in which the Greek oracle spoke.

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ENGINEERING

Change in Soil Texture Keeps Roads from Freezing

AN ENEMY to good roads wherever the ground freezes—and that includes the greater part of the United States—has been defeated by research, it was revealed in a report to the Highway Research Board of the National Research Council by A. C. Benkelman and F. R. Olmstead, engineers for the Michigan State Highway Department.

The freezing and consequent "heaving" of highway subgrades, which cause the surface of a road to rise and crack apart, were accounted for in a new theory explained by Mr. Benkelman and Mr. Olmstead. This theory has already been tested, they stated, in the construction of roads in Michigan. Highways have been built as suggested by the new views, and it has been found that these roads are damaged much less than others during the winter.

The new theory lays the excessive expansion of frozen soil, which is often as much as 60 per cent. of the original volume, to changes in temperature. Water, which has accumulated in the ground just below the frost line, freezes with each drop in temperature and thus the frost line is forced lower and lower as the temperature rises and falls. In this way, the engineers stated, the layers of ice frequently seen in frozen soil are formed.

They have found that if there is enough water, all types of soil will freeze and expand to injure the highway above it. But fine, colloid-like soils expand much more readily than those of coarser texture, not because of any inherent property but because they are hard to drain and usually contain more water than the coarse-grained soils. Hence in building new highways the engineers have been careful to replace colloid-like soils in the roadbed with coarser earth and drain it well. The report stated that frost action at about 200 locations has been entirely prevented by this treatment.

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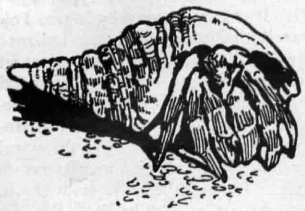
ZOOLOGY

Nature Ramblings

By FRANK THONE



Hermit Crab

NOT ALL the hermits of ancient and medieval times were "old crabs," but many of them were. And the more crabbed of them usually lived, not in houses constructed by their own industry, but in ruinous buildings abandoned by their original owners.

So it is also with the curious creature which many of us have seen among the rocks during a seaside vacation, the hermit crab. He cannot be truly said to have a crusty disposition, except perhaps about his head and claws; for the lack of natural crust with which all other crabs are endowed is what determines his peculiar custom of inhabiting the deserted dwellings of departed sea-snails.

If you see a small curled sea-shell hustling along in a shallow tidal pool, at a good deal higher rate of speed than its proper owner could ever have carried it, it is almost certain that its present tenant is a hermit crab. If you capture such a shell and try to pry the little creature out, you will have no luck, for the crab sticks as tight in the shell as did the snail that grew in it originally, and will not come out except in pieces.

Hermit crabs grow, just as other crabs do, but instead of cracking a shell and moulting, the hermit, whose body is permanently in the unprotected, "soft-shell" state, must abandon his quarters when they begin to cramp him, and seek new ones. That is a time of anxiety, and sometimes two houseless hermit crabs, happening simultaneously upon a suitable empty shell, will stage a fierce battle for its possession.

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An African giant forest hog, so large that it resembles a small hippopotamus, has been acquired by the Harvard Museum of Comparative Zoology.

CHEMISTRY

Research Reveals Insulin As New Member of Protein Group

Chemists Are Told That Diabetes Remedy Seems to be Made of Two Units Found Also in Many Food Proteins

INSULIN, widely used in treatment of diabetes, is merely another member of the group of proteins, one of the fundamental group of foods, Dr. H. T. Clarke of the College of Physicians and Surgeons of Columbia University told the fourth organic symposium of the American Chemical Society at New Haven, Conn.

The insulin molecule, said Dr. Clarke, seems to be made up of two of the units present in relatively small quantities in many other proteins such as wheat glutenin or the casein of milk. The special properties of insulin which make it so important to diebetic sufferers, depend not on any unusual component, but on the way the common amino-acid units, tyrosine and cystine, are arranged in the structure. These conclusions have been reached by Prof. Karl Freudenberg and his school of researchers at the University of Heidelberg, Germany.

"It must be confessed," concluded Dr. Clarke, "that the prospect of finding the key to the relationship between the constitution of insulin and physiological properties is far from rosy—when one considers the practically infinite number of possible ways in which the components may be arranged."

Dr. Clarke's address outlined for his fellow chemists the recent breath-taking advances in biochemistry. Great progress was reported in the tracking down of the constitution of the various vitamins, one or two of which have been prepared nearly pure. Similar success is crowning the efforts to prepare in crystalline form the so-called, "digestive enzymes," substances which make possible the chemical transformations of food substances for absorption into the body.

Other advances reported included chemical tests for pregnancy and the chemical mechanism of muscular action. It has now been shown, said Dr. Clarke, that the conversion of carbohydrate into lactic acid, previously believed indispensable to muscle contraction, can be replaced in a poisoned muscle by a quite different chemical action involving the breakdown of another substance, creatine-phosphoric acid. This is a very important physiological discovery involving a revision of fundamental theories of muscle action.

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• First Glances at New Books

Archaeology-Art

SCULPTURED PORTRAITS OF GREEK STATESMEN—Elmer G. Suhr—*Johns Hopkins Press,* 189 p., 23 pl., $4.50. Facts and fragments of facts regarding Greek portraits in sculpture from earliest times down to the Roman period have been gathered for this study. Dr. Suhr traces the evolution of the Greek attitude toward realistic portraiture, and discusses the significance, as portraits, of various famous sculptures, with special consideration given to sculptures of Alexander. Considering the many arguments that are held over this question of portrait sculptures, this book devoted to the subject should be useful to the classical archaeologist, the historian, and the student of art as well.

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Zoology

PRESENT DAY MAMMALS—Claude W. Leister—*New York Zoological Society,* 74 p., $1. Brief popular descriptions of typical members of all the principal mammal groups, adequately illustrated. Most of the animals described and pictured are to be found in the New York "Zoo."

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Aeronautics

AIR NAVIGATION—P. V. H. Weems—*McGraw-Hill,* 587 p., $5. A book of fundamental and practical importance to all of those who from the cockpit of airplanes pilot our new era of transportation. The author is a Lieutenant-Commander in the U. S. Navy, and in the preparation of this book has had the cooperation of such other authorities as Lindbergh, Byrd, Ellsworth, etc.

Science News Letter, January 2, 1932

Botany

THE BOTANY OF CROP PLANTS—W. W. Robbins—*Blackiston's,* 639 p., $4. A third and revised edition of this well-known and successful text and reference book.

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Oceanography

THE MARION EXPEDITION TO DAVIS STRAIT AND BAFFIN BAY. PART 3. Edward H. Smith—*Government Printing Office,* 221 p., 50c. The oceanographic research work of the United States Coast Guard, undertaken in connection with the International Ice Patrol for which it has been responsible ever since the Titanic disaster, is a notable contribution to our knowledge of the North Atlantic. This volume gives the scientific results of an expedition in 1928 to the locality of the birthplace of the icebergs that some years menace transatlantic steamship travel.

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Anthropology

THE MAYA SOCIETY QUARTERLY—The Maya Society—*Johns Hopkins University Press,* $10 a year. A new quarterly, designed to show the public what Maya culture and literature were. It will bring forth translations of important Maya texts and other material long inaccessible, and is a departure from former research which has been largely archaeology and field work. In the first number is a translation with annotations of the Chilam Balam of Kaua, one of the most important native manuscripts known. There is also the Chumayel story of the birth of the "Vinal," the twenty-day month, considered as fine a piece of Maya literature as is known.

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Aviation

MODEL AIRPLANES, BUILDING AND FLYING — Joseph S. Ott — *Goodheart-Willcox,* 358 p., $2.50. In the hands of growing youths in their constructive 'teens, this book will provide many hours of beneficial occupation in the building of home-made model airplanes.

Science News Letter, January 2, 1932

Psychology

CHILD PSYCHOLOGY—John J. B. Morgan—*R. R. Smith,* 474 p., $3.50. A book presenting the findings of many contemporary students of child psychology in a form suitable for a textbook. Only child psychology is treated; physical growth, nutrition, heredity, and other aspects of child study are omitted, and only the normal child is considered.

Science News Letter, January 2, 1932

Agriculture-Economics

MAKING FARMING PAY—Cornelius J. Claassen—*Macmillan,* 126 p., $2. A proposition most people would instantly set down as impossible, or at least miraculous, is here crisply and objectively discussed by a man who has made farming pay on a thousand farms which he has managed—made it pay for the tenants as well as for the owners. He backs up his statements with well summarized case histories.

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Geography

THE TRAVELS OF MARCO POLO—Translated by Aldo Ricci from text of L. F. Benedetto—*Viking Press,* 439 p., $5. It is easy to see why Marco Polo's travels thrilled stay-at-home Italians of the Middle Ages. Marco's adventures are good reading. His way of describing strange lands and their people—which pleased the great Kubilai Khan—is quaint but effective, and the translator has happily elected to preserve this style. The translation is from the text brought out in 1929 by Prof. Benedetto of Florence, which includes some important new passages based on manuscripts recently brought to light.

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Vital Statistics

BIRTH REGISTRATION AND BIRTH STATISTICS IN CANADA—Robert R. Kuczynski—*Brookings Institution,* 219 p., $3. This book brings out the fact that Canada has the unusual record of being the only country in the world that has had a continuous series of birth records for three centuries. The material contained in it, therefore, should be valuable to those interested in vital statistics and birth registration everywhere.

Science News Letter, January 2, 1932

Hunting

GAME BIRD SHOOTING—Charles Askins— *Macmillan,* 312 p., $4. Quite distinctly a sportsman's book; the birds are considered only as seen over the top of a shotgun. There are some good hunting yarns interspersed—but occasional mention of bags of other days gives further confirmation to the old tragic tale of the overshooting of American game that is partly responsible for present dearths.

Science News Letter, January 2, 1932

Chemistry

TRANSACTIONS, VOL. 8, 1930—*Institution of Chemical Engineers,* 232 p. The annual publication of one of England's leading scientific organizations.

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General Science

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION, 1931—*Government Printing Office,* 159 p., 20c. A year's survey of the status and activities of one of the world's great scientific institutions.

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