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STUDIES ON WILDLIFE OF NARBADA VALLEY. PART IV. MAMMALS

By

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(With 2 Plates)

INTRODUCTION

The mammal collection made during Narbada Survey 1962-1971 consists of 106 specimens comprising 41 taxa. Very few large mammals were collected because of non-receipt or late receipt of shooting permits, later followed by complete ban on shooting. However, practically all central Indian species of these magnificent animals were seen during the survey. Detailed ecological observations were made on twenty-one species of bats around Jabalpur city, and *Suncus murinus* Linn, *Pteropus g. giganteus* Brünnich, *Rhinopoma h. hardwickei* Gray, *Tetracerus quadricornis* Blainville, *Tatera indica* Hardwick, *Vandeleuria o. obracea* Bennet and have been published elsewhere (Khajuria *vide* references). Parts I, II, III of these reports deal with General Introduction with summary of results, reptiles and birds respectively. All measurements are in m. m. and are taken after Khajuria (1971).

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SYSTEMATIC ACCOUNT

Order INSECTIVORA

Family SORICIDAE

1. **Suncus murinus murinus** Linnaeus

The House Shrew

1766. *Sorex murinus* Linnaeus, *Syst. Nat.* 12th ed. 1 : 74. Java.

Material : 1 ♂ Deotal, Jabalpur city, 18. 8. 1961, 1 ♀ Pachpedi, Jabalpur city, 1.12.66.

Measurements : External : Head and body ; 149, 130 ; Tail 85, 80, Hind foot, 24, 21 ; Ear, 13.

Remarks : The male has a rather brownish fur on the snout, the underparts has yellowish tint and the fur is coarse to a great extent.

The species is very common in Jabalpur town. It is reported to have taken bread and cooked rice in captivity. Rats, mice and abnoxious insects though generally avoiding this animal are, nevertheless, found in houses regularly visited by it. As such it is not likely to be an effective check on these vermins at least in Jabalpur city as reported in some areas. It may breed inside certain types of cushioned furniture and contaminate food as it is attracted by utensils containing food remnants (Khajuria, 1972) described the young of the species in Jabalpur city.

2. **Suncus etruscus nitidofulvus** Anderson

Anderson's Shrew

1877. *Crocidura* (*Pachyura*) *nitidofulva* Anderson, *J. Asiat. Soc. Bengal*, **46** : 272. Lower Bengal, India.

Material : 1 ex ♀ , Garha, Jabalpur city, 7.9.65.

Measurements : External : 1 ♀ : Head and body, 76 ; Tail, 47 ; Hind foot, 11.5 ; Ear, 9.

The shrew appears very rare around Jabalpur city as only one specimen could be obtained after considerable trapping. It does not appear to enter houses. Stomach contents could not be identified with certainty.

3. **Suncus stoliczkana stoliczkana** Anderson

Stoliczka's Shrew

1877. *Crocidura* (*Pachyura*) *stoliczkana* Anderson, *J. Asiat. Soc. Bengal*, **46** : 270. Bombay, India.

Material : 1 ♀ , Jabalpur, Office campus, 27.12.66 ; 1 ♀ , Jabalpur city, Pachpedi, 29.9.67 ; 1 ♀ , Choral, Indore 29.10.69.

Measurements : External

	Jabalpur city	*Choral*
Head and body	114, 124,	101
Tail	77, 79,	79
Hind foot	20, 205,	19
Ear	13, 13,	13
Wt.	30 gm. (1 specimen)	

Remarks : The specimen from Pachpedi is darker than other two and the colour is brighter. The species is very rare in the area. The stomach contents appear to contain remains of insects. It appears to enter houses occasionally.

CHIROPTERA

Family PTEROPIDAE

4. **Rousettus leschenaulti leschenaulti** Desmarest

Leschenault's Fruit Bat

1820. *Pteropus leschenaulti* Desmarest. *Encly. Meth. Mamm.* **1** : 110. Pondicheri, India.

Material : 1♂, 1♀, Garudeshwar, 19-22. 12. 71.

Measurements : External : Forearm : ♂, 87 ; ♀, 87.

Cranial : Occipitonasal length—37, 35.5 ; Palatal length, 21.5 ; m^3-m^3 ; 11, 11.5 ; m'-m', 9.5, 10 ; c'-m', 9, 11 ; C'-m^3, 14, 16 ; C,-m_3, 18, 17.5 ; cranial width, 16.5, 16 ; interorbital width, 8.5, 8 ; mandibular length, 29.5, 28.

These specimens were collected by mist net near the bank of the Narbada river during night. The roost could not be located. The female was pregnant. As they were flying low, they probably came to the river for a drink. They appear to follow a well defined path in flight while visiting the river.

5. **Pteropus giganteus giganteus** (Brünnich)

Indian Flying Fox

1782. *Vespertilio gigantea* Brünnich. *Dyrenes Historie*, I, : 45. Bengal, India.

Material : 1♂, 1♀, Manot, Mandla Dist., Burwani, Khandwa Dist., 1963, 1970.

Measurements : Unrecorded.

Remarks : The flying fox on the left bank of the river started leaving its roost at 7 A. M. and continued to about 7.45 A. M. Although they flew over the river after a hot day, it was not found to drink except one specimens which could not be identified with certainity. Two specimens were seen to pursue others for a short distance. The direction of their flight was towards the west although not exactly the same in case of all individuals. Although males (?) of the flying fox were seen pursuing females (?), no mating was observed. A female shot was heavily pregnant (foetius measured, ca 7 cm. in diameter).

Khajuria (1965, 1971a) described in detail the habits of this bat.

Family RHINOPOMATIDAE

6. **Rhinopoma hardwickei hardwickei** Gray

Hardwickei's Rat-tailed Bat

1831. *Rhinopoma hardwickei* Gray, *Zool. Misc.*, p. 37 (India).

Material : 3♂, 4♀, M. P. Chikalda village, Dhar Dist., 25-26.2.71.

Measurements : External : forearm : 1♂, 61 ; 4♀, 59-61.5 (60.08).

Cranial :

Condylobasal length,	2♂ 16,	(One specimen) 2♀ 17	(One specimen)
Occipitonasal length	16, (")	16 (")	
Palatal length	8.5, "	8, 7.5	
Postmolar length	10.5 ,,	10.5	
m^3—m^3	8.5, 8.5	9,9	
m'—m'	7.5, 6.5	8, 8	
c'—m^3	7, 7.5	6.5, 6.5	
c'—m'	5, 4.5	4.5, 4.5	
c'—m_3	8, 8	8, 8.5	
Cranial width	8.5, 8.5	8	
Interorbital width	4, 4	4.5,4	
Mandibular length	12 , 12	14, 14	

Remarks : A large colony consisting of about 50 individuals occupied a temple under active worship near the Narbada river. They were not molested on religious grounds and did not mind human presence and noise of temple bell even at a distance of $1\frac{1}{2}$ mile. They were not found to leave the roost upto 8 P. M. It was a mating season. Mating has been described in detail by Khajuria (1973).

Family EMBALLONURIDAE

7. **Taphozous longimanus** Hardwicke

1825. *Taphozous longimanus* Hardwicke, *Trans. Linn. Soc.* London, **14** : 525. Calcutta, Bengal, India.

Material : 1♀ Narbada bridge at Manot, Mandla Dist. 12. 11. 63.

Remarks : A colony occupied a long vertical crevice in the pillar of bridge fully exposed to sun. Khajuria (1975) described in detail habits.

8. **Tapozous malanopogan** Temminck

The Bearded Tomb Bat

1891. *Taphozous malanopogan* Temminck Mon. mamm. 2 : 287. Bontam, Western Java.

Material : 1 ♀ Gujarat, Gurudeshwar village, Baroach Dist., 3.1.72

Measurements : External : forearm, 61. Cranial : Condylobasal length, 16.5 ; occipitionasal length, 19.5 ; postmolar length, 12 ; m^3—m^3, 9 ; m^1—m^1, 8 ; c^1—m^3, 9 ; c^1—m^1, 6 ; c_1—m_3, 10.5 ; cranial width, 10.5 ; interorbital width, 6 ; mandibular width, 15.

Remarks : Two colonies of this bat were observed in old building on the bank of Narbada river at Mandla town on 22. 11. 63 from 11 a. m. to 3 p. m. without collection of any specimen so as not to disturb the bats. One of the colony contained only about 100 specimens and occupied a small old temple with high dome-shaped ceiling, while the other contained about 500 specimens and occupied a dilapidated double-storeyed building, with a flat, cemented, low ceiling hardly three metres above the floor. Both stories were occupied. The first storey was very dark but the second one was well-lighted because of a large window. The first colony did not show any special feature while the specimens of the second colony in the first storey could not be observed accurately.

The second colony in the second storey were observed at a distance of $2\frac{1}{2}$ metres from the specimens. Although slight movements on the part of the observer caused considerable disturbance in the colony, quiet watching was allowed even from a distance of two metres.

The scene was somewhat reminiscent of the mating behaviour of the flying fox in miniature—frequent shifting of positions with short flights, fights with claws, chaser, attempts to lick the genital organs and shrieks resembling *Krin-Krin* and *Krun-Krun*, sound possibly given out by females and males respectively. This commotion was not due to the presence of the observer. There was large, thick, cluster containing about a 100 specimens more or less in the centre of ceiling but a little away from the direct light from the door and the window. There was always great commotion in this cluster on account of the new individuals joining the cluster and pushing their way though it and some flying away from it and the new entrants were possibly either females which had previously been dislodged from the cluster. Quite a large number of specimens were, however, scattered around this nucleus and could be observed in detail. Most of the frequent short fights appear to be due to the fact that some individuals alighted almost on the

other individuals which had to fly away on account of their precarious held on the ceiling. Some individual were also seen pairing in the usual posture described above in the case of the flying fox, outside the cluster, but without any special protests from the female. Although the male has a distinct black beard it was not possible to ascertain the sex of all specimens because of darkness. The pairing formation of bats lasted only for a few moment possibly because the other pairing individuals were disturbed by non pairing bats alighting very close and sometimes even over them. Attempts to lick the vulva were observed only in half a dozen individuals and lasted only for a moment without any serious protest from the female. It is also to be noted that there are no spines on the tongue of this species. The central cluster disappeared a number of times due to the movements of the observer but was reformed within minutes, showing that it was one of the essential characteristics of the colony.

Testis in mature males is characterized by the black beared bulging. The glans through faintly papillated is devoid of any spines. This probably accounts for lack of any serious protest from the female during copulation. The vulva was open, reddish in colour and about $1\frac{1}{2}$ mm, in diametre, the penis is well covered with prepuse.

Two individuals were seen reversing there upside down hanging posture for a moment during which they hung by the claws of their thumb. However, no passage of excreta was observed during this posture. When disturbed the flying individuals tried to pass as near the observer as possible urinating or passing excreta while doing so. This may be due to panic or to a deliberate effort on the part of animals to keep off the intruder. This habit has also been observed by the writers under certain conditions in other colonial species of bats, e. g., *Rhinopoma hardwickei* Gray, *Lyroderma lyra*. *Scotophilus temmincki* Horsfield and *Scotophilus heathi*, *Taphozous melanopogon* when at sexual rest was not observed to show the habit. The habit may be due to panic or it may be a deliberate effort on the part of the animals to keep off the intruder.

Two males and two females from this colony were kept in captivity for three days in a room. A mature male and female were seen to fix themselves in the usual pairing position for about 45 minutes. The female frequently tried to free itself from the hold of the male with usual shrieks but without success. The male was, however, not seen to have any special hold on the female except that its wings and body were in contact with those of the female. No copulating movements on the part of the male were observed. This prolonged

pairing in captivity shows that in natural state the effective mating may be taking place within the cluster of the females where the disturbance from other individuals was less.

The place was again visited on 28.11.63 but the scene of 22.11.63 could not be observed ; only about a dozen individuals were seen scattered here and there. There was however no reduction in number of individuals in the smaller colony in the temple. Four females from former colony were dissected but were not found to be pregnant. The vulva was more or less, closed and lacked the reddish tinge.

Two species of *Rhinopoma hardwickei* and *Taphazous melanopogon* were found to inhabit the caves. The same was reminscent of the one seen in Mandla town in November in a colony of *T. melanopogon* in light, various sounds and condition. In all probability, it was a mating colony but since the bats have the habit of lying one alive the other in ordinary condition, mating pairs could not be identified with certainty. They urinated frequently on the intruders.

Family MEGADERMATIDAE

9. **Megaderma lyra lyra** Geoffrey

The Indian False Vampire

1810. *Megaderma lyra* Geoffrey, *Ann. Mus. H. N.* Paris, 15 : 190, India (East coast Madras).

Material : 1 ♀, Gujarat, Broach Distt. Garudeshwar, Jan. 1972.

Measurements : External : forearm, 68.5 ; *Cranial* : Condylobasal length, 23 ; occipitonasal length, 21.5 ; palatal length, 8.5 ; postmolar length, 15.5 ; m^3—m^3, 10 ; m^1—m^1, 7 ; c^1—m^1, 6 ; c^1—m^3, 10.5 ; c_1—m_3, 13 ; cranial width, 13 ; interorbital width, 5.5 ; mandibular length, 19.

Remarks : They were found in a small cave on the bank of the Narbada river. The colony consists of about 50 individuals. They inhabited soapstone mine at Jogakhurd in small numbers in well lighted places open on many sides and were difficult to collect.

Family RHINOLOPHIDAE

Subfamily RHINOLOPHINAE

10. **Rhinolophus lepidus lepidus** Blyth

Common Leaf-nosed Bat

1844. *Rhinolophus lepidus* Blyth. *J. Asiat. Soc. Bengal*, **13** : 486. Calcutta, India.

Material : 1 ♀, M. P., Hoshangabad Dist., Jogakhund, Jan. 1966.

Remarks : They occupied dilapidated house on an island in Narbada river. The specimen were quite active and were not found hibernating. The specimen were seen scattered in different rooms.

Family VESPERTILIONIDAE

11. **Pipistrellus dormeri** (Dobson)

Dormer's Bat

1915. *Scotozous dormeri caurinus* Thomas, *J. Bombay, nat. Hist. Soc.*, 24 : 33, Junagadh, Kathiawar, 400 ft., India.

Material : 2♂, 3♀, Gujarat, Dist. Broach, Garudeshwar, 22. 12. 1971.

Measurements :

External :	1♂	3♀
Forearm	35	35 (one specimen)
Cranial	10	3♀ ,,
Condylobasal	12	12, 12
Occipitionasal	12	12, 12.5
Palatal length	6.5	7, 6-7
Post molar	8	9, 8
m^3—m^3	7.5	7.5-7 (7.3)
m^1—m^1	6	5.5-6.5 (6.0)
c^1—m^3	6	5.5-6 (5.8)
c^1—m^1	3	3-3.5 (3.5)
c_1—m_3	6	6-7 (6.3)
Cranial width	8	7.5-8 (7.6)
Interorbital width	5	4.5-5 (4.6)
Mandibular length	9	9-9.5 (9.3)

Remarks : Six specimens were purchased. They were inhabiting a wide opening in stone brick wall. All were adult, females although some are younger in age as appear from their size and tooth wear. Sexual segregation appears to have taken place. The whole of the colony has been collected.

Dorsal colouration is brownish with yellowish hinger. Underside is paler. Individual hair have darker bases.

12. **Pipistrellus ceylonicus chrysothrix** Wroughton

1899. *Pipistrellus chrysothrix* Wroughton, *J. Bombay nat. Hist. Soc.*, 12 : 720 (Masskatni Surat Darji, India).

Material : 3 ♀ Gujarat, Broach distt., Garudeshwar 22.12.71.

Measurements : External

Forearm : 37-37.5 (37.3)

Cranial : Condylobasal 12-12.5 (12.3) ; occipitonasal 12-13 (12.5) ; palatal length, 6.5-7 (6.6) ; post molar length, 8 ; m^3—m^3 7-7.5 (7.1) ; m^1—m^1 6-6.5 (6.3) ; c^1—m^3 6 ; c^1—m^1 3-3.5 (3.1) ; c_1—m_3 6-6.5 (6.3) ; cranial width, 8 (8) ; interorbital width 4.5-5 (4.8) ; mandibular length 10.5-11.5 (11).

Remarks : These specimens provisionally identified as *P. c. crysothix* as the locality is intergrading zone between this and nominate race. A small colony of the bat was reported to inhabit a hole in a house. The external genitalia resemble the nominate race.

13. **Pipistrellus mimus mimus** Wroughton

Indian Pygmy Pipistrelle

1899. *Pipistrellus mimus mimus* Wroughton, J. *Bombay nat. Hist. Soc.*, **12** : 722, Mheskatri, Dangs, Surat dist., Western India.

Material : 1 ♀, Right bank of Narbada river near Pondi, Mandla dist., 27. 11. 63. The specimen was collected from a hole in a tree.

14. **Scotophilus heathi heathi** Horsefield

The Yellow Bat

1831. *Nycticejus heathi* Horsefield P. Z. S., 113, Madras, India.

Material : 1 ♂, 2 ♀, Gujarat, Broach distt. Garudeshwar, 22.12.71.

Measurements :—	1 ♂	2 ♀
External :		
Forearm :	58	58, 58
Cranial :		
condylobasal length	18	16, 17
occipitonasal length	17	16.5, 17
palatal length	9	8, 10
postmolar length	12	12, 13

Cranial :

m^3-m^3	10	9, 9
m^1-m^1	9	9, 9
c^1-m^3	7.5	7, 8
c^1-m^1	4.5	4, 4.5
c_1-m_3	8.5	8.5, 8.5
cranial width	10.5	10, 11
interorbital width	6.5	6, 6
mandibular length	14	14, 15

Remarks : It is a common bat inhabiting human dwellings. Because of its large size, considerable quantity of its droppings spoil the furniture in houses. It fed on large dung beetles in captivity.

Order PRIMATES

Family CERCOPITHECIDAE

15. **Presbytis entellus anchises** (Blyth)

Hanuman Langur

1844. *Presbytis anchises* Blyth. *J. Asiat. Soc. Bengal* ; 13 : 470 (Deccan, India).

Material : 1 ♀ , Bhiloda vill. Jabalpur, 15.2.61.

Measurements : External : head and body ; 465 mm. ; hind foot, 215 mm. ; tail, 450.

Cranial : Skull inside the skin.

Remarks : Observations were made on the habits of the langur, around Choral village (Indore Dist.) from 1.11.69 to 7.11.69. The area on the right bank of the river particularly the village was frequented by a large troup including about five (?) adult males ten (?) adult females and six (?) yearlings. At least one female was heavily pregnant. Some attempts resembling mating chase by some males were also observed. Sometime the monkeys crossed the river where the water was shallow. They started feeding actively soon after sunrise, had midday rest in some shady place, and retired to trees soon after sunset. Their main food was the leaves of a tree locally known as 'Arjan' although they were occasionally seen feeding on several trees and shrubs. One day they were voraciously feeding on the bitter leaves of 'Nim' tree *Aradiraeta* sp. The mothers spent considerable time on

'grooming' their yearlinge young which assumed several postures before their morthers to get better attention. These postures varied from prostrate, supine, sitting, half erect, erect and normal quadripedal. One yearling was greatly attached to its mother and continued screaming even when properly attended to. It would not leave the 'fed-up' mother even after serious scolding from the latter.

The heavily pregnant female was seen on 7.11.69 to be isolated on a tree from the other troup. The overlord was also separated from others and kept a careful watch on her. Both of them shifted at night to an isolated tree.

Order CARNIVORA

Family CANIDAE

16. **Canis aureus** Linnaeus

Asiatic Jackal

1758. *Canis aureus* Linnaeus, *Syst. Nat.* 10th ed. **1 : 40**, Province of Lar, Persia.

Material : 1 ♀, Pachpedi, Dist. Jabalpur, M. P. (mounted).

Measurements : External : Head and body, 800 mm ; hind foot, 105 mm ; tail, 220 mm.

Cranial : Skull mounted with specimen.

Remarks : This jackal is one of the commonest animals throughout the valley. Although useful as a scavenger, it is also reported to be a great pest of poultry and young of several game animals. Its meat is considered as a delicacy by some tribes. If properly managed, its fur can be a useful article of commerce.

17. **Vulpes bengalensis** (Shaw)

Bengal Fox

1800. *Canis bengalensis*, Shaw. *Gen. zool.* 1, 2 : 330, Bengal.

Material : 1 unsexed Rani Durgavati Road, Jabalpur, 25. 6. 1963 (mounted in museum).

Remarks : It is a common species.

Family VIVERIDAE

18. **Paradoxurus hermaphroditus hermaphroditus** (Pallas)

Common Palm Civet

1777. *Viverra hermaphrodita* Pallas, in Schreber. *Saugeth.* 3 : 426 (? India).

Material : 2 ♂, Jabalpur dist. 8. 11. 64 (mounted).

Remarks : This civet was very common both near human habitation and in forested areas. A number of times, it was seen crossing forest roads and once on a guava tree in fruit. It was found on a number of times in cities in fruit gardens. It appears to have special liking for guava.

19. **Vivericula indica** Desm.

Small Indian civet

1971. *Viverra indica* Desmarest, *Nouv. Dic. N. H.*, 170 (India).

Material : 1 ♀, Joga forest, Hoshangabad ; 30. 12. 65.

Measurements : External : Head and body, 560 mm ; hind foot, 78 mm ; tail, 365 mm.

Cranial : Skull-mounted with specimen.

Remarks : The animal is rare everywhere, possibly because of its persecution for the supposed value of its musk. Because of its scent found near holes of rats which it hunts, some of villagers think that there is a species 'musk' rat also which belief appears to be unfounded.

Family Hespestidae

20. **Herpestese edwardsi** Geoffry

Indian Grey mongoose

1818. *Ichneumon edwardsi* E. Geoffroy, *Dexr.* Egypt. 2 : 139 "East Indies" (Madras).

Material : 1 ♂, 1 ♀, 1 unsexed Jabalpur city, July, Aug., December, 31. 7. 68.

Measurements : External : 1 ♂, Head and body, 227 ; hind foot, 450 mm ; tail, 182 mm.

Cranial : Skull-mounted with skins.

Remarks : This animal is common and also not shy of man. Once a pair was seen crossing the road just a few metres in front of the observer. The male mounted the female which continued walking with protests in form of screams. A pair was found to live in holes in trees about 3-4 mts. above ground. It appears to be sensitive to non-living objects to which it was once attracted with aggressives display.

Family Hyaenidae

21. **Hyaena hyaena hyaena** Linnaeus

Striped Hyaena

1758. *Canis hyaena* Linnaeus, *Syst. Nat.* 10th ed. 1 : 40 (Benna Mountains, Laristan Southern Persia).

Material : 1 ♂ Jabalpur city (mounted).

Remarks : The animal appears common as shown by its foot prints and droppings. The author observed on following a path regularly over the hill near a military establishment for three days. There are no record in the area of its attack on children or livestock.

Family FELIDAE

22. **Felis chaus kutas** Pearson

Jungle Cat

1832. *Felis kutas* Pearson ; *J. Asiat. Soc. Bengal.* 1 : 75 Midnapore in Bengal about 70 miles west of Calcutta.

Material : 1 ♀ Aioor vill., Dist. Mandla, M. P. Nov., 1963 (mounted).

Measurements : External : Head & body, 642 ; hind foot, 155 ; tail, 238.

Cranial : Skull-mounted with specimens.

Remarks : It appears to be one of the commonest cat in the forest. It was seen on forest roads and in grassy clearings hunting hares and rodents.

23. **Panthera pardus pardus** (Linnaeus)

Leopard

1758. *Felis pardus* Linnaeus, *Syst. Nat.* 10th ed. 1 : 41 (Egypt.)

Material : 1 young, Pachpedi, Dist. Jabalpur, M. P. 30.3.65 (mounted).

Measurements : External :

Head & body, 425 ; Tail (broken)

Hind foot, 53

Cranial : Skull-mounted with specimens.

Remarks : The leopard is not so common as supposed. During the survey, we saw it only twice but it may be due to its stealthy habits.

Order ANTIODACTYLA

Family CERVIDAE

24. **Cervus unicolor** Kerr

Sambar

1792. *Cervus axis unicolor* Kerr, *Anim kingd.* 300, Ceylon (as restricted by Hamilton Smith).

Material : 1 ♂ , Joga Dec, 1965 (unmeasured, skull inside skin).

The specimen though fully adult have unbranched small antlers. This deer was found throughout the area in forested area but is rare. Groups of females including 4-5 individual were seen occasionally in May. An adult female shot by a poacher was seen at Amarkantak. The stag in hard antlers were found in May and January. Their wallows and resting places could be identified from their foot prints and droppings where they were common, *e. g.*, Amarkantak.

25. **Axis axis axis** Erxleben, 1777

Chital

1777. *Cervus axis* Erxleben, *Syst. Regn.* Anim, 312. Banks of the Ganges, India.

Material : 1 ♂, Joga, Dist. Hoshangabad, h. P. 2-1-66 (mounted).

Remarks : It is reported to be common but was rarely seen only in Mandla, Jabalpur, and Hoshangabad Dists.

Family Bovidae

26. **Gazella gazella bennetti** (Sykes)

Indian Gazelle

1766. *Antilope bennetti* (Sykes), P. Z. S. 1830-31 : 104. Deccan, India.

Material : 1 Juv. ♂, Dist. Jabalpur, 7.9.65 (mounted).

Remark : Although seldom seen, it was reported to be common in scrub jungle where it is frequently poached. A small herd of 5 is kept in the premises of Jabalpur Central Jail where it roams about freely in lawn and is a sourse of recreation to prisioners.

Order LAGOMORPHA

Family Leporidae

27. **Lepus nigricollis nigricollis** F. Cuvier

Black Naped Hare

1823. *Lepus nigricollis* F. Cuvier, *Dict. Sci. Nat.* 26 : 307, Madras, India.

Material : 1 ♀ M. P., Rani Durgavati Road, Jabalpur Dist. June 1963 (mounted.)

The hare was common and was never missed on grassy meadows at night. A method adopted in villages to hunt it and other hares is to go through its habitat early in the morning in winter and at noon in

summer when it suns itself or rests outside bushes. The hunter looks sideway while moving forward. As soon as the animal is spotted, the hunter tries to encircle it uttering loud sound. The animal crouches down instead of running away and then approached within a shooting distance.

Order RODENTIA

Family SCIURIDAE

28. **Funambulus pennanti pennanti** Wroughton

Northern Palm Squirrel

1905. *Funambulus pennantii* Wroughton, *J. Bombay. nat. Hist. Soc.* 16.3 : 41 (Mandvi, Taluka, Surat District, Bombay Presidency. India).

Material : 1 ♀ M. P., Jabalpur 21.6.65, 6-3-62, 1 ♀ M. P., Mandla, Manot, 12.11.63.

Measurements :	Manot	Jabalpur
External :	♀	1 ♀
Head and body	144	145, 147
Tail	140	158, 166.5
Hind feet	40	40, 37
Ear	17	17.5, 16.5

Cranial measurements : 1 ♀ (Jabalpur) ; occipitonasal length, 37.4 ; nasal, 11.7 ; palate, 18.7 ; frontal, 10.9 ; upper tooth row, 7.1.

Remarks : Hinder portion of stripes of one specimen (Manot) is somewhat greyish orange not whitish or white. Tail of other two specimens is blackish with few white hairs. Underparts of one specimen (Manot) is pinkish white. The squirrel is very common in the eastern parts of the valley upto Distt. Hoshangabad. Two young were kept in captivity and fed on cows' milk but did not survive for more than a week. One female from a large family living in a house in Jabalpur city avoided mounting by a male by getting under its belly at least for ½ hr. but did not run away.

29. **Funambulus palmarum robertsoni** Wroughton

Indian Palm Squirrel

1916. *Funambulus robertsoni* Wroughton, *J. Bombay N. H. Soc.* 24. (Pachmahri, Hoshangabad, Central Province, India).

Material : 1 ♂, 2 ♀, Hoshangabad Distt., Joga, (Khandwa Dist.), Dec. 1965, Jan. 1967.

Measurement :

External :	1 ♂	2 ♀
Head and body	142	151, 139
Tail	156	— 164
Hind feet	38	44, 42
Ear	18	18, 17.5

Cranial : Skulls broken.

Remarks : This squirrel was met with only in one locality, where it inhabited forested areas. The note is distinctive. It was not shy and allowed approach within a few metres.

30. **Ratufa indica centralis** Ryley

Malabar Squirrel

1913. *Ratufa indica centralis*, Ryley, *J. Bambay nat. Hist. Soc.*, 22 (3) : 436 (Bori 1600 ft., Hoshangabad, M. P.)

Material : 1 unsexed. Aama Nala on Gowrella Road, right bank of Narbada 1-5-62 (mounted).

Remarks : Very rare.

Family MURIDAE

31. **Millardia meltada meltada** (Gray)

The Soft-furred Field Rat

1837. *Golunda meltada* Gray, *Mag. nat. Hist.* **1**, 586 (Dharwar, India).

Material : 1 ♂, 1 ♀, Mandla Distt. Manot. 27.11.63 (Damage).

Measurements :

External :	1 ♂	1 ♀
Head and body	156	119
Tail	—	113.5
H. F.	29	23.5
Ear	23.5	18
Wt.	90 gms.	

Cranial :	1 ♂	1 ♀
Palate	17.7	14.8
Palatal foramina	7.9	6.5
Diastama	9.8	7.8
Bullae	6.1	5.5
Toothrow	5.5	5.4

Remarks : The species is rare in the locality. Its burrows were found near cultivated fields.

32. **Rattus blanfordi** (Thomas)

Blanford's Rat

1881. *Mus blanfordi* Thomas, *Ann. Mag. N. H.* 7 : 24. (Kadapa, Madras, India).

Material : 12♂; 6♀, rocks near Jabalpur city, May, August, Sept. 1961-1965.

Measurements :

External	12♂	6♀
Head and body	102-184 (149)	110-156 (140.3)
Tail	110-225 (183)	126-226 (187)
Hind foot	29-36 (33.5)	29-40 (35.2)
Ear	23.5, 25	24,21
Cranial :		
Occipitonasal	34.5-42.7 (13.2)	35.3-42.2 (31.6)
Nasal	13.4-16.7 (15.0)	(16.2)
	12♂	6♀
Palate		12.5-20.8 (18.2)
Palatal foramina	6.2.-8.9 (7.9)	(8.16)
Diastama	8.2-11.9 (10.2)	(10.9)
Ballae	7.1-8.6 (7.9)	7.8-8.5 (8.1)
Toothrow	6.1-6.5 (6.2)	(6.9)

Remarks : Only two specimens have reddish fur on the back. The species is found among rocks near Jabalpur city but it is known to inhabit fields and even sandy beds of rivers elsewhere. The whitish colouration of the long distal part of the tail appears to be an adaptation as it generally protudes from the haunts of the rats but looks something unlike the tail of a rat. Khajuria (in press) has given a detailed account of its habits and morphology.

33. **Rattus rattus narbadae** Hinton

House Rat

1918. *Rattus narbadae*, Hinton, *J. Bombay nat. Hist. Soc.* 26 : 72. (Salcat, Hoshangabad Central Province, 1200 ft. India).

Material : 2♂, 2♀, Jabalpur city. October, November 1960; 2♂, Mandla Dist. Manot, November, 1963.

Measurements :

External	4♂ Manot & Jabalpur	2♀ Jabalpur
Head and body	144-205 (174.25)	147, 190
Tail	170-210 (193.75)	173, 210
Hind feet	30-33 (31.5)	31, 30
Ear	23, 19	— —

Cranial : *measurement* :

Occipitonasal length	36.9-41 (38.8)	34.9 1♀
Nasal	—	
Palate	19.8-22.0 (21.0)	19.9 ,,
Palatal foramina	6.6-7.5 (8.9)	7.5 ,,
Diastama	10.0-12.1 (10.8)	
Bullae	6.6-7.5 (5.5)	7.1 ,,

34. **Rattus rattus rufescens** (Gray)

House Rat

1837. *Mus rufescens* Gray, *Ann. Mag. Nat. Hist.* 1 : 585 (Dharwar, India).

Material : 1♂ Military Grass Farm, Cantt., Jabalpur, 24. 4. 1961 (mounted).

Remarks : A great variation in colour of under parts is observed without geographical significance. In 4 specimens they are greyish and in 2 specimens, they are whitish while in one it is yellowish. Generally the fur of this species is harsh but two specimens from Mandla, have softer fur. The skulls of the species were commonly found in the pellets of the owls. It is common near human dwellings.

35. **Mus booduga booduga** Gray

Little Indian Field Mouse

1837. *Leggada booduga* Gray, *Charlesworths, Mag. N. H.* 1 : 586. Southern Mahratta country, India.

Material : 1 unsexed, near Jabalpur city, skull damaged
1 unsexed, Burmanghat, Narsinghpur

Remarks : This mouse appears common in the field and sometime appear to enter houses.

36. **Mus platyhrix platythrix** Bennett

Indian Brown Spingy Mouse

1852. *Mus platythrix* Bennett, *Proc. zool. Soc.* : 121 ("Dukhun" Deccan, Peninsular India).

Material : 1 ♂, 20 ♀ Madanmahal, Jabalpur, M. P. Sept., 1965.

Measurements :

External	1 ♂	2 ♀
Head and body	106	101, 100
Tail	86	78, 70
Hind feet	20	17, 16
Ear	15.5	— 17
Cranial :		
Occipitionasal	25.2	25.7, 24.7
Nasal	10.7	10.7, 9.4
Palate	13.9	14.5, 13.4
Palatal foramina	6.5	5.8, 5.4
Diastama	—	— —
Bullae	4.2	4.2, 3.5
Toothrow	3.8	— 3.4

Remarks : The species is very rare.

37. **Mus musculus castaneus** Waterhouse

House Mouse

1843. *Mus castaneous* Waterhouse, *Ann. Mag. nat. Hist.* **12**, 134. (Philipine Islands).

Material : 2 unseen, Napier town, Jabalpur, 18.10.1960. (damaged)

38. **Bandicota bengalensis bangalensis** (Gray and Hardwick)

1833. *Arvicola bengalensis* Gray and Hardwick, *Illustr. Indian Zool.*, 2, pl. 21 (Bengal).

Material : 2 ♂, 3 ♀, Manot, Mandia Dist. Nov. ; 1 ♂, 3 ♀ near Jabalpur City, April, October ; 3 ♀, Choral, Indore Dist.

Measurement : *External*

	Jabalpur		Manot		Indore
	1 ♂	3 ♀	2 ♂	3 ♀	3 ♀
Head and body	200	191,137,142	162,164,	131,145,184	117,105,189
Tail	145	186,113,112	144,128.5	118 172	93,101,172
Hind foot	34	36, 31, 33	33, 33	19, 31,33.5	30, 31, 38
Ear	—	lost, 20, 19,	21, 21	21, 21, 23	18.5,19, 23

1.—Young ones of the house shrew *Suncus murinus* Linn. in Jabalpur City.

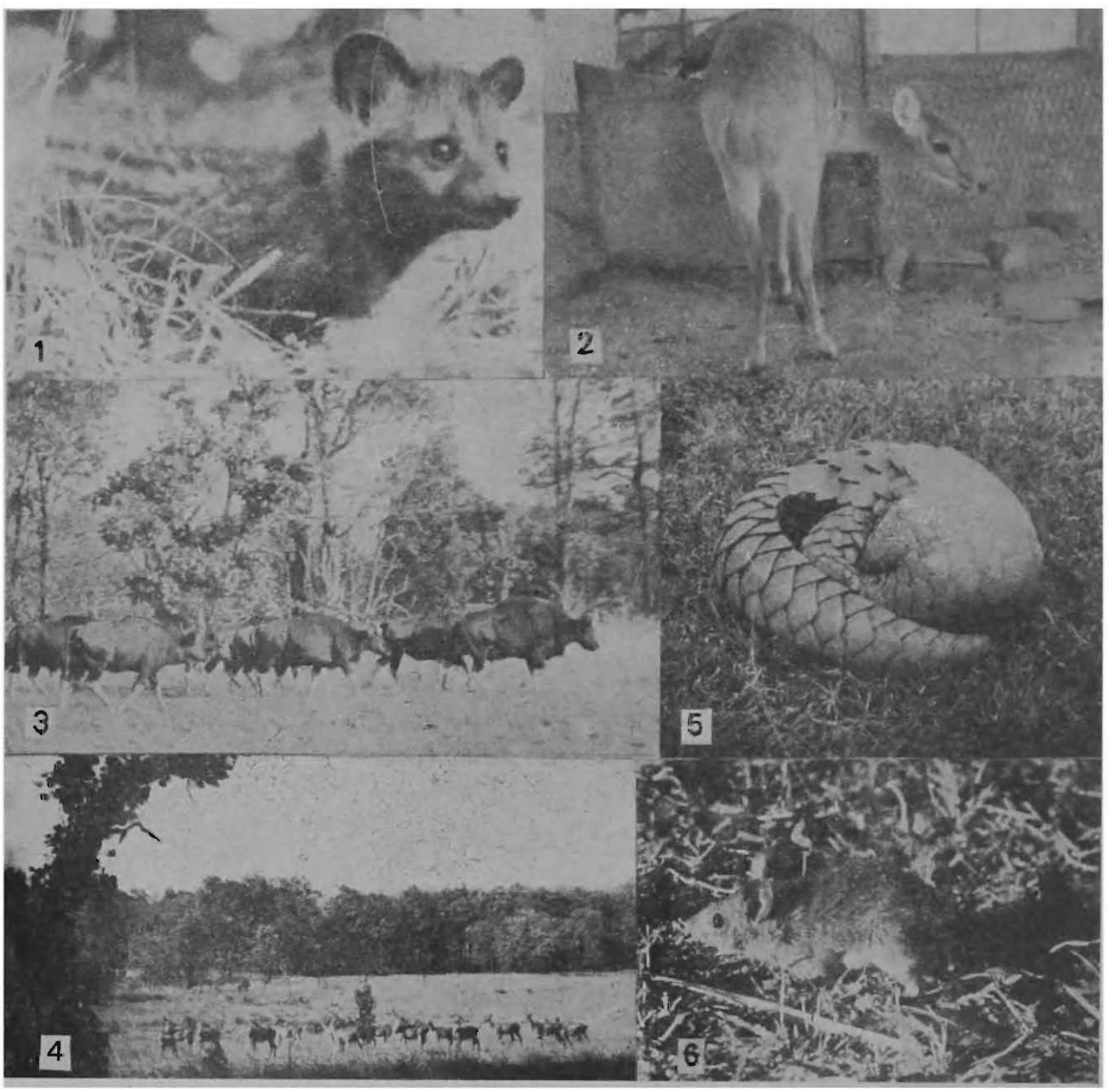
2.—Indian Fruit Bat at rest, *Cynopterus sphinx* (Vahl.) near Jabalpur.

3.—A troop of Common Langur *Presbytis entellus* (Dufresne) near Manot, Hoshangabad dist.

4.—Roosting place of Flying Foxes *Pteropus giganteus* (Brunnich) in Jabalpur.

5.—Showing a crevice, in a pillar curious haunt of Tomb Bat *Taphozous longimanus* Hardwicke

KHAJURIA & GHOSAL PLATE V



1.—The Palm Civet *Paradoxurus hermaphroditus* (Pallas) in Jabalpur.

2.—The Four-horned Antelope *Tetracerus quadricornis* (Blainville) in captivity in Jabalpur City.

3.—The Gaur, *Bos gaurus* H. Smith in Kanha National Park, M. P.

4.—The Cheetal, *Axis axis* Erxleben, in Kanha National Park, M. P.

5.—Indian Pangolin *Manis crassicaudata* Gray near Jabalpur City.

6.—Antelope Rat (?) *Tatera indica* Hardwicke, near Jabalpur City.

Cranial :

Occipitonasal	34.4, 38 33.2, 31.4 —
Nasal	10.2 — — — —
Palate	20.4, 21.7 19.6, 18.7,22.9
Palatal foramina	72, 7.8 7.1, 6.8, 7.4
Diastema	10.4, 11.4 10.4, 10.0, 12.1
Bullae	7.9, 8,2 7.8, 7.5, —
Toothrow	7.4, 7.5 7.4, 7.1, 7.5.

Remarks : 4 specimens have soft fur and the colour is blackish brown and others have harsh fur with rufous colour. It is a great pest of agricultural crops. The skulls of this species more commonly found in pellet of owls. Three burrows were dug out at Manot in harvested paddy fields with hard soil. There were about 5 cm. below surface with numerous remifications.

39. **Tatera indica indica** (Hardwicke)

Indian Gerbile or Antelope Rat

1807. *Dipus indicus* Hardwicke, *Trans. Linn. Soc. London*, 8 : 279 (Between Banaras and Hardwar).

Material : 1 ♀ Pachpedi, Jabalpur, 26.8.68
1 ♀ „ „ 24.8.68
2 ♂ Amkhas, „ 29.5.65
1 ♂ Manot, Mandla, 12.11.65
1 ♀ Joga forest, Hoshangabad. 21.12.65
1 ♂ Choral, Indore 29.10.64

Measurements :

External	4 ♂	3 ♀
Head and body	50.5-196 (171.8)	141-188 (166.6)
Tail	206.5-214 (210.3)	187-218 (200)
Hind feet	39— 43 (40.3)	41- 42 (41.6)
Ear	19— 25 (21.7)	22- 25 (23.8)

Cranial : 1 ♂ (Mandla)

Occipitonasal	— — — 44.5	42.1-45.8 (44.1)
Nasal	— — — 18.6	18.6-19.7 (18.9)
Palate	— — —24.8	23.0-24.8 (23.6)

Cranial :

Palatal foramina	— — — 8.5	8.1- 9.2
Diastama	—	—
Bullae	— — — 11.4	11.0-11.4
Toothrow	— — — 6.6	6.3- 6.6
Frontal width	— — — 7.1	7.1- 7.2

Remarks : It was a common rodent in the Narbada valley. Its burrows were found near agricultural fields in soft soil. Its breeding habits have been described by Khajuria (1965). Its skulls were commonly found in pellets of owls.

40. **Vandeleuria oleracea oleracea** (Bennett)

Palm Mouse

1832. *Mus oleraceus* Bennett, *Proc. zool. Soc.*, London, 121, Deccan, India.

Material : 1 ♀ Jabalpur.

Remarks : The specimen has been described in detail by Khajuria (1960).

Order PHOLIDOTA

Family MANIDAE

41. **Manis crassicaudata** Gray

Indian Pangolin

1827. *Manis crassicaudatus* Gray, *In Griffith's Cuvier Anim Kingd.* 5 : 282, India.

Material : 1 Unsexed, mounted, Jabalpur 1975.

Remarks : The specimen was purchased. It was kept in captivity for 24 hours but did not take food. The species is rare although anthills, its chief feeding places, are numerous. This is probably because of its easy capture for its scales, which are associated with superstitions.

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