



# Science News-Letter



A Weekly Summary of Current Science

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Issued by SCIENCE SERVICE, Inc., 21st and B Sts., Washington, D. C.

Vol. X  
No. 287

SATURDAY, OCTOBER 9, 1926

\$5 a year  
10c. a copy

ANTHROPOLOGY

## Jungle Speaks Again on Man's Pre-Human Relatives

By FRANK THONE

A second time the veil of the Javanese jungle has lifted a corner, and a bewildered creature—a man, but marked deeply with the brand of the ape—shambles out, stooping and blinking, from the shadows of a past two hundred and fifty milleniums old. Pithecanthropus erectus, the Ape-Man of Trinil, at last has a brother. After thirty-five years, the skulltop, jaw, thigh-bone and three teeth which the Dutch physician, Eugene Dubois, found in the ancient gravel stratum by the Solo river are joined by another relic, a portion of a skull representing the same race of men—or of near-men according to your scientific leanings. Anthropologists are all agog over the new discovery, and the little station in the heart of the jungle bids fair to become a Mecca of scholarly pick-and-shovel men from all over the world.

The first find of remains of Pithecanthropus erectus, and the only one until the present discovery, was made by Dr. Dubois, in a gravel bed beside the Solo river at Trinil, in central Java, in 1891. At that time Dr. Dubois found the calvarium, or skulltop, two teeth and the left thigh bone. During the following year he found part of a lower jaw and another tooth. The teeth were all near the skull, but the thigh bone was at a distance of about 49 feet from it.

The three bones and three teeth might seem to constitute a very fragmentary outline on which to sketch in the figure of the earliest known man. But if a scientist were to be told that he could have three bones of a skeleton, and only three, on which to build such a picture, he would probably choose exactly the three which Dr. Dubois had the great good luck to find. For the thigh-bone gives an idea how tall the individual was who once walked on it, and the position of the ball-bearing at its upper end permits a pretty



HE HAS BROTHER NOW

A French artist fitted flesh and skin over the fossil bones, making this restoration of Pithecanthropus, the "Ape-Man."—From Cast in U. S. National Museum.

safe inference as to whether he walked vigorously erect, or loped along on all fours, or whether he shambled in an intermediate stooping position. From the jawbone one can get a pretty good idea of the general structure of the whole lower half of the face, especially of the mouth and chin. And the brain case, both inside and out, tells volumes. If our hypothetical scientist were given a Hobson's choice of only *one* bone, he would without a moment's hesitation choose the first one in Dr. Dubois' collection, the top of the skull.

This collection then, incomplete but highly significant, was what Dr. Dubois had to work on during his generation of jealously secretive labors, and from it he read many things that to the non-scientific person would have remained sealed mysteries.

Pithecanthropus, he concluded, was a creature of rather less than average human height, about five feet six inches tall. He walked approximately upright, but the position and shape of

the upper ends of the thighbones would never have permitted him to assume the full erect posture of modern man. They did, however, permit him to swing his arms clear of the ground and thus relieved him from the almost constant use of his hands as extra feet, which characterizes even the highest of modern apes. He was therefore probably a more or less stooped and shambling creature, but free to pick up sticks and stones and use them as simple tools, and perhaps even to sharpen the sticks and break the stones and thus get tools a little more to his liking.

But this thighbone told not only of the racial characteristics of Pithecanthropus but of the hardships and dangers through which this one particular individual had passed. For on its rearward inner side, extending down a full fourth of the length of the shaft, is a great, irregular, jagged outgrowth of bone, the memento of a cruel wound received, probably, from a jungle beast that leaped upon him from behind but from which he escaped. This misadventure must have left this poor Pithecanthropus lame for life, and may have resulted in his death by drowning or other accident and so brought about his final entombment in the river gravel.

His jawbone is eloquent even in death. It is a heavy, massive affair, much thicker and deeper than that of present-day man, framed for tearing and crunching tough food, and perhaps for desperate fighting of the most primitive kind. It has virtually no chin, which is a notably ape-like character, but the teeth, though much larger than those of man, are quite distinctly human.

The shape of his head and the size of his brain show that though he was a low-brow he was far ahead of even the biggest of the apes when it came to gray matter. The portion of the

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skull in Dr. Dubois' hands has a capacity of 570 cubic centimeters. This is estimated to be about two-thirds of the capacity of the original brain cavity, which would thus be approximately 900 cubic centimeters. Recent re-measurements slightly better this figure, making it 980 cubic centimeters. This is nearly double the size of the gorilla's brain, which is 500 cubic centimeters, but nowhere near the size of a modern man's, which runs between 1,200 and 1,600.

There has been a great deal of argument as to whether Pithecanthropus was an ape or a man, but the balance seems to have swung definitely in favor of his having been a man, largely on the basis of his brain size and of his teeth. Whether he was an ancestor of modern man is another question, but the majority of anthropologists seem to be inclined to regard him as a separate branch of the family tree not represented by any modern descendants—as a remote and childless great-great-uncle rather than as a great-grandfather.

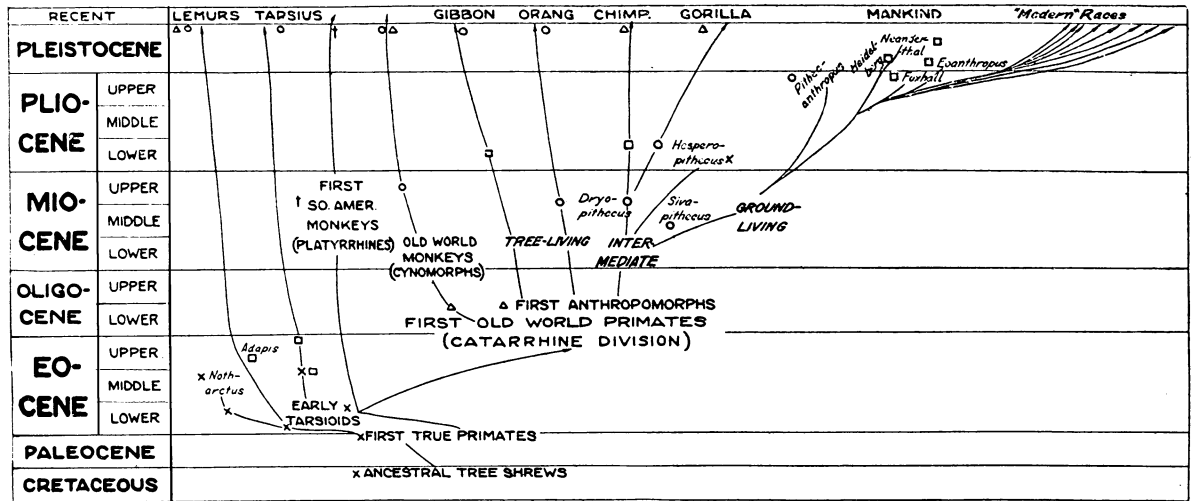
Against this consensus of opinion,

however, some anthropologists hold out stoutly, and among them is Dr. Dubois himself, original discoverer and first student of the remains of Pithecanthropus. He still adheres to his first opinion, formed after a careful preliminary examination of the bones, that Pithecanthropus is a true "missing link," a creature connecting the apes and man.

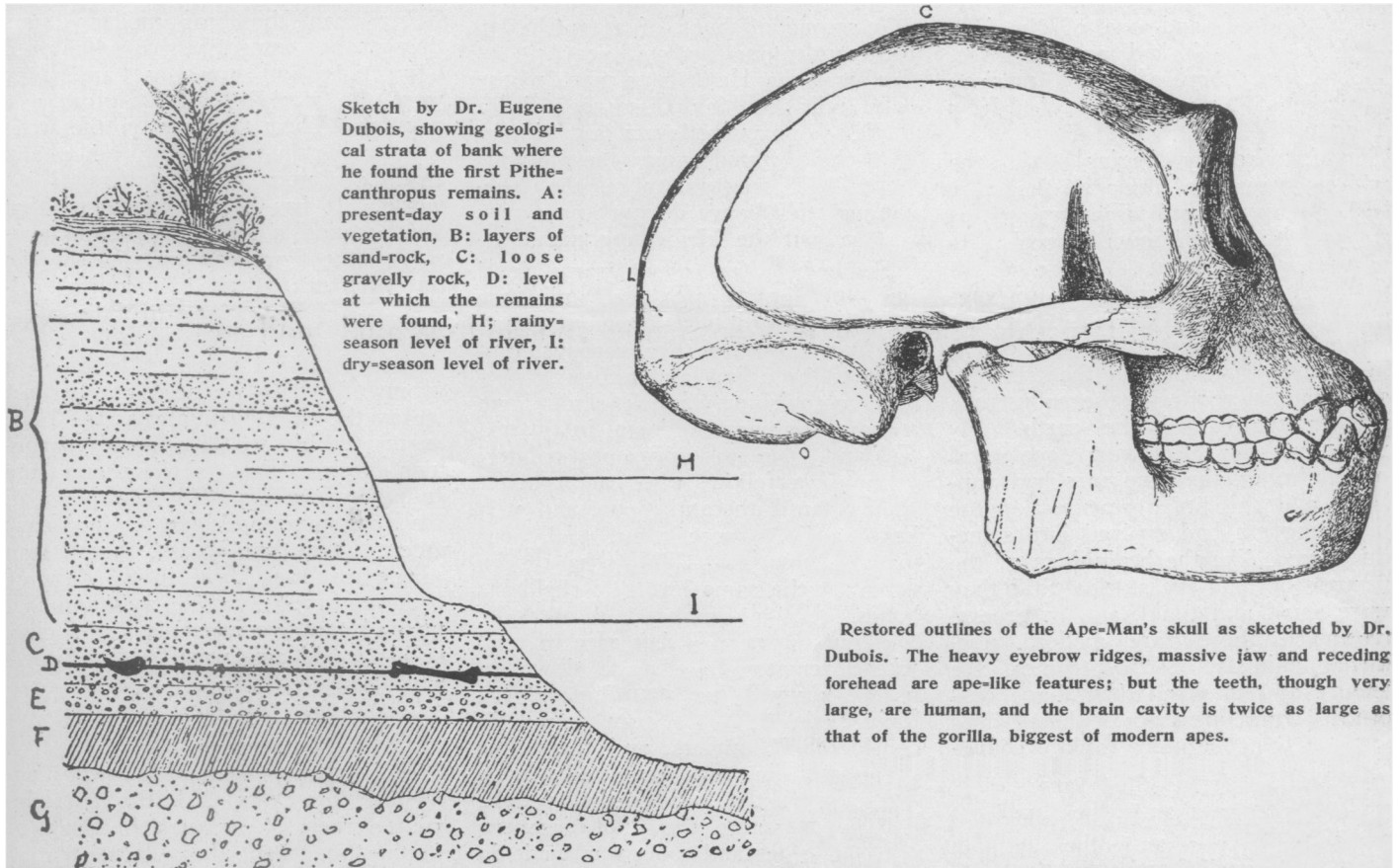
The scientific name Pithecanthropus erectus, given by Dr. Dubois to his find, is in itself an expression of this opinion. The first or generic name is made up of two Greek words:

(Just turn the page)

Family tree chart by Prof. W. K. Gregory of the American Museum of Natural History, showing descent of man and his ancestors since the last days of the dinosaurs. Note that modern apes are not shown as man's forefathers, but as cousins by collateral descent from a common stock. Pithecanthropus also, shown near the upper right corner, is not a great-grandfather but occupies a branch by himself, as a sort of great-uncle who died leaving no family.



LEGEND: FOUND IN: NO. AMER. X SO. AMER. † EUROPE - □ ASIA - ○ AFRICA - △



Sketch by Dr. Eugene Dubois, showing geological strata of bank where he found the first Pithecanthropus remains. A: present-day soil and vegetation, B: layers of sand-rock, C: loose gravelly rock, D: level at which the remains were found, H: rainy-season level of river, I: dry-season level of river.

Restored outlines of the Ape-Man's skull as sketched by Dr. Dubois. The heavy eyebrow ridges, massive jaw and receding forehead are ape-like features; but the teeth, though very large, are human, and the brain cavity is twice as large as that of the gorilla, biggest of modern apes.

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"pithecos," meaning ape, and "anthropos," meaning man. The second or specific name, "erectus," is self-explanatory. The whole therefore means "upright-walking ape-man."

The new find in Java, with the stimulation of interest among scientists which it has caused, will also inevitably bring up for renewed discussion the whole question of the descent of man. Ever since Darwin popularized the doctrine of evolution, which before his day had been an obscure and on the whole unexciting subject of purely academic interest, many ill-informed persons have cherished the idea that because evolution teaches that man is bodily related to apes and monkeys it necessarily follows that he must regard them as his ancestors. For many years scientists have been reiterating, with a sort of patient exasperation, that evolution does not infer anything of the sort, but rather that men and monkeys descended together from a common ancestral stock, and that the monkeys have evolved in one direction while we have evolved in another. Monkeys are therefore not grandfathers but distant cousins—zoological poor relations, if you like.

To make the matter plain, some scientists have drawn up diagrammatic family trees of man and his furry kindred, and one of the best of these was worked out by Prof. W. K. Gregory of the American Museum of Natural History in New York.

Prof. Gregory begins with the earliest mammals, back in the days when there were still dinosaurs on the earth, in the time known by geologists as the late Cretaceous. There wasn't much about these creatures to suggest men, or monkeys either, for that matter. They were little, timid, creeping things that lived in the treetops, safe out of reach of the monstrous reptiles that ruled the earth. By the time the following geological period began, the dinosaurs had vanished and the little creatures of the preceding era had evolved into something more like the beginnings of the primate or man-ape stock. Still they were small and timid, and in general resembled those rare modern nocturnal animals of the tropics, the lemurs and tarsids, which have descended from this stock with but little modification. A more rapidly changing branch from this same early stock has given rise to the small but lively long-tailed South American monkeys.

The main evolutionary line, however, bore off to the right, and by late Oligocene and early Miocene times had developed a great complex of ape-like creatures whose bodily structures began to have some suggestion of humanness about them. Some of these still kept their main dwelling in the trees, and from these the modern gibbons and orang-outangs have sprung. By a different line also the Old World monkeys, including the baboons and drills, have descended from the same stock. Another group began to come down to the ground, at least part of the time, and from these intermediate forms we get our nearer simian cousins, the gorillas and chimpanzees.

But the main line of descent still bore off to the right, for its work was not yet finished. Now there began to appear more and more human-like creatures. First, probably, of the creatures wholly committed to the ground was the man-like ape whose skull, recently discovered at Taungs, in South Africa, which had so many human characteristics that it was at first thought a man of a still more primitive type than Pithecanthropus. The next relative whose remains have come down to us was Pithecanthropus himself, the center of all the present excitement. He was an offshoot from the main family stem, as has already been explained.

A second offshoot, of a type above Pithecanthropus but still very primitive, was the Heidelberg man, whose only relic so far discovered is a single very massive lower jaw without any chin, found near the famous German university city on the Neckar. Naturally we do not know very much about the Heidelberg man.

Somewhere on about same level among the branches of our family tree we find a third little-known offshoot, the Dawn Man, or Eoanthropus, represented by a jaw and a few bits of most astonishingly thick skull from a gravel pit near Piltdown, in Sussex, England. He was apparently a burly brute of a fellow, who had a better brain than Pithecanthropus, and who knew a little more about tools, for many crudely shaped flints have been found at the same level that held his bones.

About the next higher race of men whose remains have come down to us we know a great deal more, for their skeletons have been found in considerable numbers, and their flint implements in very large quantities. These were the Neanderthal people, so called because the first discovery of their bones and tools was made in

the valley of the little river Neander, in Germany. They were a more or less chinless, low-browed, squat, stoop-shouldered lot, but they had already learned the use of fire, and probably clothed their hairy bodies in skins. There is also strong evidence that they buried their dead with gifts to take on the long journey—though they ate them occasionally instead. Both practices, however, indicate the existence of a religion among them, for cannibalism is frequently a ritual or sacramental feast, according to recent findings of anthropologists.

These Neanderthals were a successful race. They multiplied and possessed the earth; for their bones have been found all over Europe, and latterly also in Palestine, and other evidences of their presence have been uncovered in both Asia and Africa. Possibly the much-debated Rhodes skull was an aberrant Neanderthal man, though the combination in this skull of an unusually large brain case with an outright gorilline face will probably leave it in the class of scientific freaks and puzzles for many years.

The end of the Neanderthals came when the Cro-Magnon race arrived: a magnificent fighting and hunting people, who swept over Europe during the Late Stone Age, about 20,000 years ago. Their men averaged over six feet in height, their brains were larger than those of modern men, they made exquisitely shaped chipped flint tools and weapons, and they were the world's first sculptors and painters. Their frescoes on the walls of caverns in southern France and Spain are among the wonders of the world. It has been conjectured that the Basques, a tall and splendid people of the Pyrenees and one of the most difficult of all ethnological riddles, represent a remnant of the Cro-Magnon. Here at any rate is an end of side-branch peoples; here is a group of whom we need not hesitate to say they were our ancestors. Here begins the history of our own particular species, *Homo sapiens*, and here culminates, at least for the moment, the long and toilsome evolutionary ascent from the beast that began somewhere back there in the days of Pithecanthropus, when a shambling, puzzled creature stood up and looked at his world and wrinkled his brows and tried to think.

Science News-Letter, October 9, 1926

Indians of Tierra del Fuego, according to Darwin, killed and devoured their old women in times of famine, and kept their dogs.