

PALEONTOLOGY

You've Never Known Such Animals

If You Can Imagine a Rhinoceros Crossed With a Dachshund, You May Picture Prehistoric Creatures

By DR. FRANK THONE

See Front Cover

WE HAVE all of us had the feeling at one time or other, that some animals are "real" and that others are somewhat fanciful, even though they stand before us in solid flesh and blood, complete with hoofs and hair and horns. Dogs and cats, horses and cows, the deer and the antelope have the "right" shape, color, size. They do not even need to be particularly orthodox: elephants and seals and porcupines pass muster with most of us as "all right."

But confront us with a rhinoceros, or a mandrill, or a duck-billed platypus, and we are apt to balk, like the famous fictional hayseed, and to declare within ourselves, "There ain't no sich animule!"

It is hard to get at the psychological foundation for this involuntary disbelief in the evidence of our own senses. Perhaps it is simply that we have certain conventions or norms about how an animal should look, and if he doesn't look that way—why, so much the worse for him. We just shoo him off our mental retinas as though he were a pink elephant.

Maybe it is a good thing for us, therefore, that we can't take a Wellsian journey backwards through time for the last couple of hundred million years, across the geologic periods that have marked the passing of the dinosaurs and the rise of our own multiform kindred, the mammals. If we find it difficult to believe in our own grandfather in sideburns and plug hat, or an earlier ancestor in the funny-looking pants they wore in Nieuw Amsterdam, what ever would we do about remoter relatives like a gopher with horns, or a jack-rabbit with a long catlike tail, or a rhinoceros built on the general lines of a dachshund? Our credulity just wouldn't be able to stand the strain!

Still More Strange

Yet these are only samples of the Past's great menagerie of wild animals we have never known—and by no means the most bizarre of them, at that. We can at least describe these in terms of in-

credible variants of familiar forms. But some of the other, older creatures simply defy all description. They have no surviving relatives to serve as standards of comparison, and even the scientists who know them best can only flounder a bit helplessly, and say, "Well, this one looked a little like a hippopotamus, and a little like a pig, and something like a horse." It really doesn't help much.

Or, the scientists can assemble their fossil skeletons and then help artists to sketch or model the departed flesh and hide and hair upon them. But even then the results are very apt to be like something Doctor Seuss thought up some night when his imagination was hitting on all cylinders.

If you'd really like to take such a journey into vanished lands of incredibility, just consult that classic work of America's veteran student of ancient mammalian life, *The History of Land Mammals in the Western Hemisphere*, by Prof. William B. Scott of Princeton, newly published in revised form by the Macmillan Company. The graceful beauty of the deer and the antelope-like forms, the sleek terror of the carnivores, and the utter, indescribable grotesqueness of some of these once-living gargoyles march past in fascinating procession.

100,000,000 Years

The parade takes well over a hundred million years to pass a given spot. For nearly double that length of time the mammals, animals that have warm blood, are (usually) clothed with hair, and suckle their young with milk, have been inhabitants of this planet. For the hundred million years that have elapsed since the last dinosaur died, they have dominated it, in thousands of strange forms, occupying land and water and even air, from Pole to Equator and on down to the Nether Pole. This has been the Age of Mammals, and Prof. Scott is among the foremost of its historians.

Mammals first appeared on earth during the age that preceded their own heyday, the Age of Reptiles, when the ruling forms were the dinosaurs and the other strange giant cold-blooded creatures that lumbered over the land, wallowed

in swamps and seas, and soared on leathery wings through the air. It used to be said that mammals appeared only toward the end of that age, but Prof. Scott states that they were there well back toward its beginning, and probably fairly numerous at that. That their fossil remains are rare may be accounted for, perhaps, by conditions unfavorable for preservation rather than by actual scarcity of individuals.

Inconspicuous

Paradoxical though it may seem, the earliest mammals were not at all odd or fantastic in appearance. If we could see one we should probably pay little attention to it, dismissing it as a field mouse or a chipmunk. For these arch-ancestors of all of us, from 'possums to people, were small, mousy creatures. It has been conjectured that they owed their very survival to their inconspicuous size and habits, and possibly also to living in trees, out of reach of most of the hungry reptiles.

Most of their rather scanty fossil relics consist of lower jawbones, and especially of teeth. These were the solidest and hardest parts of their skeletons, likeliest to be preserved under the one-in-a-



BUNNY?

This ancient South American animal might be mistaken for a primitive jack-rabbit—but look at the long, un-rabbit-like tail! The restoration drawing is by Charles R. Knight.

thousand chance conditions that attend fossilization. These jaws and teeth indicate that their owners lived largely on a diet of insects. Truly, these Daughters (and Sons) of the Original American Revolution had little claim to aristocratic standing!

For its was a revolution, a long period of violent upheaval and hard times on the earth, that gave mammals their chance, by removing the vast, cumbersome, ultra-conservative royalty of reptiles that had thitherto usurped all places in the sun and kept the meek little furry creatures in age-long subjection. When better times came again, these meek literally inherited the earth.

Branched Out

They straightway set about expanding and multiplying and diversifying, and filled it to overflowing. Line after line of evolutionary descent, through age after age, rejoiced in the freedom and opportunity that was theirs. As among all earlier heirs of any revolution, many of them tried experiments in ways of living that did not work out well. These presently found themselves up blind alleys where further progress was impossible, and so came to nothing.

Yet other some, of all this prodigal extravagance of biological seed, fell on the good ground of favorable environment, and so brought forth fruit an hundred fold: the multifiform well-adapted animal life we see today. Including (to be a bit vain about it) that most flexibly-adapted of all the mammals, Man himself.

Not that Man has much part in the history of mammalian life on this continent. He is a late comer, an immigrant. His nearest kin, the primates, are represented even in recent times mainly by the prehensile-tailed monkeys, which are not nearly so closely related to us as are the Old-World apes. Prof. Scott's American Eden gets along without any Adams or Eves.

But there are plenty of other actors, and their performances are interesting, their costumes sometimes astonishing, often beautiful.

One thing that is quite noticeable in earlier parts of the great drama of mammalian life in this hemisphere (and indeed throughout the world) is the development of quite generalized forms: a creature, for example, with claws on its feet, with long jaws and wolf-like legs, that by all the rules of modern zoological logic should be a flesh-eater. Yet the teeth may be adapted only for a rather soft vegetable diet! And at the same time, another line of animals, looking almost



REALLY!

Horns have been tried out by many types of animals that no longer wear them. Here is a pair of horned gophers of the weird long ago, as pictured by R. Bruce Horsfall.

its duplicate in general outline, might have the real meat-grinding equipment of carnivores.

Obviously, such unspecialized animals could get along only in a world offering not-too-sharp competition—the more so since they had small brains and were therefore presumably neither very clever nor very agile. Sure enough, they passed, and they have no descendants.

Duplicated

Another striking fact that emerges is a tendency for the same pattern to be repeated by types of animals just about as far apart as it is possible to be and still remain within the mammalian pale. We are all familiar, of course, with the saber-tooth tiger, that terrible giant cat that ruled the California hills during the Ice Age in the East. There were other saber-tooth cats, a long line of descent. Well, down in South America there have been discovered the fossil remains of an animal with quite as formidable saber-armor projecting from the upper jaw of its round, feline skull. And it isn't a cat at all, not even a carnivore, but a member of the utterly different group that includes opossums, kangaroos, and koalas—it is a marsupial! A restoration drawing of this creature by R. Bruce Horsfall is shown on the cover of this week's SCIENCE NEWS LETTER.

Horns always have been favorite objects for biological experimentation; even the later dinosaurs went in for a lot of cornuary fancy-work. Our present varied array of deer and goats and antelope derive from forebears even more varied. Ancestors of the deer included many forms with antlers considerably simpler and less branched than those of modern representatives of the line. But among them was at least one strange animal with a third, backwardly-projecting horn between the other two!

The pronghorn antelope (which by the way is not a true antelope) stands today as a zoological orphan, with no living relative. But the pronghorn has ancestors, and some of them must have been very impressive in life. They had rather a tendency to develop four horns apiece, and one form had very long horns, twisted into a spiral shape.

Recent Too

It must not be thought that all the grotesque animal clowns belong to the early part of the great show of animal life in the Western World. Some of them were among the latest survivors. There were the glyptodons, for example, huge armored things that one might at first guess assign to the long-gone Age of Reptiles. They lived right up to, and probably through, the Ice Age, of course

staying in the warmer parts of the world.

As fantastic were the immense, lumbering ground sloths, of almost-elephantine size. They were so recent that we have found not only their bones in abundance, but even tendons and skin and hair, and the remains of their last meals. And most astonishing of all, in the same caves with these mummified relics have been discovered stone and wooden implements that tell of the coming to this continent of the latest-born of all the long line of mammals—Man.

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GENERAL SCIENCE

Democracy Declared Best Means Toward Human Goal

DEMOCRACY is the best means toward the goal all men strive for, declared Prof. A. G. Huntsman of the University of Toronto in his address as president of the Royal Society of Canada.

Life, as seen by Prof. Huntsman, is not a condition of static "being" but a flux of constant "becoming," tending always, through all manner of diversities, toward a never-attained goal of perfect order. In a way, these two things are opposed, yet they both are indispensable to life.

"Without diversity," said Prof. Huntsman, "there is death; without order there is chaos. The greater the diversity, the more difficult is the attainment of order. Whether it be in art, in science, or in practical life, based upon science, the goal is to combine the greatest diversity with the most perfect order.

"In man's social organization, whether it be the small community, the nation or the international human world, there is the same goal.

"Recently, the extraordinary increase in diversity in life has resulted in demands for more order. Autocratic rule, regimentation and planned economy are invoked and will inevitably lead toward monotony, comparative death. The mental calibre of a nation is shown by the extent of the diversity that it can weld into a sufficiently orderly, harmonious whole.

"For those peoples that are able to make it work, democracy with its encouragement of individual enterprise presents endless possibilities of advance towards that unattainable goal of full diversity, combined with perfect order."

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PSYCHOLOGY

Four Types of Auto Drivers Are Hazards on the Roads

Watch Out for the Alcoholic, the Feebleminded, The Stupid, and Psychopathic; Direction Sense Real

WATCH out for these types behind the wheel on the highways: the chronic alcoholic; the feebleminded man who is not too feebleminded to make a living; the intellectually inferior who is not feebleminded; and the psychopath or unstable individual.

These are the types of mental disturbance found most often among 348 drivers referred to the Psychopathic Clinic of the Recorder's Court, Detroit, for examination after traffic violations, Dr. Lowell S. Selling, director of the clinic, told members of the Michigan Academy of Science, Arts and Letters.

The accidents in which the chronic alcoholics are involved are largely those due to impulsiveness, Dr. Selling found. These drivers were unable to describe exactly how the accident occurred and tended to blame the other fellow. Probably at the time of the accident the alcoholic driver's hand had been incoördinate, his eyes unable to follow the car in front, and, said Dr. Selling, his field of vision had been somewhat limited at the extreme sides, since there were more crossing accidents than head-on or rear-end collisions among alcoholics.

Feebleminded but economically adjusted persons have all types of accidents, but probably can be safe on the highways if warned that their driving permit will be revoked at the first or second offense, Dr. Selling indicated.

Intellectually inferior but not feebleminded persons also get into all types of accidents. They present a bizarre appearance in court, and will say such things as "I didn't think I needed to stop even though I saw the stop sign."

The fourth group, the unstable or psychopaths, get into trouble because they are so easily upset in a situation where quick judgment is needed. Being late to work, for example, disturbs them so that they will impulsively drive through red lights.

"Sense of Direction"

Ability to point out the direction of distant places is much more common than has been realized, an experiment

reported by Dr. Paul D. Woodring, also of the Psychopathic Clinic, revealed.

In a strange room without outside windows, nearly one hundred men and women of a wide range of intelligence were asked by Dr. Woodring to indicate the direction of several well-known places in Detroit, the cities of New York and London, and straight north.

Just about half were able to do so with remarkably small errors. Some did not even hesitate; it was as simple to them as pointing straight up. Others wanted to work out the problem and would take a minute or more to decide.

In addition to these persons who have a "sense of direction" there are others who are "turned around." If they drew a map, the places they locate on it would be in correct relation to each other but there would be about the same amount of error in locating each and it would be in the same direction.

Unaware of Defect

Still others, it turned out, are completely without orientation, but are unaware that they differ in this way from others. They said when confronted with the problem that the whole thing is silly and unfair, that no one can be expected to know the direction of a place that he cannot even see. Like the color-blind, they seldom are aware of any lack.

College students are just as likely to lack orientation as are morons, Dr. Woodring found. He speaks of the ability as a habit rather than a special "sense" or instinct. Although its origin is not well understood, he believes that the well oriented individual may have been taught by parents or by circumstances in his early environment.

Further study of this direction ability may bring to light facts useful in selecting individuals for airplane pilots and similar occupations and may even revolutionize the teaching of geography.

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The peccary is the only native wild pig in North America.