

NEW FOSSIL HOMINOID MATERIAL FROM THE SIWALIKS OF KANGRA DISTRICT, HIMACHAL PRADESH

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ABSTRACT

Occurrence of *Ramapithecus* cf. *punjabicus* (Pilgrim 1910) is being reported from a new locality in the Lower Siwalik of Dera Gopipur, Kangra district, Himachal Pradesh. Widely spaced hominoid bearing sites in the Lower and Middle Siwaliks suggest that this hominoid was well distributed throughout the north western part of the Indian Subcontinent during the late Miocene to Lower and Middle Pliocene times.

The paper deals with stratigraphic details of the hominoid material, associated fauna, tentative stratigraphic correlation with other hominoid bearing sequences in India and palaeoecological conditions as inferred from the present find.

INTRODUCTION

Fossil hominoids in the Siwaliks of India have been reported mainly from two localities, namely, Ramnagar in Udhampur district, J & K and Haritalyangar in Bilaspur district, Himachal Pradesh. The fossiliferous zone at Ramnagar is located in the upper part of Middle Chinji (*Vindobonian*) and has yielded a rich vertebrate fauna. Occurrence at Haritalyangar belong to Nagri (*Sarmatian*) and Dhokpathan (*Pontian*) zones (Pilgrim, 1913, Lewis, 1934 and Prasad, 1970). Recently an isolated tooth of *Ramapithecus punjabicus* has been reported alongwith other vertebrate forms (Sahni, 1980, received after this manuscript was ready) from the Lower Siwalik of Kalagarh area, Pauri Garhwal district, Uttar Pradesh.

The present material, consisting of isolated hominoid teeth (possibly belonging to the same individual), fragmentary chelonean scutes and bovidian limb bones, was located by the authors in an excavation 1½ kms south of Bankandi (31°57'30" : 76°11'30"), 11 kms north-west of Dera Gopipur, Kangra district, Himachal Pradesh. The fossil site is situated about 50 meters north of the road, in the basal part of a well exposed red clay band. The material though fragmentary and insufficient, but well preserved and unworn condition of some of the teeth necessitate their proper documentation in view of the extreme rarity of fossil hominoids in the Siwaliks. A brief account of the accurate stratigraphic position of the hominoid teeth, associated fauna, geology and palaeoenvironmental set up around the site is dealt in this paper. A plausible correlation of the present site with those of Haritalyangar and Ramnagar is also discussed. A part of the Lower and Middle Siwalik succession across the southern limb of the Dera

Gopipur Anticline was measured to indicate the stratigraphic level of the fossil hominoid (Text fig. 2). Stratigraphically the material comes from a horizon located approximately in the lower part of the upper most Lower Siwalik.

Repository : The material is deposited in the Siwalik Fossil Park-Saketi, Field Museum, Sirmur district, Himachal Pradesh.

GEOLOGY

The Siwalik belt around Dera Gopipur (31°53' : 76°12'30") Kangra district, H. P. was mapped by the Oil & Natural Gas Commission during the late fifties. A small scale map of the entire Siwalik belt has recently been compiled and published by Karunakaran and Ranga Rao (1976). The structure in the north of Dera Gopipur has been named as the Dera Gopipur Anticline by the geologists of the ONGC.

The prominent ridge running immediately from north of Dera Gopipur town to Haripur (32°00' : 76°09'30") consists of Lower and Middle Siwalik strata, which have been tightly folded into a large anticline (Dera Gopipur Anticline), with its axis running more or less along the crest of the ridge. Both limbs of the anticline exhibit vertical dips. The Lower Siwaliks occupy the core of the anticline and are well exposed along the Dera Gopipur-Haripur road. The southern limb though steeply dipping, appears undisturbed up to the northern bank of Beas river. Further to the south, this limb is faulted against the Upper Siwaliks or probably the latter rest unconformably on the Middle Siwaliks. A younging sequence of the sediments is available from 200 meters south of Gharat (31°56'45" : 76°12'15") towards the Beas river.

The Lower Siwalik here are characterised by highly

jointed, compact, fine to medium grained sandstone, siltstone and red clay layers. Frequency of red clays is higher than the sandstone. Upwards, the sandstones gradually become friable, coarser and bright grey in colour. Occasionally, pebbles and conglomeratic lenses are also seen embedded in sandstone layers. On the basis of gross lithological and physical characters the beds are referable to Middle Siwalik. The exposed southern flank of Dera Gopipur Anticline (section line, Fig. 1) is nearly 1500 meters thick. Topmost horizons of the Middle Siwalik are concealed under the Beas River Alluvium and Upper Siwalik conglomerates.

A localised NW-SE trending strike fault, noticed about 30 m north of the present site, has brought the Middle Siwalik against the Lower Siwalik. Another thrust fault, about 1 km north of Bankandi, has again transposed the Lower Siwalik in juxtaposition to the Middle

Siwalik (plate, 1 fig. A). South of Gharat village the basal beds in the core of the Dera Gopipur Anticline contain a friable siltstone band which is overlain by a massive clay layer. The hominoid material under reference was excavated *in situ* from the transitional zone of these siltstone and clay layers exposed on the footpath leading from the main road (Dera-Kangra, State Highway) to Gharat (Fig. 1).

PALAEONTOLOGY

There are seven isolated hominoid teeth in all in the present collection which probably belong to the same individual, as all the specimens were found occurring together at one place. The material represents three molars, two fragmentary canines, one premolar and one incisor. The molar specimens are well preserved but the other teeth are damaged.

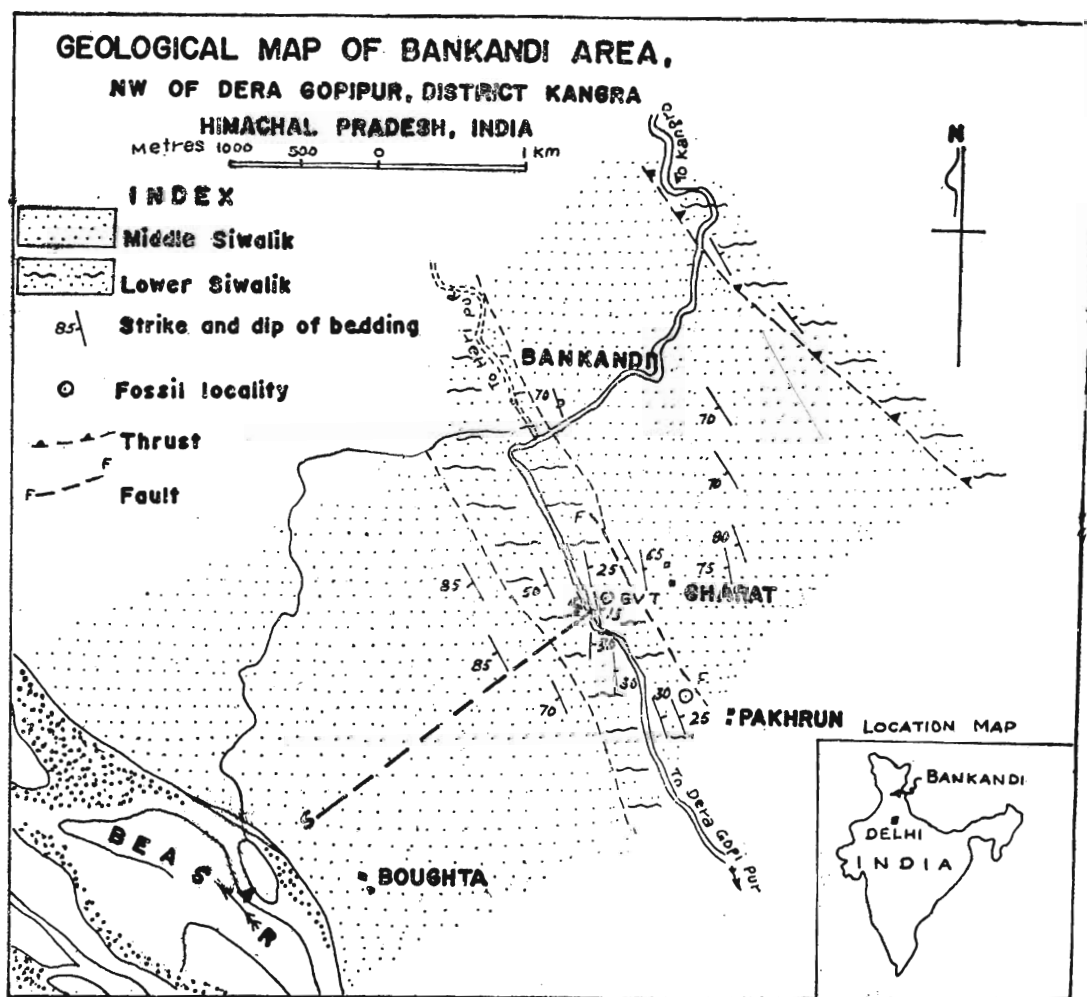


Fig. 1

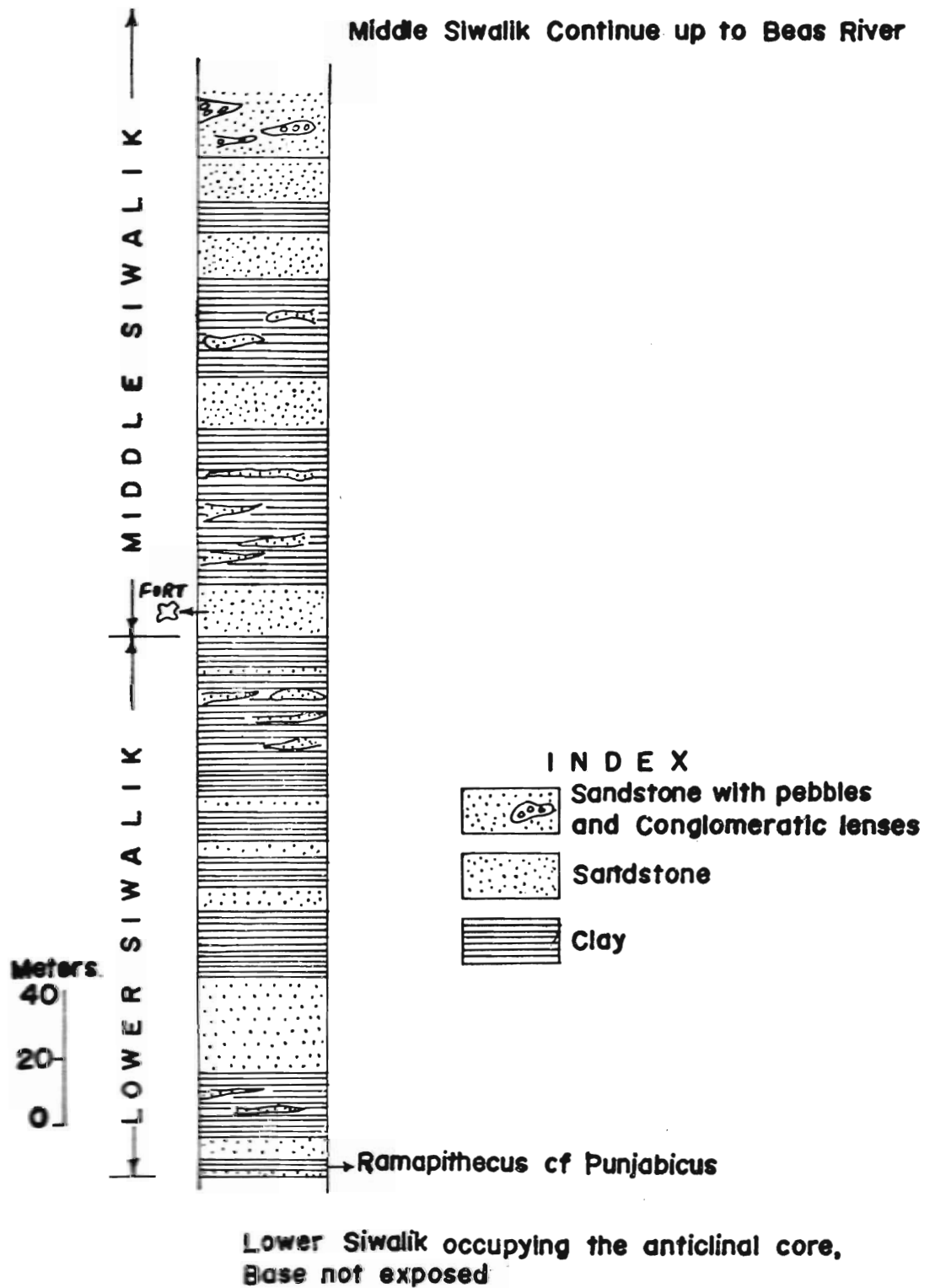


Fig. 2. Litho-column across lower and middle Siwaliks south of Bankandi, Kangra District, Himachal Pradesh.

SYSTEMATIC DESCRIPTION

- Family Ramapithecidae
 Subfamily Ramapithecini
 Genus *Ramapithecus* LEWIS 1934
Ramapithecus cf. *punjabicus* (PILGRIM 1910)
 (Plate I—B & C)

Description

RM¹ (No. SFP 187). Well preserved tooth but lacks the posterior margin. The paracone is the highest cusp. The anterior cingulum extends from the paracone linguallly to the protocone. Though the posterior margin is broken, it is possible to make out the outlines of the metacone as well as the ridge that links the metacone to the protocone. The hypocone is not preserved. (Plate 1—B, left).

Transverse width .. 11.30 mm

Maximum height .. 5.10 mm

LM² (No. SFP 188). A well preserved transversely worn tooth with a high paracone, but in general low cusps. Metacone-protocone ridge distinct (Plate 1, fig. 8, centre).

Length (a-p) .. 9.45 mm.

Transverse width .. 11.70 mm.

Maximum height .. 5.80 mm.

RM₂ (No. SFP 189). This tooth is lacking in antero-lingual part of the crown. Protoconid robust. Hypoconid low. Talonid as in GSI No. D 118-119 (Plate 1—B, right).

Maximum width on the posterior

side .. 10.50 mm.

Maximum height .. 5.50 mm.

P³(?) (No. SFP 190). Badly preserved, enamel damaged from the lingual and buccal walls. Crown semi-worn. Cusps low.

Maximum height .. 4.10 mm.

I₂ (No. SFP 191). This tooth is half broken from the left side. Crown partly worn. (Plate 1, fig. C, left).

LC (No. SFP 192). Upper left canine, broken from the internal side. Root partially preserved. Crown considerably worn (Plate 1—C, right).

Maximum height .. 7.10 mm.

LC (No. SFP 193). Lower left canine, broken from the crown and the root portions. Buccal wall also damaged. Metaconid half preserved. Lingual wall vertical and striated.

The form shows affinities with *Ramapithecus punjabicus* (Pilgrim) and is tentatively assigned to this species.

ASSOCIATED FAUNA

The massive red clay layer from which the present material was excavated, though looks ideal for fossils, yielded very little material belonging to other groups.

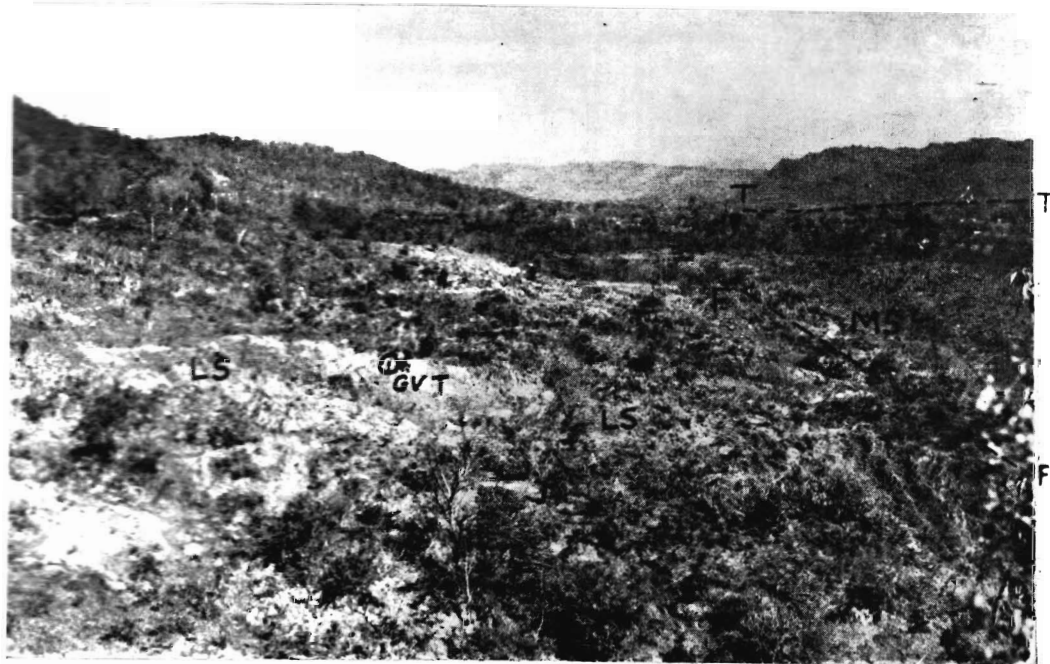
Of the numerous bone fragments collected, chelonean scutes predominate. A few post-cranial bone pieces representing two bovids—one small and one medium sized individuals, were found about 5 meters above the hominoid zone. A badly broken tooth fragment possibly of a tragulid, was also recovered from the same horizon. Nearly 30 meters above this level another clay band also yielded chelonean scutes. A thin band of a compact sandstone, one meter above the hominoid zone, is profusely rich in micro-vertebrates and coprolitic material. Larger pieces of the latter are frequently noticed in other clay layers.

PALAEOECOLOGY

Palaeoenvironmental set-up inferred at the present site is more or less similar to other primate localities of Siwaliks. Higher frequency of chelonia, presence of fragmentary microvertebrates and coprolite in one of the horizons, and alternating layers of sandstone, siltstone and clay etc. are some parameters which throw light on the natural habitat of the hominoid. Land tortoises preferably live around limpid water lakes or swamps located in open landscapes or areas of dead drainage. Cyclic deposition of sandstone and clay layers are suggestive of alternation of dry and wet periods. Possibly the area was prone to frequent floods or occupied by meandering streams which had their everchanging courses. Fragmentary bones of microvertebrates and associated coprolitic disseminations in the sandstone layers are indicative of the existence of dry sand-patches on the bank of a stream or lake shore, where birds and other predators waited in search of food. Bovid live in a wide range of environmental conditions, but their association in a setting discussed above, picture an open grass land, which supported grazing and browsing populations. The area might not have afforded thick forests as is evident from the general paucity of megaterrestrial forms. Presence of red pigment in clays and siltstone points towards the prevalence of oxidising conditions.

CORRELATION

In the absence of adequate fossil material precise biostratigraphic correlation of the present site with those of Haritalyangar and Ramnagar is not possible at the moment. However, from the general stratigraphic set-up in the three localities and gross lithological and physical characters of the sediments, a tentative correlation can be attempted as the Siwalik basin had been more or less continuous in the entire region. The fossiliferous horizons around Haritalyangar are located in bright grey sandstone and red clay layers of Middle Siwalik. The beds have been assigned Nagri (*Sarmatian*) and Dhokpathan (*Pontian*) ages by Pilgrim (1913) on the basis of consti-

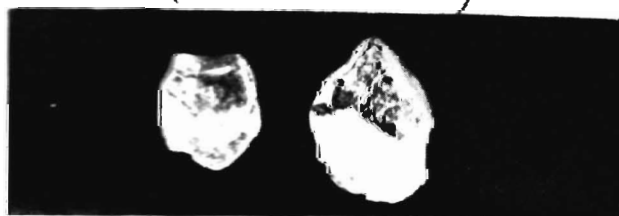


A



0 1 2 cm

B



0 1 2 cm

C

Table 1. Tentative stratigraphic correlation of Ramnagar, Bankandi and Haritalyangar hominoid sites.

Gross lithology & physical characters	Ramnagar section		Bankandi section		Haritalyangar section
Bright grey, coarse grained friable sandstone and interbedded red and orange clays.	Undifferentiated Siwalik.	Middle	Undifferentiated Siwalik.	Middle	Dhakpathan ¹ (Pontian) Nagri ¹ (Sarmatian).
Red clay and interbedded medium to fine grained compact sandstone and siltstone layers.	Chinji ² (Vindobonian) Kamlial.		Lower Siwalik (present hominoid site).		Lower Siwalik ³ (Sutlej Formation) ³
Intense coloured purple and pink clay with interbedded fine grained micaceous sandstone.	Undifferentiated and Upper Murrees.	Lower

1 Pilgrim, G. E. (1913) and Prasad, K. N. (1970).

2 Vashist, R. N., *et al.* (1978).

3 Boileau, V. H. and Kohli, G. (1953).

uent faunal assemblages. The *Ramapithecus*-bearing horizon (Hari temple scarp) approximately lies 250 meters above the typical red clays and fine to medium grained compact sandstone of Lower Siwalik in the Haritalyangar section. The constituent beds at the present hominoid site consisting of red clays, siltstone and fine to medium grained sandstone are comparable with the Lower Siwalik of Haritalyangar area. Strata having lithological and physical similarities with the Middle Siwalik of Haritalyangar area, commence about 75 meters above the hominoid level at the present site.

The fossil bearing horizons at Ramnagar are located in red clays, siltstone and sandstone layers referred to the Chinji zone (Vindobonian) of Lower Siwalik (Vashist *et al.*, 1978). These are very similar to those of Bankandi area of Dera-Gopipur. Bright grey, coarse grained friable sandstone and subordinate red and orange clay layers of Middle Siwalik begin 50-75 meters above this fossiliferous zone south-west of Ramnagar. Thus with all probabilities the hominoid zone of Bankandi is nearly at the same stratigraphic level as that of Ramnagar and considerably lower than the Nagri zone of Haritalyangar. It may be well within the lower part of Upper Chinji. Gross lithologies and physical characters of the Lower and Middle Siwaliks are similar in the three areas in spite of the fact that they are distantly located.

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EXPLANATION OF PLATE

PLATE I

- A. A view of the Bankandi Valley towards north-west. Cluster of trees in the right center is Bankandi village (to the left of the spot marked T in the photo); LS, Lower Siwalik, MS, Middle Siwalik, T-T, thrust and F-F, fault; GVT, Hominoid site.
- B. *Ramapithecus* cf. *Punjabicus*. Isolated molars. Left to right—Rm¹ (No. SFP 187), LM² (No. SFP 188) and RM³ (No. SFP 189). Crown views.
- C. *Ramapithecus* cf. *punjabicus*. Left to right—RI₁ (No. SFP 191), lingual view and LC—upper (No. SFP 192). Buccal view.