SCIENCE NEWS

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THE NEWLY DISCOVERED MAN-APE SKULL

FROM a study of the face and brain cast of the childish specimen of the man-ape, *Australopithecus africanus*, found at Taungs, Bechuanaland, Professor Raymond A. Dart, of Witwatersrand University, its discoverer, has come to the conclusion that this new creature, believed to be intermediary between ape and man, was far further advanced than any living anthropoid ape.

Professor Dart also declares that it seems probable that in view of this and other new and important discoveries connecting the early history of man with Africa, it is likely that the Darwinian claim that Africa is the cradle of mankind will be substantiated.

"This group of beings, having acquired the faculty of stereoscopic vision, had profited beyond living anthropoids by setting aside a relatively much larger area of the cerebral cortex to serve as a storehouse of information concerning their objective environment as its details were simultaneously revealed to the senses of vision and touch and also of hearing," Professor Dart says, referring to man-apes, of which the six-year old child, Australopithecus, is a sample. "They possessed to a degree unappreciated by living anthropoids the use of their hands and ears and the consequent faculty of associating with the color, form and general appearance of objects, their weight, texture, resilience and flexibility, as well as the significance of sounds emitted by them. In other words, their eyes saw, their ears heard and their hands handled objects with greater meaning and to fuller purpose than the corresponding organs in recent apes. They had laid down the foundations of that discriminative knowledge of the appearance, feeling and sound of things that was a necessary milestone in the acquisition of articulate speech.

"There is an ultra-simian quality of the brain depicted in this immature endocranial cast which harmonizes with the ultra-simian features revealed by the entire cranial topography and corroborates the various inferences drawn therefrom. The two thousand miles of territory which separate this creature from its nearest living anthropoid cousins is indirect testimony to its increased intelligence and mastery of its environment. It is manifest that we are in the presence here of a prehuman stock, neither chimpanzee nor gorilla, which possesses a series of differential characters not encountered hitherto in any anthropoid stock. This complex of characters exhibited is such that it can not be interpreted as belonging to a form ancestral to any living anthropoid.

"Unlike Pithecanthropus, it does not represent an apelike man, a caricature of precocious hominid failure but a creature well advanced beyond modern anthropoids in just those characters, facial and cerebral, which are to be anticipated in an extinct link between man and his simian ancestor. At the same time, it is equally evident that a creature with anthropoid brain capacity, and lacking the distinctive, localized temporal expansions which appear to be concomitant with and necessary to articulate man, is no true man. It is therefore logically regarded as a man-like ape.

"It will appear to many a remarkable fact that an ultra-simian and pre-human stock should be discovered, in the first place, at this extreme southern point in Africa, and secondly, in Bechuanaland, for one does not associate with the present climatic conditions obtaining on the eastern fringe of the Kalahari desert an environment favorable to higher primate life. It is generally believed by geologists that the climate has fluctuated within exceedingly narrow limits in this country since Cretaceous times. We must therefore conclude that it was only the enhanced cerebral powers possessed by this group which made their existence possible in this untoward environment.

"In anticipating the discovery of the true links between the apes and man in tropical countries, there has been a tendency to overlook the fact that, in the luxuriant forests of the tropical belts, nature was supplying with profligate and lavish hand an easy and sluggish solution, by adaptive specialization, of the problem of existence in creatures so well equipped mentally as living anthropoids are. For the production of man a different apprenticeship was needed to sharpen the wits and quicken the higher manifestations of intellect—a more open veldt country where competition was keener between swiftness and stealth and where adroitness of thinking and movement played a preponderating rôle in the preservation of the species. Darwin has said, 'no country in the world abounds in a greater degree with dangerous beasts than Southern Africa,' and, in my opinion, Southern Africa, by providing a vast open country with occasional wooded belts and a relative scarcity of water, together with a fierce and bitter mammalian competition, furnished a laboratory such as was essential to this penultimate phase of human evolution.

"In Southern Africa, where climatic conditions appear to have fluctuated little since Cretaceous times, and where ample dolomitic formations have provided innumerable refuges during life, and burial-places after death, for our troglodytic forefathers, we may confidently anticipate many complementary discoveries concerning this period in our evolution."

THE PREVENTION OF THE SPREAD OF PLANT AND ANIMAL DISEASES

THE eternal vigilance that is the price of freedom from diseases of plants, animals and men was discussed before the Washington Academy of Science, on February 19, by representatives of the three government agencies charged with the task of keeping immigrant diseases from American shores. Dr. J. R. Moller, of the Bureau of Animal Industry, told of the development of quarantine and sanitary safeguards over the importation of

animals; Dr. C. L. Marlatt, of the Bureau of Entomology, spoke on plant diseases and insect pests, and Dr. Lawrence Kolb, of the Public Health Service, summarized the situation as regards human immigration.

Two conditions, Dr. Moller said, are making it increasingly possible for an animal disease to make great headway once it gets a foothold. These are the great crowding to which dairy cattle are subjected and the present-day methods of handling all kinds of animals intended for market, with the long journeys and the congestion at market and shipping points. This makes for a much more dangerous situation than did conditions a couple of generations ago, when there were far fewer animals and no long hauls. As an example of the rapidity of spread, Dr. Moller cited the case of the 1914 outbreak of hoof and mouth disease, when the plague spread over twenty-two states and the District of Columbia in thirty days.

To combat live stock diseases, which are now causing an annual loss of over $200,000,000, stringent regulations are now imposed on all importation. But in spite of all precautions, Dr. Moller stated, diseases sometimes get through, and by most surprising means. The 1914 outbreak of hoof and mouth disease came in as a contamination in medical supplies from the Orient; the 1924 outbreak in Texas, which was not in any way connected with the California epidemic, apparently started from a pasture where aviators, smuggling contraband goods across the border from Mexico, were accustomed to land and where they threw away the hay used for packing.

A further danger pointed out by Dr. Moller lies in the fact that cattle which are denied entrance to gulf ports have been taken to Vera Cruz and sold there; and their diseases, of course, have an opportunity later to spread across the border.

Dr. Marlatt took up the tale for plant diseases and insect pests, and told of the struggle for the passage of an adequate plant quarantine act. Over fifty per cent. of our plant diseases and pests, he said, are aliens. Their dates of introduction range all the way from colonial days, when the Hessian fly and the codling moth came to America, up to the past three or four years. By a curious irony of events, he said, some of the worst pests were introduced by people with the best of intentions. The San Jose scale, for example, came in with a shipment of Chinese stock sent by a scientific missionary to a friend in California. The gipsy moth was introduced by a French professor of mathematics whose biological information was not on a par with the rest of his learning, and who had a notion that he could breed a race of hardy hybrid silkworms in Massachusetts. The white pine blister rust came in on imported seedlings, which had been raised in Germany from American seed.

The most recent and in some ways the most tragic of pest introductions was the coming of the Oriental fruit worm. This came in with a shipment of ornamental Japanese cherry trees, sent by the city of Tokyo to the city of Washington as a gesture of international goodwill. The worm has spread all over the Middle South, and it is feared that it will seriously affect the great peach region in Georgia.

As for the diseases not yet here, but awaiting their chance to get in, Dr. Marlatt said their name is legion. He has compiled a list of some three thousand of plant diseases and insect pests as yet unknown in the United States. And even more than the known diseases, he said, we must dread the unknown; for the latter can come upon us unaware and we do not know how to fight them until we discover them.

Dr. Kolb spoke briefly on the work of the Public Health Service with the immigrant. The principal causes for exclusion or deportation, he stated, are mental defects, epilepsy, chronic alcoholism and loathesome and incurable diseases.

GAME FARMS ON THE PACIFIC COAST

WASHINGTON and Oregon have become Edens for sportsmen through the operation of large farms for breeding and introducing game birds for many lands. California is watching with the interested eye of a possible competitor and contemplating like action in the near future. This is the gist of a report to the California Board of Fish and Game Commissioners by Executive Officer George Neale, who has just returned from a tour of inspection of the game farms of the northern coast states.

Oregon has three state game farms, maintained out of hunters' license fees, from which nearly 22,000 pheasants were set free during the two-year period 1923–24 and where breeding stocks of several thousands of Chinese and Mongolian pheasants and Hungarian partridges are constantly maintained. Washington has two game farms, which propagate not only the pheasants but also grouse, two species of partridges and the eastern bob-white. One unique feature of the Washington farms is the fact that one of them is maintained by the labor of convict "trusties," and the other by the more competent inmates of the state institutions for the mentally afflicted. Good results are claimed in both places.

"A peculiar situation now exists in both of these states," concludes Mr. Neale, "inasmuch as some native game birds are strongly recommended to be placed on the protected list for a number of years, while nearly all the introduced game birds, domestically raised and liberated, are now on the open list and furnish the sportsmen ninety per cent. of the upland bird shooting."

THE DEVELOPMENT OF PHOTOGRAPHIC FILMS AFTER FIXING

TOPSY-TURVY methods of developing photographic films and plates, by which the process is carried out in daylight instead of a dark-room, and the film is placed in the fixing bath first and then in the developer, has been shown possible as the result of experiments made at the Wagner Free Institute of Science, by Dr. Henry Leffman, over a number of years. The plate or film is first placed in a dilute solution of sodium thiosulfate, commonly called "hypo." This is done in a dark-room. Although it seems entirely transparent when brought out into daylight, it is placed in a special developer and the image

appears. The inventor of the process claims that this is a great advantage since there is plenty of light to observe the action.

In photography, the silver bromid is mixed with some substance such as gelatine that can be spread out in a thin layer on a glass or celluloid support. This forms the plate or film and when exposed in the camera to the image formed on it by the camera lens, the parts struck by the light are affected, while the others are not. No change is apparent if the film is then examined, but this invisible or latent image may be brought out by development, which changes the latent image into one of very minute particles of metallic silver. This process leaves the parts that were not reached by the light as unchanged silver bromid, so it is necessary to remove it by fixing. Sodium thiosulfate dissolves the silver bromid, but not the metallic silver and the result is the familiar "negative," with dark areas corresponding to the lights of the original scene.

This being the case, it would seem that if the silver bromid were first dissolved away by fixing, the latent image, supposed to be due to a change in the molecule, would go with it but Dr. Leffman has demonstrated that it persists in the gelatin itself. The ordinary developer can not be used but by means of a special one containing mercuric chlorid or bromid, metallic mercury is deposited where the silver would have been if the plate had been treated in the usual manner and the negative may be printed in the ordinary way.

THE ACQUISITION OF MALE CHARACTERS BY FEMALE PIGEONS

THE changing of sex from female to male in a number of pigeons in flocks kept for scientific study at Cold Spring Harbor, Long Island, has led Dr. Oscar Riddle, of the department of genetics of the Carnegie Institution of Washington, to some interesting and far-reaching speculations.

Dr. Riddle's observations started several years ago, when a female pigeon, as a result of a diseased condition, turned into a male. After a life of normal housewifely behavior, she ceased laying eggs, and after a time began conducting herself—or rather "himself"—as a male in mating behavior. When the pigeon died, it was found that the female sex gland—all female birds have but one ovary, the left—had degenerated, and that on the right side of its body a male sex gland had developed.

This led Dr. Riddle to further investigations. In many dissections which he conducted himself and in numerous recorded cases which he examined, he discovered that wherever similar changes of sex in birds or mammals had occurred, it was always on the right side that male reproductive tissue developed, either exclusively or at least to a larger extent than it did on the left. He also found that in normal male individuals there was a tendency for the left sex gland to be smaller than the right.

The whole situation leads to the interesting suggestion, in Dr. Riddle's opinion, that there is a difference in degree of sexuality between the two halves of the body, the right side being more strongly male in male animals, and the left side more strongly female in female animals.

Another suggestion is put forth by Dr. Riddle. The determination of what sex an animal is going to be has always been supposed to be unchangeably fixed from the very beginning of life development. There are certain structures in the cell, called chromosomes, that in most cases seem to settle the matter once and for all. These changes in sex, taking place long after birth, appear to bring the whole idea of the unchangeable determination of sex into question. Dr. Riddle suggests that not only the character of sex, but "other chromosome-determined characters may have the course of their development altered; and thus heredity may not have the fatefulness usually ascribed to it. It does not follow, however, that the hereditary factors are transformed, nor that the character-transformation at all affects the succeeding generations."

ITEMS

IN the January 2nd number of SCIENCE it was stated that the first large artificial single crystals of copper were made by Professor P. W. Bridgman. These crystals were made by W. P. Davey, of the Research Laboratory, General Electric Company, Schenectady, N. Y., using a slight modification of the unpublished method developed by Professor P. W. Bridgman for metals of much lower melting point.

THE production of sponge iron, a finely separated form of the metal and very useful in chemical and metallurgical industry, has been made possible on a large scale by researches conducted at Seattle by the Bureau of Mines of the U. S. Department of the Interior. The process depends on the fact that most iron ores are oxides of iron, and that if the oxygen can be extracted at temperatures so low that the iron does not fuse or run, it is left standing as a very fine, porous metallic sponge, presenting very large areas of free surface, on which the reactions of chemical manufacturing processes can take place. The process also promises to render possible the profitable production of iron from low-grade ores and furnace wastes.

THE eclipse of the sun had no direct effect on the heights of tides, according to officials of the U. S. Coast and Geodetic Survey. Variations in the height of tides are greatest and least at new and full moon, when the sun and moon are practically in the same line with the earth. At the time of the eclipse, the earth, moon and sun were lined up and the combined pull of the two heavenly bodies was being exerted on the earth and its waters; but this pull was not appreciably greater than at the usual periods of full moon. In checking up one of the several reports of unusual tidal conditions attributed to the eclipse, experts of the U. S. Coast Survey discovered that the supposed effect occurred four hours after the eclipse and was no greater than that recorded for the day before the eclipse.