Preliminary note on the Mammalia *of the* Karnul Caves, *by* R. LYDEKKER, B.A., F.G.S., &c.

Having received and examined the bones collected by Mr. H. B. Foote in the Karnul caves,[1] I present a preliminary list of the Mammalian genera and species which I have been able to identify. My list differs somewhat from that given by Mr. R. B. Foote,[2] as I have found some forms which he had not recognized, while, on the other hand, I am unable to confirm two or three of his provisional determinations. The majority of the specimens sent to me consisted either of bones of Rodentia and Chiroptera, or of fragments of bones of larger Mammals, the greater number of which did not admit even of generic determination. There were also sent a large number of bones from the surface bed, which were all of extremely recent origin, and need no further notice. The following list comprises the forms found in the deposits below the surface bed, exclusive of certain human remains, some of which are briefly noticed in the sequel:—

PRIMATES—1. Semnopithecus priamus, *Blyth.*
„ 2. Cynocephalus (*cf.* anubis, *F. Cuv.*)
CARNIVORA—3. Felis tigris (*or* ? leo) *Linn.*
„ 4. „ ? pardus, *Linn.*
„ 5. „ chaus, *F. Cuv.*
„ 6. „ rubiginosa, *Geoffr.*
„ 7. Hyæna crocuta (*Erxl.*).
„ 8. Viverra karnulicensis, *n. sp.*
„ 9. Herpestes griseus, *Desm.*
„ 10. „ smithii, *Gray.*
„ 11. Ursus, sp.
INSECTIVORA—12. Sorex (*cf.* cærulescens, *Shaw*).
CHIROPTERA—13. Taphozous saccolæmus *Temm.*
„ 14. Phyllorhina diadema (*Geoffr.*).
RODENTIA—15. Sciurus macrurus, *Harda.*
16. Golunda ellioti, *Gray.*
17. Mus mettardi, *Gray.*
18. „ platythrix, *Sykes.*
19. Nesokia kok, *Gray.*
20. „ bandicoota, *Rech.*
21. Hystrix hirsutirostris, *Brandt.*
22. Lepus (*cf.* nigricollis, *F. Cuv.*)
UNGULATA—23. Rhinoceros karnuliensis, *n. sp.*
„ 24. Equus (? 2 *sp.*).
„ 25. Bos[3] or Bubalus.
„ 26. Boselaphus tragocamelus (*Pall*).
„ 27. Gazella bennetti (*Sykes*).
„ 28 Antilope cervicapra (*Linn*).
„ 29. Tetraceros quadricornis (*Blain*).

[1] *Supra*, vol. xvii, pp. 200-208 (1884), and xviii, pp. 227-235 (1885).

[2] *Supra*, vol. xviii, pp. 231-232. Some emendations have been on the generic and specific terms employed by Mr. Foote.

[3] Including *Bibos* (*Gaveus*).

UNGULATA—30. Cervus aristotelis, *Cuv.*
„ 31. ——— axis, *Erxl.*
„ 32. Tragulus [*cf.* meminna (*Erxl.*)].
„ 33. Sus cristatus, *Wagner.*
EDENTATA—34. Manis gigantea, *Gray.*

In this list the crania on which Nos. 16, 17, 18 are identified are from loose red loam underlying the surface bed in the "Charnel House" cave in which human remains occur,[1] but from other fragmentary specimens it is probable that these species also occur in the underlying beds. The most interesting features in the fauna are the two new species (Nos. 8, 23), and the occurrence of Equus and the three Ethiopian forms Nos. 2, 7, 34.

Of the new species, *Viverra karnuliensis* is founded on a mandibular ramus,[2] showing the carnassial and the alveoli of the premolars; the former is very similar to the corresponding tooth in *V. zibetha* and *V. megaspila*, but the space occupied by the premolars is very much longer than in either of those species, the specimen being quite unlike the mandible of *V. civetta*. As the mandible of the Siwalik *V. bakeri*[3] is unknown, it is almost impossible to say whether the Karnul form is identical with this species, but as this is somewhat improbable, I have provisionally assigned a distinct name to the former.

Rhinoceros karnuliensish[4] is a small bicorn, and brachydont species agreeing very closely in several respects with the pleistocene *R. etruscus* of Europe, but differing somewhat in the structure of the upper cheek-teeth, and in the deeper and more defined channel in the mandibular symphysis, and thereby approaching the African *R. bicornis*. The species differs from *R. deccanensish*[5] by its brachydont character and the absence of the distinct cingulum in the upper premolars.

Of the Ethiopian forms the *Cynocephalus* is indicated by a second lower true molar, indistinguishable from $\overline{m}\,2$ of *C. anubis*; but probably insufficient for specific determination. Of *Hyæna crocuta* there is a lower carnassial and an upper canine; while *Manis gigantea* is represented by a terminal phalangeal of the manush[6] agreeing almost precisely with the corresponding bone in a skeleton measuring 54 inches in length. Both *Cynocephalus* and *Manis*, as well as hyænas of the crocutine group, occur in the Siwaliks; and the present specimens are of great interest as proving that the intimate generic connection existing between the pliocene fauna of India and the recent Ethiopian fauna had in the late pleistocene (to which period I am disposed to refer the Karnul cave deposits) of India developed in some instances into a specific one, traces of which still remain in the existence of species like *Felis leo*, *F. pardus*, and *Canis aureus* in the two areas at the present day.

The *Equus* I have at present been unable to determine specifically, but some of the molars (as Mr. Foote observes) indicate a small species, which may possibly

[1] *Supra*, vol. xvii, p. 205.
[2] Provisionally identified by Mr. Foote (*supra*, vol. xviii, p. 231) with *V. zibetha*.
[3] Pal. Ind'., ser. 10, vol. ii, part xxxiii, fig. 1.
[4] Provisionally identified by Mr. Foote (*supra*, vol. xviii, p. 322) with *R. sondaicus* (*javanicus*).
[5] Pal. Ind., ser. 10, vol. i, pts. i-iii.
[6] Identified by Mr. Foote with *M. pentedactyla*.

be closely allied to the African *E. tæniopus*. The occurrence of a small species of *Ursus* is indicated by the *distal* portion of a humerus; but it would be difficult to say to what species it belonged, the most likely forms being the existing *U. malayanus*, and the pleistocene *U. namadicus* of the Narbada valley. Some of the teeth referred to *Sus cristatus* indicate individuals of larger size than the existing race, but I cannot regard this as a specific difference. There are also some slight differences between the upper molars referred to *Cervus aristotelis*, and the corresponding teeth of recent examples, but these may probably be also considered as but racial variation.

Besides the forms I have recorded, Mr. Foote mentions (1) *Macacus* (?), (2) *Canis*, (3) *Paradoxurus* (?), (4) *Tupaia* (?), (5) *Cervulus aureus* (?), (6) *Ovis* (?) and (7) *Capra* (?). Of Nos. 1 and 5 I can find no evidence, while I believe that the specimen on which No. 2 was determined belongs to *Felis*. Of Nos. 3 and 4 the specimens are insufficient for generic determination Some limb-bones from the 'Purgatory' cave undoubtedly belong either to *Ovis* or *Capra*, but as they are of extremely recent appearance, and agree precisely with other specimens from the surface-bed of the 'Charnel House,' I am inclined to think that they cannot be referred to the pleistocene fauna.

With regard to human remains, Mr. Foote records [1] a molar from a depth of 4 feet in the 'Chapter House' cave, which was the lowest level at which such remains were found; and he also records [2] the occurrence of cut bones and implements, but without particularizing the horizons whence they were obtained. As the latter specimens were not forwarded to me, I can of course say nothing about them, but I may observe that a very considerable number of the larger bones sent to me have been gnawed by porcupines, and I would venture to suggest the necessity of submitting the reputed cut bones (and perhaps some of the 'instruments') to a stringent examination with a view of determining whether they may not have been subject to the same action.

The more interesting of the above-mentioned specimens will be figured in a fasciculus of the 'Palæontologia Indica', which I hope to bring out during the current year.

HARPENDEN,
The 8th March 1886.

Memorandum on the prospects of finding coal *in* Western Rajputana, *by* R. D. OLDHAM, A.R.S.M., *Deputy Superintendent, Geological Survey of India.*

As this subject is one of general interest and importance, in view of the great expense incurred for fuel on all the railway lines in North-Western India, and as the discovery of workable coal in this region would allow of the profitable construction of a line of railway much needed on other grounds, I have thought it advisable to draw up a special memorandum, in addition to the purely technical report of my last season's exploration of the desert, showing the evidence at present available on this subject.

[1] *Supra*, vol. xviii, p. 231.
[2] *Ib.*, p. 232.