SCIENCE NEWS

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A NEW SKULL OF THE APE-MAN OF JAVA

THIS title of the earliest human being that ever walked the earth is restored to the Ape-Man of Java, *Pithecanthropus erectus*, after years of doubt, by the discovery of a new skull, reported by Dr. John C. Merriam, president of the Carnegie Institution of Washington, at the recent meeting of the trustees of the institution. The discovery was made by Dr. G. H. R. von Koenigswald, of Bandoeng, Java, a research associate of the institution.

The new skull was in more than forty pieces when it was picked out of its age-long resting-place in the gravel beds of the Solo River and has not yet been fully patched together. However, Dr. von Koenigswald has determined that it is definitely human, a point hitherto considerably in doubt. Only last spring, the discoverer of the first skull, Dr. Eugene Dubois, reported his conversion to the opinion that the Ape-Man was an ape and not a man.

The new-found fossils consist of a lower jawbone and a much broken skull-cap. The jawbone still contains several teeth and the sockets from which others have fallen out. Of particular importance is the third lower molar, or wisdom tooth. This is very large, showing no trace of the reduction common in most human jaws, and is characterized by Dr. von Koenigswald as an ape-like feature. On the other hand, the socket of the eyetooth is small, therefore not ape-like. The wrinkling of the crowns of the molars is more complicated than in modern man but less than in Peking Man, and is more similar to that of Neanderthal Man.

The skull-cap is definitely human in the position of the ear, and in the way the lower jaw was jointed to the skull, but lacks a well-developed mastoid process, and in this respect it is ape-like. Summing up, Dr. von Koenigswald says, "By these new finds it can be definitely proved that *Pithecanthropus* is human."

The age of the Java Ape-Man, Dr. Merriam commented, is not as great as was supposed when Dr. Dubois discovered the first skull-cap, more than forty years ago. Then, the fossils were stated to belong to the period before the Ice Age, and to have an antiquity of more than a million years. Recently discovered fossils of extinct animals in the same gravel beds indicate that *Pithecanthropus* existed some time near the middle of the Ice Age, and is therefore not much more than half the formerly supposed age.

MODERN PHYSICS FOR THE LAYMAN

TEN years ago a physicist would have been able to draw a picture of an atom for you that looked something like a solar system in miniature. To-day scientists confess that such a picture is obsolete and there is nothing fit to satisfy you or fit to hang on the wall. Intricate mathematical equations and explanations replace old concepts. You can have mathematical "pictures" much more useful and satisfying to the physicist.

This abandonment of atom models was the mark of modern physics emphasized at the symposium on "Philosophical Concepts in Modern Physics" being sponsored by the Franklin Institute. Four of America's leading physicists lent a hand to struggling laymen who haltingly ponder the seeming paradoxes of modern mathematical physics. They were Dr. E. U. Condon, of Princeton University; Professor J. C. Slater, of the Massachusetts Institute of Technology; Professor E. C. Kemble, of Harvard, and Dr. W. F. G. Swann, of the Bartol Research Foundation of the Franklin Institute.

Here are some clues to the mental changes needed in the orientation of oneself in the stream of modern physical discovery and experiment. Stop asking the physicists to backtrack and launch their attacks on fundamental problems about matter by starting with the things you think you understand. That would be like trying to build Bolder Dam with pick and shovel. And above all don't put too much reliance in what you may think is your common sense. Remember that common sense, like Einstein's theory, is relative.

Modern physics is not becoming lost in unrealities. Each symbol and their collection into a mathematical what will happen when certain physical conditions are equation serves the very practical purpose of forecasting thus and so. The forecasts of modern physical theory are much more accurate than such familiar predictions as to-morrow's weather. And, because they deal with much more basic happenings, they eventually should have much more importance. Already hope has been spurred that major conquests of disease will come out of experiments on artificial radioactivity and the transmutation of the elements; experiments, it should be emphasized, which are guided at almost every step by the prediction of symbols in modern mathematical physics which it is all too easy to scoffingly misunderstand or fail to appreciate.

One needs a sharp mental readjustment to get over the idea that electrons and atoms and electric waves are real things that you can touch or see. Many people know that one can't see electrons, but familiarity with the term lends a sort of mental faith in their reality. These terms of modern physics are merely convenient—and often misleading—mental concepts which represent certain symbols in mathematical equations. The things that may seem real turn out merely to be "tools" of the mind just as a test-tube is a tool of the chemist. Moreover, you will need to recall the goal of physics, which is not to build up a lot of mental models, but rather to set up the simplest relationships which will explain and predict what happens in the physical world around us.—ROBERT POTTER.

RADIO WAVES IN THE TREATMENT OF DISEASE

NEW researches at the California Institute of Technology hold the possibility of offering the long-sought goal of selective treatment of various organs of the body

by those ultra-short radio waves now being employed to produce artificial fever in the therapy of disease.

Cancer, rheumatic fever, arthritis, syphilis, gonorrhea, St. Vitus Dance, and certain ocular diseases are among the afflictions of mankind which have been treated by artificial fever induced by high-frequency radio waves. They all represent potential direction in which the treatment may be extended with new and perhaps more successful results.

Professor G. Potapenko, of the department of physics, is the man whose findings may yield these important practical results. For more than a year he has been investigating the absorption of short radio waves, 8 inches to 4 feet in length, as they pass through many substances.

Contrary to present-held theories the point of maximum absorption seemed not to depend greatly on the size of the molecules in the substance, but rather on the size of part of the molecule which can be called the "tail." This "tail" seems to rotate freely about the axis of such molecules as those of alcohol.

The exact knowledge of the maximum of absorption is necessary to produce the selective heating of specific organs or parts of the body. Those parts containing molecules with orienting "tails" can be easily administered.

All that is necessary, points out Professor Potapenko, is to tune the radio wave generator to the wave-length corresponding to the maximum of absorption. Otherwise the effect is one of general heating like that now used to produce a general artificial fever in the whole body.

One new and significant finding, previously unknown, is that to eliminate the general heating and direct the benefits upon the liver or tumor, for example, the wave-lengths of the radio waves must be considerably shorter than those now used in practice.

From the medical standpoint a valuable contribution will be the development of a table giving the proper length of radio wave to be used in treating various parts of the body.

The medical application of Professor Potapenko's research were not the initial goal of the scientist who is a physicist rather than a physician. His research began when it was found that alcohol molecules failed to behave according to the well-known and favored theory of Professor Peter Debye.

It became necessary to reinterpret the Debye theory which holds that if a particle is a dipole it must orient itself in an electric field. A dipole is a pair of electrical charges, one positive and one negative, separated by a small distance. In the case of an alcohol molecule the dipole is made of two parts due to the carbon and hydrogen atoms combined with oxygen atoms.

According to theory the orientation causes energy to be absorbed and gives a maximum absorption in certain wave-lengths which depends primarily on the size of the molecules.

Finding that this prediction was not obeyed in his experiments Professor Potapenko was led to the conclusion that the molecules themselves did not orient, but just their "tails." The molecule remains at rest. Therefore the size of the "tail," and not the size of the molecule, determines the crucial maximum of absorption for the ultra short radio waves.

A SURVEY OF SYPHILIS IN CHICAGO

THREE FOURTHS of the victims of newly acquired syphilis in Chicago fail to complete curative medical treatment by their physicians, the minimum cost price of which is some $300 a case. Half the patients who go to clinics, at much less cost, stop treatment too soon. These facts, unearthed in an official survey, indicate that money is the chief need in the campaign against this serious venereal disease. They seem to provide argument for financing of the anti-syphilitic treatment from public funds.

To the Chicago Medical Society, Dr. R. A. Vonderlehr and Lida J. Usilton, of the U. S. Public Health Service, and Howard Hunter, of the Works Progress Administration, presented without economic argument the data of their syphilis survey conducted with the cooperation of the Chicago and Illinois health departments and Chicago clinics and physicians. It is the most extensive syphilis survey ever made.

Syphilis afflicts 44 out of every 10,000 persons in Chicago, the survey showed. This figure is based on reports from clinics and private physicians which showed that 14,350 patients with syphilis are constantly under medical care in the city. Syphilis in this city is 8.5 times more frequent in the Negro than the white population. Over 15,000 persons with syphilis seek treatment annually but of these only 2,500 have the disease in its early, curable stages. The number of syphilitic patients coming for treatment increased markedly during the three months of the survey, indicating that the anti-syphilis campaign is beginning to have results.

A particularly black spot in the picture is the situation with regard to syphilis in expectant mothers. In half of these women the disease was not detected until after the fifth month of pregnancy. In those in whom it was detected before the fifth month only one fifth had sufficient treatment to insure the birth of a living, non-syphilitic baby. The effectiveness of the treatment of the mothers could not be accurately learned because in half the cases no examination was made of the baby to determine whether or not it had escaped syphilis.

THE INCREASE IN AIRPLANE SIZE AND AIRPORTS

AN aviation industry and a host of local government officials, already acutely worried about the necessity of enlarging the nation's airports, heard their worst fears confirmed. Airplanes within the next few years will grow larger and faster and will require still bigger landing fields, declared Dr. George W. Lewis, director of research of the National Advisory Committee for Aeronautics.

Dr. Lewis, speaking before the Airport Conference called in Washington by the U. S. Bureau of Air Commerce, stated that municipalities which have reached their financial limit in building airports now becoming obsolete can not expect aeronautical engineers to turn out large planes able to use existing facilities, nor can they expect the aviation industry to attempt to keep down the size of the plane.

Scant hope was held out by Dr. Lewis of any development in the immediate future enabling large planes with a greater wing loading or power loading, weight per square foot of wing surface and per horse power developed by the plane's engines, to take off and land within the confines of present-day airports. The use of catapults and the development of the tricycle landing gear offer some hope, but not for the immediate future. These two aviation developments are still too much in the experimental stage.

Even before Dr. Lewis gave air and government officials a technical report on aviation trends of the immediate future, half a dozen speakers urged the necessity of a Federal airport planning program as the most practicable solution for the current dilemma of the aviation industry and of local governments: how to build larger airports when cities have already spent all their available funds on their construction, only to find their most recent efforts already growing obsolete.

The suggestion that airplanes be limited in size was made by Clifford Ham, of the American Municipal Association, but it found no echo in the opinions of any of the Army, Navy or Air Commerce representatives. Railroads have developed their equipment within the limits of track size and of maximum overall dimensions and automobile and truck sizes are limited, Mr. Ham argued in one of the opening addresses. But even before he had spoken, Colonel J. Monroe Johnson, assistant secretary of commerce, indicated that the department frowned on any such approach. "I don't think that any one knows where aviation is going," he told his audience of airmen and government officials from all over the United States, and it would not pay to take the risk of stunting the growth of a young industry by imposing an arbitrary limit on it.

After addresses by Secretary of Commerce Daniel C. Roper and by representatives of the Post Office Department, the Army and Navy, the Aeronautical Chamber of Commerce, the Air Transport Association, the National Association of State Aviation Officials, the U. S. Conference of Mayors and the Works Progress Administration, the conference broke up into committees to give detailed consideration to national airport planning proposals prior to conclusion of the conference.—LEONARD H. ENGEL.

ITEMS

BACTERIA in lakes are useful because they have an important part in the cycle of life whereby food is built up for fish. Research at the University of Wisconsin indicates that their growth can be encouraged by pouring into the water finely divided substances of no direct food value, like pulverized charcoal or crushed sand. Apparently the bacteria thrive when they have such clean, solid surfaces on which to cling, just as oysters grow best when there are solid objects like broken stone or old bottles on the oyster beds. The research was conducted by Drs. W. H. Stark and E. McCoy, in collaboration with Drs. E. A. Birge and C. Juday.

WHEN severe winter weather makes it necessary for game birds and animals to accept grain at the hands of man, they prefer corn to anything else, according to studies made at the University of Wisconsin by A. S. Hawkins, E. B. Moore and Aldo Leopold. So fond are some of the animals of corn that special precautions have to be taken to prevent its waste. Squirrels will carry off whole ears; to prevent this, it is recommended that the cobs be impaled on spikes well above ground level. It is a good idea to have the grain well off the ground in any case so that it will be above snow level when the wild creatures need it most. Just leaving the grain in shock is one simple and effective way of taking care of the matter. Wildlife needs but little grain to supplement the natural foods which the birds and animals find for themselves. One seventh of an acre of corn is enough for the game population of an average farm.

PEKING MAN, China's oldest inhabitant, was a head-hunter who dined off the brains of his fellows half a million years ago. This is the verdict of Dr. George Barbour, geologist at the University of Cincinnati, from the fact that almost all skeletal remains of this ancient Asiatic race so far discovered have turned out to be parts of the head. Absence of leg bones or other parts of the body can only mean, Dr. Barbour reasons, that Peking Man brought heads of his less fortunate fellows into his cave and whacked them open with stone axes to remove the brain. Pieces of one skull shattered by a sharp pointed instrument were found in one instance, scattered widely and mixed with ashes of the hearth fire —a clue which Dr. Barbour cites as supporting evidence for the theory of Peking Man's head-hunting habits. Dr. Barbour, who was geology professor at Yenching University for twelve years, has been actively engaged in much of the investigation of China's earliest human remains.

A RADIO tuning dial on which radio stations are shown in their proper location on a map has been patented by an Italian inventor. Stations are shown on a map by dots. To each dot is connected a horizontal line which projects across the map to bring it into line with a regular tuning scale which runs across the bottom of the map. The projections are made necessary by the fact that stations are not assigned frequencies in order of geographical location. The radio user, inventor Umberto Quintavalle, of Milan, Italy, explains, picks the town to which he wishes to listen by looking at the map and turns the radio tuning knob until an indicator is at the end of the line representing the desired station. Fabbrica Italiana Magneti Marelli Soc. An. of Milan is the assignee of the patent.

BURNING trash, and not reviving volcanic fires, caused the "smoking cave" near Buhl, Idaho. A study was made of the cave by an engineer of the U. S. Geological Survey. "The cave in Salmon Falls Creek Canyon contains pack rat nests, guano and other trash that clearly have been on fire recently, probably as a result of human agencies," according to Dr. W. C. Mendenhall, director of the survey. "This does not support theories that have been expressed in the press that there has been a revival of volcanic activity in the region. The smoke that has been reported as issuing from this small cave is most naturally and logically explained as due to burning of this trash."