

E. E. Bond
© 1934
mi.

BULLETIN NUMBER X

MISSOURI STATE MUSEUM, JEFFERSON CITY, MO.

Dr. A. C. Burrill, Curator.

THE MISTY PAST YIELDS UP ITS SECRETS.

Ancient Bogs and Quicksands of the Pliocene Were
Mortuary Urns for Colossal Beasts Whose Life
History is Gradually Unfolded Through Work of
Scientific Investigations.

Edited by
Mr. & Mrs. Geo. Pickens, Hon. Jewell Mayes, the
Dr. O.P. Hay, A.C. Burrill
&
C.W.A. Workers.

Revised
November, 1934.

p. X - 3

THE MISTY PAST YIELDS UP ITS SECRETS.
Ancient Bogs and Quicksands of the Pliocene Were Mortuary
Urns for Colossal Beasts Whose Life History is Gradually
Unfolded Through Work of Scientific Investigations.
By Dr. A.C. Burrill
(Curator Missouri Resources Museum.)

Outside of a few farmers who have been successful in finding mastodons and other kinds of elephants, it is not generally known that Missouri was a great game country even as late as the time of the early men of the Stone Age. Notwithstanding this general lack of knowledge upon a most interesting subject, evidence accumulates in our State Resources Museum and other institutions that bear out the possibility of success for the efforts of our State Game Warden in bringing back some kinds of big game to the state.

Some years ago, the Resources Museum published a list of counties where authentic finds of the bones of prehistoric animals no older than the Ice Age had been recorded. (See Missouri "Blue Book" or Official Manual for 1925-6, pages 959-961.) But this list is now out of date as far as big elephants are concerned, although it was borrowed in part from Dr. Hay's list in the Carnegie Publications. We have now in the Museum many specimens of our own, as has also the state of Illinois; and so the story of elephants and other mastodons in their relation to the prehistoric life of Missouri, becomes as interesting to the local explorer as Dr. Andrews' find of the remains of a 700--foot lizard on the south edge of the Desert of Gobi in China.

According to the London Mail, two huge mammoth teeth have been unearthed by a diamond digger near the present bank of the Vaal River at Bloemhof, the first to be discovered south of the Equator in Africa. So it is apparent that the Age of Mastodons was general over the world and that Missouri had her share. Gigantic lizards, mammoths and many other great beasts inhabited this region in prehistoric days. Local spring basins or water-holes are likely repositories in which to find valuable museum pieces in the remains of ancient animal life, therefore it follows that the farmer boy may have a thrill in store for him in the discovery of things scientists have not yet brought to light. Besides mammoths, we should be able to locate a tooth or other bones of the great 14-foot high Imperial elephant (*E. imperator*) which is known to have ranged up to the latitude of Ohio and if able to cross the Mississippi River, then must certainly have come into Missouri also on the way up from Mexico. There is always the possibility of discovering these signs of prehistoric animal life in gravel pits, in some river bank that is cutting away, or at some highway grading of a bog or quicksand.

Have you ever looked out over the brimming banks of the Missouri river on a hot summer morning and seen it through the mists or haze steaming like a tropical river? It does not take much of an imagination to reconstruct those days long ago when great beasts of the mastodon type trumpeted up and down the dense forests clothing the valley in just such a view as we can see from the upper stories of the State Capitol Building. I have tried to pierce the mists that hang over the Missouri river on a summer morning and in the words of a recent African writer, this is prophetically what has happened many times in the great past of the Old Missouri Valley:

"We may imagine ancient aborigines awakened on a dark night as still and cold as the floor of the sea, by a sound which rose once, held, and died away; a sound comparable to nothing else, perhaps the oldest animate sound in the world. But it did not come again. A great silence ruled on through the black hours until the blackness became dimness. Now, vague colossal shapes begin to tower up out of the void of the valley forests and become grey in the first light of dawn. A great gnarled sycamore and other giants of the primeval forests with masses of bark rubbed off in places stretched up like tall columns into the sky, supporting a canopy of foliage while great twisted grape vines clambered around their trunks where they had not been torn down by the mighty tug of passing mammoths or mastodons of the late Pliocene Age.

"Imagine again, an opening in the roof of the forest canopy, a circular space where no trees stood, on a forested hillside above the valley. Here, apparently, no trees had ever grown, for in the center was a spring and water trickled away through gravel for a radius of a dozen rods, thence to the great river half a mile away.

"Indians were already awake with their stone arrow-heads and fleet shooting bows, in time to see when the gray turned dim again, movements of great beasts across the circular open space of the forest. A bulky, hairy figure swayed over the gravel toward the spring and a smaller like figure followed, balancing something in its great arms. The first one leaned over the water, balancing on its knuckles with its knees unbent and drank its fill. Then it took the baby from its mate and the mate drank; the baby was returned and they moved methodically away."

Next some delicate deer sauntered out into the clearing, the herd looking curiously about. They drank a little, stood about then drank again and suddenly disappeared into the forest. A herd of low, heavy-set peccaries were next to come trotting out grunting and squealing, champing their tusks and sniffing the edge of the water. They also drank and bolted away. Ancestors of our modern camel, two or three at a time, pushed their way onto the gravel, quenched their thirst and vanished; with them came the early one-toed ancestor of the modern horse, having but just been perfected in the Pliocene as a swift running creature able to escape from all of its enemies in open prairie. The stately tread of a giant stag of our ancestral American elk making his way to the spring put the last visitors to route and they dashed into the forests.

Again a wild sound rose, held, and died away. In the jungles of the Missouri bottoms the mastodon was calling and a dozen others were answering. Now and then crashed a sapling or a great grapevine line was threshed down by the mighty trunk that yanked it out of the way as the great beasts shouldered their way and gave notice of approach to the others. Shadows were gliding into the open spaces of the clearing--huge shadows were hulking out of the mammoth-made forest corridors. As the gray dawn lightened, the mastodons drank. Their trunks went lower and lower into the spring hole while the trickle in the gravel dried up. More animals came, including a pair of Columbian elephants and a Boreal elephant, great beasts ranging from nine to ten and eleven feet in height. But mostly the strange gathering was mastodons. "The fully grown but younger mastodon bulls came first, then the cows appeared, some with their off-spring and the old bulls ming-

ling among them, pushing, grunting and whinnying.

"All ages and sizes were in the gathering herd when finally two ancient bulls came last, with great wrinkled foreheads, heads and trunks moving up and down as they padded slowly toward the spring. Their ivory was larger than that of the others and they did not use it to thrust their way through the milling herd of fifteen or twenty now gathered in the clearing. Their days were numbered with the herd—they would soon be outcasts, driven out by the younger bulls, to roam for years, old patriarchs, their tempers more and more ugly with age.

"When all had quenched their thirst the herd milled around on the edges of the clearing, beating down the rushes and sedge grass, leaning and rubbing against the larger trees and bumping into one another, blinking their little red eyes as they grew accustomed to the light of dawn. They seemed in no hurry for anything; just as it had taken them many million years to perfect these huge pachyderms, so time was endless and filled with endless motion. Two years covered their prenatal stage and another two years before they were weaned, more than ten years before they were grown and more than one hundred years before they were ready to go hunting for their burial ground.

"From the forest came the primeval call once more and the herd quieted. Then one of the old patriarchs raised his trunk and answered and out of the forest marched a great tusker over 13 feet at the shoulder, with gigantic curved scimitars of ivory longer than any of the rest. The sign was unmistakable; this was the Imperial elephant of more tropical clime and now at the northern end of its range, from which latitude all of these great beasts were soon to be blotted out by the hard times of the Ice Age.

"No primitive hunters step among such herds, but from vantage points of larger forest trees or from rough platforms near the clearing they began to shoot in with expert care their sharp arrows, wounding the right fore-leg of one of the patriarchs. The whole herd crashed away through the forest, the old bulls trumpeting with rage and headed up the valley." Primitive weapons were too feeble to kill immediately such thick-skinned creatures, but the trail was followed by relentless Indian trackers for days and nights, until they caught up with the patriarch with eight or ten arrows in his legs, on the Pomme De Terre River in Benton County, not far from Avery, which is just over the line in Hickory County. Here they found the elephant in a quicksand at a spring near the edge of the river where he had attempted to slake his thirst and only the blood stained surface of the spring marked the spot of his final burial place. The slippery bank had caved in and the smooth quicksand had engulfed him. This burial place was discovered by white men about 1806, possibly told them by Osage Indian guides, and was dug up by Koch in 1840. This specimen was mounted and is in the British Museum, having paid Koch some \$25,000. (?) Over the right femur bone, Koch said there were found five arrow-heads which had left light-colored spots on the otherwise brown bone. And this proves early man.

This was not the only place in Missouri where mastodons have mired in quicksand or sunk to death in a swamp. In 1917, Eugene L. Bond, farmer, was cleaning out a spring for his livestock, six miles

east of Olean and about two miles south of the Cole County line, when he discovered an ancient Mastodon tomb at the head of Brush Creek between the Clark Fork and the Moreau River. Two mastodon teeth from this place have been loaned by Mr. Bond and they are now in the Resources Museum of the State Capitol Building at Jefferson City, Pier D 4A. He dug out these teeth about 17 years ago. Just like Koch's account of a farmer cleaning out a spring near Bour-beuse Creek, this farmer started to clean a springy place, having been told by a centenarian lady that cattle had mired in a certain quagmire spot on his newly bought farm. He wished to run the possible water supply to a cattle tank and paid no attention to the many bones he ran into, until he came upon the four teeth, two of which must have been lost since by farmhands. After ten years with rough handling, the chalky roots were mostly broken off while the numerous other bones of this location were broken up in the excavating. Probably they badly disintegrated on exposure to the weather. The continual soaking with underground water is what must have preserved these bones for so many thousands of years. It is a pity that ignorance is so general in the Missouri country after 100 years of the little red schoolhouse, that a farmer would fail to seek an expert in time to preserve his great find.

From the state highway gravel pit, two miles south of La Grange, Mr. W.F. Howell secured in 1925 a Mammoth tooth with enamel less discolored than any other specimen received. This tooth was so well preserved it might well have been shed only recently by an elephant, for they begin shedding their surplus milk teeth as soon as they are born. Later they found a tusk fragment and tooth now in Highway Department Office. (framed exhibit)

Mr. Jesse Maughs, of Fulton, has brought to the Museum a larger tooth of the mastodon (Mammut americanum) measuring six and one-half inches on the grinding surface. In 1925, H. Russel, farmer, went in bathing with a party of friends on the Loutre river, three and one-half miles south of Mineola, in Montgomery County, and discovered a ridged ivory tooth sticking out of the gravel. This proved to be eight and one-fourth inches long. This fine specimen is now on exhibit with glacial gravel adhering to it with a lime stickum developing under pressure of a million tons of ice long ago. There is no doubt but that this locality and the region around Olean, would be a rich field for excavation to secure more remains of these valuable specimens.

Attention is called to a tooth found in excavating near the house formerly occupied by Architect J.G. Braecklein, and a gift of that gentleman, Kansas City, Mo., a record separate from the other Kansas City (find below) which was the find at a point about 300 feet west of the intersection of First Street and Lydia Ave. and 20 feet deep; also 500 feet south of same, again, a tooth. The other Kansas City printed records are parts of tusks. Another specimen is from the old Henry Graves' Museum at Doe Run, St. Francois County, Mo., Acc. #100, but the collection data is missing, so we doubt if it were a local find. To compare with this, came in the same collection, a mastodon tooth from the Caucasus Mts., Eurasia.

Another with records lost is a fossil elephant tooth badly cracking into laminae. For comparison, we have a prehistoric elephant

tooth from Eskimo land and Pleistocene molars of fossil elephants from the Caucasus Mountains--four thousand years old, probably more.

Dr. Hay lists mastodon bones recovered from places designated on the accompanying article reprint from 1925-6 "Blue Book", pp. 960-1. For the expert there are extensive museums of fossil series at Rolla and Columbia. Here the above are duplicated and in shell and leaf impressions run into the thousands for student study and monographic work.

The identified series of mammals now known from Missouri and where they were uncovered is as follows:

Location of finds of Xenarthra:

1. Pomme de Terre River, Benton or Hickory County, Myiodon harlani and Megatherium.
2. Kimmswick, Jefferson County, Megalonyx jeffersonii.

Location of finds of Mastodons:

Unless another name is used after the localities, Mammut americanum to be understood as the species.

1. Galena, Stone County.
2. Joplin, Jasper County.
3. Springfield, Greene County.
4. Papinsville, Bates County.
5. Pomme de Terre River, Benton County.
6. Tackner, Benton County.
7. Osceola, St. Clair County.
8. Sedalia, Pettis County.
9. Bourbeuse Creek, Gasconade County.
10. _____, Ste. Genevieve County.
11. Kimmswick, Jefferson County.
12. St. Louis, St. Louis County.
13. Arrow Rock, Saline County.
14. Kansas City, Jackson County.
15. Line Creek, Platte County.
16. _____, Caldwell County.
17. St. Joseph, Buchanan County.
18. Clarksville, Pike County.
19. Fertile, Washington County.

Location of finds of Elephas boreus:

1. Osage River, Benton County.

Location of finds of Elephas columbi.

1. Joplin, Jasper County.
2. Tackner, Benton County.
3. Rockport, Atchison County.
4. _____, Jackson County.

Location of finds of elephants of undetermined species:

1. Kimmswick, Jefferson County.
2. Bonne Femme Creek, Howard County.
3. New Madrid, New Madrid County.
4. Wellington, Lafayette County.

Location of finds of horses (Equidae)

1. Papinsville, Bates County.
2. Osage River, Benton County.
3. Kimmswick, Jefferson County.
4. Opposite St. Louis, in Illinois.
5. Rockport, Atchison County.

Location of finds of peccaries (Tagassuidae):

1. Tackner, Benton County.

Location of finds of camels (Camelidae):

1. Rockport, Atchison County.

Location of finds of deer (Odocoileus):

1. Pomme de Terre River, Hickory County.
2. Kimmswick, Jefferson County.

Location of finds of Elk (Cervus canadensis)

1. Pomme de Terre River, Hickory County.

Location of finds of musk-oxen (Ovibovinae):

1. New Madrid, New Madrid County, Symbos cavifrons.
2. Cape Girardeau, Cape Girardeau County, Symbos cavifrons.
3. Tackner, Benton County, Symbos cavifrons.
4. Kimmswick, Jefferson County, Symbos cavifrons; Bootherium bombifrons.
5. St. Louis, St. Louis County, Symbos cavifrons.
6. Wellington, Lafayette County, Symbos cavifrons.

Location of finds of extinct Bisons:

1. Joplin, Jasper County.
2. Pomme de Terre River, Hickory County.
3. Pleasant Hill, Cass County.
4. Kimmswick, Jefferson County.
5. Kansas City, Jackson County.

Location of finds of modern Bison in Ice Age (Bison bison).

1. Kimmswick, Jefferson County.

Location of finds of giant beaver (Castoroides):

At East St. Louis.

The detailed description of all these finds is located on 29 maps and thereon are noted the text pages about same.

For invertebrate fossils one may consult the volumes of the State Geologist, especially the one by Prof. E.B. Branson "The Devonian of Missouri" Vol. XVII, 2nd series, 1923. For an introduction, note the plate or two in the University of Missouri publication "Geology of Missouri", University of Missouri Bulletin, Vol.19, No.13, May, 1918, pp. 97-105.

MISSOURI'S BIG GAME PARADISE FOR MASTODONS AND OTHER ELEPHANTS.

Man's stupidity in the wild as well as in civilized times has worked woe to the big game of the earth. There was a time when the dry lands of the earth thundered from the jar of passing thousands of bison, elephant, hippopotami, wild cattle, wild horses, and various deer; while the tundra grasses of the alternating cold and warm periods vanished like magic before the drifting herds of musk oxen and reindeer, and of camels. This picture was true of the Old World and the New, save that we must leave out the hippo and wild cattle for Missouri.

It will be hard for the school boy and girl or the grown sportsman and business man to imagine just how it looked in Missouri to see droves of elephants of many kinds, more different species than now exist in all Africa and India, moving about the grassy glades and Ozark primeval forests of many thousands of years ago. Only in the last hundred years have people been picking up and saving from places where rivers cut banks or excavations were going on, the teeth of these early mastodons and mammoths, woolly elephants, Columbian elephant, Northern and Imperial elephants, and perhaps other species. A half dozen of these finds of bones are now represented in the State Museum by teeth in various stages of perfection from more than two species of these huge beasts which died here in Missouri before the days of the Indian tribes known to us.

In general, we know that the Indians of De Soto's time and later, that of Lewis and Clarke, did not have any ivory weapons or trinkets that could have come from such beasts, nor do we find such remains in the excavated homes of the early cliff-dwellers of the Southwest. I hope no one will try to claim the silly notion that circuses have made a business of burying their dead elephants in out of the way quagmires and hollows of the Ozarks, far removed from the railroad and public highways. If these matters are agreed to, it will be easy to understand that the time when these big beasts roamed and trumpeted through the Missouri hills goes back of the reputed time when Adam lived a long period. It hurts a lot of people to allow the Creator time enough to have produced creation, but relics like these elephant teeth tell a voiceless tale of truth. It ^{is} pays to ramble on about the romantic and strange past that was Missouri of yore. But this elephant tale is being revealed in these latter times, not to prophets of Jehovah so much as to unlettered farmers, ignorant laborers, road build-

ers, sand-pit men, railroad excavators, and others. These people come to us with treasure from an ancient world of life which lies buried all about us, and ask what these things are and what they mean. These are leaves out of pages of big-game ancient history which the white race with its hard heads was not permitted to see; no, not one; nor permitted to hunt, not even once.

And the reason why our times have not had a shot at, and the savage joy of, mastodon hunting lies in two directions. In those former days, most of the earth was filled with stupid people that lived on meat and built pitfalls or drove herds into quicksands or over cliffs to get their meat without too much personal injury. When meat was plentiful, they multiplied in their cave warrens or on the open prairie like jack rabbits. As more mouths had to be fed, the elephants were nearly destroyed to furnish meat enough. Then came the drouth with fire, or the wintry storms when they could not seek enough meat and many perished miserably of starvation for lack of that point of view we now call conservation of game. The American Indian had it, in-so-far as he killed only what he needed and spared the rest of the herds and flocks. It is said he did not delight to kill wantonly and often breathed a prayer of forgiveness to the animal spirit whose life he despatched, and to the Great Spirit that he and his be allowed to live on such meat as he had prowess to take. The second reason was climatic changes and consequent shifts in food supply and enemies.

Many stupid races of men passed across the stage of the world before the refined feelings of the Indian or of some white men came to expression in actual saving and multiplying of game. It is thought that America was never so thickly peopled with aborigines as Europe and Asia; not so many public works left to mark their passage as in the Old World. Of their skeletons which we find, no numerous new types like those of the Old World show up. The cave remains are mostly Indians of one kind or another so that the Mormons claimed that their people first settled this continent some 800 B.C. until Jacob's Cavern at Pineville, Mo., revealed the bone carving of mammoths and things that must have been made some 10,000 to 20,000 B.C. or more.

To go back a bit, scientists claim that the skeletons of Dinotheres found in the Rhine Valley and elsewhere were the Tertiary beasts from which sprang such forms as the early rhinoceros, manatee, hippopotamus, and mastodons. The word mastodon means nipple-tooth, that is, a beast that has cusps projecting as prominently like enamel nipples on their molar teeth. There were several rows of these tall cusps on each molar and as they ground away on their rank grass diet, willow twigs and shrubs, through the centuries, these nipple cusps ground down to cross ridges of harder enamel and dentine. After a-while elephant descendants quit growing the nipple cusps but, instead, huge molars with very many narrow ridges running crosswise of the tooth. According to Dana, this is an easy distinction in telling apart the different teeth found in Missouri soil and bog, and now shown at the State Capitol.

According to Osborn, when the mastodon was driven out of Europe by climate or human hunters, it lingered on in North Africa awhile and certainly survived in America in very late Pleistocene time, that

is, through some of the Ice Ages. Our Dr. Osborn has had more men and money and done more to show that the mammals of Europe in Pliocene times which preceded the Ice Ages, were derived by very remote migrations from North America, and, more directly, from southern Asia. While they have proved a Pliocene Piltdown man to have lived in England with mastodons, we have but two very slim proofs in Missouri that man saw the mastodons within our borders. The first case, I referred to in noting the great find at Jacob's Cavern.

The second case is told by Dr. O.P. Hay in a Carnegie publication in the following words: speaking of Pomme de Terre River in Benton County: This locality is famous for the remains of mastodons which it has furnished. Besides these, however, there have been found or reported remains of Elephas columbi, Bison, Odocoileus, Cervus, Equus, Mylodon and Megatherium. In 1842, Richard Owen (Proc. Geol. Soc. London, vol.iii, p. 689), in discussing Koch's collection left at the British Museum, stated that in it were remains of Mylodon harlani; also portions of large species of Bos, Cervus, etc.; but the place of their origin is not mentioned.

The occurrence of bones in this region was known to B.S. Barton as long ago as 1806. In the fourth edition of Cuvier's Ossemens Fossiles, 1834, vol.ii, page 270, is an extract from a letter written by Barton to Cuvier in 1806, in which Barton stated that an intelligent traveler had seen in a particular locality near the river of the Osage Indians, thousands of the bones of this animal and that this traveler had collected there, among other things, 17 tusks, of which some had a length of 6 feet and a diameter of a foot. However, the majority of these bones were in a bad state of decomposition. Barton sent a molar to Cuvier which appears to have been found in this region. In his Archaeologia Americana 1814, page 26, Barton speaks of the immense number of bones in the country of the Osage Indians; he also stated that he had a molar from there.

It was through the explorations of Dr. Albert C. Koch that the Pomme de Terre locality became famous. This indefatigable searcher after fossil remains of mastodons and zeuglodon gave a description of his discovery of mastodon bones and teeth in Benton County, Missouri, in 1840. These remains are of interest, because from them was restored, by Professor Richard Owen, a skeleton in the British Museum of Natural History. In his "Short Description of Fossil Remains Found in the State of Missouri", a pamphlet of 8 pages, printed at St. Louis, in 1840, Koch gave an account of the discovery of the skeleton on which he bestowed the name Missourium. A fifth edition of the same work, enlarged to 28 pages, was published in the same year at Dublin, Ireland. An account in different words was presented by Koch in his pamphlet of 99 pages and 8 plates, printed in Berlin in 1845 and entitled Die Riesenthier, etc. The locality was in the southern part of Benton County, on the Pomme de Terre River, a tributary of Osage River. Broadhead (Kansas City, Rev. Sci. Industry, vol.iv, 1881, p.520) described the place as being on Pomme de Terre River, 10 miles southwest of Warsaw; but, according to the best maps at hand, a point on Pomme de Terre River 10 miles from Warsaw would be almost due south of this town. Broadhead further stated that the place was on the farm of Alexander Brashears. This information was taken from James H. Lay's History of Benton County, page 14. publish-

ed in 1876. Here the name is given as Breshears. Lay stated that a Scotchman named Cott exhumed a large and well-preserved skeleton, which he took east and sold for \$20,000. This probably refers to Doctor Koch's work. Other persons are mentioned as having unprofitably spent much money at this place in search of bones.

From Mr. J.S. Kidwell, county surveyor and highway engineer at Warsaw, Missouri, the information has been received that the locality is in the northwest quarter of section 9, township 38, range 22 west. This would be in Hickory County, not far from the town of Avery.

According to Koch, an attempt had been made by some of the earlier settlers to construct a mill for grinding flour and corn meal. In making the necessary excavations, some bones of young mastodons were met with; but the interest in these was soon lost. In 1839, another tooth was found and the report of this reached Koch early in 1840. On March 31 of that year (*Die Riesenthier*, pp. 69,70) he was at the crossing of Osage River 24 miles away from his destination. On page 71 of the work quoted he said that he spent 5 months in a cabin there. On the other hand, P.R. Hoy (*Amer. Naturalist*, vol.v, 1871, p.147) wrote that in March, 1840, he "visited the spot on the Pomme de Terre, Benton County, Missouri, where Dr. Koch had recently disinterred the large male mastodon now in the British Museum, which the Doctor mounted and named the Missourium tetracaulodon." Hoy found that the excavation made by Koch was about 15 feet in diameter and 6 feet in depth and was half filled with water. A man who had helped Koch told Hoy that Koch did not get out all of the bones; and Hoy succeeded in finding a molar and some other remains. See also statements made by Dr. Edmund Andrews (*Amer. Jour. Sci.* vol.x, 1875, pp. 32-34). It is impossible to reconcile such contradictory statements.

In 1843, Harlan (*Amer. Jour. Sci.* vol. XLIV. p.69) speaking of Koch's large collection on exhibition in Philadelphia, stated that it contained more than 300 mastodon teeth, with numerous jaws, besides remains of the ox (probably bison), deer, elk, megatherium, and mylodon. Harlan (*loc. cit.*, pls. I-III) described some parts of the skeleton and about 24 teeth (his Orycterotherium missouriense) which is now referred to as Mylodon harlani. He believed that the collection was made on the Pomme de Terre.

Koch described quite minutely the character of the deposits met with in making his excavation. Above all was the surface soil, the depth of which was not stated; beneath this from 2 to 3 feet of gravel; beneath this about the same thickness of yellowish clay. Then followed two layers of gravel, each from 9 to 18 inches in depth, below these, 3 feet of blue clay. Then came 3 feet of alluvial soil, which contained some of the bones of the Missourium. Under this was the deposit which enclosed most of the skeleton. Besides the bones, this layer contained much other animal material, consisting of the flesh, skin, etc., which had been transformed into a brown fatty mass. Beneath this bone-bearing layer was a deposit of sand. The layer of alluvium contained an abundance of vegetable matter in a wonderful state of preservation. Koch regarded the plants as indicating a warm or tropical climate. He found cypress burrs, and wood which he thought was related to logwood; also a flower of Strelitzia, a genus of African plants; likewise several stems of palmetto. Koch concluded

that "a revolution of the earth" had taken place here, between September 15 and October 20 at some time in the past. In discussing the discovery in 1857, (Trans. St. Louis Acad. Sci. vol. I, pp. 63, 64) Koch affirmed that the layer of vegetable mold was 5 or 6 feet deep and was overlain by 20 feet of alternate layers of sand, clay and gravel.

From the bones in Koch's possession, no doubt obtained partly on Pomme de Terre River, he reconstructed his Missourium theristocaulodon, of which in 1845 he gave a description and a figure (Die Riesenthier, pp. 43-53, pl. viii). The tusks were each 10 feet long. The length of the skeleton, from tip of nose to root of tail, is given as 30 ft., height 15 ft. This skeleton was afterwards sold to the British Museum and reconstructed by Richard Owen, being at the same time reduced to more reasonable proportions. Even in its reconstructed form it was composed of bones from several individuals (Lydekker, Cat. Foss. Mamm., pt. iv, p. 16, fig. 3). The price received by Koch for this skeleton was 1,000 pounds sterling (Amer. Jourl. Sci. Vol. ii, 1846, p. 132, fig.) British Museum Guide, 9th ed., 1909, p. 61 (State Museum lib.)

Besides the bones of the several animals mentioned, which Koch claimed to have found when excavating for his Missourium, he asserted that he took out with his own hand from among the bones 5 stone arrow-heads. One of these lay under the right femur and had left a light-colored spot on the elsewhere brown-colored bone.

We can not form definite conclusions about the age of fossil found by Koch along Pomme de Terre River. If we were certain that the things which he reported from there were really found there, we would have some foundation to stand on. If he found there remains of horse, mylodon, and megatherium, early Pleistocene, probably Aftonian would be indicated. Thus Koch has puzzled all posterity with his messy records.

Tackner, Benton County.--At a meeting of the Academy of Natural Sciences, December 3, 1843 (Proc. Acad. Nat. Sci. Phila., vol. 1, p. 321), Doctor Chaloner called the attention of the Society to a collection of bones of mastodons and elephants which had been brought from Benton County, Missouri, by S. H. Whipple. The weight of the collection was estimated to be about 2,000 pounds. At a meeting of the American Philosophical Society held January 19, 1844 (Proc. Amer. Philos. Soc., vol. iv, p. 35), this collection of bones was reported as having been purchased of Whipple at the instance of Dr. Isaac Hays. A statement by Whipple accompanied the collection to the effect that it had been made in the county mentioned, at a distance of half a mile from Osage River, and evidently south of it. Broadhead (Kansas City Rev. Sci. Indust., vol. iv, p. 520) stated that the place was on the farm of the heirs of Charles Wigkliffe. Whipple reported that the locality was in the latitude $38^{\circ}10'$ and in $16^{\circ}40'$ longitude west from Washington, which would be $93^{\circ}41' 34''$ west from Greenwich. However, the latitude as given would locate the spot about 5 miles south of the Osage River, and the longitude as given would locate it in the middle of Henry, the next county west. One cannot rely on the statement. Mr. J. S. Kidwell, county surveyor of Benton County, has informed the writer that the locality is in the southeast quarter of section 24, township 40, range 23 west. The description of the character of the country is no doubt correct. South of the Osage it is

characterized by its irregular and broken appearance, running up into extensive ridges, rocky cliffs and flinty knobs. Between these there intervene valleys, through which run streams of water bordered by alluvial bottoms and lofty forests. In one of these valleys there is a small saline marsh, perhaps an acre in extent. Close to the marsh runs a rocky ridge on which remain columns of limestone, sometimes rising 20 ft, and lying in great disorder. It does not appear that any remains of other animals than mastodons and elephants were secured at this place. The elephant is probably E. columbi, inasmuch as specimens from this county are in the Philadelphia Academy collection.

The collections of the American Philosophical Society were many years ago turned over to the Philadelphia Academy of Natural Sciences. In the collections of the Academy are found a considerable number of teeth and bones of mastodons, labeled as having been obtained in Benton County, Missouri, but no definite spot is mentioned; most of them probably belong to the Whipple collection. In the Academy's collections is the type of Dr. Isaac Hays's Tetracaulodon collinsii, now regarded as belonging to Mammut americanum. This specimen is labeled as having come from Benton County. As it was described in 1834 (Trans. Amer. Philos. Soc., vol. iv, p. 326, pl. xxviii), it appears, if the label is not incorrect, that mastodon materials from Benton County had reached Philadelphia long before Koch and Whipple brought their collections there. Furthermore, the type of Mastodon cuvieri Hays is in the Academy's collections; it, too, is labeled as having been obtained in Benton County. It was described in 1834 (op. cit. pp. 322, 334 pl. xxiv). Just where these fossils came from in Benton County is impossible to determine. As to the geological age of the fossils of the Whipple collection, one can only indulge in surmises.

In James H. Lay's History of Benton County, published in 1876, it is recorded that, "at the Wickliffe farm, Case and Redmond took out a part, perhaps the whole, of a large mastodon skeleton and sold it at Cincinnati."

In the new Museum Bulletin No. V, "Missouri Caves Yield Up Their Secrets", edited by Marian B. Pickens, with later remarks by Dr. Moorehead, February, 1934, a discussion of the famous stag deer humerus engraved with a mastodon, and taken from Jacob's Cavern, near Pineville, Mo., McDonald County, entertains a possible age of man to 16,000 B.C. according to one guess. This is on exhibit due to the courtesy of J.L.B. Taylor of Joplin, owner of Jacob's Cave, in the Museum Center Case V, which together with Bulletin V and this Bulletin X were arranged by C.W.A. workers.

Having said so much about an old bone engraved with a mastodon, it is interesting to note that two or three more finds of mastodons, at least their teeth, have been found in Missouri, and within the seven years since, another two of them were brought to the State Museum. Besides this we have been clipping newspaper items to show that other teeth have been found in various parts of Missouri, which we feel sure from the letters written us about them, are of the same gigantic herds of elephants that roamed over this territory in the dim past. Perhaps the best way to handle this information is to give it in the form of our article published in the Missouri Magazine of December, 1928, -p. 18 and p. 19, with map full of little black elephants made up by my good friend Mr. George Pickens, Secretary of

the State Chamber of Commerce.

To this we have to add the fine big specimen with roots loaned by Dentist Pletcher of Pacific, Sept. 4, 1933, and found in a gravel bed of the Meramec River. But let us review other old records before going on with the later ones.

As a result of a series of articles about the early discovery of the Mastodon or Mammoth bones in Benton Co., (See Warsaw Times, June 1, 1933 "Famous Skeleton Finds") reprinted in other town papers, like the Buffalo Reflex, John Wise brought from his two-acre bog northwest of Buffalo where Lindley Creek crosses the county line, a broken mastodon tooth which his grandson Jack found in 1903, in the creek sand by the Loftis Place. This bog, according to the Reflex of Sept. 7, 1933, was covered with grass when Mr. Wise came to the section in 1868, had to be fenced to keep livestock from being trapped, as under the grass it had a depth of 7 feet, where Wise nearly lost his life in the early spring days when following deer he took a short cut across it. Draining the spring since then has reduced acreage to less than a half-acre bog, but it probably harbors other bones. The bits of tooth now in the Museum collection as #861/1 originally had a 2" height and a length of 3.5 by 3", ridged as elephant molars should be, weighing 6 pounds. We have only fragments of the enamel left, but the record adds a new county, Dallas, to the state list.

The Warsaw Editor above calls attention to a letter from Sec. A. Wetmore of the Smithsonian Institution, Washington, D.C., citing Dr. O.P. Hay's work, 1924, and Jas. H. Lay's "History of Benton Co." 1876, p.14, for data on the Cott or Koch mastodon sold to the British Museum, from the Breshears Valley farm owned by Jo.A. Jones. The son W.S. Jones, of the Jones Variety Store wants to have these "Bone Springs" searched again by modern methods for more bones, where so many were exhumed. Another, T.B. Jones of Appleton City says it would be worth an expedition to the Jo.B. Clark farm swamp, 2.5 miles S.W. of Warsaw with its 12 foot ribs and at Black Sulfur Springs at old Denton, northwest of Warsaw (interview, Jan.11,1933), but there are no state funds for such work. It is feared that local folks will ruin all they take out so no Museum can desire the injured remnants. Representative C.S. Nelson of Freeman, Cass Co., claims where his father first staked a claim (Sec.35,T.44,R.33W.,) they cut a road in 1936 by the limestone cliff where a trickle of water issues, and that ten feet down in solid clay found a huge bone, 20" long, with knuckle 10" diameter, shank 6" diameter, and that in 1887, in digging a well they brought up a bone with a ball joint about 11" diameter, on a shank 6" diameter and hear 14" long.

These seem to constitute new discoveries to record on map of elephant bone finds, and Mr. Nelson has a piece of one of these bones left at home.

In the Tri-County News of King City, Mo., Aug. 29, 1930, courtesy of Hon. Jewell Mayes, Mo. Dept. of Agriculture, as many previous clippings, is a half column account "Dr. R.H. Hurst finds Bones of Pre-Historic Mastodon located near King City, Gentry Co.," which we refrain from quoting to save space, though very interesting, but writing him for material the Museum received the following letter of Sept. 15, 1930, from this osteopathic physician:

"I am very sorry to say that the specimen was in such poor state of preservation that it was impossible to preserve any part of it. Would be glad to accept your offer for place of safekeeping had the specimen been in good condition, but as it was located under an Elm tree, the roots had burrowed down and tangled up in the bones badly, and the fact that it was so close to the surface permitted the moisture, freezing and thawing to do too much destructive work.

"The find was made on a creek bank and only a small portion of the skeleton remained, balance had been washed away. The lady who owns the place told us of having seen what she thought were legs sticking out of the bank several years ago. These, no doubt, were the leg bones and had been carried down by the stream before we made the discovery."

Signed, R.H. Hurst

A news item quoted from the Shenandoah Sentinel, notes the finding of mastodon fossil bones in the old bed of the Tarkio River, south of Blanchard, Iowa, but inside the Missouri line. The find on the Will Houston (or Huston) farm by Wyatt and Raymond Houston, was followed up and brought this letter from Mr. Raymond Houston, Sept. 11, 1931, as follows:

Dear Sir:

"With regard to the bones found in the Tarkio River this summer, you are right in supposing they are a 'Missouri find'. They were found by my brother, who is a student of Rush Medical College, Chicago. Since going back to Chicago this fall he has talked with the Curator of Field Museum and it seems probable that the bones are those of a Mammoth. The pieces found were three teeth, two of them in excellent condition, pieces of the skull and jaw bones, an ankle bone and what seems to me to be the head of the femur. It seems that another fellow found some vertebrae a year or so ago. That is the report, at least, but I do not know where they are now.

"The bones were found in the very bottom of the river ditch. The extreme low level of the water was what made it possible to find them. One tooth was found about $\frac{1}{2}$ mile down the stream from the point at which the others were. No doubt other bones have washed down the stream and may be lodged in the holes which are continuously being washed out and filled up by the current. At the same place with these bones and almost growing over them, were several preserved stumps of small trees. They seem to have been swamp trees or something of that nature as they have no tap root, but the roots spread out on all sides in a nearly level plane for a few feet. All this was about 20 or 25 feet below the present surface of the ground.

"At present we have the things here at home.

"Another item that might be of interest to you. At a point about 1 mile south of where the bones were found, a walnut tree was washed out of the river bank as the current changed. This tree butt was 12 ft. below the surface, and directly above it was standing a large maple tree, and a few years ago an elm tree of approximately 3 ft. in diameter fell off the bank just above this spot. This

cave-in, I think, is what caused the current to wash out the log. Yesterday my father and I cut off 25 feet of the walnut log and took it to a saw mill. It was sawed today and seems as hard as ever or maybe harder. This log evidently has been buried for a great many years as the elm which grew above it probably was not far from the century mark.

"Hoping these things are of some interest to you, I am,

Sincerely yours,

Signed Mr. Raymond Huston,
Blanchard, Iowa.

Besides this, the Publicity Director, T. Godsey of the State Game & Fish Department, July 18, 1931, referred me to very poor remains of mastodons from Rockport, in west center of Atchison Co. Have not found an address to get in touch, but wonder if this is the same area reported by Dr. Hay as Mastodon columbi. This is a more recent find than Dr. Hay's 1924 report.

This about completes the records filed with the State Museum, but it is known that Teachers' Colleges and other school museums all over the state have like specimens, waiting to be studied by a qualified expert able to pass on the species of elephant each tooth or bone represents. Will you notify us if you know of specimens?

Our late Museum friend, Hon. Lee Witty, of the Missouri House, furnished the following account in the Kansas City Journal-Post-undated-(about 1927), quoting the St. Louis Globe-Democrat.

MASTODON TEETH FOUND IN STATE

Kimmswick, Mo., Regarded as Rich Field by Expert Scientists.

Missouri, which-already has furnished an interesting chapter for the archaeologists in their study of the prehistoric mastodons and mammoths of the pleistocene age, may be a source of further research material, according to Walter Miller of Festus, who participated in the uncovering of the "graveyard of history" near Kimmswick, Mo., some twenty-five years ago and who, since, has been interested in exploring that neighborhood for further animal specimens and for Indian relics.

Miller declares that there are two other cities in the region about Kimmswick which he has carefully examined and which he knows to contain certain bones of prehistoric giant animals. Both of these places, he believes, are better deposits than the one which was uncovered previously in the interests of science; and he maintains that better preserved teeth, tusks and bones will be found if the additional locations are explored.

The original Kimmswick discovery was one of the greatest of its kind in the world. Teeth and pieces of bone, estimated to have come from approximately 200 of the animals, have been taken from the

ground there. F.A. Lucas, in his book, "Animals of the Past", describes Kimmswick as the "most noteworthy of all deposits." It attracted the presence and study of learned men from all parts of the United States and several from foreign countries, and specimens of mastodon structure found there are believed to have found their way into college collections and museums the world over.

Have Mastodon Teeth.

Washington University at St. Louis, possesses a number of teeth, both of mastodons and mammoths, taken from the Kimmswick district. It also has a huge mastodon skull in fair state of preservation, showing the huge contours of these elephantine animals. The jawbone of a mammoth, showing the peculiar slide system by which this type of animal maintained a complete set of teeth, also is at the university, it being one of the four mammoths found in this area.

The district about Kimmswick in which these deposits of bones were found, is peculiarly marked by nature and indicating nowadays are that at one time it was a particularly favored spot--probably one of luxurious growth, of salubrious climate, of never ending supply of sparkling and health impregnated waters--the sort of place that nowadays would be a health resort or winter resort for mankind. That the mastodons and mammoths used it as a winter resort and, possibly, as a home for the aged, is the deduction of scientists from their study and research there.

Today sulphur springs and salt springs abound in an area a mile and a half northwest of Kimmswick, which is in Jefferson County on the LeMay Ferry Road, about twenty-six miles from St. Louis. This territory lies between Rock creek and Black creek, which effect a junction below the deposits. And apparently it was also beloved of the Indians, who came at a later date than the mastodons, for there is indication of a big Indian village having been at Montesanto, nearby, and Indian evaporating cups and bowls have been found at the salt springs. These pottery basins were used by the aborigines to catch the salt water from the springs, expose it to the sun's rays and thus, by evaporation, obtain a supply of salt. One of the most curious and perfect of these relics has a place in the Jefferson memorial collection. There is also nearby an old Indian battleground, where arrow heads abound, together with what appear to be graves of the braves who fell in conflict.

Springs Never Fail.

The sulphur and salt springs even today, never fail to flow, even in the most desperately cold weather. For these reasons, scientists are inclined to believe that the prehistoric animals sought winter refuge there, and that the aged and feeble went there for comfort and convenience in their last days and many of them died there.

That many of them died there and that all which did so were aged, is confirmed by the specimens of bones, teeth and tusks found. The teeth invariably indicate age, for they are worn and ground down, only as the teeth of an animal which has used them throughout a lifetime can be. Just a step from the largest sulphur spring, in a sloping bluff, which edges into Rock Creek, were found the huge bones and ivory tusks and teeth of the monster animals of long ago.

The four mammoths, which were extracted from this district, were not buried with the mastodons--nor is there indications of great age among the jaw formations found here, as among the mastodons. The spot of their burial is nearly a mile away from the "boneyard" of the mastodons, it being a crevice in a limestone cliff. Twenty-five to thirty feet under the surface of the ground these bones and teeth were found when excavators opened a stone quarry there; and it is believed that many bones were hauled away to a dump before it was realized that here was a deposit of monsters' bones. However, skulls, teeth and jawbones were found, indicating the presence of at least four bodies.

Special Care Needed.

Digging for prehistoric bones is a special job, according to Miller. The workman has to be very careful with his tools, lest he break or otherwise injure the bones buried beneath him. He calls this work "tedious." When a bit of bone was found, the edge exposed, it was customary to clear the earth away from it with exceeding care until the surface was all exposed. Then the top would be covered with a mixture of flour paste, and cheesecloth would be carefully wrapped about it to preserve it from the destructive effects of the air. When the top was completely covered, the rest of the bone would be gradually freed from the ground, its surface being continually covered with the flour paste and cheesecloth as it was revealed. Then the entire bone would be removed to a shed near by and there impregnated with carpenters' glue to preserve it, and the bandage removed.

Bones found near the surface crumbled easily. Bones found in gravel deposits and blue clay or mud fifteen or more feet underground almost invariably were in a good state of preservation and could be recovered. Perhaps the most valuable find was two good tusks of ivory about eight feet long. Archaeologists swarmed about the place practically all the time and much valuable information is said to have been secured.

False impressions of the size of both the mastodon and the mammoth have been spread generally about the world, according to archaeologists. As a matter of fact, they both were about the size of the present day Asiatic elephant and very much resembled him in general conformation and characteristics. The elephant of today has teeth made expressly for consuming grass, much like the teeth of the mammoth, but differing from those of the mastodon, which were more of a grinding sort, designed for browsing on the leaves and twigs of trees. The mammoth's teeth were in a groove of his jaws, and, as they were worn out, the front teeth dropped out, others moved forward to keep the set complete and a new one formed at the extreme back of the groove, far in his mouth, where it wasn't used much. The elephant today has the same arrangement. But the teeth of the mastodon were rooted in his jaws and when he had ground them down so they were no longer efficient, he was without replacements.---St. Louis Globe-Democrat Magazine.