New and Interesting Facts from Science and Life

WERE the FIRST BIRDS Merely Flying FISHES?

PALEONTOLOGISTS say that birds came later than fishes and reptiles in the evolution of life. But what manner of creature was it that linked fish with birds? What did the first bird that ever flew look like? Fossil remains and imprints have so far given only scant information as to how the feathered descendants of the fish or the reptile gradually came into possession of the power of flight. Intermediate links in the development have left but few and faint traces, and this is due, at least in part, to the extreme remoteness of the transition period during which birds became birds from whatever they were before. The change was so radical that, according to the estimates of scientists, millions of years were required by nature's slow methods.

Fortunately a single natural document has come down through the ages which goes far toward explaining the mechanics that made the elongated swimming fish or crawling reptile fit for sustaining, propelling and balancing itself in the air, and this document, as it happens, also is said to establish a most curious and interesting parallel between nature's experiments in flying and those fundamental experiments by Prof. Langley of the Smithsonian Institution in Washington to which the inauguration of the airplane era in flight is said to be due, more than to any other one cause.

The document referred to is a true document; for it was found printed by natural forces on the rocks of the Solinghofen quarry in Germany. Here in a formation estimated to be 7,000,000 years old, one of the ancestors of the modern bird, a strange feathered reptile, had been imprisoned, caught unawares perhaps in one of the every-day upheavals of that formative age when mountain ranges, continents and oceans were still in the making. Its skeleton, outlines and feathers are here preserved, stamped in unmistakable distinctness in stone, which is now hard, but which must have been plastic as clay when the fluttering creature was seized in deadly embrace.

"More than twice as old as any of the prehistoric monsters reconstructed from their bones in museums of natural history," says Maurice Krosby in Popular Science Monthly, "the fossil imprint of the Tetrapteryx, as this creature has been named (meaning four-winged), represents an indisputable and descriptive record of perhaps the earliest feathered flyer.

"The Tetrapteryx record was discovered 55 years ago, but science has only recently undertaken to interpret it mechanically. William C. Beebe, while curator of birds at the New York Zoological Park, demonstrated that several species of modern birds, and especially the white-winged dove, show very marked traces of just such wings on the legs, called pelvic wings, as the Tetrapteryx record reveals.

"On the very young dove, at the time when its body is still bare but for the sprouting flight features of wings and tail, 12 flight features and six covers begin to grow from the outer and upper edge of the leg, extending in two rows from the knee almost to the base of the tail. The growth of these telltale feathers is soon arrested and is covered up in the surrounding plumage, so that the grown bird shows only traces. The fact that the young of the species pass rapidly through the same evolution that is represented in the succession of innumerable generations of their ancestry almost clinches the conclusion that birds are descended from a type equipped with wings on all four limbs, as the Tetrapteryx, and that nature has learned gradually to replace four small and imperfect wings, weakly muscled, by two larger and stronger wings under perfect control.

Scientists Say That Seven Million Years Ago the First Bird Began to Fly When the Elongated Crawling Reptile or Swimming Fish Instinctively Spread Their Limbs When Falling from Trees or Jumping up in Exuberance of Spirits.

"Frederic A. Lucas, director of the American Museum of Natural History, called attention last year in the American Museum Journal to the great force of the evidence which has thus been collected to prove how nature learned to accomplish flight, the interest centring in birds, on account of their considerable weight, rather than in bats and insects.

"The original, four-winged bird came from a race whose fore and hind limbs were spaced well apart, whose legs were relatively heavy and whose arm muscles were weak. Its structure had to be modified by hereditary influences before it would balance at all in the air, hung from the arm sockets alone, as birds do.

"Meanwhile, nature adopted the compromise solution of upholding the rear weight by large, feathery extensions from the legs and tail, and it may be noticed that the fantastic feather tail of the Tetrapteryx was built up around a tail-like appendage and was not all feathers under muscular control like that of the modern bird. Nature evidently found it impossible to change the bony structure in less than millions of years, working from the basis of a reptile with only growth and heredity as the tools at command, but she could make feathers grow in the place of horny scales, which are made of almost the same material, by a comparatively brief evolution."

WHAT THE POPE'S SAFE CONTAINS

THE mechanism of the finances of the Holy See, so long a secret even to the majority of cardinals, will be revealed to the world soon, it is believed, because of the deficits caused by the war.

"It was recently stated to me," says a contributor to a recent number of London Answers, "that Pope Benedict himself hasn't the slightest idea of the organization of the Holy See's finances, and that, in view of the extraordinary expenses laid upon the Vatican by the war in the way of charities, pensions and contributions, he will see the necessity of calling in banking advice, and having an entire readjustment made according to modern banking ideas.

"Just previous to the death of J. P. Morgan, who was a frequent visitor in Rome, it had been arranged to secure his advice in this connection, and he had had a preliminary conference with Pius X. But the deaths of both Mr. Morgan and the Pope put an end to the matter for the time.

"Such reorganization is considered all the more urgent, not only because of the present lack of revenue from such nations as Belgium, France and Austria, but because after the war the Vatican will consider it its duty to help in the reconstruction of Catholic countries. It is pointed out that, in the same way as all of the world's wealthiest nations have so far been forced to put out immense loans to secure funds to maintain their government expenses, the Vatican might issue a world-wide loan.

"Those Vatican officials who at the present time must daily discuss with the Holy Father decisions to be taken regarding appeals for aid, relate many instances of his indifference to money as money and of his generosity.

"'This is a case where the right hand must not know what the left hand does,' is one of his favorite expressions when favorably deciding some one of the many appeals submitted. In his office is a large safe where are kept the moneys which reach the Vatican in the form of the world-wide Peter's pence collection, taken up in all the Catholic churches of Christendom at Christmas, or of gifts made personally to the Holy Father by individuals or churches or dioceses. To this safe Pope Benedict goes and takes out the money he sees fit to give.

Just what amount of money lies in the Pope's safe is unknown to him, according to Vatican officials.

"'He has never taken the trouble to count it, and won't bother about it,' explained one official, 'unless some day he finds it empty, or else in need of some very large sum.'

"The capital in the treasury of the Holy See, for the most part invested in interest-bearing bonds of various sorts, has been placed at about $8,000,000.

"As the Popes never leave the Vatican grounds, their personal expenses are said to average about $500 a year for food, lodging and clothes."

Why WOOL CLOTHING Is Warmer Than COTTON

WHAT is it in wool that gives it a reputation for warmth superior to that possessed by fibres of vegetable origin? Not merely the fact that wool is an animal fibre, but because it is so constructed as to entrap air in small spaces, thus forming an excellent insulator. Called upon to decide the relative efficiency of wool and cotton provided with a heavy nap by mechanical methods, an apparatus had to be constructed for the test. This device, as described in the Scientific American, consisted of a copper vessel heated electrically, provided with thermostatic control and surrounded by an atmosphere artificially maintained at the freezing temperature. The fabric under test was wrapped about the copper vessel where it acted as an insulator, and the amount of electrical energy required to maintain the contents of the vessel at body heat was a measure of the efficiency of the cloth in keeping a wearer warm.

As a result of a series of tests it was found that cotton can be provided with a nap such that it will have seven-eighths the heat-retaining capacity of wool.

In some recent analyses of cloth to determine the fibre composition it was found that strong cotton thread had been wound with short fibred wool and then woven. This cloth had all of the appearance of wool, its warmth and "feel" together with the strength due to the cotton foundation. Now this cloth may become much more common and it is well to recognize that the combination is quite reasonable. Of course it should not be sold as all wool or even as wool mixture for that term may be so manipulated as to convey the wrong impression regarding the percentage of cotton present but the short wool would make a poor fabric unaided by the cotton, while the wool adds much of real value even if of short fibre or shoddy.

The war will continue to make it difficult for the world to clothe itself, for besides obstacles to production there is an increased demand. An average of 65 pounds of wool per soldier is said to be required each year, and a simple calculation will indicate what that means. It becomes attactive therefore to provide new fibres and great effort is being expended to this end.

"FILARIASIS," STRANGEST of All Parasitic DISEASES

ONE of the most peculiar of all tropical diseases, and one that is very common in some parts of Africa, is filariasis, caused by a parasite called the filaria. In the blood of persons suffering from it there are found innumerable little worms that can be seen only by the aid of a microscope. These are present only at night in the blood that is circulating. At about 5 o'clock in the afternoon they begin to appear in the blood, having been hidden away in the body until this time, and then they remain in the circulation until about midnight, when they begin to diminish. By 8 or 9 o'clock in the morning they have all disappeared, and a search of the blood under the microscope after this fails to reveal any. They are now collected in certain large blood vessels deep in the body, especially in the lungs, where they remain hidden until they go out on their next nocturnal excursion.

The parasite is conveyed to human beings by the bite of certain kinds of mosquitoes. The mosquito bites and takes from a man, or from some animal, as the case may be, blood which contains these small worms. In the stomach of the mosquito (the intermediate host) the parasite goes through certain definite changes or metamorphoses which are just as necessary to its complete life as are the different phases in the lives of butterflies, moths and a great many insects. First it escapes from a skin or shell in which it has existed. Then it bores its way through the wall of the mosquito's stomach and travels forward through the body until it arrives at the base of the bill or proboscis. Here it curls itself up and waits until its host begins to feed upon a warm-blooded animal, when it passes out and finds its way into the circulation of the animal.

These filariae behave in a curious way which has the same effect as though dictated by intelligence—that is, when the mosquito, in the absence of animal food, feeds upon fruit, such as bananas, the filaria does not leave its comfortable berth but continues to wait until it has the chance to enter the circulation of a warm-blooded animal. A possible explanation of this, however, is that when a mosquito bites a human being, it first injects a small amount of fluid secreted in its salivary gland. This fluid prevents the blood from coagulating and stopping up the very small bill through which it is drawn. This poisonous substance is the cause of the swelling and itching that follow moquito bites. It is not known but that the filaria is injected along with this, for it is fair to assume that the insect would not need to inject the secretion when feeding on bananas, as banana juice does not coagulate.

Is the "FLAPPER" FAN the Best Breeze Maker?

IF you have ever visited India or other parts of the Orient, then you will at once recall the "punkah"—the slow-moving, feather bedecked fan, wielded by a husky native at a cost of a few cents a day. Two English inventors, who evidently had sweet memories of a trip to the Orient, have taken out a United States patent on just such a "flapping fan," only it is operated continuously, when desired, by the ever-obedient genie, electricity.

The "Flapper" Fan, Which Brings to Mind the Oriental Breeze Maker or "Punkah," Is Said to Produce the Most Healthful Circulation of Air Possible.

The employment of rotary fans, say the inventors, whether of the oscillating or other type, as a means of agitating the air for the purpose of ventilation, gives rise to discomfort owing to the fact that the action of the fan produces a continuous draft, usually in one direction only, while, if a rotary fan of the so-called blower type be employed, the resulting introduction of air from outside is or may be objectionable for the reason that such air may have a temperature either too high or too low relatively to that of the air within the ventilated space and may in addition be laden with impurities or micro-organisms which it is difficult to get rid of.

It has, however, been demonstrated by experiment (as recently stated in medical journals) that, contrary to the common supposition, continual renewal of the air within a closed space is not essential to the health or even the comfort of the occupants, although, for the sake of both health and comfort, it is imperative that the air within the space should be kept in motion. It is, moreover, true that a punkah, as commonly used in hot climates, serves for agitating the air without either creating a continuous draft in one direction or introducing air from outside. But not only are the prime and running costs of a punkah excessive relatively to the benefits obtained from its use, but the fact of a punkah being of necessity permanently installed overhead or near the ceiling has the effect of seriously diminishing its efficiency, for the reason that movement is imparted chiefly to the upper strata of the air while the lower strata, which are breathed by the occupants of the apartment, are not directly affected by the agitation set up by the punkah. Who ever thought the punkah covered such a multitude of scientific laws and out-laws!

The fan actuating mechanism as pictured and described in the Electrical Experimenter, is very simple; in the case of the motor-driven type a cam shaft causes a sliding shaft to work back and forth inside the flexible goose-neck stem shown, thus causing the fan blade to rise and fall alternately. For battery (or 110 volt) systems they have perfected an extremely efficient electro-magnetic mechanism, which is attached to the sliding shaft aforementioned. This design would appear to solve the battery fan problem at last.

THE CHINESE MOTHER

THE crowning glory of a Chinese woman is motherhood. At its altar she removes her sandals of worldliness and unclasps her garments of materiality. She prefers death in childbirth to a defeated motherhood.

The selection of a wife for a son involves great responsibility on the part of Chinese parents. Five considerations influence their choice. No matter how lovely the girl herself may be, they always hold. A girl who comes of a rebellious house, is of criminal descent, has a leprous blood taint, or has been motherless from infancy, is tabooed. Family is of more value than worldly goods.

The young Chinese wife in anticipation of motherhood separates herself from her husband until the child is born.

The pre-natal rules are lived up to in Spartan mother fashion. The prospective mother must sleep upon her back, stand or sit erect and well balanced, never laugh loudly, avoid crowds, disastrous or unpleasant sights, let her mind dwell only on harmonious things, her eyes must see only the beauty in her surroundings and her ear be attuned to music. She must avoid seeing or talking of deformities, eat only the most perfectly prepared food, look upon only the best workmanship in all occupations, and show the utmost obedience to all the higher laws of life. These are the important rules looked upon as to be observed during the gestatory period if a perfect child is to be the result of her care. Modern science is lending a newly attuned and attentive ear to arguments on this great subject which has already been demonstrated and proven to the satisfaction of the followers of new or, to speak more truly, recently adopted mental religious cults.

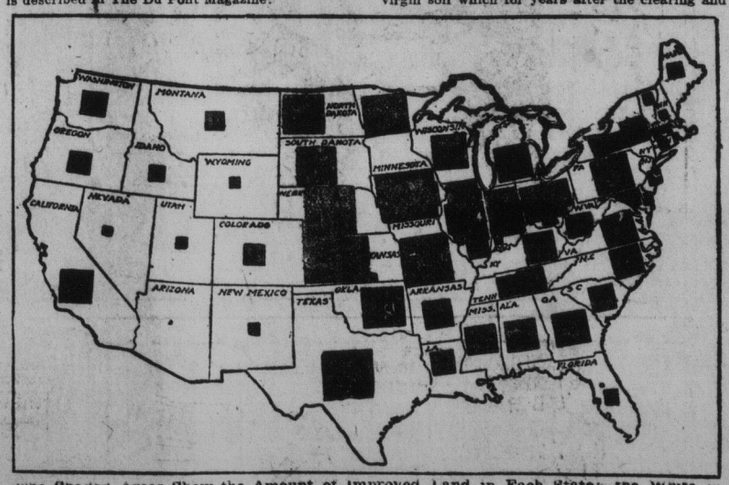
Newspaper Feature Service, 1918.

Uncle Sam's 400,000,000 UNCULTIVATED ACRES

IT is estimated that there are over 400,000,000 acres of unimproved land in the United States.

In these days, when more food is needed for the world, why not put this land to work? If food is to win the war, that is, if the ultimate victory is to rest with the side that can feed its population and its troops the longest, then the problem of land improvement is of the highest importance.

A land-clearing demonstration recently held under the auspices of the University of Wisconsin is described in The Du Pont Magazine:



The Shaded Areas Show the Amount of Improved Land in Each State; the White is Yet to Be Cleared.

"Wisconsin has recently adopted legislation to facilitate land-clearing, and this is doubtless a most favorable opportunity, the writer thinks, to put land into tillable condition. Even the stumps can be sold, the present fuel shortage giving them considerable value for this purpose.

"The war in Europe is playing havoc with farming over there. Millions of acres of Europe's farm lands are idle, and probably will remain idle for years after the conclusion of the conflict. This condition puts it up to America to produce food enough for all, and she can do it because she has the land, provided every acre of it is cultivated and forced to maximum production. The millions of acres of cut-over land and swamp-land that now occupy parts of our country should be included in the cultivated areas.

"Think of what it would mean if the 400,346,575 acres of unimproved land in this country were put to work producing crops. Beneath the stumps and rocks is concealed a gold mine, and there is more profit to be derived from the mining of farms than from the mining of mountains. The ground occupied by one average stump will produce from 25 to 50 cents' worth of food per year.

"The cost of clearing land must be paid but once, whereas the profit derived from it will go steadily on through generations. Cleared land is virgin soil which for years after the clearing and 'taming' will yield bumper crops, with minimum expense for fertilization. Expenditures for land-clearing are permanent investments that will be returned many times over in profitable crops.

"In Wisconsin there are still thousands of acres of very fertile cut-over land. With its usual commendable enterprise, the university set about to see what could be done to get more of this land cleared and under cultivation, and in the spring of 1916, before the United States had entered the war, sent out an agricultural engineer to locate points for large public land-clearing demonstrations. The university itself organized a demonstration crew and obtained the co-operation of three railroads operating in the state to run trains over their roads with a view to showing the settlers how to clear their land."