

ON A SKULL OF SHIVALIK CROCUTA

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A comparative study of *Crocota sivalensis*, *C. felina* and *C. colvini* has been made. The view that *C. sivalensis* and *C. felina* are synonymous has been accepted. In the opinion of author, the ancestor of the spotted hyaena is the Indian *C. sivalensis* which originated in India during Tatrots and migrated to Europe during the Villafranchian time.

HISTORICAL RESUME

First time an Indian hyaenidae skull was described by Baker (1835) which was collected from a bed of the Shivalik Hills. Subsequently a few other skulls of the genus were collected and described by several authors (*H. sivalensis*, Falconer 1868; *H. felina*, Bose 1880; *H. colvini*, Lydekker 1884 and *H. bossi*, Matthew 1929). Pilgrim (1932) stated that all these skulls belonged to *Crocota*. In his opinion these skulls might have been collected from the Upper Shivaliks. He thought that at least *C. felina* originated from a Chinese species *C. honanensis* which was the ancestor of *Crocota crocuta*, and also expected that some intermediate form might be found in the older Shivaliks. The author made a large collection from the Upper Shivaliks through eight years' continuous exploration while he was working in the Punjab University, Chandigarh, but it was surprising that not even a single tooth of any Carnivora was found from the highly fossiliferous zone of the Tatrots (Sahni and Khan 1964). In 1968 when he was working at the Aligarh Muslim University, Aligarh, India, where the specimen has been kept, nearly a complete skull under description was excavated from a silty bed of the same fossiliferous zone (Pl. XX, Fig. 1). The author agrees with Kurten (1968) that the ancestor of the spotted hyaena is the Indian *C. sivalensis* Falconer and Cautley. Kurten thinks that *C. sivalensis* lived during the Villafranchian time, whereas the present find shows that *C. sivalensis* originated during the Tatrots (Astian).

DESCRIPTION

(Pl. XX, Fig. 2; Pl. XXI, Figs. 1, 4)

Order—CARNIVORA Bowdich, 1821

Family—Hyaenidae Mivart, 1882

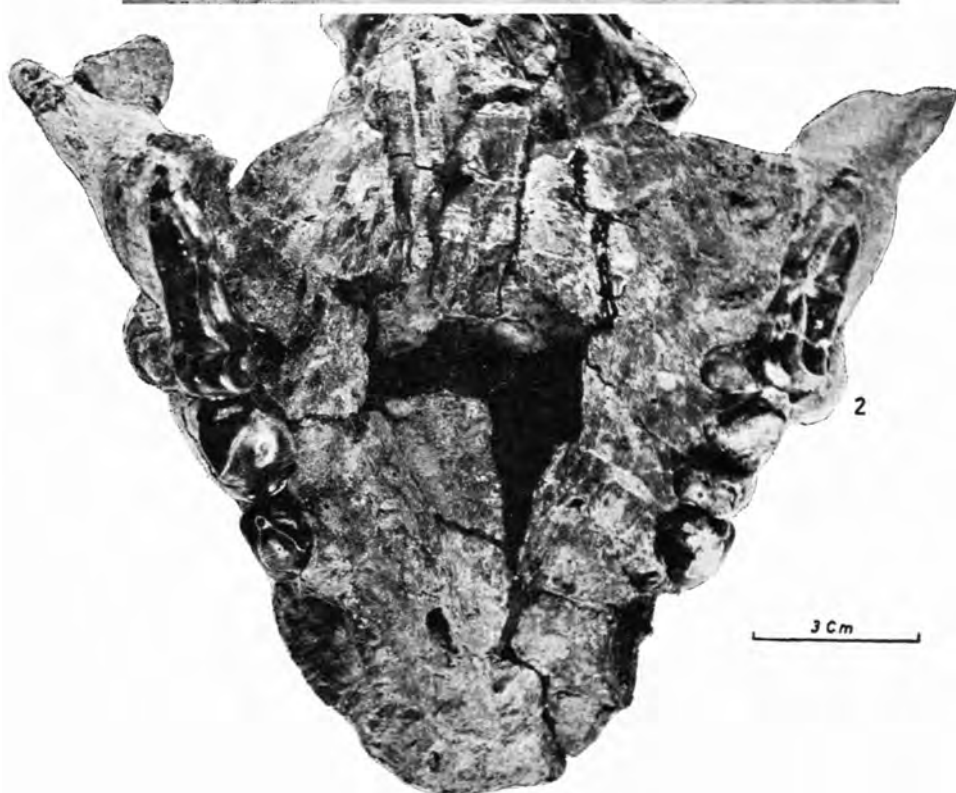
Genus—*Crocota* Kaup, 1828

Species—*Crocota sivalensis* (Falconer and Cautley)

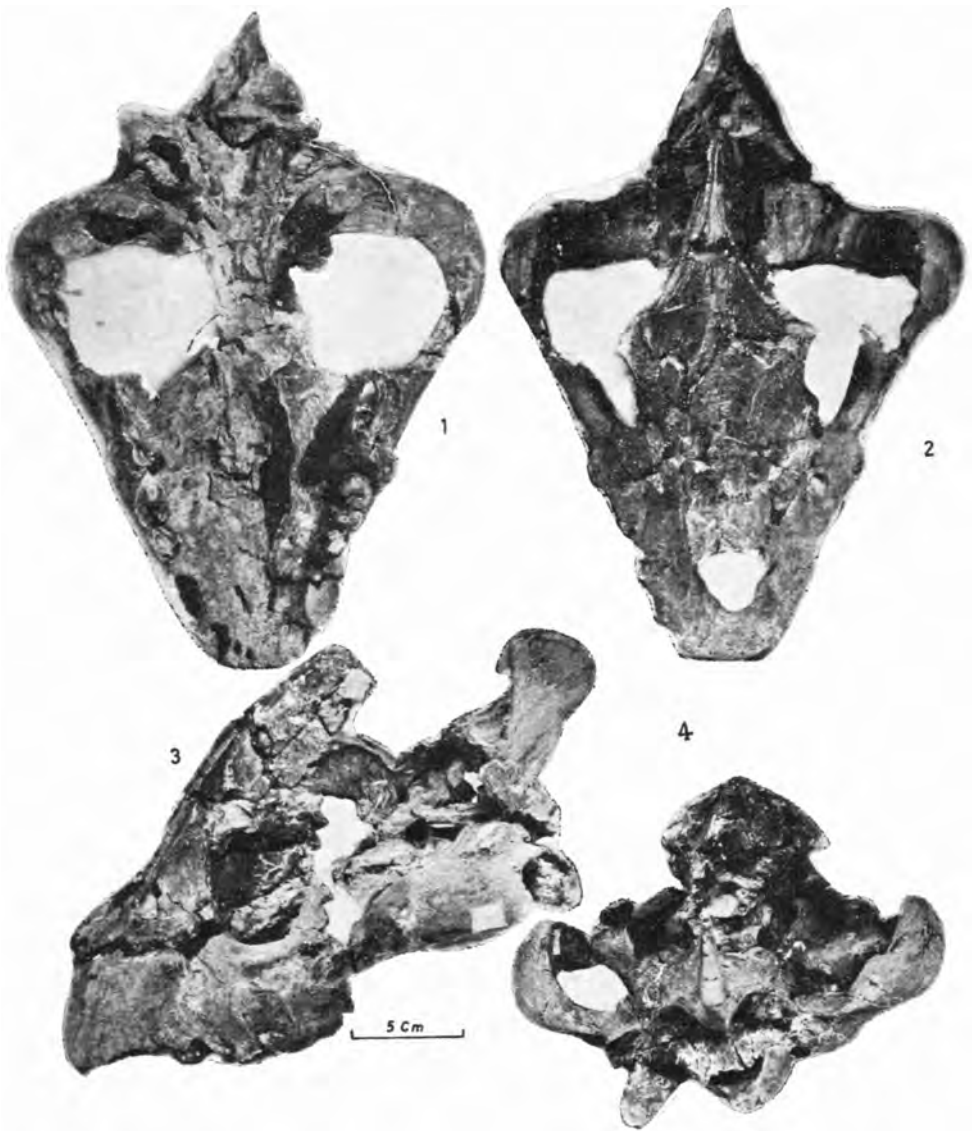
1835. *Hyaena*, Barker, *J. Asiat. Soc. Beng.*, 4, 569, Pl. 46, Figs. 22, 23.

1868. *Hyaena sivalensis*, Falconer and Cautley, *Palaeont. Mem.*, X(2), 548.

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FIGS. 1-2. 1, The site whence the skull (No. (EK/25) has been excavated;
2, Palatal view of skull (No. EK/25).



FIGS. 1-4. 1, Top view of skull (No. EK/25); 2, Palatal view of skull (No. EK/25); 3, Lateral view of skull (No. EK/25); 4, Occipital view of skull (No. EK 25).

1884. *Hyaena felina* Bose, Lydekker, *Palaeont. Indica* (X)2, 281, Fig. 13. Pls. 38, Figs. 1 & 39, Fig. 1.

1884. Non *Hyaena sivalensis* Bose, Lydekker, *Palaeont. India* (X)2, 303, Pl. 34.

Locality—Nearly $1\frac{1}{2}$ miles south of Surajpur cement factory (lat. $30^{\circ} 44' 10''$; long $76^{\circ} 52' 25''$).

TABLE I
(Measurements in millimetre)

	Present Skull No. EK/25	<i>C. felina</i> Bose British Mus. No. 15902	<i>C. sivalensis</i> Fal. (Baker collection) Dublin No. 42	<i>C. colvini</i> G.S.I. No. D 47	<i>C. crucuta</i> Fossil Recent	<i>H. striata</i> (Indian Hyaena)
Width of palate at P ⁴	98.8	108.3	116.8	91.2	121.9	88.9
" " P ³	75.1	99.6	104.1	—	114.3	81.8
" " behind canine	60.1	63.5	67.6	—	71.6	50.8
" " at canins	43.2	66.0	69.1	—	72.1	54.3
Interval between posterior border of palate and anterior border of incisor alveoli	124.2	119.4	—	114.8	139.2	120.4
Interval between inferior border of foramen magnum and the same	232.5	207.0	231.1	—	233.7	213.4
Interval between post orbital process of frontals and the same	135.3	134.6	142.2	110.5	137.7	124.5
Interval between the same and posterior border of occipital condyles	141.2	124.4	142.2	—	—	130.1
Space occupied by incisors	48.2	44.5	46.0	34.5	43.7	31.8
Interval between canins	44.3	39.4	—	30.0	42.9	30.5
Interval between hinder border of P ⁴ and canine	84.2	80.0	83.8	76.2	92.5	72.9
Length of three last premolars	81.0	71.5	77.2	—	81.5	64.8
Interval between canine & P ²	8.4	6.1	7.6	—	10.7	10.7
Length of P ¹	4.0	—	6.1	—	7.1	7.4
" P ²	18.0	17.0	18.3	17.2	18.3	17.2
" P ³	22.0	21.6	22.3	22.3	25.1	22.3
" P ⁴	42.0	34.8	35.6	35.6	40.4	30.5
Transverse diameter of M ¹	3.2	5.6	—	13.4	—	10.8

Horizon.—About 200 ft. below the base of the Pinjaura.

Collected by—Ehsanullah Khan

State of preservation—The skull (No. EK/25, Goel. Mus. Aligarh Univ.) is very well preserved except for the parietal and squamosal regions. Only alveoli of incisors, canines and p^1 are present.

Comparison—The skull belongs to a mature individual, therefore, the sutures are obliterated, which does not warrant to compare the each bone. However, the general comparison is given below :

The present skull is broader, stouter and higher than those of the other species (*C. sivalensis*, *C. felina* and *C. colvini*), and the broadness at nostral and zygomatic arches is very prominent. A marked concavity in the nasal region is present, and frontals between the orbits are nearly flat, whereas the concavity of the nasal region and the flatness of the frontals are not so marked in other species. Prominent sagittal crests join the postorbital processes, whereas they are very weak in *C. colvini*. The occiput is higher, narrower and more concave with prominent keel joining the supraoccipital and foramen magnum than those of other species; basioccipital does not show any marked difference with those of other species. The central region of the palatine shows more or less same degree of concavity as those of other species.

Only alveoli of P^1 are present, therefore, this tooth cannot be compared with those of other species. P^2 has more resemblance to P^2 of *C. sivalensis* and *C. felina* in obliqueness, weak inner cingulum and anterior cusp, whereas in *C. colvini* P^2 is very oblique with well developed inner cingulum and prominent anterior and posterior cusp. P^3 is just in front of P^4 and does not show even slight obliqueness, whereas this is present in other species though more prominently in *C. colvini*; inner cingulum is less marked than those of other species. In P^4 parastyle is nearly half of paracone, and protocone appears to join the paracone as in *C. colvini*, whereas in other species parastyle is larger and attachment of protocone is more or less to parastyle. M^1 are smaller than those of other species though it has greater resemblance to that of *C. felina*. Table I clarifies the description further.

DISCUSSION

Author agrees with Matthew (1929) that *H. (C.) sivalensis* Bose can be designated as *H. (C.) bosei* which had been wrongly designated as *Felis cristata* by Murchison (Bose 1880; Falconer 1868, Pl. 25, Figs. 1-4), A different skull described and figured by Falconer and Cautley (1836) has been designated as *Felis cristata*.

Author also agrees with Lydekker (1884) and Matthew (1929) that *H. (C.) sivalensis* and *H. (C.) felina* are synonymous, the former belongs to a male and the latter to a female. The view of Lydekker (1884) who designated the skull of *H. (C.) felina* Bose as type and that described and figured by Baker as paratype is unacceptable on the ground that *H. (C.) sivalensis* (Falconer 1868) has priority over *H. (C.) felina* (Bose 1880). Keeping *C. sivalensis* and *C. felina* as two separate species by Pilgrim (1932) without sufficient data does not seem reasonable. Even to keep *C. colvini* as a separate species also need considerable evidence to hold this view. But till the geological horizons of these materials are definitely known

the extreme view to combine the three into one, and attributing the variations due to difference in age, sex and individual variations within species, cannot be easily accepted. Had the remains of these three species been collected from the same geological horizon or stage they might have been considered to belong to the same species despite the variations referred to above on the ground that more than one species of the same genus cannot be imagined to exist simultaneously in the same environment of a particular place. However, at present two species, *C. sivalensis* and *C. colvini* may be retained.

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