

NARMADA ALLUVIUM AND ITS EQUIVALENTS

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Some characteristic features of the Narmada alluvial deposits have been described, and on the basis of the critical examination of the fauna found there, the geological age of the deposits has been determined. Some light has been thrown on the nature of deposition of the implements found there.

INTRODUCTION

Animal remains from the Narmada alluvial deposits were collected near Jabalpur for the first time by Spilsbury (Prinsep 1832). Subsequently, numerous fossils were collected by other workers also. Almost all of them were described by Falconer (1868). Later on other specimens including the previous ones were described in detail by Lydekker (1878, 1882 & 1884 *a, b*). No systematic attempts were made to work out the stratigraphy and to find out the age of the fauna. However, Pilgrim (1905) threw some light on the stratigraphy and geological age of the deposits. Khatri (1966) studied the fauna and implements of the Narmada alluvial deposits. Recently some specimens from the Godavari alluvial deposits of the Nevasa region, which are of the same geological age as those of the Narmada alluvial deposits, have been described by Tripathy (1968). An attempt has been made by him to establish the relationship between the fauna and the tools found there.

Hacket (Medlicott and Theobald 1873) collected an implement for the first time at Bhutra in the Narmada Valley. Afterwards several implements were collected and described by various workers. De Terra and Paterson (1939) and Sankalia (1953) showed special interest in the study of stratigraphy. Sankalia (1962) also summarized the works carried out on the Pleistocene stratigraphy of India, which has been determined on the basis of the study of implements. He concludes that, in general, two gravel beds, the lower and upper, are found in the Pleistocene deposits of central and southern India. The lower gravel bed consists of well-cemented coarse gravels with the Lower Palaeolithic implements, whereas the upper gravel bed is made of fine loose gravels with the Middle Palaeolithic implements.

STRATIGRAPHY

The exposures found along the Narmada River strongly suggest that the river is eroding an old deposit, and the general sequence of the beds exposed is as follows :

Brown concretionary silt
Upper gravel bed

Reddish concretionary silt

Lower gravel bed

It is said that these beds are horizontal, but keen observations reveal that there are various channels too. The beds deposited in the channels often show high depositional inclination (45°) near the centre, and farther away they become horizontal. Thus, near the centre of the channel the sediments are coarse and are finer farther away. This is why the gravel beds are discontinuous, and their thickness varies from place to place. But, in general the main sequence of the four beds mentioned above is unaffected.

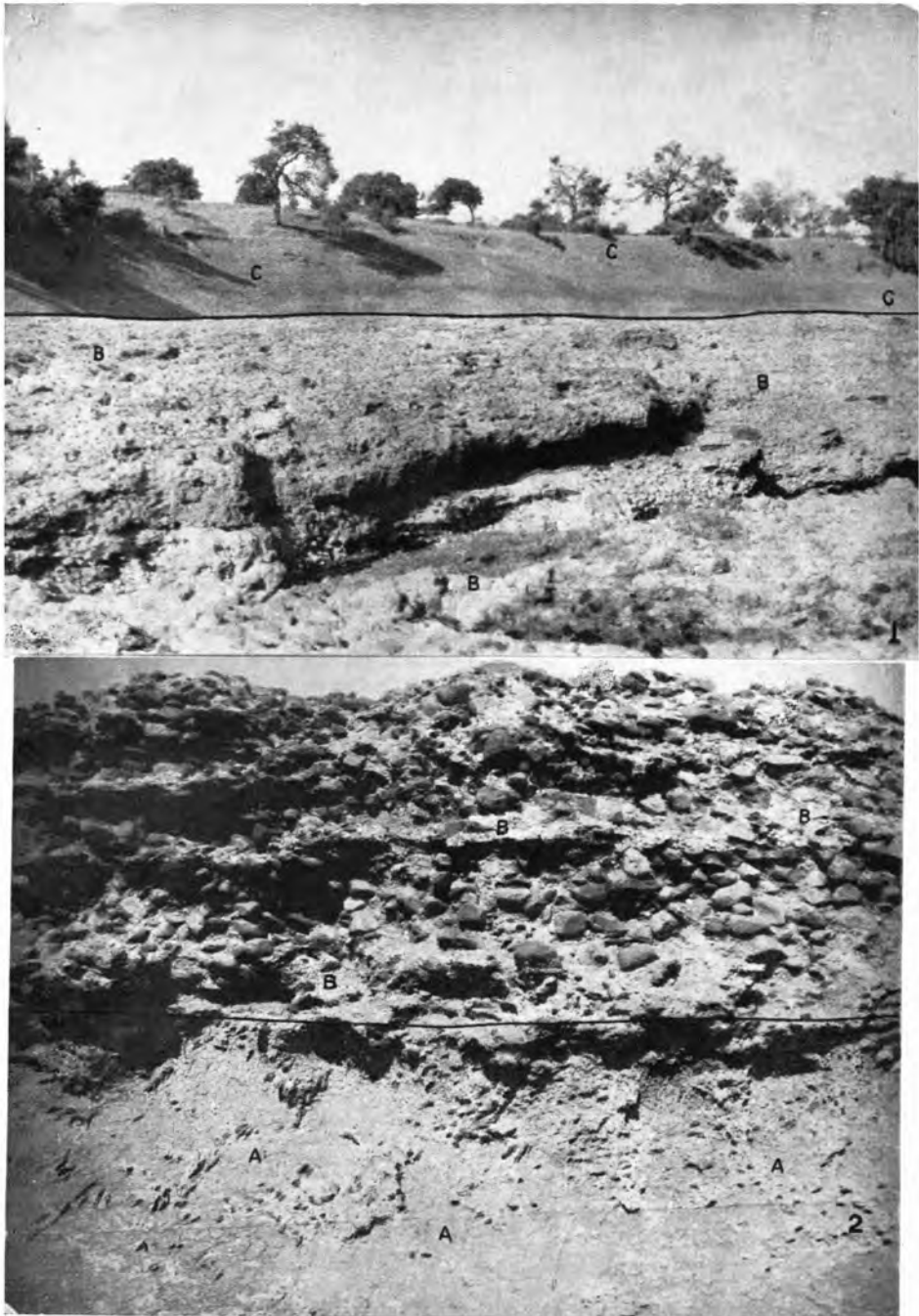
The continuity of the outcrops of the four main beds is not only disturbed by the channel deposits, which may be synchronous with the main deposit, but the exposures of these beds are also covered by terrace deposits of the present Narmada River, which most probably cut the present course during the last glacial age. In the higher terrace, rolled pebble chopper and hand-axe are common (Pl. XII, Figs. 1-4), whereas in the lower one the Middle Stone Age tools are found in association with blades (On right bank, nearly 1-1/2 miles north of Hoshangabad Rest House, Fig. 1).

The lower gravel bed in general, consists of coarse gravels, but along the strike the lower coarse gravels grade into fine gravels similar to those of the upper gravel bed. Thus, at places it is extremely difficult to distinguish the lower from the upper gravel bed. The pebble chopper, cleaver, hand-axe, etc., are found in the lower gravel bed, wherever its gravels are coarse, but often the Middle Stone Age tools—scraper, borer, point, etc.—are found in their association. At places where the gravels of the lower gravel bed are fine, only the Middle Stone Age tools are found. Thus, stratigraphically speaking, the lower and Middle Stone Age tools were deposited during the same geological age in the Narmada alluvial deposit after being transported by river or rivers from the factory sites. It is likely that lag concentration of earlier gravel bed may be present below the sequence of these beds which have not been definitely demarcated so far. Bore holes sunk in the region indicate that the maximum thickness of the Narmada alluvial deposit is about 250 metres. (personal communication from Mr. K. R. Srinivasan, Geologist, Geological Survey of India). Consisting of four clay and three gravel beds, the sequence of these beds is as follows :

Last Interglacial	{	Pinkish clay bed .. .. .	..	..	..	..	about 30 metres.
		Gravel bed (size of gravel in general 0.2"-0.5")
	{	Pink clay bed) .. .. .	..	..	..	..	about 12 metres.
		Gravel bed (size of gravel in general 0.5"-1.0")
(?) 3rd glacial	{	Reddish clay bed .. .. .	..	..	..	..	about 40 metres.
		Gravel bed (size of gravel in general 1.0"-2.0")
(?) Second Interglacial	{	Red Clay bed .. .. .	..	..	..	..	about 120 metres.
		Deccan Trap (Bed Rock) .. .. .	..	..	..	..	..	..

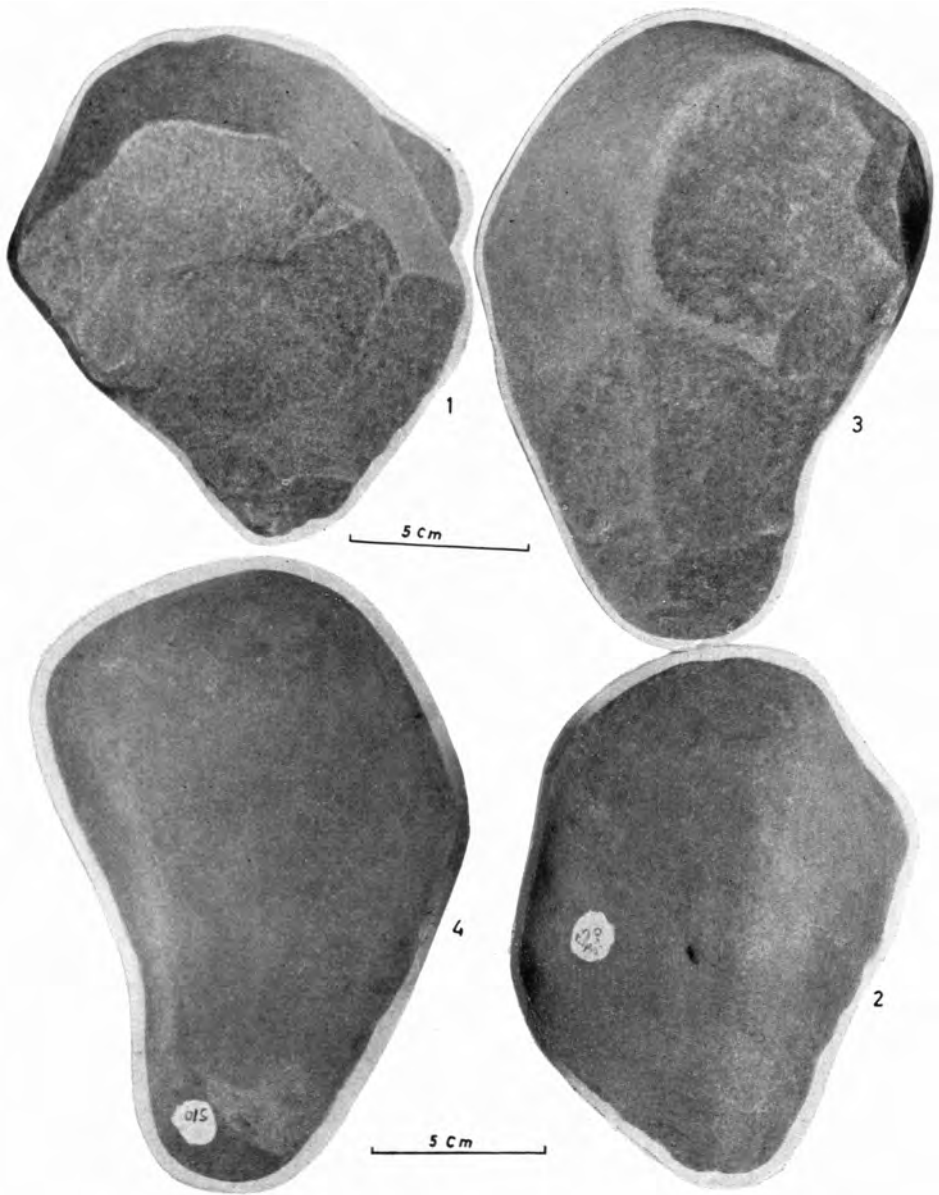
FAUNA

It may also be kept in mind that so far only two fossiliferous deposits (Shivaliks and Narmada alluvial deposits) of the Pleistocene are well known in



FIGS. 1, 2. Shows succession of beds on the left bank north of Hoshangabad Rest House : 1, Showing beds B and C facing south; 2, Showing beds A and B facing north; C. Brownish concretionary silt; B, coarse gravel bed; A, Pink concretionary silt.

India. The Shiwalik fauna is of the Lower Pleistocene, and bulk of the Narmada fauna is of the last interglacial age. It is likely that the fauna which existed during the period from the first to the third glacial age may be unearthed from northern or central India, though till now no definite evidences are available.



Figs. 1, 4. Pebble choppers : 1, 3, show worked surface; 2, 4, show back surface.

Animal remains have been collected from the Narmada alluvial deposits since 1832. But the scrutiny of the fossils indicates that the collection made so far from the Narmada alluvial deposits is an admixture of the fossils derived from the older beds, from the terraces of the present Narmada River, and from the four main



FIGS. 1, 4. *Bos namadicus* : 1, 2, Horn-core, only part of tip side is present; 3, 4. Left ramus with P_4-M_2 .

beds exposed along the river. Bulk of the fauna which is characteristic of the last interglacial appears to have come from the four main beds, whereas the remaining ones may have come either from the terraces or from the older beds whose outcrops have not been positively identified in the Narmada Valley till now, though bore holes sunk in the region proved the presence of three such older beds. Thus, naturally the age of the deposit would be older if the rolled fossils are taken into consideration, and younger, if the fauna of the terraces are relied upon. Khatri (1966) devoted considerable time to the working out of the stratigraphy of the Narmada Alluvial deposits by the study of the implements and fossil fauna collected by him from time to time. Khatri tried to identify the mammalian remains and to fix the geological ranges of various species, but failed to do so. Recently, Tripathy (1968) collected some specimens from the Godavari alluvial deposits around Nevasa, which have the closest resemblance to the Narmada alluvial deposits with respect to the fauna, implements and cycles of deposition, and has attempted to determine the geological age of the deposit. Tripathy (1968) accepted the idea of De Terra and Paterson (1939), that mammals of the Middle Pleistocene persisted during the deposition of the entire Narmada alluvial deposits whose upper group, according to archaeological data (Sankalia 1962), is of the Upper Pleistocene age, and concludes that the lower Narmada fauna may be slightly younger than the Middle Pleistocene in age. Thus the stratigraphy of the Narmada alluvial deposit remained in a state of confusion. In such circumstances the earlier collections are unreliable for stratigraphical purpose and fresh collection may be made either by an experienced person who will also work on the fauna, or by some experienced biostratigrapher for a thorough stratigraphical investigation of the region. However, for general guidance, characteristic fauna and horizons of the three Indian pleistocene deposits are given below :

Characteristic fauna	Horizon	Geological age			
1. <i>Equus asinus</i> 2. <i>Hyaena crocuta</i> 3. <i>Rhinoceros Karnuliensis</i> 4. <i>Hystrix</i>	Kurnool Caves	4th glacial			
1. <i>Palaeoloxodon namadicus</i> 2. <i>Hexaprotodon palaeindicus</i> 3. <i>Equus namadicus</i> 4. <i>Bos namadicus</i>			Narmada alluvium	Last interglacial	
5. <i>Rhinoceros deccanensis</i> 6. <i>Stegodon (? namadicus)</i> 7. <i>Sus (? namadicus)</i>					Fauna undiscovered from 1st glacial to 3rd glacial
1. <i>Equus sivalensis</i> 2. <i>Equus cautleyi</i> 3. <i>Hypselephas hysudricus</i> 4. <i>Rhinoceros sivalensis</i> 5. <i>Punjabitherium platyrhinum</i> 6. <i>Bubalus platyceros</i> 7. <i>Sus hysudricus</i> 8. <i>Crocota sivalensis</i>						Pinjor stage	Lower pleistocene

DISCUSSION

Taking into consideration the typology and technique, the Middle Palaeolithic industry of India has the closest resemblance to the Mousterian industry of Europe and Sangoan industry of Africa, and thus these two industries may be synchronous. But the mammalian fauna associated with these three industries speak a different story. The mammalian fauna found associated with the Middle Palaeolithic industry of India are of the last interglacial age, and they indicate warm climate (Khan 1968), whereas the fauna found associated with the Mousterian industry of Europe are of the Early Würmian age, and they are indicator of cold climate (Kurten 1968). Thus, in the light of the palaeontological data one is tempted to conclude that the Middle Palaeolithic industry of India is about 20,000 years older than the Mousterian industry of Europe. On the other hand, on the palaeontological ground the layers exposed at Venosa in Italy may be equated with the deposits of the Narmada Valley, and the pre-Mousterian or pre-Tayacian industry of Venosa (Chippella 1964) may be synchronous with the Middle Palaeolithic industry of India.

In Olduvai Gorge, the mammalian fauna of the Bed I and the lower part of Bed II are of the Villafranchian age (Coles and Higgs 1968) and the tools are of chopper type. The mammalian fauna of Bed IV, III and upper part of Bed II have not been properly sorted out bed by bed; therefore, definite age of each bed cannot be ascertained. However, dominance of the Chelles-Acheul culture in these beds may indicate a shorter duration for their deposition. But radiocarbon age data from the Kalambo Falls site suggest that the same industry continued up to 60,000 to 50,000 years (Deacon 1966) at least in this region. Recent studies reveal that Chelles-Acheul culture persisted in all parts of Africa till the last interglacial age (Coles and Higgs 1968). During the last glacial age the Sangoan industry evolved, and later on more complex industries spread in different parts of Africa (Coles and Higgs 1968).

So far no implements have been unearthed from the deposits of the last interglacial of America, but some crude hand-axes made of bone have been recently collected from the last interglacial (Sangamon) deposit of Central Canada (Khan 1971) which has yielded a characteristic fauna of the last interglacial age (Khan 1970).

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