SCIENCE NEWS

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THE YALE NORTH INDIA EXPEDITION

A NEW link in the evolutionary history of man and ape has been discovered by the Yale North India Expedition. Investigation of fossil jaw-bones and teeth brought back by the expedition reveals the existence of man-like apes nearer to the main trunk of man's evolution than any living or extinct great apes previously known. The family to which these man-like apes belong could develop in several directions, some becoming more like the great apes, others approaching man.

Three entirely new genera are included among the five fossil jaws found in the badlands region of Potwar, India. One has been named Ramapithecus, after Rama, the hero of a Sanskrit epic. Another is named Sugrivapithecus, after Sugriva, king of the monkeys in the same saga. The jaw of Sugrivapithecus indicates that the animal had a well-developed chin, a sign of high evolution, according to G. Edward Lewis, paleontologist to the expedition. The chin is more like that of a primitive man than that of any living great ape. Many features of the teeth show parallels with human anatomy.

The finds tend to confirm the theory that higher primates originated in this section of the world, said Mr. Lewis. From a Eurasian center they migrated into China, Java, Asia Minor, India, Africa and Europe. No anthropoid apes or very early humans, however, have ever been found in America.

The expedition discovered many fossils of animals. Curious huge ruminants related to the modern giraffe were found. They resemble a cross between a moose and a bison and have two pairs of horns. Giant land tortoises that make the elephant tortoise of the Galapagos Islands look like pygmies were also uncovered.

Stone knives and crude scrapers used by men some 500,000 years ago, but millions of years after the era of the fossil anthropoid apes, were discovered by Professor Hellmut de Terra, leader of the expedition. With the Stone Age implements lay remains of mammoths and hoofed animals. These discoveries show for the first time that early Stone Age men inhabited the Himalayan Mountain region.

The foothills are called by Professor de Terra a "cemetery of prehistoric life," because of the fossil bones, wood and leaves embedded and preserved in the rocks.

According to Professor de Terra the Himalayan region is the most dynamic in the world, geologically speaking. It has changed from an ocean to the highest mountain land on earth, and in the strata are fossils from every geologic age in earth history. To-day, the region north of Benares is rising at the rate of six feet a century.

ANABASIN AS AN INSECTICIDE

COMBINING the possibilities of checking the ravages of certain insects against already existing crops, and of being itself a good crop for use on some of the irrigated lands of California and elsewhere in the Southwest, a new insect-poison plant has attracted the attention of pharmacologists attending the meeting of the American Chemical Society.

The poison is known as anabasin, and is especially effective against aphids, or "plant lice," which are among the hardest to kill of all insect enemies of plants, and annually do vast amounts of damage to field crops, nursery stock and shrubbery. They are particularly bad troublemakers in greenhouses.

The standard means of chemical warfare against these pests now is nicotin, made from tobacco wastes and from especially grown tobacco varieties. But the new chemical, anabasin, is said to be an even more potent aphid-killer. It will also kill other insects, although for some of these uses it is not so effective as nicotin and that other recently developed insecticide, rotenone.

Anabasin is a double discovery. American chemists, striving to make something stronger than nicotin, synthesized a compound which they called "neonicotin." At the same time, Russian chemists extracted a most efficient insect poison from a common weed bearing the classic Greek name Anabasis, and called it anabasin. A comparison of the synthetic and the natural compounds showed them to be chemically identical.

Small shipments of anabasin made in Russia have been received in New York. The U. S. Department of Agriculture chemists and entomologists have become greatly interested in the compound, and are continuing their experiments with it, with an eye to its possible usefulness against other insect pests.

Anabasis is a genus of dry-land weeds common in North Africa, Asia Minor and parts of Russia. There are about fifty species, of which only one, *Anabasis aphyllum*, has been investigated as a source of insect poison. The plant is related to such common American weeds as lamb's quarters, tumbleweed and greasewood.

While chemists and entomologists are looking into its usefulness as a source of aphid poison, botanists of the U. S. Department of Agriculture are undertaking tests to find whether it can be grown with profit in some of the warm, dry lands of the Southwest, which are similar to its native habitat.

THE CAUSE OF DIABETES

DIABETES, a death-warrant disease until the discovery of insulin about a decade ago, is not merely a matter of the proper functioning within our bodies of the pancreas in which insulin is manufactured.

Other glands of internal secretion, the thyroid, the adrenals and the pituitary, play their parts in causing and preventing the disease. Dr. B. O. Barnes, of the University of Chicago, discussed at the meeting of the American Physiological Society how these glands are interrelated.

For many years diabetes has been considered primarily a disease of the pancreas with its insulin-producing islands of Langerhans. During the last few years evidence has been accumulating that some of the other

glands of internal secretion might also be involved. For instance, experimentally-produced diabetes may be markedly improved by removal of the pituitary gland. This small structure located deep within the head has an important influence over growth and sex.

The thyroid also plays a part in diabetes. If a diabetic patient develops Graves' disease, due to overactivity of the thyroid gland, the diabetes becomes worse. Latest experiments now show that this effect is the result of the thyroid acting through the pituitary gland. When both pancreas and pituitary are removed, a mild diabetes occurs which is not aggravated by giving thyroid extract.

Just as removal of the pituitary improves the experimentally-produced diabetes in dogs, removal of part of the adrenal glands causes an improvement in the diabetic condition. It now appears that the pituitary may exert its influence on diabetes by acting through the adrenals, as the thyroid acts through the pituitary.

Considerably more experimental work must be done before these observations can be applied in the treatment of human diabetics, Dr. Barnes said, but these latest discoveries have led to better knowledge of the long-suspected interrelationship between the glands.

Research that sheds light on how the sugar-utilizing mechanism of the body breaks down in the absence of insulin, with diabetes resulting, was reported by Drs. C. N. H. Long, F. D. W. Lukens and Edith G. Fry, of the University of Pennsylvania, at the meeting of the Society of Biological Chemists. After exercise which uses some of the body's store of sugar, glycogen, which is the form in which sugar is stored, is rebuilt from lactic acid. This process goes on in the diabetic as well as in the normal animal, but at a much slower rate.

CORTIN AND ADDISON'S DISEASE

THE life-saving hormone of the adrenal gland, cortex, has for the first time been obtained in pure crystalline form and its chemical composition discovered. This important announcement was made by Dr. E. C. Kendall, of the Mayo Foundation, Rochester, Minnesota, at the meeting of the American Society of Biological Chemists.

Dr. Kendall and his associates found that cortin, as this hormone is called, has the formula $C_{20}H_{30}O_5$. Discovery of its composition means that chemists can now work toward the laboratory production of the hormone.

This hormone has saved the lives of victims of hitherto hopeless Addison's disease, the ailment in which the skin turns dark and the patient gradually wastes away. These patients have thus far had to depend on cortical extracts from animal glands. The scarcity of this material and its expense have made it impossible to treat all of them, since the treatment must be kept up continuously in order that the patient may go on living. With the discovery of the hormone's chemical structure it may be possible to manufacture it and thus increase the supply.

Besides its life-saving effect, cortin was found by the Mayo Foundation group to act as a brake on the thyroid gland. This U-shaped gland in the neck secretes a hormone, thyroxin, which stimulates the body's use of protein. When the gland is over-active and too much of its hormone is produced, it opens the throttle too wide and makes the body burn up protein too fast. People suffering from this condition are in consequence very thin. But cortin puts a brake on this process. This action is a good example of the reciprocal effect of one gland secretion on another, about which scientists are learning more and more. Sometimes these glands of internal secretion act to reenforce each other and sometimes they have an antagonistic effect on each other's activities.

THE CAUSE OF TRICHINOSIS

ANOTHER medical mystery has yielded to the persistent research efforts of science with the discovery that actual micro-organisms and not some mysterious poison thought to have been generated by them are responsible for fatal inflammation of the heart in human cases of trichinosis. This disease is produced in humans through the eating of undercooked pork in which the parasite, Trichina, is present. The discovery was made by Drs. Carl V. Weller, Glenn A. Dunlap and John C. Buhger, of the University of Michigan.

Most thorough microscopic examination of diseased heart tissue recovered from post mortem cases apparently had failed to show the presence of the encapsulated Trichina embryo, he explained, although these could be found in great numbers in muscle tissue throughout the rest of the body. Yet it was this acute inflammation of the heart tissue that caused death some weeks after infection with the organism. Hundreds of fatal cases were studied, but always with the same negative result. Thus it was assumed that the conclusions of earlier investigators were correct.

Then at this juncture a discovery was made. Medical men had been searching for the familiar, rounded, encapsulated form of the embryo. Dr. Buhger was puzzled by the presence in his microscope field of a long, slender granulated body, easily confused with ordinary tissue. He studied it closely and finally recovered a specimen of the Trichina embryo un-encysted. Further examination revealed others. But other fatal cases failed to give the same results.

Experiments on animals showed that the free embryo may be found in the heart muscles seven to fifteen days after infection, but that after this time it disappears and can not be seen in any form. This is true although the other muscles in the body may be crammed with the parasite. Nevertheless, the acute inflammation of the heart continues, and it is this condition which causes death.

THE RESULT OF STRATOSPHERE FLIGHTS

THE flyers who have recently ascended into the stratosphere were not traveling in totally unknown territory. True, no one had preceded them to such heights, but scientists working at their desks, without moving off terra firma, had already formed an estimate of conditions to be found there.

Using as a basis for their calculations such data as those obtained from observations of the way sound travels along the surface of the earth, and the way radio signals are returned from the electrified reflecting layer of the atmosphere, physicists were able to calculate the composition of the atmosphere at great heights. Their calculations have now received verification from analysis of

the samples of air brought down from a height of nearly 12 miles by observers in the Soviet balloon *USSR*.

Drs. H. B. Maris and E. O. Hulbert, working at the Naval Research Laboratory, and Dr. B. Gutenberg, at the California Institute of Technology, discovered from their calculations that the air high above the earth, as well as that near the surface, is warmed by the sun during the day and cooled by its own radiation at night. This daily variation in temperature must give rise to winds, and winds inevitably mean a mixing of the air, a stirring up that would cause the composition to be uniform. The proportions of the gases in the air remain the same, they conclude, up to the great height of about 100 kilometers or 62 miles, except for ozone, which exists in greater proportion above 30 miles than it does at sea-level.

Dr. Gutenberg has based his results, besides, on the spectrum of the auroras and on the height at which meteors appear. Furthermore, the fact that helium enters the atmosphere from the ground in such quantities that it should form a noticeable part of the stratosphere but that only traces have been observed, seems to indicate that this gas escapes from the atmosphere into the interstellar space, and the same seems to be true with hydrogen. The conclusions of Dr. Gutenberg are that we have very probably an increasing temperature in the stratosphere, beginning at a height between 30 and 40 kilometers (about 20 miles), no noticeable change of composition at least until a height of about 100 miles, no hydrogen at any height, a slowly decreasing amount of oxygen at heights of some hundred miles and, probably, small amounts of helium or water vapor on neon at very great heights. The principal gas at any height is nitrogen.

Since the samples obtained by the *USSR* showed the same proportions of oxygen, nitrogen and other gases as are contained in the air we breathe at sea-level, the physicists look upon this finding as evidence of the correctness of their theoretical predictions.

ITEMS

A DIFFUSE object, possibly a new comet, has been discovered in the southern hemisphere skies by Dr. Cyril Jackson, of the Union Observatory, Johannesburg in Africa. It is of the twelfth magnitude. News of the discovery was received by Harvard College Observatory.

A CABLE from London reports that the weight of the triple weight hydrogen isotope has been determined by Lord Rutherford the British physicist who discovered it a few weeks ago as a result of smashing double weight hydrogen atoms. It is 3.0151 on the chemical mass scale on which the common oxygen atom weighs just 16. If three ordinary hydrogen atoms come together to make the triple hydrogen atom, there is a loss of weight presumably released as energy equivalent to nearly 8,000,000 electron-volts. Lord Rutherford's estimate will be published in the next issue of *Nature*. That goldfish live normally and happily in dilute heavy water will also be reported in *Nature* by Drs. G. Hevesy and E. Hofer, of the Institute of Physical Chemistry of Freiburg. Other investigators had previously found that life processes were slowed by deuterium water and some lower animals were killed.

AN apparently new vitamin B factor, which makes rats grow, found in whole wheat by Nellie Halliday and Linnea Dennett, of the Michigan Agricultural Experiment Station, was reported to the American Institute of Nutrition meeting in New York. Animals fail to grow and develop certain nervous symptoms when this vitamin is lacking from their diet. The vitamin is not the familiar B one nor vitamin G, but resembles that known as B four.

DISCOVERY of two substances essential for life and growth were reported by Dr. William C. Rose and Madelyn Womack, of the University of Illinois, at the meeting of the American Institute of Nutrition. The two substances described by Dr. Rose are leucine and isoleucine. They belong to the chemical family of amino acids, which have been called building blocks of the protein substances in our food. There are eighteen or twenty of these amino acids. Previously four of them had been found to be indispensable food elements—indispensable because the body can not make them itself. It was found that two more of these amino acids are indispensable. The discovery is considered to be an important contribution to knowledge of nutrition.

CHLOROPHYLL, the stuff that makes leaves green, makes a good source of vitamin A, but only when taken with milk. This discovery was reported to the American Chemical Society by Professor O. D. Abbott, of the University of Florida. Fed alone, chlorophyll and two of its chemical derivatives did not help anemic laboratory rats on a deficient diet, but when the milk was added the formation of red blood cells was promoted. Xantophyll, a yellow coloring matter also found in plants, proved of no dietary value to mammals but apparently could be a substitute for carotene in keeping hens healthy.

THYMUS is capable of causing enormous precocity, Dr. L. G. Rowntree, of the Philadelphia Institute for Medical Research of the Philadelphia General Hospital, reported at the meeting of the American Physiological Society. Growth, development, maturity and fertility were speeded up at a tremendous rate in rats by doses of thymus gland extract, Dr. Rowntree and associates, Drs. J. H. Clark and A. M. Hanson, found. These effects of thymus treatment were transmitted to the offspring and were much more marked in the third generation than in the first.

CENTURY plant juice may help defective kidneys to let their owners stay alive longer is indicated by experiments of Dr. Herman D. Jones and associates, of Alabama Polytechnic Institute. These experiments were reported to the American Chemical Society meeting. Of seven laboratory animals with artificially induced nephritis, six died. Of seven others with similarly induced nephritis, but treated also with agave (Century plant) concentrate, only two died and five survived.