

THE HOG-BADGERS (*ARCTONYX*) OF BRITISH INDIA.

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(With a text-figure).

Hog-badgers are not found in Peninsular India, but although widely distributed to the north and east of the Bay of Bengal are nowhere plentiful. As E. H. Peacock remarked they are of rare occurrence in Burma. A few only were collected by the Mammal Survey in that country and both Crump and Baptista failed to secure them in Bhutan, Sikkim and Nepal.

No detailed description of them is necessary since their general characters are well known; and the different kinds are superficially very much alike, being mainly distinguishable by size, by the luxuriance of the coat and by minor variations in colour, both the coat and colour being seasonally variable and the pattern of the head hardly ever quite alike in any two individuals. The skull and teeth are also subject to very remarkable individual variations, the skull more particularly in the degree of development of air-cells in the bones of the forehead and hind-palate which may alter its shape profoundly and the last two upper teeth differ more in size and shape within subspecific limits than in any other mammal known to me.

The literature relating to the Hog-Badgers reveals great divergence of opinion regarding the status and nomenclature of the many forms that have been described, chiefly on account of the varied application of the name *collaris*, symbolising the type-species of the genus *Arctonyx*.

In his account of the British Indian representatives Blanford, following Blyth, Anderson and W. L. Sclater, admitted two species, a larger, *A. collaris*, extending from the eastern Himalayas to Burma, and a smaller, *A. taxoides*, occurring in Assam and Arakan. Gray, however, had previously cited *taxoides* as a synonym of *collaris*. Wroughton, when dealing with the 'Survey' material, followed in 1914 Blanford's lead in adopting *taxoides* as the name for a valid species; but I have been unable to ascertain precisely what his conception of *collaris* was, except that he cited as representing it a ♀ specimen from Karenni, which is obviously immature, and another, which I have not seen, from the Chin Hills. He inferred apparently from these that the total length of the skull does not exceed 135 mm. in *collaris*, whereas Blyth, Gray and

Blanford had included under that heading specimens with the skull surpassing 150 mm. in total length.

Accepting Wroughton's statement about the length of the skull in *collaris* and Anderson's erroneous assertion that the type of *isonyx* Horsfield came from Tibet, G. M. Allen, in his revision of the Chinese Hog-Badgers, took *collaris* for the name of a southern Chinese, Tibetan and N. E. Himalayan form, with a skull of approximately the length given by Wroughton and quoted as synonyms of it *albogularis* given by Blyth in 1853 to a Tibetan specimen and *obscurus* given by Milne Edwards in 1868-1874 to one from E. Tibet. Although Allen gave no opinion about the status of *taxoides* or of the larger Hog-Badger identified by Blyth, Gray, Blanford and others as *collaris*, I infer that he would have regarded them as representing merely subspecies of *collaris*, since he assigned the Chinese Hog-Badgers to two subspecies of that species. At all events Osgood, who accepted Allen's designation of *collaris*, assigned the large Hog-Badgers of Annam, Laos, and the Malay Peninsula to a subspecies for which he adopted the name *A. collaris dictator*, Thomas.

Although there is not as yet, so far as I know, complete evidence of the intergradation of all the forms of Hog-Badger, I adopt the conclusion of my American colleagues that there is in Continental Asia but one species, *A. collaris*, represented by several subspecies; but I differ from them in the assignation of some of the names.

It has probably been my good fortune to see more examples of Hog-Badgers than any of my predecessors. The British Museum contains skins and skulls of all the described forms, except the north Chinese race *leucolæmus*. In addition it has been my privilege to examine the specimens in the Museum of the Bombay Natural History Society and in the Indian Museum, Calcutta and I am greatly indebted to the authorities of these institutions for the kind loan of them, especially to Dr. Baini Prashad, the Director for sending me the type of *taxoides* from Calcutta.

My conclusions regarding the British Indian Hog-Badgers is that there are two distinguishable races, a smaller, *collaris*, and a larger for which a new name seems necessary, although it contains specimens erroneously, in my opinion, assigned to *collaris* by several previous authors. The two may be briefly distinguished as follows:

- (a) Size small, head and body about 2 ft. long, condylobasal length of skull not known to reach 120 mm., less than 5 inches; teeth smaller. *collaris*.
- (b) Size larger, head and body about 2½ ft. long, condylobasal length of skull over 150 mm., or 6 inches in length; teeth larger. *consul* subsp. nov.

***Arctonyx collaris collaris* F. Cuvier.**

Arctonyx collaris F. Cuvier, *Hist. Nat. Mamm.*, pt. 51, pl., 1825 and of some subsequent authors but only in part; and not *Arctonyx collaris collaris*, G. M. Allen, *Amer. Mus. Novit.*, no. 358, pp. 10-11, 1929 and *Mamm. China and Mongolia*, p. 404, 1938.¹

Arctonyx taxoides, Blyth, *Journ. As. Soc. Beng.*, 22, p. 591, 1853. Anderson, *Zool. Res. Yunnan*, p. 196, 1878; Blanford, *Mamm. Brit. Ind.*, p. 180, 1888; W. L. Sclater, *Cat. Mamm. Ind. Mus.*, pt. 2, p. 291, 1891.

Arctonyx isonyx (Hodgson MS.), Horsfield, *Proc. Zool. Soc.*, 1856, p. 398, pl. 1.

Arctonyx collaris taraiyensis, Hodgson, *Cat. Mamm. etc. ed.*, 2, p. 7, 1863 (no description).

Locality of the type of *collaris*, 'the hills between Bhutan and India', cited by Wroughton as the Bhutan Duars; of *taxoides*, Assam; of *isonyx* and *taraiyensis*, the Sikkim Tarai.

Distribution.—The Sikkim Tarai, Bhutan Duars, Assam and perhaps Chittagong.

Distinguished from the other British Indian race, which apparently replaces it in Burma, by its smaller size, the head and body being only about 2 ft. long or less, shorter tail and smaller skull, the length of which is only about 120 mm. or less; also by its noticeably thicker winter coat. From the Southern Chinese race *A. c. albogularis* by its shorter, less thickened winter coat and smaller skull the length of which in *albogularis* is about 135 mm.

I have only seen four specimens that I assign to this race, namely the skin of the type of *isonyx*, from the Sikkim Tarai, an immature skin from Darjiling (Calcutta Museum), the skin and the skull of the type of *taxoides* from Assam and of a specimen, received from the East India Co., entered as from 'Bengal' but marked on its stand as from Chittagong which was formerly included in that Province.

The restriction of the name *collaris* to this small Hog-Badger is based on the assumption that the type specimen from Bhutan Duars is probably racially the same as that of the type of *isonyx* from the Sikkim Tarai. I have seen no specimens from Bhutan and am not aware of a record of one from that district apart from Cuvier's account based on a description sent to him by Duvaucel of a living specimen exhibited in the ménagerie at Barrackpore and stated to have been brought from the 'hills between Bhutan and India'. The type was probably not preserved and no measurements were given. But the skin of the type of *isonyx* is in the British Museum and in Hodgson's MS., where the specimen is said to have come from the Sikkim Tarai, there is a fairly good figure of the skull which from its muscular moulding appears to

¹ Since *collaris* is not, in my opinion, applicable to the Tibetan and Southern Chinese Hog-Badger, I adopt for that race the name *albogularis* Blyth, with *obscurus* Milne Edwards as a synonym; and, from an examination of the types, I entirely agree with Allen that the names *orestes* and *incultus* given by Thomas to Hog-Badgers from the Tsing Ling Mts., S. W. Shensi and from Chinteh in Anhwei respectively are also synonyms.

be adult. Its measurements, entered below, are taken from these drawings said to be two-thirds natural size. I have also seen the type, skin and skull, of *taxoides*. There is nothing that I can detect in the skin, as preserved, to separate it systematically from that of *isonyx*, although the ears, as stated by Blyth, seem to be a little smaller; and I do not attach to the cranial and dental characters, relied on by Blyth, Anderson and W. L. Sclater, the importance assigned to them by those authors. In the first place the skull is not fully adult, as it was stated to be, its basioccipital and naso-maxillary sutures being open and its temporal ridges 15 mm. apart. It is moreover abnormal in being 'undershot', the lower incisors projecting 5 mm. beyond the upper. The upper carnassial is admittedly unusual in shape, as W. L. Sclater said, although Blyth noted nothing peculiar about it; but the upper teeth of *Arctonyx* vary so remarkably individually in the same locality that the peculiarity is not, in my opinion, to be relied upon on the evidence of a single specimen.

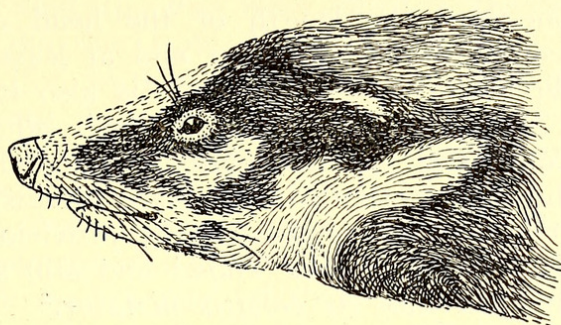
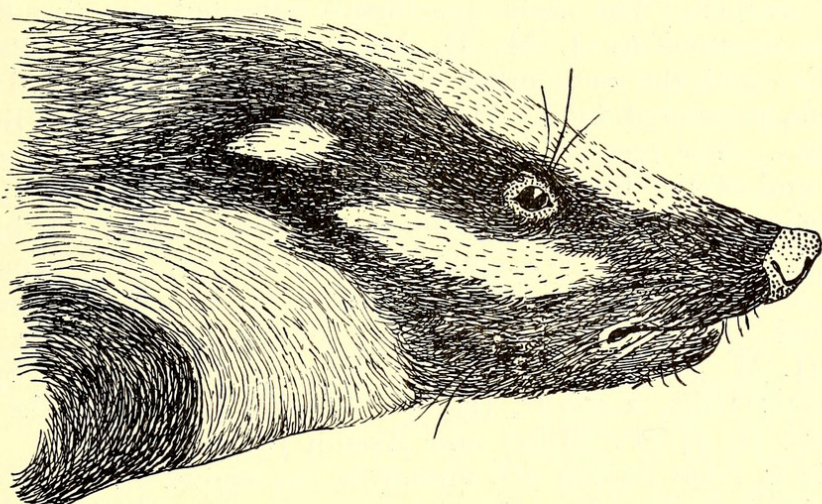
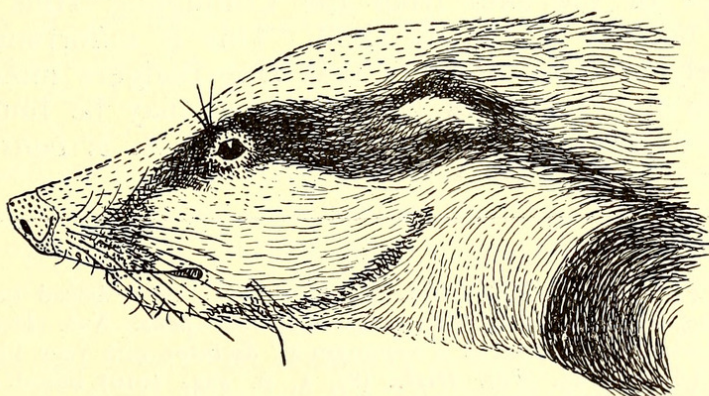
The external measurements in English inches of the specimens of this race were taken from dried skins, the type of *isonyx* is 'made up' in the conventional way from a formerly mounted specimen; that of *taxoides* is still mounted for exhibition. In these the dimensions were taken 'over the curves'. The third specimen from Bengal (? Chittagong) is now a flat skin, which was unstuffed a few years ago. They were probably stretched rather than shrunk by the manipulations to which they were subjected, which would make the dimensions of the head and body in life less rather than more than those indicated on the table.

The external measurements in English inches of *A. collaris collaris*, taken from skins, and of *A. c. consul*, taken in the flesh, are as follows:—

Name, locality and sex		Head and Body	Tail	Hind foot
<i>A. collaris collaris</i>				
Sikkim Tarai (<i>isonyx</i> , type)	ad. ♀	25	5	3
Assam (<i>taxoides</i> , type)	sub. ad. ♀	22 $\frac{1}{4}$	5 $\frac{1}{2}$	3
Bengal (Chittagong)	just ad. ♀	21 $\frac{1}{2}$	4 $\frac{1}{2}$	3
<i>A. c. consul</i>				
Thaundaung, nr Toungoo (type)	ad. ♂	31	10 $\frac{1}{5}$	4 $\frac{3}{8}$
Thaundaung, nr Toungoo	yg. ad. ♂	25 $\frac{3}{8}$	9 $\frac{1}{5}$	4 $\frac{3}{8}$
Moulmein (Tickell, MS.)	ad. ♂	30	9	4 $\frac{3}{8}$

Arctonyx collaris consul subsp. nov.

Arctonyx collaris of Horsfield, Blyth, Gray and also of Blanford, *Mamm. Brit. Ind.* p. 178, 1888 (excluding *isonyx* Hodgs. from synonymy); but not typical *A. collaris*, as identified above, nor *A. collaris collaris* G. M. Allen, *Amer. Mus. Novit.*, no. 358, p. 10, 1929.

**A****B****C**

- A. Head of *Arctonyx collaris collaris*, drawn from the type of *taxoides*.
 B. Head of *Arctonyx collaris consul*, drawn from the skin from Longpa in the Naga Hills in which the black of the 'mask' is exceptionally well developed.
 (These two figures show approximately the relative size of the head in the two British Indian races of the Hog-Badger.)
 C. Head of *Arctonyx collaris consul* drawn from the skin from Lockaw, Karenni, to illustrate the greatest reduction in the black of the 'mask' in the available specimens of the race.

Locality of the type.—Thaundaung near Toungoo, 4,500 ft. in Lower Burma (J. M. D. Mackenzie).

Distribution.—Assam, Chittagong, Burma at least from Mogok to N. Tenasserim.

Distinguished from *A. collaris collaris* by its considerably larger size both in the head and body and in the skull, by its longer tail which is about one-third the length of the head and body and about twice the length of the hind foot and at least in its typical form by its less luxuriant winter coat. It is also larger than the Southern Chinese and Tibetan race *A. collaris albogularis* Blyth (= *obscurus* M. Edw.) and has the winter coat much thinner; but it is smaller on the average both in its body dimensions and skull and has the tail relatively longer than in the provisionally admitted Annamese race, *A. collaris annæus* Thos.¹ and still smaller, in the skull, than the Malayan race *A. collaris dictator*.²

The following is a list of the localities of the specimens I assign to this race, with the altitudes, where recorded, and the collectors' names. The only specimens collected for the Survey were those secured by J. M. D. Mackenzie, H. W. Wells, and J. P. Mills; and the only other specimens in the British Museum are the one presented by E. W. Oates and a skull from 'Bengal' (Hardwicke). The rest are in the collections of the Indian Museum, Calcutta, and of the Bombay Natural History Society.

Moulmein (Tickell MS., specimen not preserved); Lockaw in Karenni, 2,500 ft. (E. W. Oates); Thaundaung, near Toungoo, 4,500 ft. and 30 miles N. W. of Kindat (J. M. D. Mackenzie); Ruby Mines, Mogok (H. C. Smith); Falam in the Chin Hills, 5,000 ft. (J. M. Wright), Chittagong Hills (J. Jarbo); Hot Springs in the Jaintia Hills, 2,400 ft. (H. W. Wells); Longpa in the Naga Hills, 3,000 ft. (J. P. Mills) and Assam (Capt. Bulter)³.

The skins from Assam are immature, as shown by their skulls, and the age of the skin from the Chittagong Hills cannot be determined because it has no skull. This is unfortunate because it is precisely in those districts that Hog-Badgers intermediate in size between the two races here admitted may be found, if they exist. The ascription of these specimens to *A. c. consul* is there-

¹ Thomas (*Ann. Mag. Nat. Hist.* (9) 7, p. 524, 1921) based on a young ♂ from Nhatrang, Annam. See also Osgood (*Field Mus. Nat. Hist. Zool.*, 18, p. 263, 1932) who made *annæus* a synonym of *dictator* and very likely correctly.

² Thomas (*Ann. Mag. Nat. Hist.*, (8), 5, p. 424, 1910) based on an old ♀ from Trang, in the Malay Peninsula.

³ The specimen from N.-W. of Kindat was identified by Wroughton as probably referable to *A. c. collaris* (*Journ. Bomb. Nat. Hist. Soc.*, 24, p. 768, 1916). It is a male shown by its skull, which is 139 mm. in condylobasal length, to be obviously immature. In the note accompanying it Mackenzie, guided by Blandford's and Wroughton's nomenclature, stated that he secured examples of *collaris* and *taxoides* in the Kabaw Valley and inferred that both occur in the Chin Hills. The specimen he identified as *taxoides* mysteriously disappeared and never, as Wroughton regretfully remarked, reached the British Museum for examination. I suspect it was a still younger example of *consul*.

fore only an inference based on the size of the young skulls from Assam and of the skin from Chittagong. Possibly, however, the Assamese specimens, especially the one from the Naga Hills may belong to the Southern Chinese race, *A. c. albogularis*, which is nearly intermediate in size between the other two.

The external measurements of the two examples from Toungoo entered in the table (p. 464) were taken in the flesh by Mackenzie and those of the one from Moulmein by Tickell as recorded in his MS. For the evidence of the differences in the dimensions between this race and the earlier described *annæus* from Annam and Laos I am indebted to Dr. Osgood who in 1932 recorded those of a male from Laos and later kindly sent me (*in litt.*) those of three examples from Thateng in Annam. In these the head and body range from $36\frac{1}{2}$ to 44 in., the average being from 9 to 10 in. greater than in *consul*, the tail from about $8\frac{1}{2}$ to $9\frac{1}{2}$ in., a little less than in *consul*, and the hind foot from 5 to $5\frac{4}{5}$ in. on the average about 1 in. longer than in *consul*. The flesh measurements of the type of *dictator* are very nearly the same as of *annæus*. The very considerable difference in the length of the head and body between *consul* and *annæus* are, in my opinion, too great to be assigned to individual variation or to be explained away by the 'personal equation' of the collectors or by different methods of measuring.

The differences in the size of the skulls is much less marked. In the three adult ♂ skulls of *consul* the condylobasal length varies from 152 to 154 mm. In three adult, unsexed specimens of *annæus* from Thateng, Annam, the same length, as Dr. Osgood informs me, is 159 mm., but in an old ♂ from Phong Saly, Laos, it is only 155 mm., as he recorded in 1932. On the other hand the condylobase in the ♀ type of *dictator* is 165 mm. and in another adult ♀ from Sai Yoke, S. W. Siam, it is 164. It is on the evidence of the larger size of these two ♀ skulls that I provisionally regard *dictator* as a distinct race from *annæus*.

Some structural features in the skulls of *consul* entered in the table may be noted. The ad. ♂ skull of the type has no trace of sutures and its sagittal crest is 8 mm. high. The actual length of the younger skull from Toungoo is uncertain because the beast was killed by a knock on the head which smashed the back of the skull, but the mandible is only 7 mm. shorter than in the adult, 102 mm. as compared with 109 mm. It has all the sutures open, no sagittal crest, the temporal ridges being 10 mm. apart at their nearest point close to the middle of the crown, and the zygomatic and mastoid widths are much less, the mastoids being respectively 92 and 83 mm. These differences are a question of age. Very noticeable, too, are the differences in the size of the teeth. Those of the type, it is true, are flattened by wear, but quite clearly they were much smaller, before being worn, than those of the younger specimen.

The skull from 'Bengal' (Hardwicke) belonged to the specimen

represented by Gray as *Mydaus collaris* (Hardwicke's *Illustr. Ind. Zool.*, 1, pls. 6 and 7, 1830) and twice subsequently figured by him as *Arctonyx collaris* (*Proc. Zool. Soc.*, 1865, p. 681 and *Cat. Carn.* etc. p. 124, 1869). The exact locality of the specimen is quite uncertain; but it may be suspected to have come from one of the districts of the Province lying in those days to the east of the Bay of Bengal. It is very like the skull of the type of *consul* from Toungoo, but has a lower sagittal crest, only 3 mm. high, a lower-projecting, hooked mastoid process and bigger teeth, more like those of the young Toungoo specimen.

The precise dimensions of the skull from Moulmein are doubtful. They have been calculated from Tickell's figures stated to be $\frac{5}{8}$ natural size. This makes the condylobasal length as entered, but according to Tickell the total length of the skull was $6\frac{1}{4}$ in. or 158 mm., and this happens to be the condylobasal length which in this skull alone of all I have seen exceeds the length from the occipital crest to the premaxillæ. If 158 mm. is correct, the skull is almost exactly the same length as those of *annæus* from Thateng, Annam, referred to above. In that case the Moulmein specimen was intermediate between the two races, not a surprising thing considering its locality.

The skull is also singular for the exceptional widths of the interorbital area and of the muzzle, which give an unusually massive look to its facial portion. It is highly possible, however, that the peculiarities above mentioned are due to this Hog-Badger having been reared in captivity, a condition known to produce profound effects on the skulls of many Carnivora. Tickell stated that he had the animal alive for two years after receiving it from a monastery where it had been kept as a pet from early cubhood.

All the ♀ skulls I have seen are immature. The largest from Falam in the Chin Hills (Bombay Museum), with an estimated condylobasal length of about 140 mm., has the postdental area of the palate greatly inflated by air-cells and the frontal region also elevated by the same factor. The skull from Lockaw, Karenni has the same regions similarly expanded, but the frontal area is also swollen laterally, the whole area being unusually wide as compared with the end of the muzzle. It is also remarkably 'undershot', more so than in the type of *taxoides*, the lower incisors overlapping the upper by 7 mm. The skull is smashed at the back but I estimate its condylobasal length to have been about 128 mm.; but judging from the length of the mandible, 93 mm., the normal condylobasal length would have been about 135 mm., making allowance for the abbreviation of the upper jaw which has resulted in the 'undershot' condition of the muzzle. The measurements of the very young ♀ skull from the Jaintia Hills, which has all its sutures open and its second teeth imperfectly erupted, have been entered for comparison with those of the adult or nearly adult skulls of *collaris* which are a trifle shorter in condylobasal length and well moulded muscularly.

SKULL MEASUREMENTS OF THE TWO BRITISH INDIAN RACES
OF THE HOG-BADGER (*Arctonyx*).

Name, locality and sex		Total length	Cond. bas. length	Zygom. width	Post. Orb. width	Int. Orb. width	Max. width	pm ⁺	m ¹	m ₁
<i>A. collaris collaris</i>										
'Bengal'	just ad. ♀	122	114	62	24	24	22½	7	13	14
Assam	(<i>taxoides</i> , type)									
	sub. ad. ♀	114	...	57	24	21	23	7	13	14
Sikkim Tarai	(<i>isonyx</i> , type)									
	ad. ♀	114½	110½	56	22½	22½	21½	6	13	14
<i>A. c. consul</i>										
Toungoo (type)	ad. ♂	158	154	91	37	37	33	9½	15	17
Toungoo	yg. ad. ♂	(158 ⁺ ₋)	...	83	...	37	33	10½	18	20
'Bengal'	ad. ♂	157	152	93	35	36	33	10	18½	19
Moulmein (Tickell MS.)	ad. ♂	152	153½	94½	35½	41½	40	9½	14½	19½
Karenni, Lower Burma	yg. ♀	...	(128 ⁺ ₋)	74	41	36	29	9	14	14
Jaintia Hills, Assam	very yg. ♀	122	118	57	32	32	24	9	15	15



Pocock, R. I. 1940. "The Hog Badgers (*Arctonyx*) of British India." *The journal of the Bombay Natural History Society* 41, 461–469.

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