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AMERICA HOLDS SECRETS CLOSER THAN EGYPTIAN TOMB

Archaeology in America has its "sealed doors" more tightly closed than those of Egypt. While arrangements are being made to break into the inner chamber of the tomb of King Tutankhamen near Luxor, Egypt, plans are being pushed to solve the more baffling mysteries presented by the prehistoric ruins on this continent.

Neil M. Judd, curator of American archaeology of the U. S. National Museum and in charge of the National Geographic Society's explorations in the southwest, has announced that an expedition will take the field in a few weeks to unearth evidence which may lead to fixing the date of the erection of cliff-dwellings and other ancient Indian buildings in this country.

With no hieroglyphics or other records such as scientists working in Egypt have, the expedition will follow the clue furnished by tree rings. Efforts will be made to locate buried stumps of trees which were old when the oldest nearby trees now living were young and perhaps young when the timbers used in prehistoric Indian architecture were cut. Thousands of these timbers are found in the ceilings and floors of what remains of the big apartment houses in which Indian communities of what are now Arizona, New Mexico, Utah, and Colorado once lived.

The moisture the tree receives determines the thickness of the annual tree rings. A series of several rings of one tree shows identical proportions with a like number of rings of other trees growing at the same time under similar conditions. The experts will therefore compare the rings of any buried trees found with those of living trees and ancient timbers in the hope of establishing a connection which will bridge the time gap between the two. It will then be a matter of counting the rings to fix the number of years which have passed since these mysterious pre-Columbian dwellings were built.

Dr. Manuel Gamio, director of Archaeology of Mexico, will use churches instead of trees to find the age of Aztec and earlier architecture in the Valley of Teotihuacan in Mexico. The date of the building of the Mexican churches of the sixteenth century is known. Dr. Gamio expects to dig down near the walls of these churches to their base and measure the depth of earth deposited by natural sedimentation in the last four hundred years. By simply dividing the distance between the present level and the base of the prehistoric monuments by this four-hundred year thickness, the approximate date of the ancient buildings will be calculated.

A check on the age estimates reached in this way and by the tree ring method may be furnished by establishing the connection between the pottery and other cultural material of our West and Mexico with the calendar of the Maya of Central America. Pieces of pottery typical of certain Indians are sometimes found among

the pottery of distant tribes and such finds are expected to connect the less advanced races with the most advanced civilization developed on this continent before the arrival of the white man.

Despite their lack of metal tools and domestic animals, the Mayan race built up a civilization on this continent which was in some respects superior to that of the ancient Egyptians. They had an accurate system of recording time and their astronomical calculations were much more accurate than anything known in old Egypt.

Dr. Sylvanus G. Morley of Carnegie Institution, who deciphered the Mayan calendar, will soon again lead an expedition into Yucatan and Guatemala to learn more about these early Americans.

The great hope of archaeologists working in this field is to find historical manuscripts in the Mayan ideographic writing. The only books so far found are merely horoscopes made by the astronomer-priests. But historical writings are known to have existed. Many were burned by the Spaniards, and there is little hope that these books written on fiber can have survived the humid climate and will be found in the ruins of the richly carved Maya temples.

There is hope, however, that the early Spaniards may have sent some of these works home. The books containing the horoscopes were discovered in European museums and it may be that some historical documents have been also preserved by chance.

Further back in the tropical wilderness of northern Guatemala and southern Yucatan, Dr. Morley believes that the remains of more large cities, such as he has discovered in the last few years, will be found.

READING REFERENCE- Report of the Secretary of the Smithsonian Institution for year ending June 30, 1922. pp. 55--. The Population of the Valley of Teotihuacan by Manuel Gamio, Department of Anthropology, Mexican Government, Mexico City, 1922.

(A Chat on Science)

GEOLOGISTS GET AN EXTENSION OF TIME

By Dr. Edwin E. Slosson.

There was a deadlock between the astronomers and geologists at the beginning of this century. The geologists, having been converted to evolution by Darwin, needed lots of time for the development of the varied forms of life by the gradual process of natural selection, the only process they knew. Then, too, they figured out that it must have taken at least 300,000,000 years to lay the sedimentary rocks and to make the ocean as salt as it is. Man, who is one of the latest settlers on this planet, seems to have been here more than 250,000 years and the earliest fossils are buried so deep that animal life must have existed some 60,000,000 years at the lowest estimate.

But here the astronomers and physicists interposed a veto on the geologists and paleontologists; "You can't have anything like such a length of time," they said, "for the earth was a molten mass long after the time when you say life began, and was a fiery gas-ball long after you talk of oceans. The earth is the offspring

of the sun and the sun itself is only 20,000,000 years old."

This time limit was the estimate of Lord Kelvin, based upon the idea that the sun's heat came from its contraction by gravitation, for no other source of its heat was surmised at that time. He figured out that if all the particles of matter that make up the sun had fallen together from an infinite distance the heat produced by their impact would not be more than enough to keep the sun radiating at its present rate for more than twenty million years.

If, however, somebody should discover another and more abundant source of heat than the shrinkage of the sun, then, of course, the astronomers would be willing to grant the geologists an extension of time for the building up of the world and its inhabitants.

Well, somebody did discover an unknown source of heat abundant enough to satisfy the most extreme demands of the astronomers. This was Madame Curie with her radium, a metal that is continually giving off heat from a secret store within its atom. It appeared then that some of the heavy elements in breaking down into lighter ones, as radium breaks down into lead and helium, give off large amounts of heat for thousands of years. It was later found that stoms of a light element might combine together to form a heavier element and likewise give off heat in immense quantities. For instance, if a pound of hydrogen were to condense to form helium the resulting helium would weigh a little less than a pound, but there would be given off as much heat as would be produced by the burning of 10,000 tons of coal.

Unfortunately no way is known of wonking this process, so it will not help us out in this winter's coal shortage, but it has helped the astronomers and geologists out of their dilemma. For the astronomers, having now a source of heat sufficient to keep the sun and stars agoing for as long as even they can imagine, can afford to be generous with the geologists in the matter of time. Prof. Eddington of Cambridge made this concession handsomely when he said recently:

"Lord Kelvin's estimate of the extent of geological time need not now be taken any more seriously than Archbishop Ussher's and the geologist may claim anything up to 10,000 million years without provoking a murmur from astronomers."

This liberal allowance ought to satisfy the geologists, especially since they have learned from Mendel that evolution may proceed by jumps instead of by the slow accumulation of minute variations which Darwin had in mind.

READING REFERENCE- Encyclopedia Britannica, New Volume No. 31, p. 210.
Outline of Science, edited by Prof. J. Arthur Thomson, p. 197. Putnam's.

Heavy laying causes a reduction in the yellow color of the shanks of hens by using up the yellow pigment in their food for the production of egg yolks faster than it can be stored in their bodies.

Tuberculosis among Eskimos is very prevalent on account of their habit of the whole family sleeping together in an unventilated room.

FUR CLAD MISS BEATS CAVE MAN DESTROYER

The modern girl is rougher than the cave-man of 400,000 years ago - when it comes to wiping out other animals. Nothing in the history of creation, according to H. E. Anthony, associate curator of mammals of the American Museum, can parallel the ravages of the fur and hide trade to satisfy the fashion whims of women today.

The present rate of desturction of mammals throughout the world, he estimated, is probably not less than fifty million a year, of which thirty million represents the demands of the fur trade. Extermination of large animals has been going on for a century, but the extermination of the small mammals has been extremely rapid in the last two decades. Muskrat, squirrel, mole, raccoon, opossum, formerly slightly valued for fur, have been relentlessly pursued to satisfy the demands of fashion.

Europe, North America, Asia, and Africa, have eliminated their wild animals through similar causes. Food supply, fur supply, industry, art, agriculture, and deforestation, and in a minor degree, sport, all have helped. The number of game animals still surviving in the mountains of Asia is relatively great, he said.

When cave men first began the destruction of mammals for food and clothing some 400,000 years ago they were probably less destructive with their primitive weapons than most of the large predatory animals. These early men first used light from burning animal oil and fat and this demand has culminated in the elimination of the sperm whale and other marinecarnivora. Twelve thousand whales have been taken in a single season from the American Antarctic.

Agriculture on land, the legitimate clearing of the land and protecting farms and gardens has been another cause of elimination. The ranging of cattle and sheep over great areas, destroying winter food for game, the killing of game by herd tenders, the bounty system against carnivora and indiscriminate poisoning campaigns have all been factors, Prof. Anthony pointed out. Agriculture, the meat supply, and the fencing of land is eliminating the game of Africa. Legitimate destruction by sportsmen has been comparatively a small feature, he said.

The fur trade, he emphasized, is now threatening to bring to a close the age of mammals which began three million years ago. The use of furs for protection, he declared, has long since passed. Now it is fashion that demands them.

READING REFERENCE- Osborn, H. F. and Anthony, H. E. Can we save the mammals. Bibl. Natural history 22: 388-405. Sept. 19, 1922. Hornaday, William T. Minds and manners of wild animals. N.Y. Scribner, 1922.

NEW METAL MAY BANISH ANOTHER HOUSEHOLD CARE

Rest for the housewife weary from rubbing the family knives, forks, and spoons is foreseen as a result of experiments at Sheffield which indicate that the stainless metal, chromium, may be used in electro-plating. These experiments have crowned with success years of effort to find a method of depositing this valuable element on iron, steel, copper, nickel, and brass by an electric current.

Chromium is harder and lasts longer than the rust-proofing metals usually used. As it resists oxidation by air, water, and acids, chromium-plating may also be employed to make ordinary steel knife blades stainless, as well as for plating food tools and ornamental ware.

NEW INVENTION KILLS UNPLEASANT SOUNDS

A device to eliminate undesirable noises has been invented by Dr. G. W. Stewart, professor of physics of the University of Iowa. This invention makes use of an entirely new method of sound suppression which will probably prove applicable to telephones, phonographs, and musical instruments so that these machines will give us only those notes we want to hear.

Dr. Stewart does not obtain his results by putting obstructions in the path of the unwanted sound waves, but by causing successive waves to interfere with each other's transmission.

Illustrating how this was done, he took a brass cylindrical tube one-half inch in diameter and six inches long, containing nothing but air and open at both ends. and caused it to transmit all tones of a piano, up to a certain note, and above this to transmit no audible sound. With another similar tube, the tones below this same or any other note were refused transmission, but all higher tones passed freely.

The tubes, while entirely open and free from obstruction, have, at regular intervals, branching tubes and chambers. At each branching point waves are reflected backward through the tube.

"The design of the branches can be made in such a manner as to produce a backward reflection and an interference of almost any group of tones," Dr. Stewart explained. "This new basic method of sound wave manipulation may find application in many acoustic devices in use today. In fact there is opened to the imagination the possibility of the elimination of undesirable noises and the enjoyment of sounds adjusted to an individual's aesthetic taste."

Dr. Stewart calls his device an "acoustic wave filter".

READING REFERENCE- Munby, A.E. American research in acoustics. Nature 110:575-7. Oct. 28, 1922. Kennelly, A. E. and Kurokawa, K. Acoustic impedance and its measurements. Boston, Mass. Inst. of Technology, 1922.

AMERICA LEADS WORLD IN WOMEN HIGHBROWS

There is a remarkably large proportion of highbrows among American women. Dr. Ales Hrdlicka, anthropologist of the Smithsonian Institution, declares that his measurements of the foreheads of over 1900 men and women of American stock which has been in this country for from three to eight generations indicate that such is the case.

Taking the distance from the nasal depression to the hair line, he found that 9 per cent. of the males and 11 per cent. of the females had low foreheads. The greater percentage of lowbrows among women, Dr. Hrdlicka explained, is what is to be expected; as the female skull tends to develop less from its childhood characteristics. His figures further showed 88 per cent. of the males and 81 per cent. of the females had foreheads of medium height. Most surprising to the scientist, however, was the fact that 3 per cent. of the men had high foreheads while 8 per cent. of the women showed this development. In other races, he said, the proportion of women to men is about equal.

Although the persons examined were from the relatively cultured classes, and

perhaps among those with fewer cultural advantages the differences would not be so great, Dr. Hrdlicka said that these figures indicate that females in this country stand relatively high in the proportion of high foreheads developed. He attributed this to the educational advantages in this country. The fact that higher and broader foreheads are more frequent today and most marked in the educated classes shows that evolution is still going on, he said, although the average skull of today is still comparable to that of the later cave men of 15,000 years ago.

The earlier Neanderthal cave men and earlier human, prehuman, and anthropoid ape skulls, however, show increasingly marked differences in the development of the frontal region of the skull. There are also sex, racial, and age differences in the height, slope, breadth, and the bulge of foreheads in man today. In general, the inferior races have the low foreheads. The whites have the highest. Breadth of head, however, is misleading, he said, as the forehead of a broad head is often mistaken for a broad forehead. Proportion of head size to breadth must be taken into consideration.

Although the brain is largely responsible for the shape of the skull, there are individual variations resembling the primitive head shapes which are not due to low brain development.

Dr. Hrdlicka scored phrenologists' and so-called character-readers' pretentions at judging mental qualities of the individual by the features and other details of the face and head. Statistical study shows that that is no foundation for their claims.

RADIO FANS OF FRANCE AND U.S. TO TALK BOTH WAYS BY WIRELESS

On January 27 for the first time, two-way wireless communication was attempted between amateur stations in the United States and France, the operating department of the American Radio Relay League announces. The tests continued up to and including February 3.

The United States station 1CKP, at South Manchester, Conn., owned by George H. Pinney of that town, was operated by Charles A. Service, assistant secretary of the League. The French station was operated by Leon Deloy at Nice, France, the French amateur who was first to transmit successfully across the ocean during the recent trans-Atlantic tests.

Each transmitter started at precisely the same time each day during the tests. Each station was to call three times and sign three times in accordance with specified form and if communication was established messages were to be exchanged.

Mr. Pinney's transmitting set has two 250 watt tubes and the antenna current is eight amperes. The antenna is a six wire cage, 15 inches in diameter with average height of 65 feet. The counterpoise consists of 15 wires spaced two feet apart and 100 feet long. The French station 8AB used a wave length of 190 to 200 meters and the U. S. station 1CKP 210 meters. The receiving apparatus, owned by Mr. Service, is a three circuit two stage audio frequency amplifier.

The League announced that the ship operator, who reported hearing four west coast stations 120 miles off the coast of China, states that he copied signals from the station operated by Thomas E. Nikirk at Los Angeles, Calif., while at anchor at Tsingtau, China, also 100 miles west of Port Arthur, China, in the Gulf of Chihili within 100 miles of Pekin.

SPIES AT ICE OUTPOSTS TO SAVE SEA SHIPPING

Ice observation posts located on the bleak coasts of the far North would probably enable government experts to forecast iceberg conditions in the trans-Atlantic shipping lanes months in advance, Edward H. Smith, of the U. S. Coast Guard, said in discussing the work of the international ice patrol service since its inauguration ten years ago as a result of the "Titanic" disaster.

"The situation may be likened to that of a river," he explained. "Flotsam observed up stream in the current will later appear at the river's mouth. In this case the Labrador Current is the river whose mouth is in the vicinity of the Great Newfoundland Bank. The flotsam is the icebergs. It takes approximately five months for a berg passing Cape Dyer, Baffin Land, to appear south of the forty-fifth parallel. If a station could be located at Cape Dyer, or some other point along the Arctic drift where it sweeps in close to the shore, to report the number and dates of icebergs passing, it would prepare us to meet and deal with a situation about which today we lack advance information."

Some years produce large quantities of ice; other years bring scarcely any, Mr. Smith said. In some years the ice is held up in high latitudes, in others it drifts far south. The ice observation posts might also serve as year-round weather stations, he pointed out, as the weather is one of the chief factors which determines the flow of the ocean currents and the melting of the ice. But great difficulty has been experienced in getting meteorological records from critical points on the Greenland and North American coasts on account of the lack of suitable weather observatories.

Describing the work of the ice patrol which was organized and placed under United States management by international agreement in 1913, Mr. Smith said:

"A continuous patrol is maintained by two United States Coast Guard cutters capable of keeping the sea in all kinds of weather. Each one alternately takes a two weeks tour of duty and is then relieved by the other. When one of these ice scouts approaches the ice region, it collects all information from near-by vessels and proceeds to search the area south of latitude forty-three for signs of ice, and broadcasts information as to the limits of the ice to all approaching vessels. In connection with this scouting duty, the Ice Patrol secures scientific observations relating to the ice area and forwards daily reports to the Weather Bureau.

One of the things brought out by the evidence gathered by these vessels, he stated, is that there is no truth in the old idea that the cold Labrador current flowing south dives under the warmer Gulf Stream moving northeast and comes up again to the southward. When these two ocean currents meet, he claims, the Labrador Current is arrested, then turned toward the Gulf Stream and finally pulled along in an easterly flow parallel to it.

READING REFERENCE - Barnes, Howard T. Icebergs and their location in navigation. In Smithsonian Institution Annual report 1912. p. 717-740.
Wordie, J. M. The natural history of pack ice as observed in the Weddell sea. Shackleton antartic expedition 1914-17. Bibl. Royal Soc. of Edinburgh. Transactions 52:795-829. 1921.

SCIENTISTS BAFFLED BY FREAK COMET'S TAIL

A comet's tail one million miles in length pointed toward the sun instead of in the customary opposite direction is a remarkable phenomenon revealed by observations made at the Yerkes Observatory of a comet now far outside theearth's orbit. This is a peculiar and uncommon circumstance for which science at the present time can offer no very satisfactory explanation.

The object that exhibits this peculiar tail is called Baade's Comet, because of its discovery by Dr. Walter Baade of the Bergedorf Observatory near Hamburg, Germany, in October, 1922. It is one of three faint comets visible telescopically in the sky at the present time, and in addition to its extraordinary tail it is of interest in that this is its first visit to the neighborhood of the sun, while both of the other comets now visible have been former visitors.

A comet usually is composed of a head containing a more or less eccentrically situated nucleus, and a tail pointing away from the sun. The tail increases in size and brilliancy as the comet approaches the sun, and diminishes or even disappears again as the comet recedes from the sun.

The tails of comets vary greatly in size and shape, but generally do not differ in direction. From the fuzzy oval head of the comet there is often, to be sure, a short fan-like formation spread toward the sun, but the main appendage is almost without exception on the opposite side. Only in rare instances do we find, as in Baade's Comet, a long tail directed toward the sun.

Baade's Comet when discovered was a faint hazy object without any tail whatever. It never got within two hundred million miles of the sun. It was photographed at the Yerkes and Harvard College Observatories and elsewhere, and carefully studied at many places in Europe and America until its orbit was determined. As the comet approached the sun it began to form tails, a short broad one in the usual position and an enormously long narrow one pointing within twenty degrees of the direction of the sun.

Although this type of tail offers great difficulty to the scientist who would explain it, there is even for the usual kind of a comet's tail no entirely satisfactory theory.

Comets' tails are believed to be composed of tiny dust particles which are driven in a glowing condition out of and away from the nebulous head by some force that issues from the sun. Whether this phenomenon is caused by light pressure, or electrical action, or some as yet undescribed force, astronomers cannot demonstrate. Since the spectroscope was invented, the tails of sufficiently bright comets have been analyzed with that instrument, and much has been learned of their composition. But the cause of their existence remains a matter for intelligent speculation. The astronomers realize that any theory that purposes to explain comets' tails must also take into account this abnormal appendage of Baade's Comet.

READING REFERENCE - Denning, W.F. Observation of comets. Nature 109:613, May 13, 1922.

It is proposed to stock islands in southeastern Alaska with rabbits as food for fur bearing animals and man.

COAL BARONS TO SUCCEED ROBIN HOOD'S MERRY MEN

Sherwood Forest is underlaid with coal soon to be brought up to drive the wheels of English industry. In all that is left of the famous woods where Robin Hood's organized outlawry once reigned, extensive mining developments by British capital are going forward. The most modern electrical machinery will succeed the long bow as a means of extracting hidden wealth.

At Thoresby, in the Dukeries, a company is installing turbo-generators of considerable capacity in the established collieries and by erecting a high-power line from these it is proposed to entirely eliminate chimneys, boilers and smoke at the pit in the forest. At Clipstone, it is claimed, there is to be one of the most up-to-date pit bank and shaft equipments in existence. It is estimated that 20,000,000 British pounds could profitably be invested in sinking shafts in this practically untouched area, where several companies are now planning operations.

Hugo Stinnes, German industrial emperor, made a bid to gain a foothold in the Yorkshire fields north of this area just before the war. The new developments will be made entirely by British capital.

THERE ARE BEARS - BUT HOW MANY?

How many bears are in the Washington Zoo? Officials of the National Zoological Park admit they do not know and can only guess, for on January 7 some European Brown Bear cubs were born. As the mother bear does not come out of her retiring den until spring, however, it will be some weeks before a census of her offspring can be taken.

RECOMMEND REQUIREMENTS FOR SMALL HOUSES

As the result of an investigation of building codes and practice made by the National Bureau of Standards under Secretary Hoover's direction, a committee of experts has recommended that building codes permit 8-inch solid brick and 6-inch solid concrete walls for 2 1/2 and 3 story dwellings accommodating not more than two families each; that 8-inch hollow building tile, hollow concrete block, or hollow walls of brick shall not exceed 20 feet in height to the gables; and that frame construction be limited to 2.1/2 stories. Metal lath and plaster on wood studs properly fire-stopped is approved for party and division walls, but at least every alternate wall in row houses must be 8-inch solid brick or concrete or 12-inch hollow building tile, concrete block, or hollow wall of brick.

The average yield of potatoes per acre in the United States varies from about 60 bushels in Texas to more than 200 bushels in Maine.

The modern chocolate manufacturer simply repeats on a large scale the various steps in curing, roasting, crushing and rolling as they were first learned from the Indians.

TABLOID BOOK REVIEW

PICTOGRAMS, No. 1, The Railroad Picture Book. Edited by Charles Fitzhugh Talman. 32 pages. The Pictogram Company, Box 840, Washington, D. C. 25 cents, postpaid.

As a vehicle for carrying any message the pictorial method has no equal. Pictograms is a new and clever application of this principle. The booklet is mostly pictures with just enough description to bring out their meaning. The first number is devoted to railroading in all its phases. Everybody may be interested and anybody can learn something from it. The next issues will be on "The Pictorial History of Coal" and "With the Astronomers".

NEW PLATES MAKE X-RAY MOVIES NEARER

X-ray movies have been brought a step closer and fine details in bone structure have been revealed by the use of a new method of photographic plate sensitizing developed by Dr. C. Scheussner of Berlin, according to information reaching the American Medical Association here.

By incorporating a radioactive substance with the light sensitive substance of the roentgenographic plate or film, he has been able to record certain wave lengths of X-rays that have never been photographed before. The radioactive substances placed in the emulsion emit their own rays when the X-rays come in contact with them.

The result is described as startling. The negatives made by the new method bring out all the finer details in the structure of the bones, which otherwise can be observed only in the sawed ends of the bones themselves. Injuries and pathologic changes that the ordinary X-ray plate is blind to, will be recorded, Dr. Schleussner hopes.

There are different kinds of X-rays, varying in length, just as there are different colors of visible light, which also vary in wave length. This new X-ray plate development is analogous to progress that has been made in evolving photographic plates sensitive to red, yellow and green light. The ordinary photographic plate is sensitive mainly to blue and violet light and a dark blue sky will look white and a yellowish red flame will appear almost black.

WILL STANDARDIZE STRENGTH OF WOOD

How strong is wood? Because of disagreements and miscalculations as to the strength of lumber, which have resulted in accidents, the U. S. Forest Service, the American Society for Testing Materials and sixteen other organizations have appointed representatives to settle the question and work out standard tests for timbers.

Detailed specifications for testing steel, cement, and other products have been worked out, but the exact methods of learning the strength of wood have never been laid down.

The posterior lobe of the pituitary body, the pea size ductless gland at the base of the brain, contains an active substance which has the effect of raising the blood pressure.

The number of species of insects in the world probably exceed three million.
