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# RECENT DISCOVERIES OF REMAINS OF PLEISTOCENE MAMMALS IN NORTHERN MANCHURIA\*

BY

A. S. LOUKASHKIN

The year 1931 was marked by a number of remarkably interesting palaeontological discoveries in the territories of North Manchuria.

Previous to this only in the following places had the presence of mammalian bones of the Pleistocene fauna been discovered :

1. The vicinity of Chalaynor Station on the Chinese Eastern Railway, where, in the course of coal-mining operations, the skulls and various bones of the ox, rhinoceros and mammoth had been found in the strata overlying the coal-bearing seams.

2. The village of Schuchie lying to the north of Hailar Station on the Chinese Eastern Railway, where the tusk of a mammoth and some other small bones had been found.

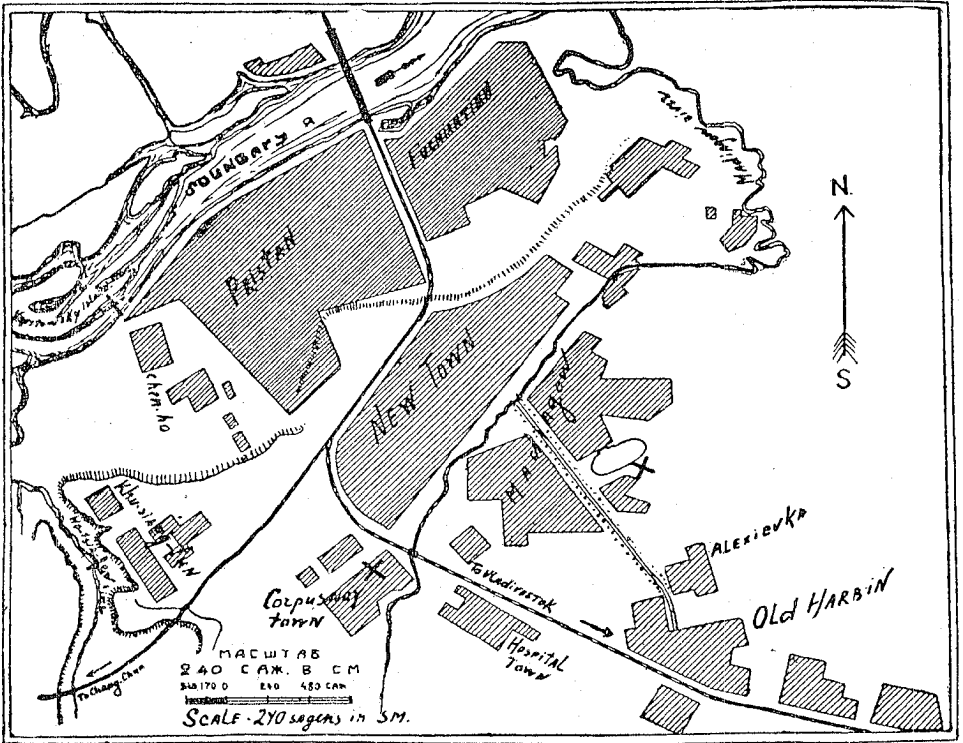
3. The Nonni River near Fouliaerdy Station on the Chinese Eastern Railway, where, approximately three kilometres away from the station down the course of the river on its right bank, are two hills which have been partly cut away by the force of the current, exposing numerous layers from which from time to time the bones of the rhinoceros and mammoth have been washed out and deposited in a pool a little further down the river course. The native Dahur fishermen sometimes drag up these bones in their nets, and, as far as is known, many of them are now in the Dairen Museum, where they were sent by Mr. Kiy, a Japanese living at Tsitsihar Station on the Chinese Eastern Railway. This site is of the greatest interest to palaeontologists and geologists.

4. In recent years occasional discoveries in the way of mammoth remains, consisting mainly of fragments of tusks, made known to science from the Harbin district.

The first of these discoveries was described by V. Y. Tolmatcheff and T. P. Gordieeff in the *Review of the Manchurian Research Society*, No. 6, 1926, Harbin.

With this short description we come to the end of the list of palaeontological discoveries of Pleistocene age in North Manchuria up to the year 1931. In all but the Chalaynor discoveries the specimens are but poor fragments. Even in the Chalaynor district a great many specimens have never come to the knowledge of scientists, for ignorant Chinese coolies believe these bones to be those of the fabulous dragon, calling them *lung ku*, and they always hide them from the officers of the Administration of Mines, breaking them into small pieces and selling them to the Chinese medicine shops. Oriental medical science, if it can be called such, considers these fossil bones to have magic and

\* Read before the members of the Natural Science Club of the Y.M.C.A. in Harbin on August 24, 1931.

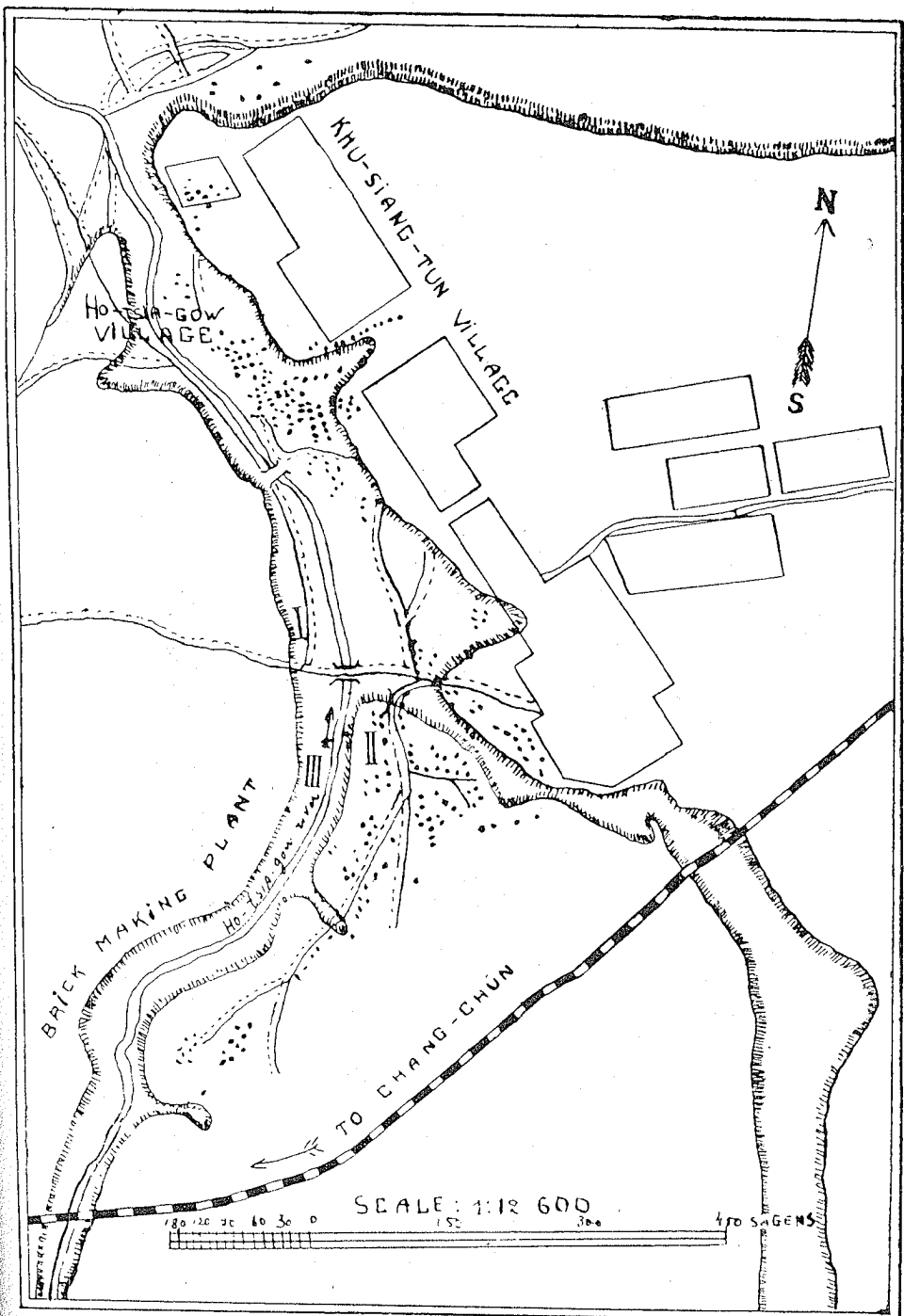


1. Sketch map of Harbin and Outskirts showing Places (X) where Fossil Mammalian Bones have been found.

healing qualities, while the teeth of extinct animals are used as charms against bad luck and danger. It will thus be understood why our knowledge of Manchurian palaeontology grows so slowly.

In the spring of 1931, however, several discoveries of new sites for Pleistocene mammalian remains were made, as already indicated. These were situated in the Harbin district as well as at various points along the Chinese Eastern Railway, namely :

I. On March 20 the Museum of North Manchuria acquired ten bones from Mr. Moschinsky. Among them were distinguished the following which were more complete and in better condition than the rest : the femurs of mammoth and rhinoceros ; the right half of the lower jaw of a rhinoceros with the teeth complete ; and some vertebrae of bison and rhinoceros. These bones had been dredged from the Sungari River by Chinese fishermen near Krestovsky Island close to Cheng-ho Village on the outskirts of Harbin in July, 1930.



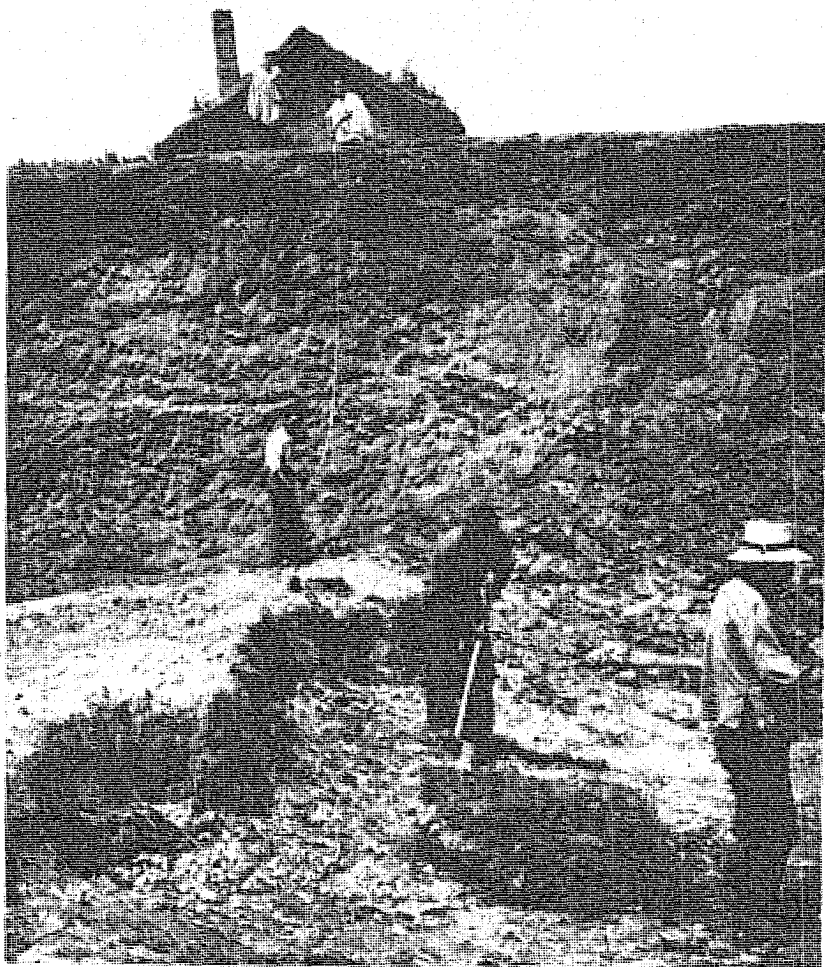
2.—Sketch Map of Khu-siang-tun Village, where Excavations were made in 1931. Sites marked I, II and III.





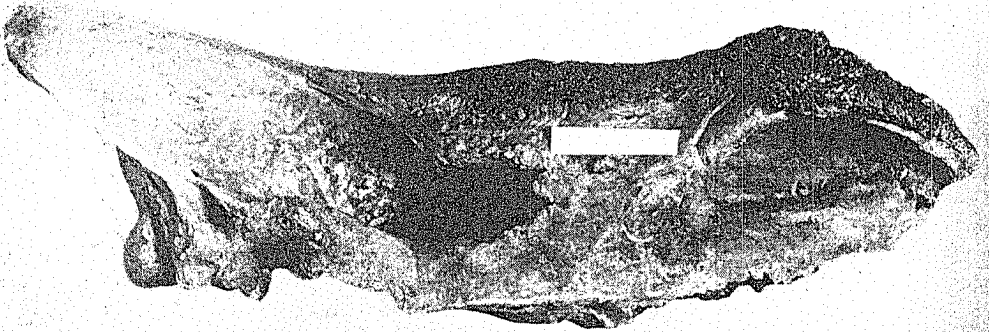
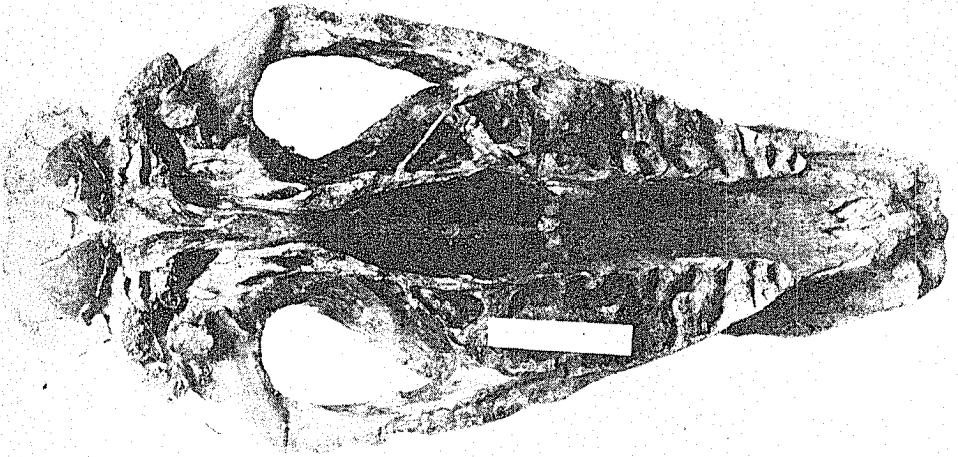
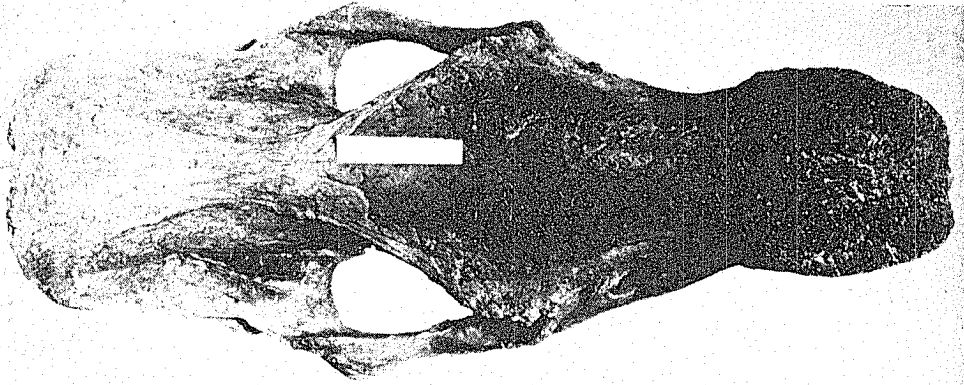
Two Views of the Spot where the First Excavation (Site I) of 1931 was made by the Museum of North Manchuria in search of Pleistocene Mammalian Remains. This was in the Valley of the Ho-tsia-gow River near Khu-siang-tun on the Southern Branch of the Chinese Eastern Railway, Northern Kirin, Manchuria. In the Group are Professor E. E. Ahnert, Mr. A. S. Loukashkin and Mr. V. V. Ponossoff, Archaeologist.





The Pit in the Loess-like Clay on the Left Bank of the Ho-tsia-gow River in Northern Kirin, Manchuria, where the Third Excavation (Site III) of 1931 was made. This Site yielded but poor Results, including remains of Mammoth, Rhinoceros and Horse.





Three Views of the Skull of the Woolly Rhinoceros (*Rhinoceros lichorhinus*) found at Site I in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.

## RECENT DISCOVERIES OF REMAINS OF PLEISTOCENE, ETC.

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II. On May 18 a Chinese peasant of Kiu-siang-tun Village, situated near Intendantsky Station on the Chinese Eastern Railway some kilometres south of Harbin, informed the Museum authorities that he had found the skull of a dragon. According to him the skull was found while he and his companions were digging clay.

III. On June 24 some bones were found at a depth of about 15 feet in the courtyard of a house owned by Mr. Krawetz at Sartuh Station on the Western Section of the Chinese Eastern Railway while digging a well in strata of clay mixed with sand. These bones were presented to the Museum, and in a preliminary examination were determined as the ribs and phalanxes (digital bones of foot) of the rhinoceros.

IV. On June 28 Mr. Gramatchikoff presented the Museum with the fossil horn of an ox (*Bos*), which was delivered from Chalaynor Station.

V. In September a Chinese merchant brought to the Museum the upper part of a bison skull, which had been found on the bank of the Amur River near Sahaliang.

This completes the list of places where mammalian remains were found in 1931.

Owing to the fact that the excavations carried out at Khu-siang-tun have proved the most successful and interesting, it is thought desirable to publish a more detailed account of these.

Having received information from Chinese peasants, the writer proceeded to the site and there ascertained that the dragon's skull was nothing but the upper part of the skull of a rhinoceros. All the teeth had already been taken away by the Chinese who dug up the skull. The pit in which the latter was found is situated on the left bank of the Ho-tsia-gow River, which formerly had been sloping. It is not less than 10 to 12 metres in depth from the previous line to the surface, but it is now very difficult to trace this line as the whole contour of the ground here has been changed by digging connected with the making of bricks and pottery. Similar surface disturbances can be seen from the railway line to the point where the Ho-tsia-gow joins the Sungari. It should be mentioned that the skull was taken over by the police, who delivered it next day to the Museum.

A few days later another discovery, the upper part of a bison's skull, was sent to the Museum by the police, who at the same time declared all such discoveries to be national property which must be delivered to the nearest police station for passing on to scientific establishments. This bison's skull was found above the bridge across the Ho-tsia-gow on its right bank.

At different times during the summer preliminary excavations were carried out which yielded numerous specimens, and by these it was ascertained that the layer principally containing fossil bones was a grey-green bed of silt, almost black when wet. This silt in some places contained numerous shells of fresh-water molluscs, amongst which nearly five species (*Unio* and others) have been distinguished.

The thickness of this layer varies from 50 centimetres to 2 metres. It can be seen at the surface only near the banks of the Ho-tsia-gow



River, in other places further from the river being covered by a great mass of loess-like clay. In some places in this clay at depths varying from 2.5 to 10 metres bones have been found. These are brittle, badly preserved and have an ochreous colour, while those from the silt bed are almost black in colour, are of good compactness, and are not destroyed by drying.

Besides the writer the following participated in the excavations: Professor Edward E. Ahnert, Messrs. T. Gordieeff, V. Ponosoff and Yin of the National Geological Survey of China.

The chief obstacles during the summer excavations were the high level of the subsoil water and the excessive rain, owing to which it was decided to postpone the work till the end of autumn, when the rains cease and the subsoil water assumes a lower level.

Our work caused great excitement amongst the local peasants who always crowded round us, hampering us in our operations and offering us all kinds of advice, or telling us of their own discoveries of dragon bones. Thanks, however, to the talkativeness of the Chinese peasants we ascertained that some of them had not removed their discoveries, covering them up with earth instead, as they feared some evil from the things they had found if they disturbed them.

Seeing our excavations, the village children began hunting for bones, and in this way greatly helped us in filling out our collection. They turned their attention mainly to teeth, for which we offered to pay them a few copper coins. Some of the adults brought us horns, tusks, teeth and other bones, which they had hidden in their homes pending the opportunity to sell them to the Chinese medicine shops.

The excavations were carried on only in the three sites marked I, II and III on the accompanying sketch map.

Site I was where the rhinoceros skull was found and Site II where the bison skull was found.

At Site I, besides the rhinoceros skull, numerous fragments of various bones and a broken piece of the lower jaw of a deer (*Cervus sp.*) with molar teeth were found.

At Site II very good results, as regards both richness and variety, were obtained, the following specimens being found there: the left half of the upper part of a female bison's skull (*Bison sp.*); two skulls of the buffalo (*Bubalus sp.*); the jaws of the bison, roedeer (*Capreolus sp.*), gazelle or antelope (*Gazella sp.*), horse (*Equus sp.*), and camel (*Camelus sp.*); the horns of the elk (*Alces sp.*); and a great many teeth of all these animals. Mammoth remains occurred in the form of a number of whole tusks and many fragments and flakes, as well as some molars in which the surface enamel patterns were well preserved. Two fragments of the tips of the tusks of young mammoths were also found.

The bones of carnivores occurred much more rarely, and we found only some jaws and separate teeth of the cave hyena (*Hyaena sp.*), tiger (*Tigris sp.*), bear (*Ursus sp.*), wolf (*Canis sp.*) and fox (*Vulpes sp.*).

Rodents were represented in our collection from this site by more than ten skulls and jaws of members of the families *Spalacidae* (mole rats) and *Arvicolidae* (voles).

## RECENT DISCOVERIES OF REMAINS OF PLEISTOCENE, ETC.

Almost nothing was discovered in the way of remains of birds, the only two specimens being the femur of a bird of about the size of a crow and a fragment of an ostrich egg (*Struthio* or *Struthiolithis*?).

In conclusion it is important to note that the greater part of the specimens found consisted of broken fragments of large bones which had been crushed. The best preserved specimens were the teeth, then the vertebrae and small leg bones, with ribs and pelvic bones in a less good condition. Femurs, shoulder bones and tibias were almost all broken into pieces; while the skulls were in only a medium state of preservation with the crania broken open.

The total weight of the bones collected here during 1931 came to nearly a ton, and the number of specimens of bone found exceeded 10,000. Of teeth alone some 500 were collected.

At Site III on the left bank of Ho-tsia-gow River the pelvis of a mammoth, the vertebrae of a rhinoceros and the teeth of the upper jaw of a horse were found. Here the excavations were carried out in the loess-like clay.

The whole valley of the Ho-tsia-gow River abounds with the remains of mammals. It is true that, in places where they were discovered in the greatest numbers, only small fragments were dug up, but there was no occasion when digging did not yield bones of some sort.

In the opinion of Professor Ahnert, Mr. Gordieeff and Mr. Yin the accumulation of bones in the Ho-tsia-gow Valley may be explained as follows: In Tertiary and Quarternary times the valley of the Sungari River was the bottom of an immense fresh-water swamp basin, into which mountain streams carried their turbulent waters. These conditions prevailed in the Pleistocene period, and the animals of that fauna, being caught when floods occurred, were carried by these swift currents to the mouths of the streams and there deposited, their divided remains being buried in the silt which accumulated in the passage of time.

Another theory that may be suggested is that parts of the banks of the rivers, in which the skeletal remains of animals had already accumulated, fell upon the frozen surfaces of the streams in winter and were later carried on the ice into the swamp, where the bones were deposited piecemeal over the bottom, subsequently being buried for the second time. For this reason we cannot hope to discover any complete skeletons in this area. Of course, this is a purely supposititious view and has not been proved.

On the other hand, the first explanation put forth of the accumulation of the bones may be allowed.

A third suggestion may, however, be put forward. As already stated, the great majority of the specimens found consist of small fragments of large bones. The broken bones are mostly of the type in which there is nutritious tasty marrow, which was the favourite dainty of prehistoric man. Therefore, it is possible that on the banks of the lake or old river was situated a camp of the ancient inhabitants of North Manchuria, who fed themselves on the products of the chase. Here, naturally, would have accumulated the remains of their meals, the fragments of bones we have discovered. This is our personal and,

perhaps, very daring view point, which we have expressed hypothetically, realizing that it can only be proved when sufficient material and evidence in the way of stone or bone implements is available to establish the presence in prehistoric times of man in this region.

This, it may be stated, has become one of the main objects of our investigations, stimulated as we have been by the discovery by Professor Henri Breuil of Paris, when examining our collection while in Harbin toward the end of 1931, of traces of human workmanship on some of the excavated bones.

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## THE RÔLE OF AQUATIC MOLLUSCS IN THE SPREAD OF HUMAN TREMATODE INFECTIONS\*

BY

ERNEST CARROLL FAUST

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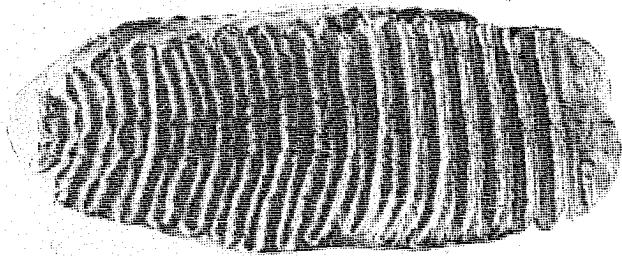
The trematode infections which cause diseases in man include three species of blood flukes (*Schistosoma hæmatobium*, *S. mansoni* and *S. japonicum*), many species of intestinal flukes belonging to three superfamilies, several species of liver flukes belonging to two superfamilies, and the lung fluke. These parasites, like all digenetic trematodes, require a mollusc as the host of the parthenitic generations of their life cycles. More explicitly, all of the human trematode parasites utilize only gastropod molluscs in this capacity. With the possible exception of the liver lancet fluke, *Dicrocoelium dendriticum*, only aquatic or amphibious gastropods are involved.

### THE LIFE CYCLE OF THE PARASITE

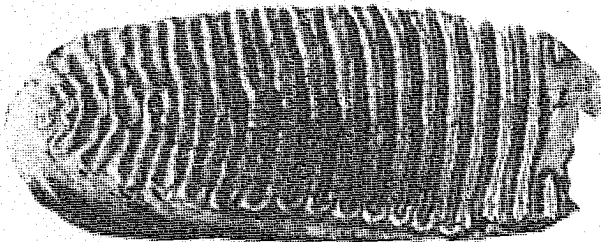
The phase of the life cycle in the human host has to do with the hermaphroditic generation of the fluke, or, in the case of the blood flukes, the unisexual males and females which are commonly paired in the portal blood stream where they reside. In all cases, eggs are laid and are voided in the feces, the urine or the sputum. In some instances (the blood flukes and *Clonorchis*) the eggs are ready to hatch when they leave the human host. In other cases (*Fasciola* and *Fasciolopsis*, also *Paragonimus*) the larvæ inside of the eggs require a period of development in diluted excrement. Eventually, however, the larva becomes clothed with a ciliated epithelium, and, on coming into an isotonic or hypotonic

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\*Contribution from the Parasitology Laboratory, Department of Tropical Medicine, Tulane Medical School, New Orleans, Louisiana, U.S.A.



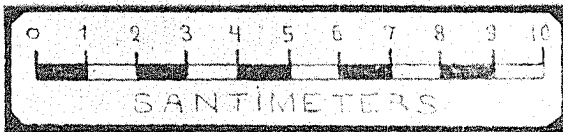
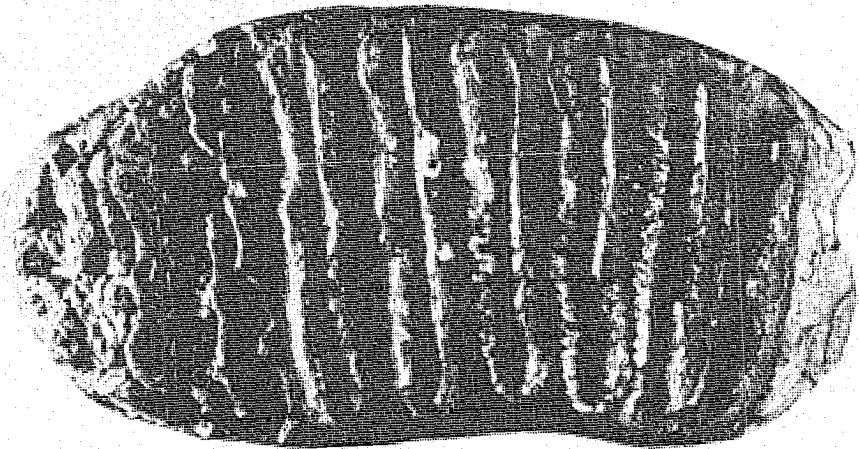
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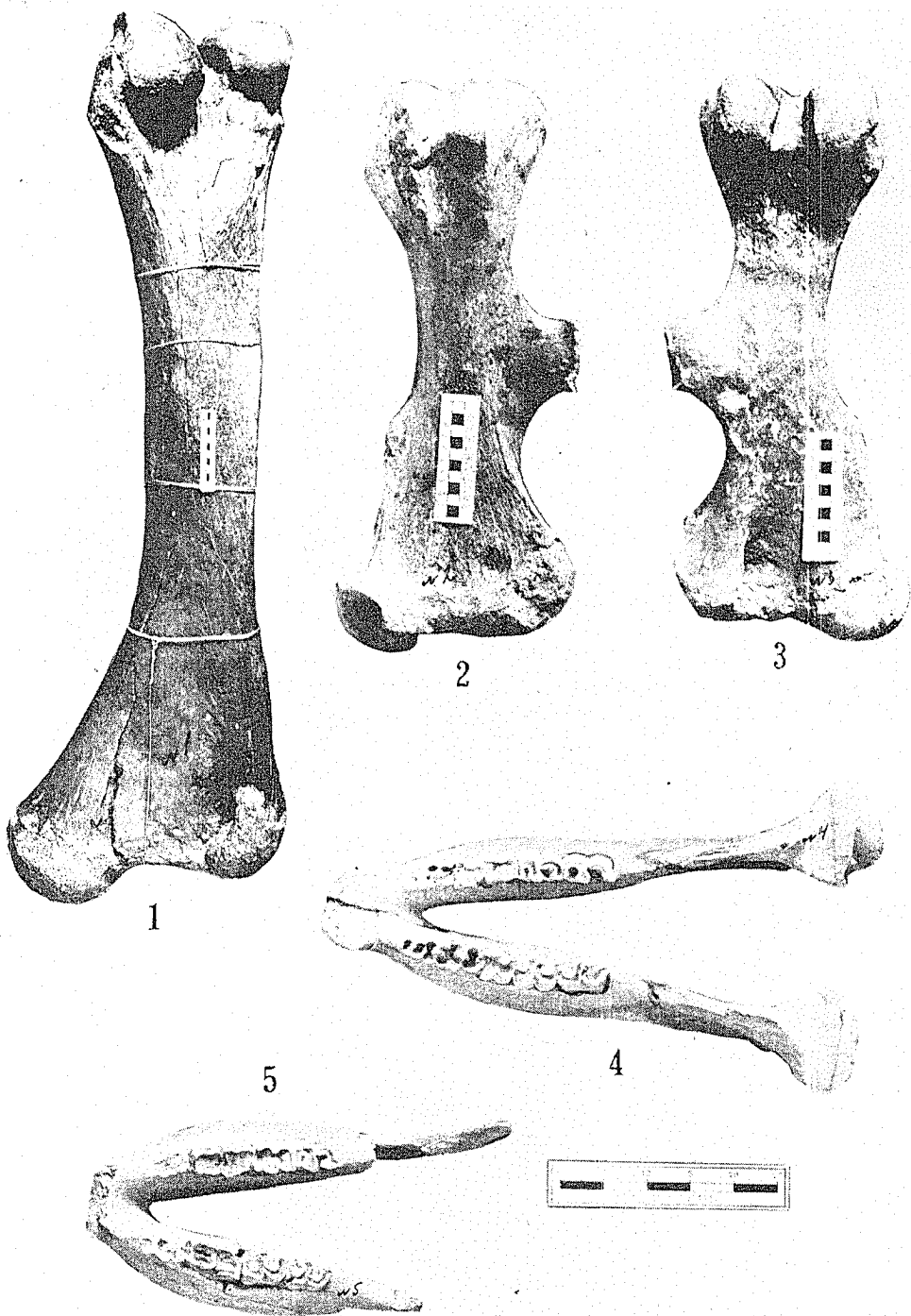


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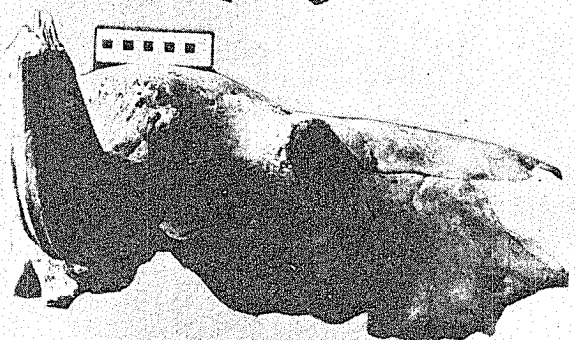
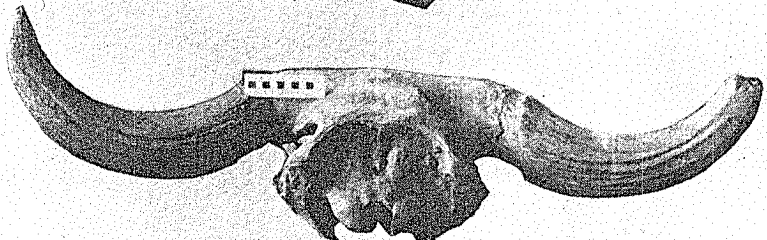
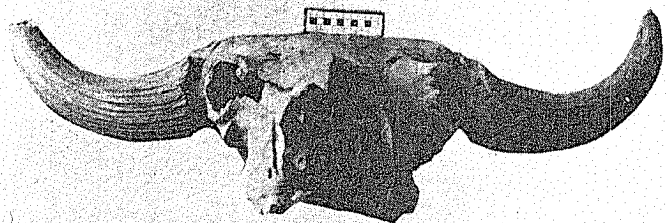
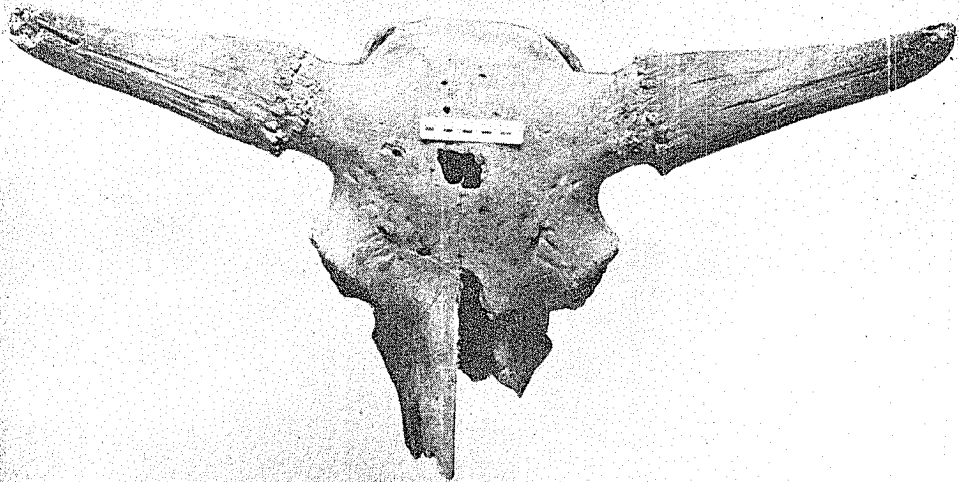


Molar Teeth of Mammoths showing the Enamel Surfaces. Numbers 1 and 2 are from Site II in the Khu-siang-tun District, North Kirin, and Number 3 from the Chalaynor Region, Manchuria.



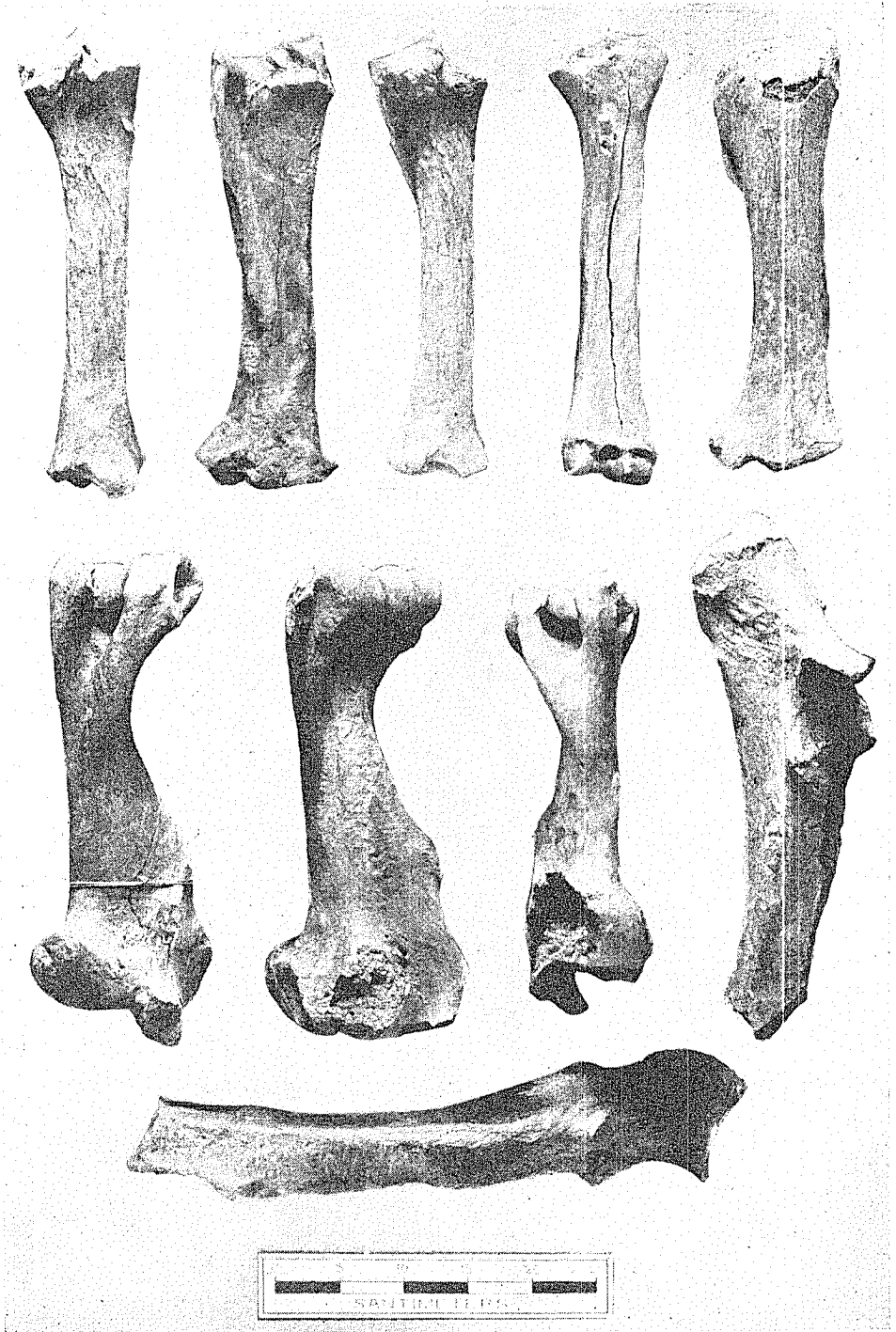


The Femur of Mammoth (1) and the Femurs and Lower Jaws of Rhinoceros (2, 3, 4 and 5).  
The Femurs were found in the Sungari River near Harbin and the Jaws at Site II in the  
Khu-siang-tun District, North Kirin, Manchuria.

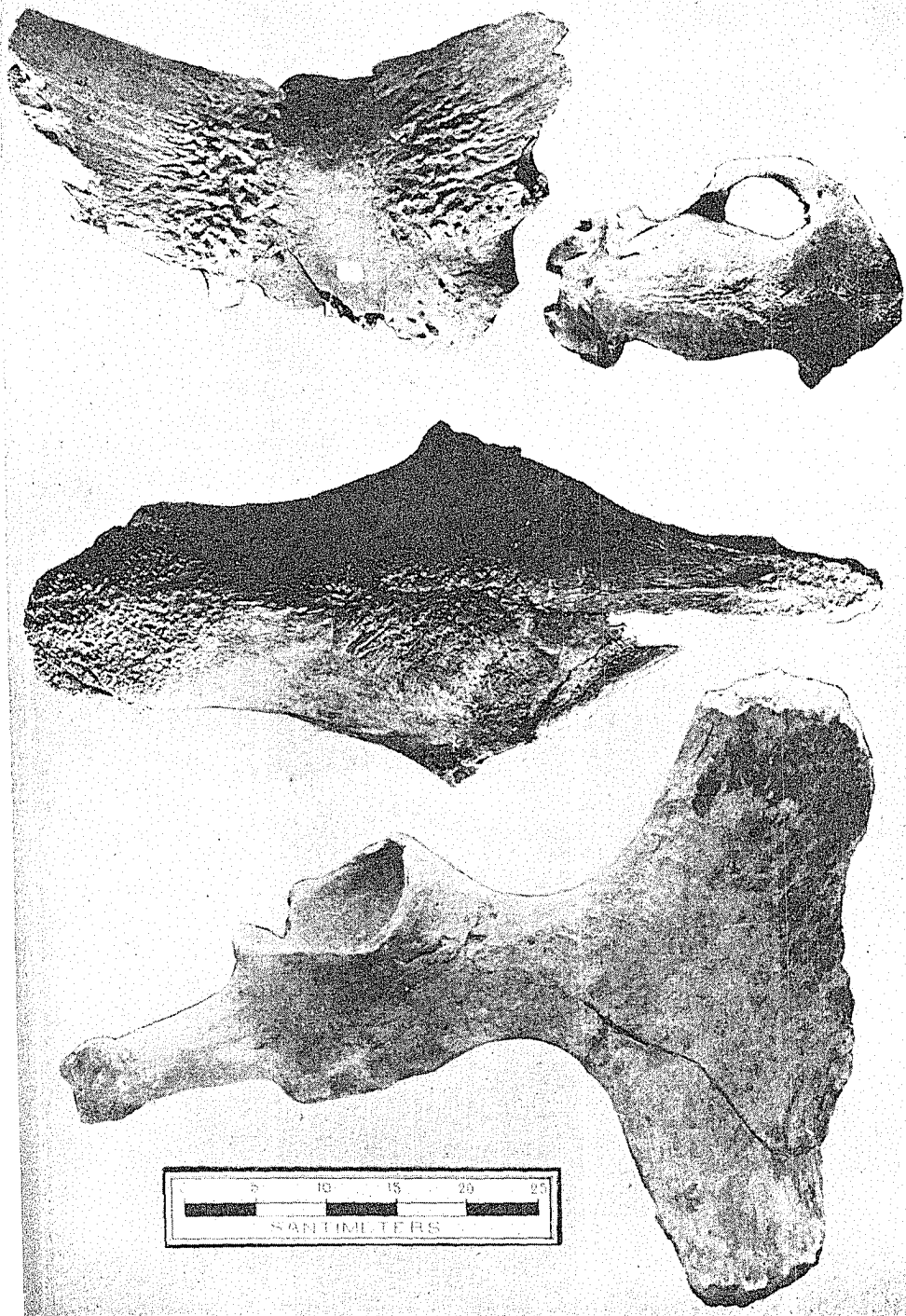


Various Views of a Bison Skull found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



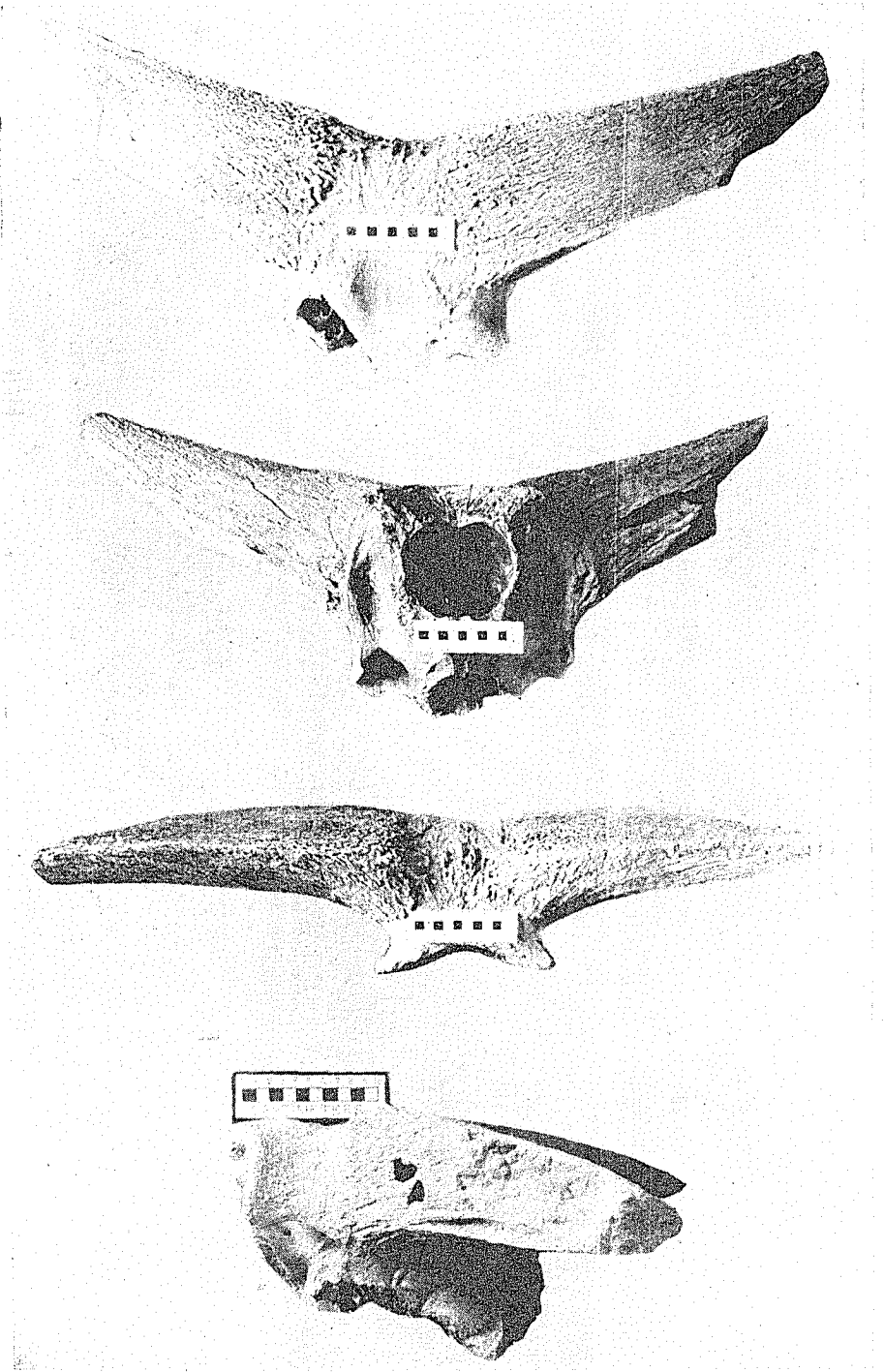


Leg Bones of Ox and Rhinoceros found in Northern Manchuria.

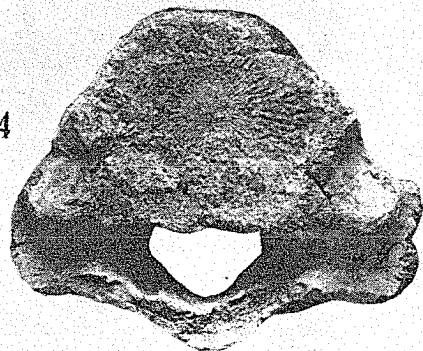
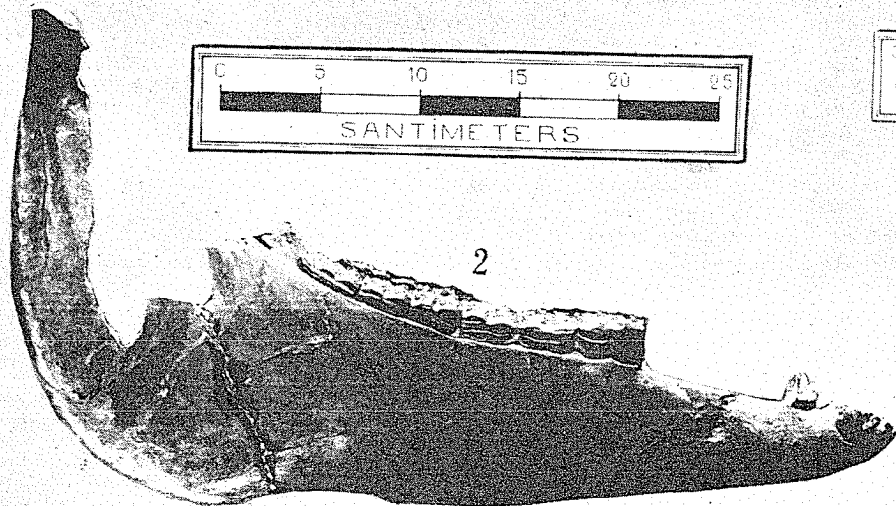
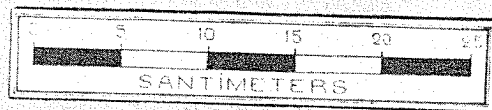
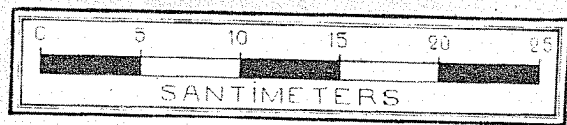
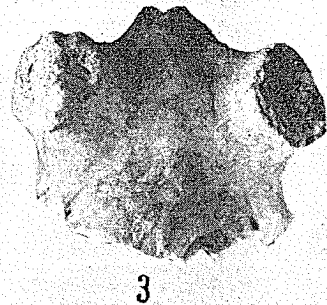
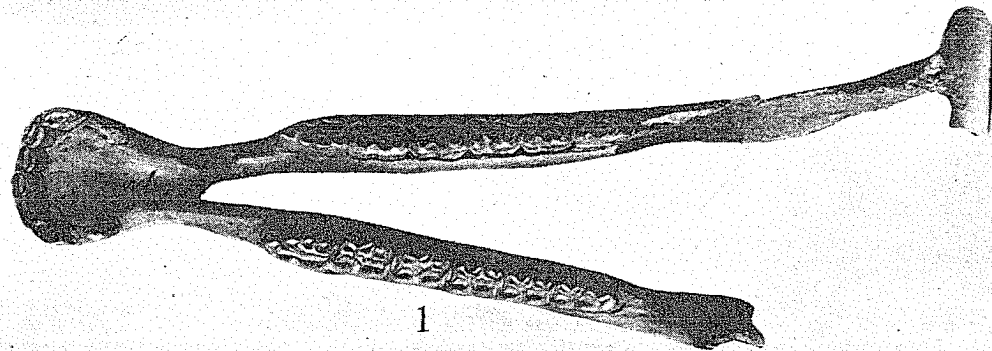


Top of Skull of *Bubalus* or Buffalo (Top Left), Top of Skull of Horse (Top Right), Upper Front Part of Skull and Part of Pelvis of Rhinoceros all found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.

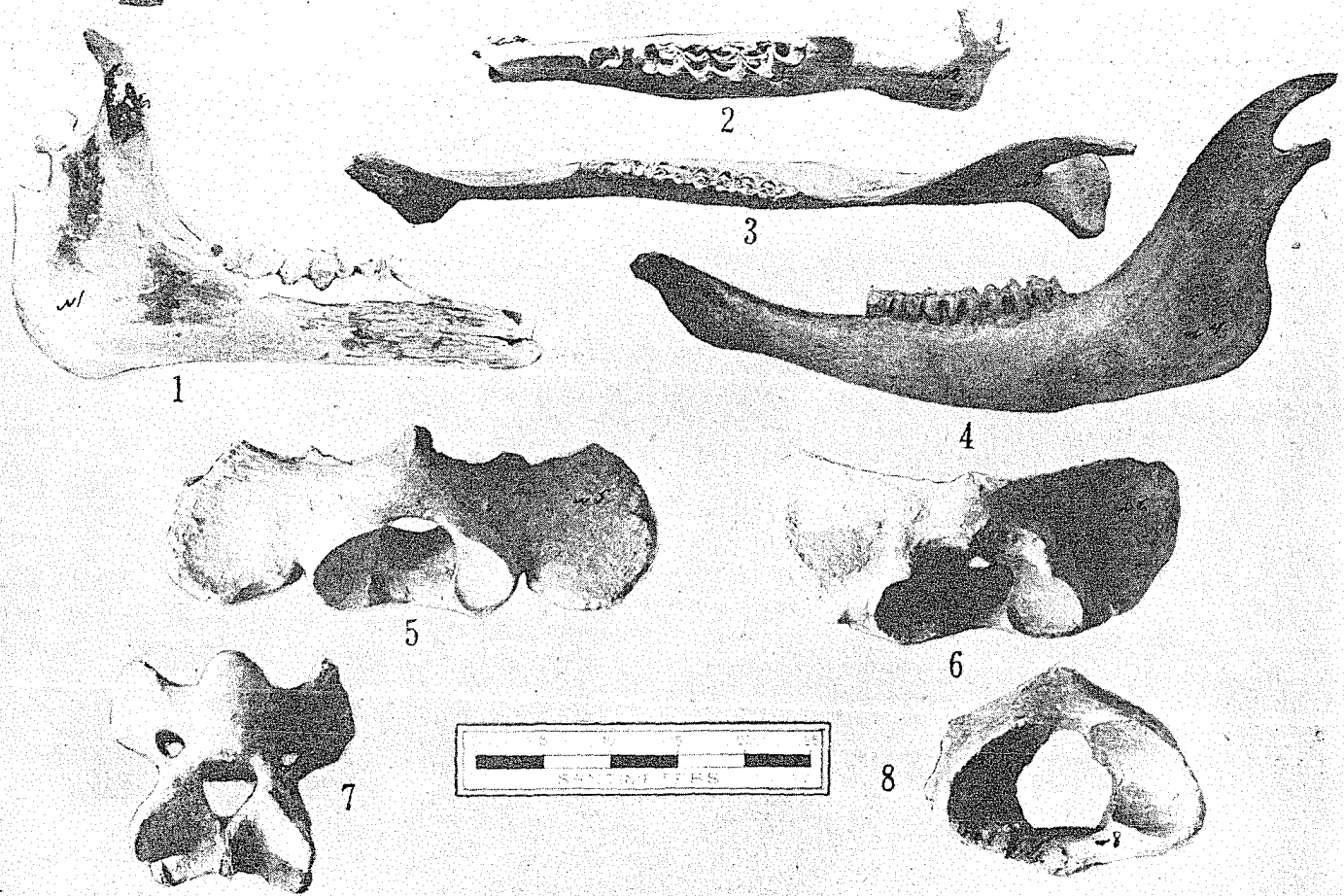




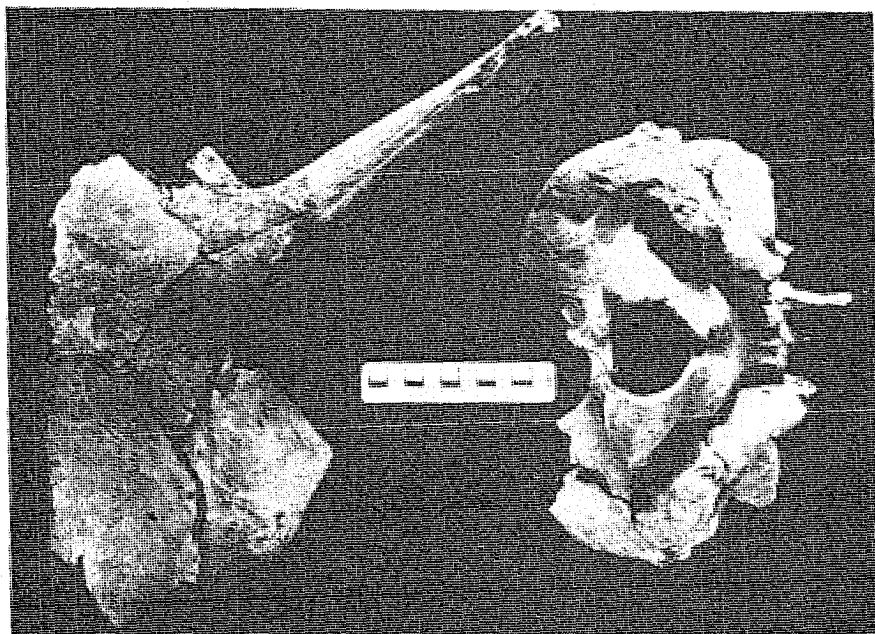
Various Views of the Upper Part of the Skull of a Buffalo (*Bubalus sp.*) found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



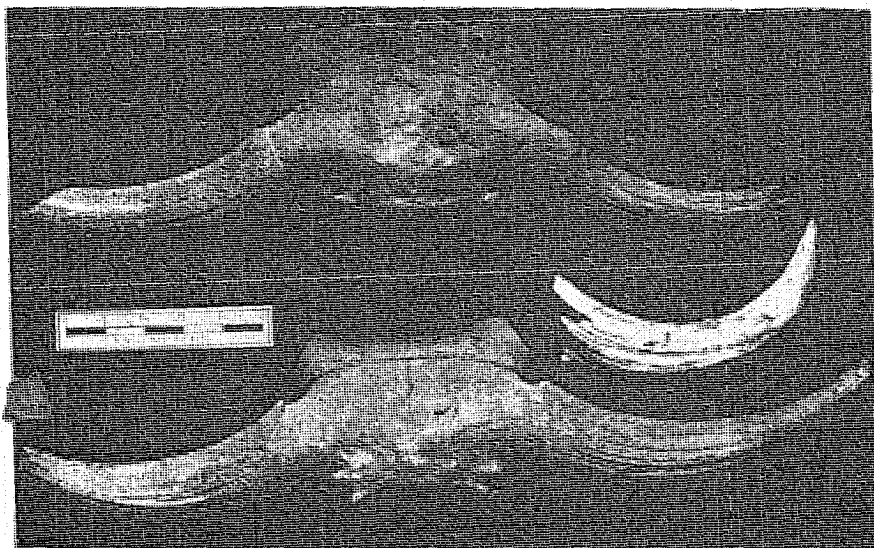
The Lower Jaws of Horse (1 and 2), Top of Skull of Deer (3) and Vertebra of Mammoth (4) found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



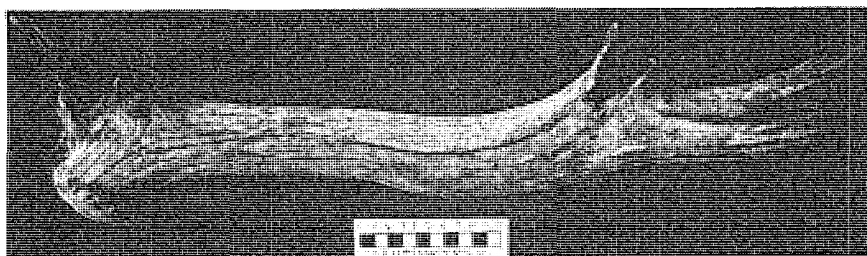
Jaw Bones of Camel (1 and 2) and Bison (3 and 4) and Vertebrae of Rhinoceros (5, 6 and 8) and Bison (7) found at Site II, in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



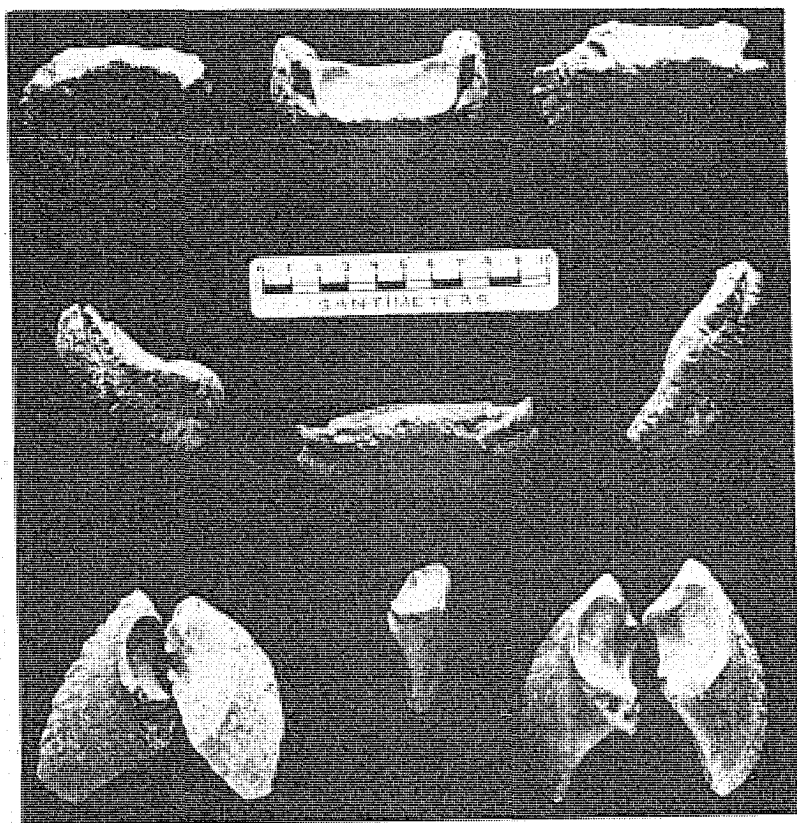
Two Fragments of the Upper Part of the Skull of a Bison found at Site II, Khu-siang-tun, North Kirin, Manchuria, in 1931.



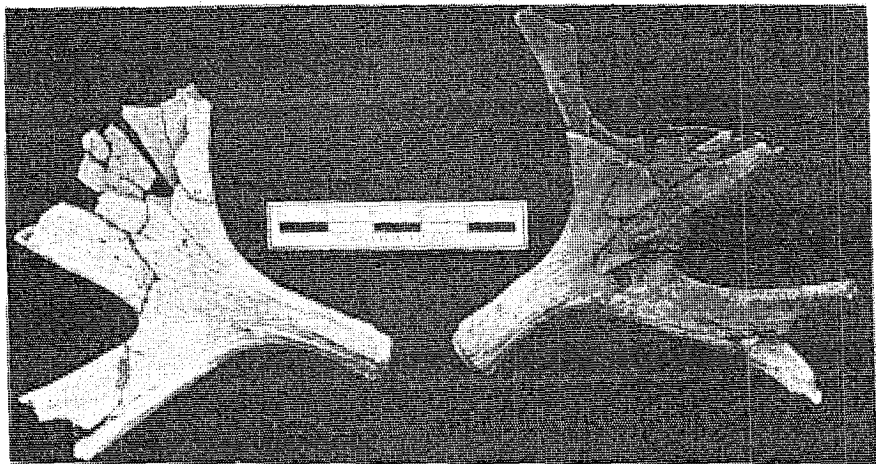
Parts of Bison Skulls and Horn found respectively at (Lower) Sahaliang, Heilongkiang, (Upper and Horn) in the Chalaynor Region on the Chinese Eastern Railway, Northern Manchuria, previous to 1931.



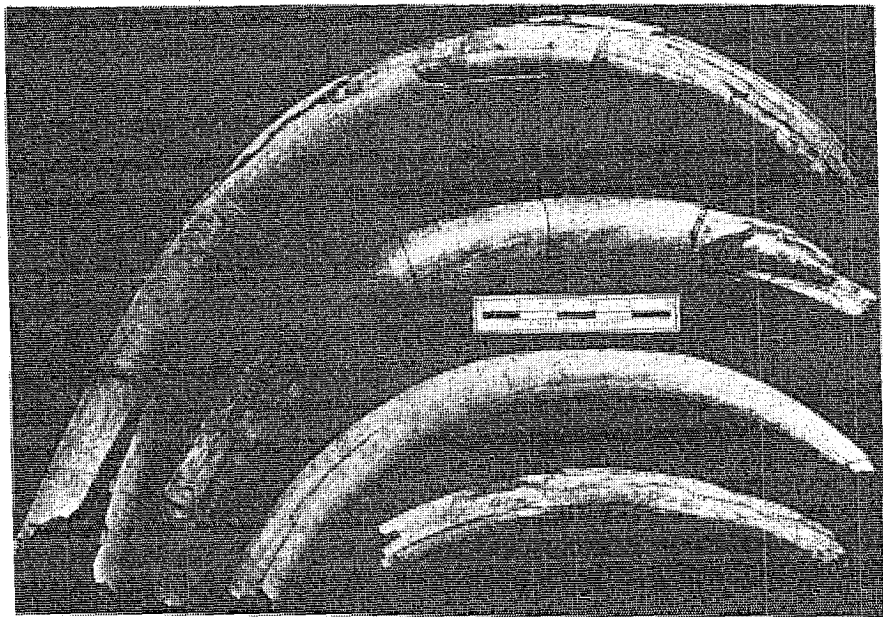
The Horn of a Deer (*Cervus*), probably the Wapiti, found in North Manchuria.



Hoof Bones of Horse (Top), Rhinoceros (Middle), Ox (Lower Left and Right), and Antelope (Lower Centre) found at Site II in the Khu-siang-tun District, North Manchuria, in 1931.

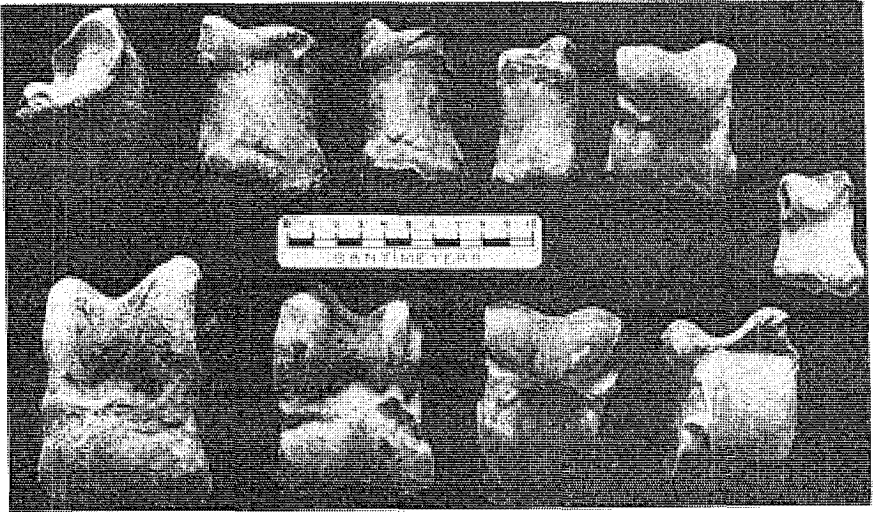


Fossil Horns of Moose or Elk (*Alces sp.*) found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.

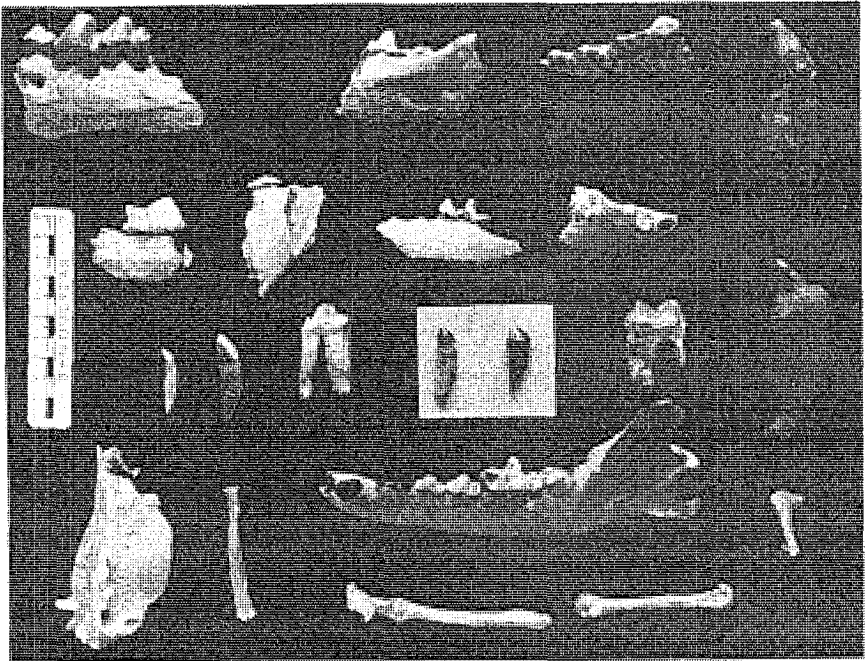


Five Mammoth Tusks found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.

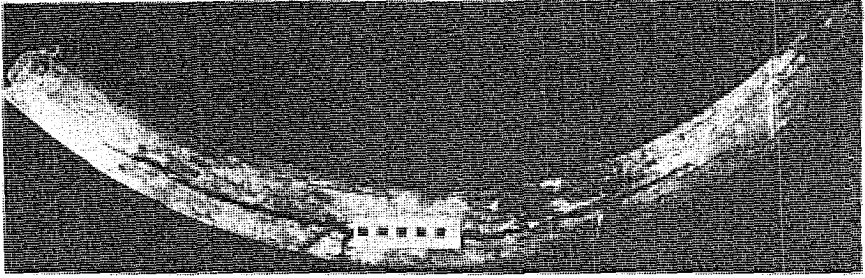




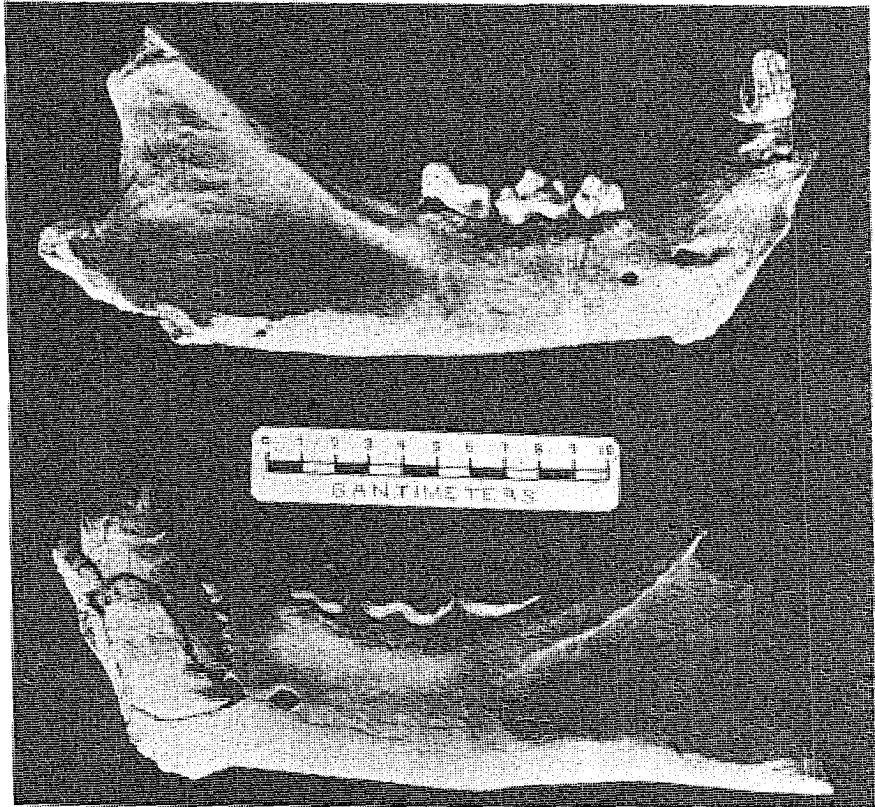
Bones of Ox and Rhinoceros (?) found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



Teeth and Bones of various Carnivores found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



A Mammoth Tusk found at Site III in the Khu-siang-tun District, North Manchuria, in 1931. This was embedded in Loess-like Clay.



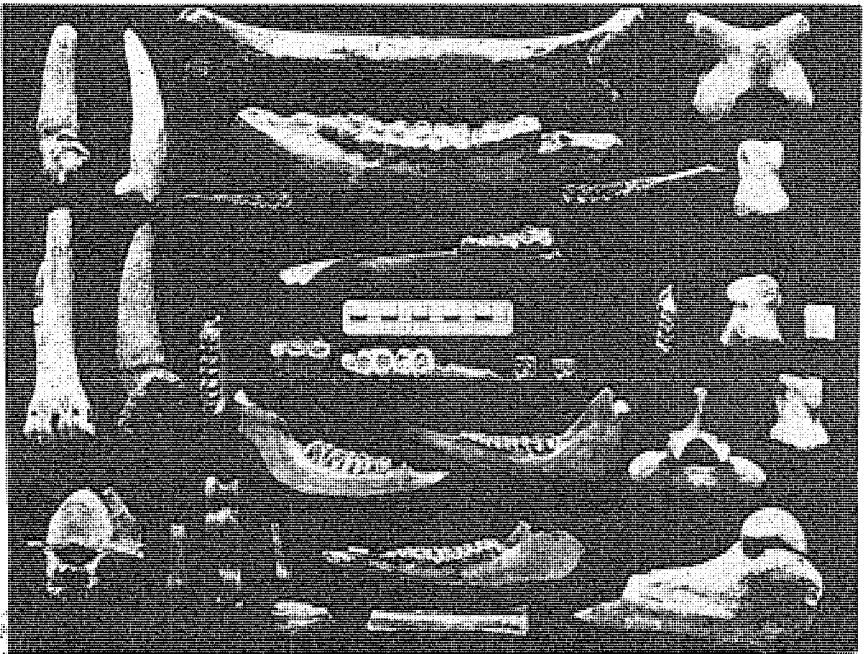
Jaws of Hyena (Upper) and Tiger (Lower) found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



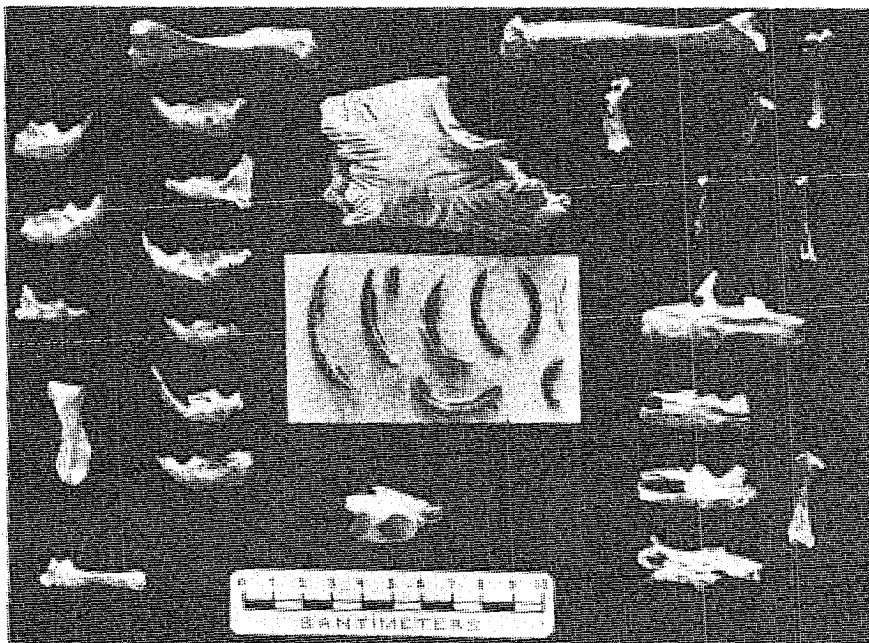




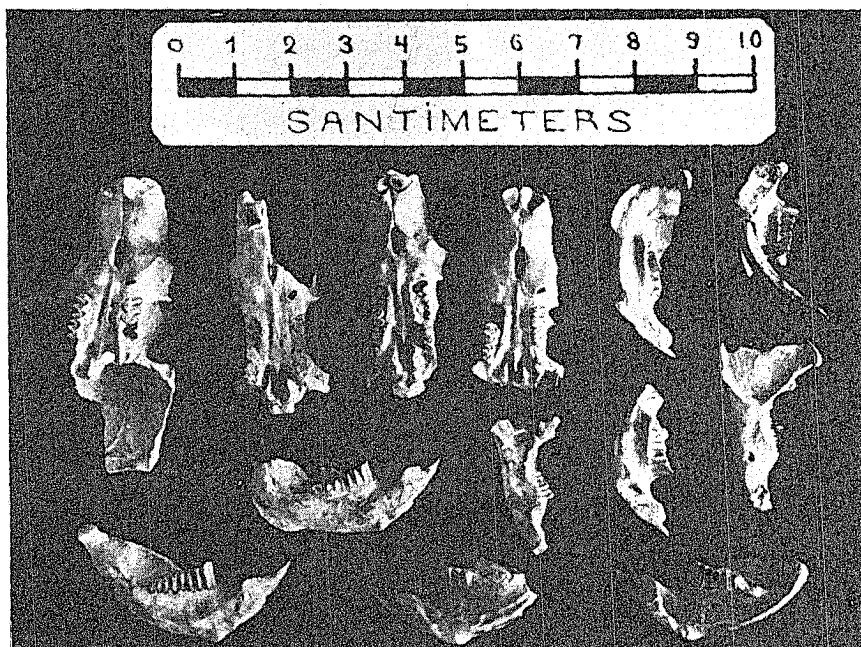
Horns of Deer (*Cervidae*) found at Site II, North Kirin, Manchuria, in 1931. The Large Specimens (Centre) belong to the Wapiti (*Cervus*), the small Ones (Top Left) to the Roedeer (*Capreolus*) and the medium sized (Lower Right) probably to the Spotted Deer (*Sika*).



Bones and Teeth of Deer and Antelopes found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.

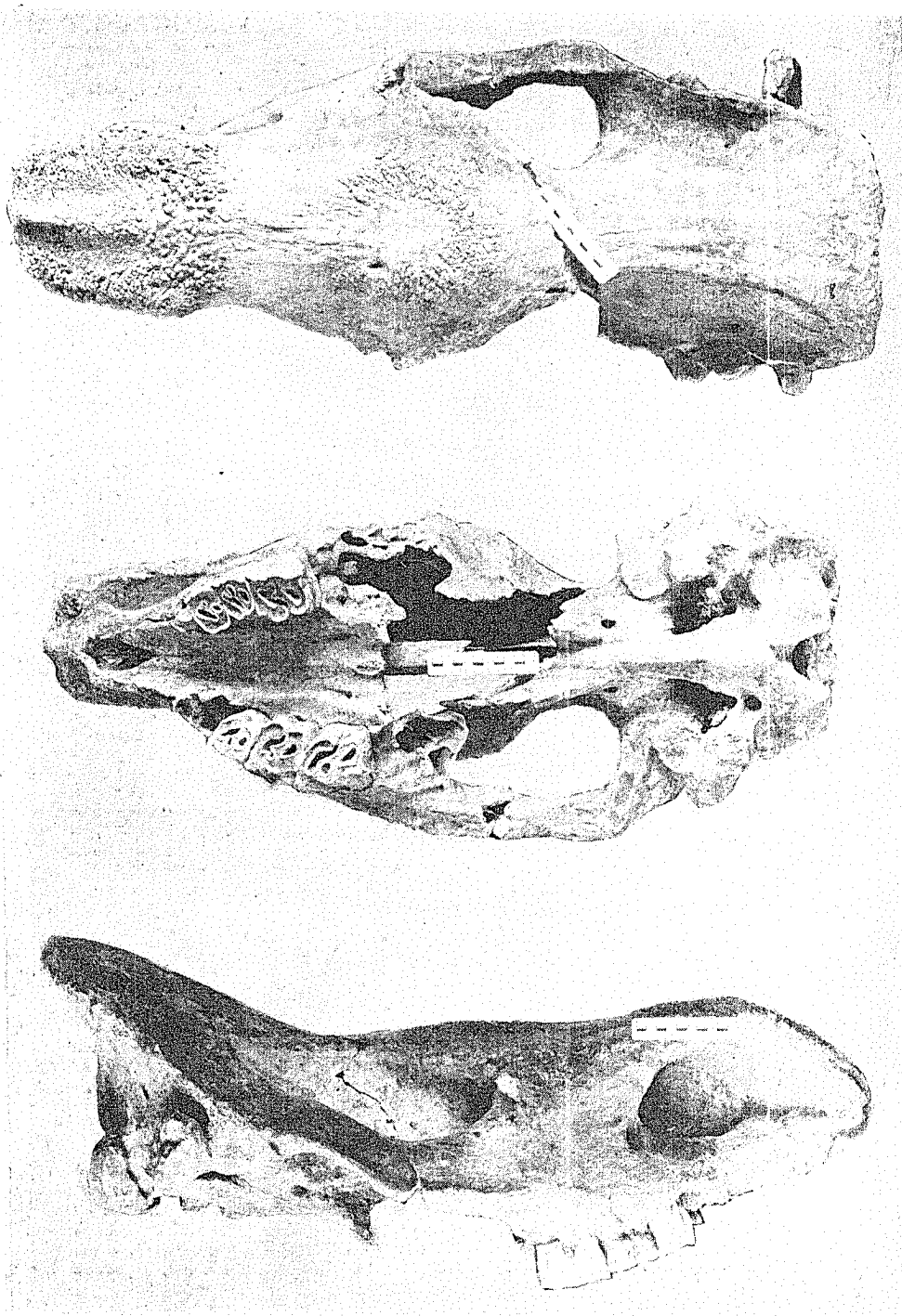


Bones and Teeth of Rodents, apparently mostly of the Molerat (*Myospalax*), and Piece of Bone gnawed by Mice or Rats found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.



Fragments of Skulls and Teeth of Rodents, apparently the Molerat (*Myospalax*) found at Site II in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.





Three Views of the Skull of the Woolly Rhinoceros (*Rhinoceros tichorhinus*) found at Site III in the Khu-siang-tun District, North Kirin, Manchuria, in 1931.