

Mighty Mammals, Terrible Reptiles

and Giant Birds WHICH ONCE ROAMED THE PACIFIC COAST



HOW YOU CAN TAKE A TRIP INTO THE HILLS AND FIND THEIR TRAILS FOR YOURSELF



PLIOCENE SKULL FOUND IN CALIFORNIA

HAIRY MASTODON



GREAT BEAR OF THE QUATERNARY EPOCH



HORNED CRETACEOUS

The Pacific coast was once the playground of animals and birds such as would set the heart of Mr. Barnum wild with delight. No side show of the present day can hold a candle to the everyday sights of that age which preceded alike the circus poster and man. The largest of our animals, the elephant, would have felt small and measly among the herds of real heavy weight champions who roamed the prehistoric woods and

paddled in the edge of the prehistoric seas. These early giant creatures left their bones, and with the bones extracted from the rocky strata many yards below the present surface of the earth the geologist is able to restore the shape and semblance of the original. If the gentle reader might transport himself back a few aeons with this page in his hand he might, upon gazing about him, think that the pictures here shown were actual photographs.

The prehistoric creatures left many indications of their roamings and their fights. In fact the fields and woods are a book of absorbing stories to one with some knowledge of geology. It is not necessary to be an expert to find the marks and understand their meaning. A little study and attention enable anybody to find out many things for himself. In the following article Mr. Carson gives some instructions which are simple and which show the out of doors with new interest.



STEGOSAURUS (JURASSIC)



TRICERATOPS (CRETACEOUS)

tracks; but each time this has been done it marks a period or day of his habitation; for the sand and slickens only fill the tracks of yesterday, without erasing them, leaving only a new plain surface for the new tracks which are to come. If one follows this trail he will see where a flood came in from the upland and left its drift along the shore. Then stop and examine the trunks of palm trees, or a tangled mass of ferns, or some of the seaweed that a tidal wave may have carried to the uplands. Perhaps some ashes from a nearby volcano may have fallen and drifted like snow behind some object, and then one can tell which way the winds blew on that day.

he has reptile, beast or bird feet. Sometimes he takes his name from the locality where his bones have been discovered; in this way we have saurpoda saurs, which signifies reptile foot; the theropoda saurs, meaning beast foot; and ornithosaura, bird footed. The best field in which to search for the remains of saurs is Wooming, but it is possible that there are other fields near by which remain undiscovered. On the Pacific slope they are often found in proximity to coal measures, and these coal measures were islands during the cretaceous period, and were covered with a profuse growth of vegetation which made them a good home for the saurs.

In California, during the cretaceous period, much of the land was under water. A strip of land about 150 miles wide and a chain of islands along the coast were separated from the states by about 1,000 miles of water. Shasta county is credited with once having owned a saurian 70 feet long; and if one will observe the bedrock of cretaceous times he may see the tracks of a saurian made as he dragged his heavy tail through the vast acres of mud which surrounded him.



AMERICAN CAMEL, FOUND IN NEBRASKA



THE "DUCK BILL" OF THE CRETACEOUS

But if one follows the tale to its conclusion he will be walking along the shores of some mystic ocean, watching the cavorting of some unknown gigantic creature, or listening to the cry of some strange bird. Perhaps, if his eye be quick and keen, he may observe the assembling of certain infusoria for the purpose of producing a new species. If he sees and feels these things he is then really in touch with the great author of the book of nature, and on the threshold of a world which ever deepens, broadens and enchants as one advances.

A close study of the saurs reveals numberless instances where nature has come to the aid of her creations. The bones of the saurian were full of cavities for the purpose of making them light. Their heads were extremely small; the brain cavity likewise, with very few convolutions. They lived in a time when the earth enjoyed her Eden days; all was serene and still, and the beauty of the tropic climate was over all. The ground was covered with a thick growth of moss, ferns and flags, interspersed with a little grass. Several species of birds dwelt among their huge brethren, the saurs, and this was the history of the cretaceous age for many thousands of years.

Every 21,000 years the earth swings in or describes a circle which changes the angle at which the sun's rays strike the surface. When we approach the point nearest the sun, which is called perihelion, it will be 21,000 years before the earth reaches that point again. We are now enjoying perihelion winters, and the sun is striking the arctic at a very flat angle, thus giving most of its direct rays to the low latitudes; but in 10,500 years we shall have aphelion winters. That is, the winters will take place when we are farthest from the sun, and our summers when we are nearest. This change will produce short, hot summers, and long, cold winters. These short, hot summers evaporate much water, which falls as snow in the north temperate zones; and as the summers will be 25 days shorter and the winters 23 days longer and 20 degrees colder, the snow does not melt even during the summer.



PTERODACTYL (JURASSIC)

Rules for the Novice
The earth history is divided into epochs from the time when it was a molten ball up to the present day. Each epoch possesses its own distinguishing characteristics, as shown in some form of animal or plant life, and to him who understands the signs the book of nature is an open book, indeed.

But, finally, the swamp lands which covered the earth began to disappear, to be supplanted by extensive grassy plains, and then the cretaceous age became history. The curtain falls on the scene and when it rises again the saur is no more. We are in the tertiary epoch, and behold beasts of the field instead of great animals in the swamps. The thousands of miles of sea east of the Sierra Nevada disappear. Nevada, Utah, Colorado and Kansas appear as dry land, with many large fresh water lakes and rivers. California is now an integral part of the American continent.

The beginning of the ice age marked the close of the tertiary age, and we enter what is called the quaternary epoch to which the ice age belonged. Nature, through all her history, is continuously anticipating some future development; and so, as it was at the close of the tertiary epoch, a new kingdom came into existence. Man appeared almost simultaneously in all countries. He left signs of his presence in the glacial drift at Trenton, N. J., and his remains have been found 50 feet below the surface at Lansing, Kan., in what must be a strata of the beginning of the quaternary epoch, while here in California we find traces of what was perhaps earliest man.



PLIOCENE DODOS



THE TAPIR, FROM WHICH OUR DOMESTIC ANIMALS ARE DESCENDED

The cambrian period was followed by the silurian, which is noted as having produced the trilobite, a little sand crab. The devonian epoch, which succeeded, produced fishes, the first creatures known to have a backbone. Following the devonian the carboniferous period was noted for its profuse growth of vegetation and the huge coal deposits of eastern America and Europe. It is claimed that the first air breathing creatures developed during the latter part of this epoch. This age was succeeded by the triassic and jurassic epochs, which have a dividing line drawn between them and yet are often classed as one. These triassic and jurassic seas were the mother seas of animal life. Sharks and their kind developed in the triassic, while all big reptiles—the first mammal, the monotreme—left the jurassic waters to roam on land. If one observes closely enough it will appear as if within the fins and lobes of the first fishes were embryonic arms, legs and feet, and that during the jurassic the embryonic feet burst forth from the membrane which nurtured them and bore their burdens out of the mother fluid to the land, where certain embryonic qualities would further refine the bodies in which they reposed.

The curious Ungulates
If we look for tracks in the bedrock, shale, claystone and tuffe of the tertiary period we shall see the footprints of the ungulate, which means hoofs. The first ungulates were queer animals; their feet were shaped much like the hoofs of a horse, but with a difference, on the end of each finger was a little hoof. The ungulate were vegetarians, their feet being adapted for use on soft, boggy ground, but as they advanced or were short and stubby and they soon gave way to other species which are, doubtless, these same mammals, only more advanced and refined.

On Table Mountain, in Calaveras county, a skull, cemented in conglomerated gravel, was removed from a shaft which had been sunk for placer gold 153 feet deep into an old, prehistoric river, which must have flowed about the close of the tertiary age. The skull was imbedded first in 17 feet of gravel belonging to the stream which drained the landscape of that day. This nature let loose one of her mighty volcanoes and filled the valley with lava depositing four feet of lava on top of the gravel. On this lava waters from the uplands again found their way, depositing another five feet of gravel, and the volcano belched forth a second formation. This lava was subsequently covered by 25 feet of gravel. There must have been a period of inertia on the part of the volcano to permit of an accumulation of 25 feet of gravel; but it was followed in time by another flow of lava 15 feet thick. Then came another five feet of gravel, which, in turn was hidden by 30 feet of lava. This last lava flow was covered by 3 feet of gravel, which represented the accumulation of debris after the crater which supplied the lava ceased to be active.

Contemplating the idea of the saurs, many will probably shudder at the thought of the same type in the future, but if they wish to contemplate the possibilities of the future they will behold beautiful forms molded from the choicest of earth's creatures, ever being remolded into other forms more beautiful. This is the law. An inspired poet has written: "A starry mist, then a planet, a crystal and a cell. A jelly fish and a saur and a cave where the cavemen dwell. Then a sense of law and beauty and a face turned from the cloud— Some say it is evolution, while others say it is God."

By George Campbell Carson
To those who are able to read her, nature has been called an open book. How wonderful and how gigantic it is, only those who have power to decipher the inner meaning can know. Few people realize when wandering through deep forests, or on the shores of mighty seas, that they are perhaps tramping on the complete history of animal life and evolution written in stone, lava or bedrock that our little planet possesses. They do not pause to think that on the rock strata are inscribed stories fascinating as any fairy tale. And to

him who would read and ponder, it is necessary only that he look along the surfaces of the flat, smooth slopes and he will readily discern the beginnings of the story in the faint tracks of some tiny creature who plodded over them when the stone was in a plastic state. It may be that he will behold the remains of some floweret which blossomed long-ages before man trod earth, or the giant tracks of some monster who wandered aimlessly along the shores of some ancient sea, searching for food. Following these tracks, one will finally come on the remains of the monster creature who made them, which is the second chapter in the story. It may be that tides have rolled out on the shore line, and filled these