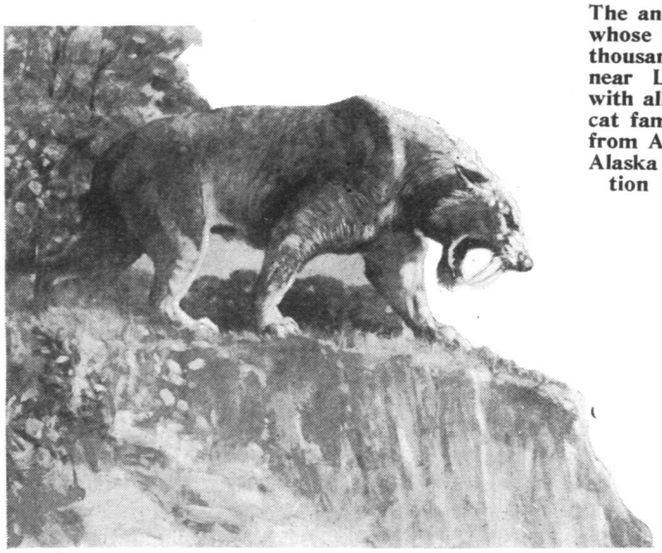


The ancient saber-tooth tiger, whose bones were found by thousands in the La Brea pits near Los Angeles, together with all other members of the cat family, probably migrated from Asia to America via the Alaska land bridge. Restoration painting by Knight.

Alaska's Vast Mines of Fossils Hold

Key to Ancient Animal Mysteries

Paleontology

By Frank Thone

SAY "Alaska" to any person who can remember the last years of the "gay nineties," and across his mental screen will instantly flash the responding word "Gold!"

For that is how the American public really became conscious of the existence of our vast territory on the northwestern corner of the continent. Alaska meant, and in much of our thinking still means, great hoards of wealth buried in the frozen soil, waiting for that epic army of the Gold Rush, with its picks and shovels and fortitude and endurance, to open up mines richer than King Solomon's in fabled Ophir and bring the gleaming nuggets and dust back home.

The gold rush is over now, and the gold mines have settled down to the soberer career of big business. But beside them—in some cases even on top of them—there are other mines of equal wealth in another field of human endeavor. They are mines for the mind, for their treasure consists of uncounted fossil bones of prehistoric animals which are only waiting for scientists to come and get them and piece them together, for the delight of crowds in our great museums and for our better understanding of how many of our wild animals came to America.

For these frozen fossil fields, these cold-storage warehouses as big as whole counties and as old as Adam, lie right across the tracks followed by animal migrations from Asia to America and from America to Asia. They contain chapters as yet unread of the history of animal life on both continents. A glance at the map will show how Alaska stands like a great keystone in the arch formed by the meeting of the two continents of North America and Asia. The elevation of a few miles of sea bottom a few hundreds of feet above their present level would close up Bering Strait and build a land bridge between the reaching fingers of the eastern and western hemispheres. Over such a bridge herds of wandering animals could go, planting colonies along their line of march and under favorable conditions leaving their bones to become fossils when they died.

All geologists are now agreed that such an isthmus connected Asia and America in the past, not once but several times, and that each time it arose a new inter-migration of animals occurred. The latest of these bridges served these emigrant tides before and during the pleistocene period, or great Ice Age, which began some hundreds of thousands of years ago and was still in progress when man became numerous and diversified into various sub-races on the earth. Before this bridge was submerged, Alaska served as a terminus of a two-way traffic that has left its records of animal remains in the earth that subsequently froze over them and has kept them safe from the moulds and microorganisms that remorselessly wipe out such documents in most other parts of the world. Alaska therefore offers an especially favorable field for the student of ancient animal life.

What the totality of Alaska's fossil wealth may be, nobody knows as yet. Very little in the way of intensive digging has so far been undertaken. As a matter of fact, such hard labor has not yet become necessary, for in several places fossils are so abundant and so easy to get at that it is hardly an exaggeration to say they can be had for the picking up. Dr. Philip P. Smith of the U. S. Geological Survey, a veteran Alaskan, has long been an advocate of the exploitation of these scientific resources, and he now has the satisfaction of seeing several institutions actively in the field.

One of the best of the bone deposits is also one of the queerest. Along the flood plain of the Goldstream, southeast of Fairbanks, chief interior town of Alaska, the deposit of gold-bearing gravel lies in a wide expanse, and on top of it is a frozen mass of mixed ice and sandy silt twenty feet or more in thickness. Melted down, the mixture proves to be, on the average, one-third solid and two-thirds liquid. Running through the gray silt-ice are veins and dikes and sills of clear ice, evidently intruded from beneath as water during ages of weird ice-geology. But the whole thing has been frozen now for untold thousands of years.

Once, however, the silt deposit must have been more nearly solid earth, at least during parts of the year. It afforded foothold for great numbers of wandering animals, and was dry enough to permit innumerable wild rats to burrow in it. For bones of a vast miscellany of large mammals are found scattered through it, some of them in neat, orderly skeletons, just as their owners lay when they died,

others in disconnected helter-skelter, with many parts missing.

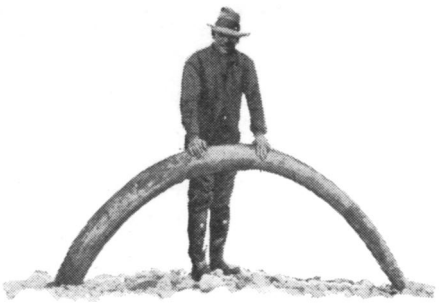
But most interesting are the fossil rat-nests. They crop up in all sorts of places when the frozen soil is cut away, like raisins in a cake. Often the rat skeletons are to be found also, and since these animals died under ground and were consequently in ready-made graves from the moment they gave up the ghost, their bones are frequently in perfect condition and neatly arranged, with every tooth and tail-joint still in place.

There is an opportunity for botanical research in these rat nests also, for they are lined with quantities of vegetable fiber and leaves, from the rushes and tough grasses that grew in the riverside marshes in that far distant time.

The great beauty about this particular frozen fossil field is that whoever undertakes to explore it needs to do no digging. In most fossil-yielding areas the ambitious scientist must humble himself to the status of a pick-and-shovel "hunky," and move bushels of dirt for every bone he recovers. But this place would be paradise for lazy geologists—if there are any such creatures.

For there is a mining company operating in this area, and it has to get the frozen silt out of the way in order to reach the gravel which is its particular prize. Even this does not involve pick-and-shovel work. The seventy per cent. ice content of the frozen soil simplifies the task. It is possible to melt it away by flowing streams of water over it, or playing water against the sides of the ice-silt bluffs from a low-pressure nozzle.

This cuts and gullies the queer mixture of soil and ice, producing a landscape that looks something like the Dakota bad lands and something like a half-gone iceberg. Fantastic pillars stand up, capped by a thicker and more resistant layer of soil. For a few days



Enormous tusks of long-extinct members of the elephant family are frequently found on the shores of the Arctic ocean.

they defy the weather, and then dwindle and break in the middle, dropping their ragged heads to the muddy gravel beneath.

And through and over this welter of a ten-thousand-year-old world of ice and mud being destroyed in a day, the searching scientists can wade, getting their bones for the mere picking up, or studying the way they are embedded in the freshly exposed faces of the silt-ice cut by the working water.

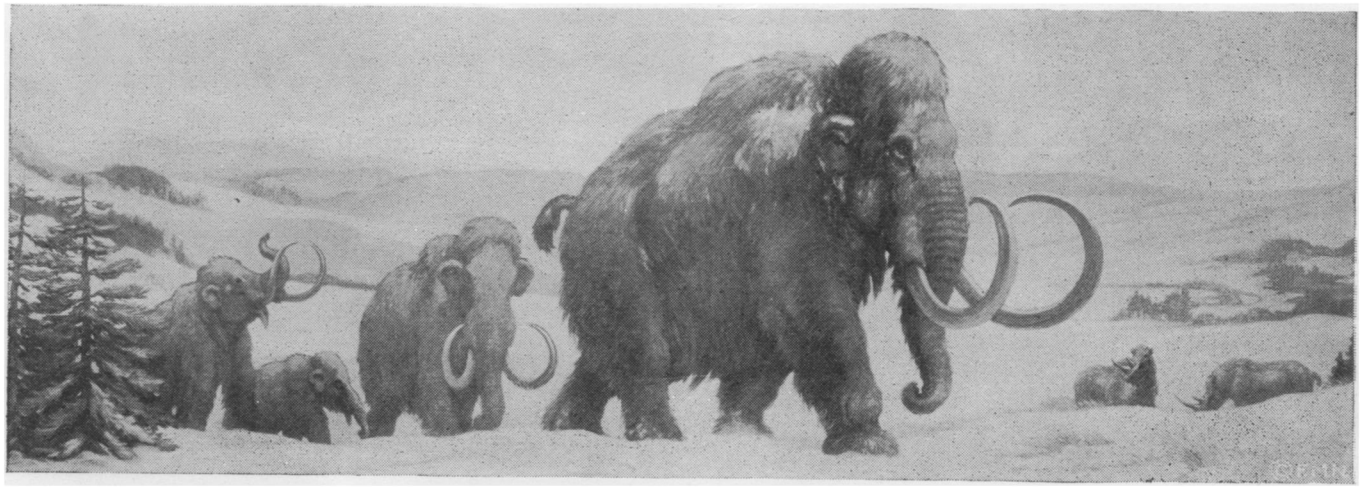
It is highly desirable that a scientist be kept on the spot during the placer-washing season, when the bones are thawed loose and will be scattered and lost unless some intrested and qualified person is there to retrieve them. Recently a cooperative arrangement has been made by the Alaska Agricultural College at Fairbanks and the American Museum of Natural History, whereby one or more collectors will be on the job throughout each open season.

But although these two institutions have preempted this unique locality, where the geologist finds his digging done for him without effort on his part, by the mining company's surplus water power, there are still vast potential fossil mines left in Alaska, completely untouched. Far up on the north coast, where the low, desolate tundra fronts the Arctic Ocean for hundreds of miles, one occasionally finds the giant skulls of mammoths, with their long, curving tusks sticking up from the low scrub and moss like fantastic snags of timber. Dr. Smith says that at least once he turned aside from his course to investigate what appeared at first to be a solitary willow bush, only to find, on closer approach, that the object was the tusk of one of these huge Arctic elephants. There are other prehistoric bones scattered about on or near the surface, in some places quite abundantly; and how much there may be underneath is as yet a matter of conjecture only.

One of the richest, and possibly the most significant, of the fossil deposits in Alaska has been uncovered at Elephant Point, a promontory overlooking an arm of the Bering Sea, very close to the strait that probably was at one time a land bridge to Asia. The fossils here are eloquent of a wealth and variety of animal life passing to and from Asia before or during Ice Age times. There are, of course, elephants —the great, hairy, curve-tusked mammoths that ranged all the cold lands of the earth a hundred thousand years ago, and passing in their restless wanderings across the Bering land bridge, populated the Americas with their kind. Not only their bones and teeth, but pieces of their thick skin with eighteen-inch hair attached, have been found here. In addition to the mammoths, there are horses, bison, musk-ox, deer, wolves and bear, and evidence of the presence of beaver has been found in fossil beaver-dams.

It is curious to note species of both American and Old-World origin at this paleontological bridge-head. The elephant family un- (*Turn to page* 204)

The Trek, as painted by Knight for the Field Museum. Elephants have not always been tropical beasts.



Alaska's Fossil Mines—*Continued*

doubtedly evolved in Africa and Asia, and mammoth and mastodon came to America as immigrants. But the horse is, with equal certainty, an American product that crossed over into Asia, whence it spread during the Stone Age into Europe and Africa. Then it died out on this continent, probably before the coming of man, and was re-introduced by the Spaniards.

The most American of all modern animals, the bison, whose image shares with the Indian head the honors of our five-cent piece, has left here the record of his exodus from Asia, to prepare the way for the copper-colored tribes who followed him and who depended upon him for food, clothing and shelter throughout the whole vast interior plains and prairie country.

It is curious, and may be scientifically significant, to find the bones of the musk-ox at Elephant Point. This strange animal is not an ox, in spite of its name. It could be called the missing link between cattle and sheep but for the obvious fact that it is not missing. So far as known, it is entirely American, though it has some possible cousins in the high mountains of Asia. It seems to be of comparatively recent evolution, for no fossils of it have been found of older than Ice Age date. Will it perhaps some day be possible to trace the trek of the musk-ox across the plains and mountains of Asia to those remote peaks where lives its putative cousin, the takin, or did some relative or ancestor cross over in the opposite direction? The skulls of Elephant Point stare solemnly out of empty eye-sockets, and will not answer yet.

Another possible line of inquiry opens up in the discovery that the Arctic slope of Alaska was free from ice during the days when all of eastern America as far south as the Ohio river groaned under mile-thick glacial sheets. The parts of Alaska fronting on the Pacific were glaciated, but no signs of ice action can be found in the whole vast northern stretches, from the shores of the Arctic sea to the foot of Brooks Range, along whose crest the continental divide runs.

This does not mean that it was not cold in northern Alaska. It may have been intensely cold there in the winter, as it is now in central Siberia, but the snowfall was so scanty that it melted off every summer and did not accumulate from year to year. Glaciers will not form unless there is residual snow, solidified by partial melting and refreezing, lasting through the summer and adding new snow to its bulk during the winter.

During the Ice Age, then, the Arctic slope of Alaska was probably as open land as it is now. Yet great animals roamed there, as witness the bones of the mammoths. They were probably in this region during all or most of the glacial epoch.

Were they indifferent to the cold? Did their half-yard hair, deep wool, and thick layers of fat under the skin make them as freeze-proof as the modern musk-ox? Could they fatten up sufficiently during the short summers, and pick up enough fare during the hard, dark winters, to keep in good condition? Or did the privations tell on them at last, and cause dwindling and degeneration to set in?

Whoever first collects some hundreds of mammoth skulls from beneath the frozen soil that underlies the tundras will be able to answer some of these questions. The skulls are there, as surface finds indicate. Beneath the surface there are undoubtedly whole skeletons, and possibly complete frozen elephants, such as have been found in Siberia.

One of those cold-storage mammoths is now the pride of the Leningrad Museum. Who will bring its Alaskan brother to an American city?

Science News-Letter, March 29, 1930

Fencing

Fencing has ceased to be merely sport at the University of Pennsylvania, and is being used as a psychological device to bring about a fine adjustment between mind and body.

Exercises developed by Leonardo Terrone, fencing instructor at the university, and Dr. R. T. MacKenzie, of the department of physical education, are so planned as to draw on the student's reserves of mental alertness and at the same time to bring the body closely under control of the mind. One of the innovations introduced by Mr. Terrone is the introduction of both right and left handed fencing. Championships are now held in left handed fencing, and popularity of this branch of the art has spread as far as Brazil. Fourteen colleges now participate in the inter-collegiate league.

Psychology
Science News-Letter, March 29, 1930

When Caesar invaded Britain, he found the Britons using horse-drawn chariots to carry fighters quickly to strategic posts.