A Vertebrate Fossil Find in the Kathmandu Valley

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An interesting fossil find has come to the noticc of Mr. J. L. Sharma, acting Director General of the Department of Archaeology, H. M. G., Nepal, by a resident of Bhadrabas village in the north–eastern Kathmandu valley.

A fragment of a lower, right bovine jaw was brought to the Department by Mr. Ram Hari Sharma Pudasaini, Thapadanda,Bhadrabas. To see the locality from where the find was made, the authors went to see the site with Mr. Ram Hari Sharma Pudasaini. The site, where a fine section of upper Kathmandu basin sediments is exposed, is situated NE of Bhadrabas village after one leaves the Sankhu road at Bramhakhel and takes the jeep path to the north for 2.5 km. to Gagalgaon/Kageswari. About 1/2 km. north-east of Bhadrabas a footpath leads to the edge of the Mahadev Khola. The section, where the fossil was found, is at 85°26'/27°43,75'. The edge of the terrace into which the Mahadev Khola has cut its bed is 1360 m. at the upper edge. The height of the section is 32 m.

The fossil was found at the foot of the section together with some other bone material, according to the farmers which, however could not be located anymore. The fossil must have come from a dark grey clay lense as such material was adhering to the bone.

Searching for more fossils we could retrieve only a few fragments of bone from a dark grey clay, 10 m. above the valley floor. Another bone fragment, of a long bone, was found also at the foot of the section, embedded in a similar clay.

The steep erosional falaise exposes a succession of dark grey to black clays and silts, intercalated with lenses of rather unconsolidated sand and gravel, with many quartz-pebbles. The top half exposes more gravel, though the very top is again a grey clay. A stream must have intercalated gravels and sands in an otherwise swampy to lacustrine environment. Several lignite seems full of plant material (reeds, grass, branches, bark, leaf impressions) and black clay lenses indicate swampy and heavily vegetated conditions. (Fig 1)

The fossil consists of two right lower molars M_3 and M_2, of *Bos namadicus* and a few bone fragments of the lower jaw, which could be fitted together again. (Plate 1) It was embedded in a dark grey, coarse clay matrix, similar to the dark clays in the middle part of the section.

Fragments of brittle bone found in the clay at 10 m. above the valley floor testify to the fossil content of these clays.

The identification could be done while being with Dr. Badam in the Deccan – College, Archaeological Dept. in Poona. The measurements of the RM_3 are : H : 6.1 cm, w : 2.0 cm, L: 5.3 cm and it was identified as *Bos namadicus*, a middle to Upper Pleistocene bovid.

A fluorine test was done to verify the Pleistocene age.

The Fluorine content was 1.567%,
the Phosphorus content was 12 00%,

$$\frac{100\ F}{P_2O_5} = 5{,}702$$

The ratio being above 5 indicates an age certainly older than Holocene.

The fossil record of the Middle to Upper Pleistocene *Bos namadicus* from the upper Kathmandu valley sediments adds a further Pleistocene fossil to the previously recorded vertebrate fossils from the valley, i. e. *Hexaprotodon sivalensis*, *Arkodiscodan planifrons*, *Crododylus* sp. (Gupta, 1975). *stegodon ganesa* (C. K. Sharma, 1973). They have been found in hard clays overlying lignites in lower Kathmandu valley sediments near Chapagaon/Lokundol in the Nakhu Khola (Fort & Gupta 1979). They indicate a Lower Pleistocene age according to Gupta (1975) and can be correlated with fossils of the Upper Karewas from Kashmir and the Pinjor Formation of the Siwalik group, and could be dated to betwen 1 and 3 million years.

Thus, the find of a later Pleistocene fossil in the upper Kathmandu valley sediments is of considerable stratigraphical significance.

A few 14_c dates of carbonized wood from probable Upper Pleistocene levels of the Kathmandu valley sediments are pointing to a Late Pleistocene (late Wurmien) age, but exact stratigraphical details of these are not available. Yonechi (1973) records a date of 33 200^{+6100}_{-3450} BP for peaty clays near Khajahi village on a road cutting north of Kathmandu. But the stratigraphic position is unfortunately not given. Boesch (1977) records a date 19 970^{+400}_{-380} BP of a lignite at Phutang north of Balaju at a height of 1355 m, 15 m deeper than the roadcutting. But no other stratigraphical detail is given. V. Mitter (in Boesch, 1974) records an age of 29 115^{+3220}_{-2285} BP from the upper peat beds exposed on the road to Sankhu near Gokarna (Agrawal *et al* 1967).

These are only few and preliminary indications of the Pleistocene age of the Kathmandu valley sediments. It is, however, not to be ruled out that Pliocene deposits fill the valley floor below the Pleistocene sediments exposed along the recent cutting of the Kholas.

Much further work, particularly of palaeontological, palaeomagnetic and geological nature, has to be done on the Kathmandu valley sediments to clarify the stratigraphic succession of its deposits.

The first author is currently carrying out a geo-archaeological programme in the

valley in co-operation with the Dept. of Archaeology, H. M. G. A significant amount of data has already been collected and particular stress is being laid on detailed stratigraphical investigations and first results of these will be published at a later date. The writers would like to extend their thanks to the finder of the fossil, Mr. Ram Hari Sharma Pudasaini, without whose interest the find would have never come to our notice.

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Fig. 1 : Bhadrabas Section, Kathmandu Valley.

Plate 1 & 2, Fig. 2 : a, b, c, RM_3 and RM_2 of *Bos namadicus* now placed at the Natural History Museum, Kathmandu.

Legend for Fig. 1 : a. light grey clay.
b. light grey, coarse gravel.
c. grey clay.
d. medium to coarse grey gravel.
e. dark grey clay (with fossil level); black clay band with lignite and wood at top.
f. fine, grey, cracked clay.
g. dark, coarse clay.
h. gravel lense.
i. dark grey, coarse clay with brittle bone fragments found at 1, 20 m. above gravel contact.
j. medium gravel.
k. medium to coarse gravel.

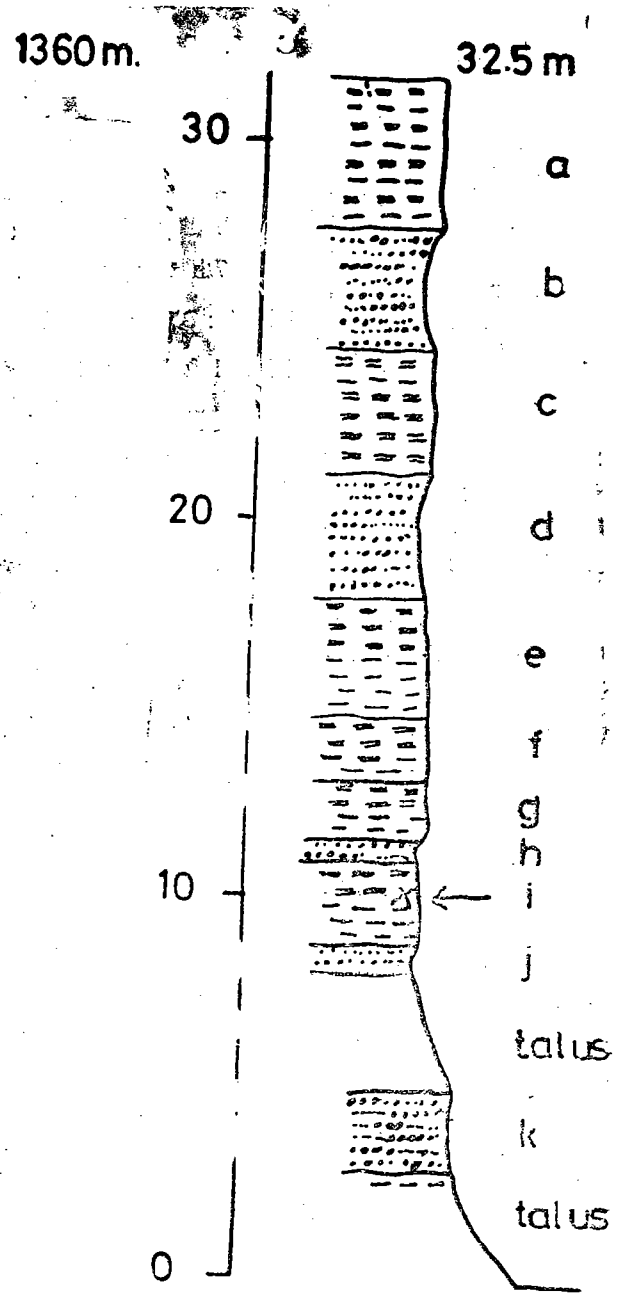
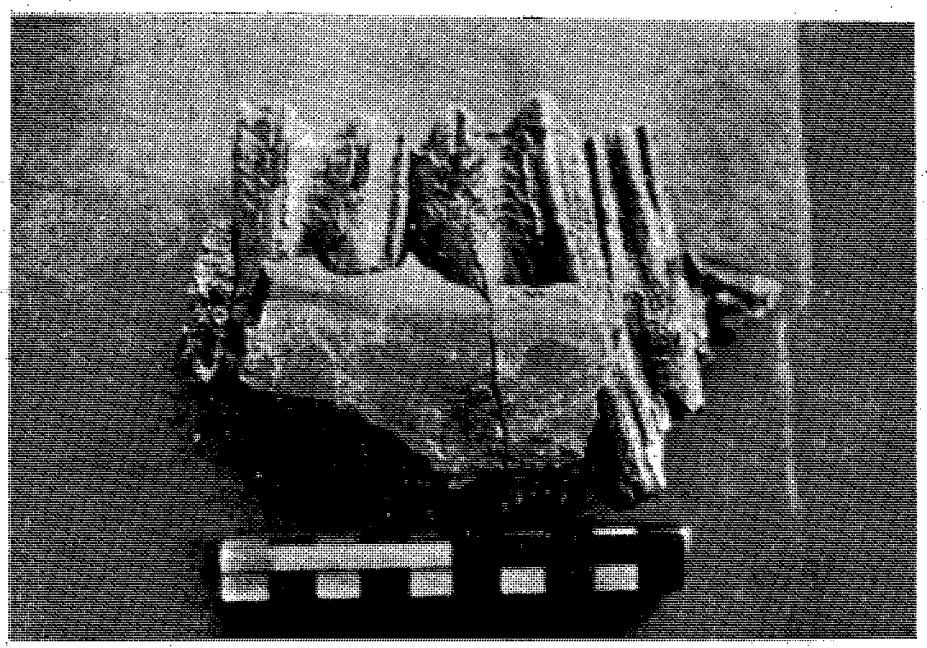
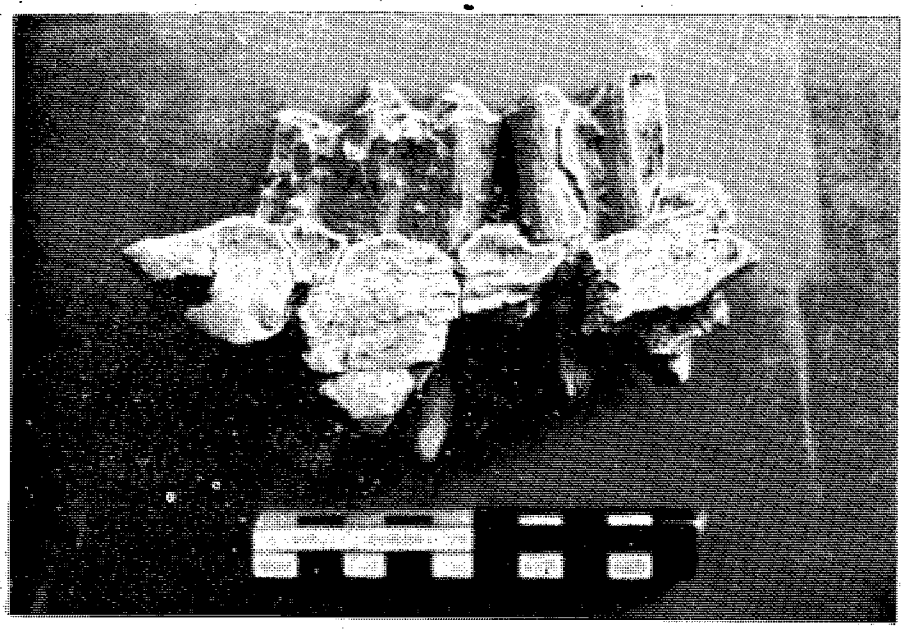


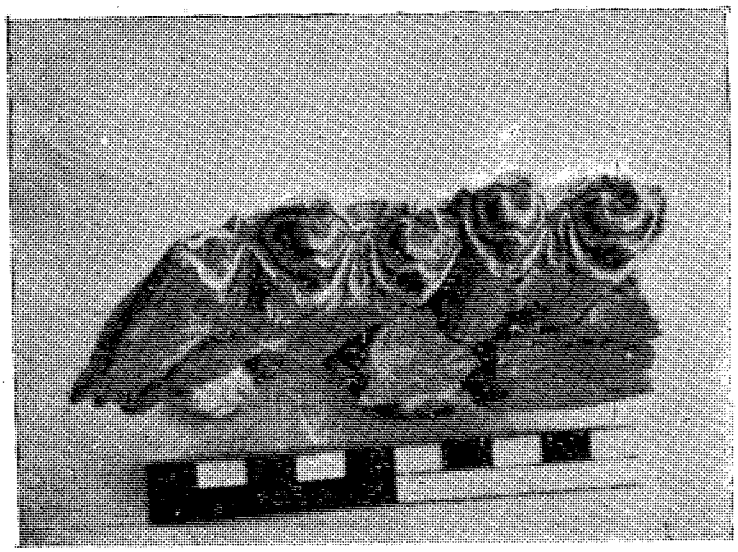
Fig. 1
Bhadrabas Section, Kathmandu Valley



a) RM_3+RM_2 **Bos** *Namadicus*



b) RM_3+RM_2 **Bos** *Namadicus*



c) RM_3+RM_2 **Bos** *Namadicus*