

## ON THE MAMMALS OF SUMBA.

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During our expedition to Sumba <sup>1)</sup>, one of the Lesser Sunda Islands situated south of Flores and west of Timor, we paid special attention to the mammalian fauna of the island which turned out to be extremely poor. Altogether we got 112 specimens, representing 18 species, 11 of which are worked out here. The remainder, one species of *Crocidura* and 6 *Microchiroptera*, have been sent to the Vienna Museum of Natural History to be named.

The species, except *Insectivora* and *Microchiroptera*, now known from Sumba are:-

*Macaca irus mordax* THOS. & WROUGHT.

†\* *Rousettus amplexicaudatus* E. GEOFFR.

† *Pteropus alecto morio* K. AND.

† *Pteropus mackloti gilvus* K. AND.

†\* *Dobsonia peroni sumbana* K. AND.

† *Paradoxurus hermaphroditus sumbanus* SCHWARZ

*Mus musculus* L.

*Mus rattus jalorensis* BONH.

*Mus rattus diardi* JENT.

*Mus rattus brevicaudatus* HORST & DE RAADT

*Mus concolor ephippium* JENT.

*Cervus hippelaphus* F. CUV.

†\* *Bos bubalis* L.

*Sus vittatus* TEMM.

\* *Halicore dugung* ERXL.

The species with an asterisk were not obtained by us, those marked † were already previously recorded from Sumba. Altogether 22 species of mammals are now known from the island. This poorness of the mammalian fauna is greatly due to the island being vastly deforested and extremely dry.

If we exclude the bats, which could have reached the island on the wing, all other mammals are well-known and wide-spread species, all forms being either identical or very nearly related to Javan species or subspecies. The total absence of Papuan elements is a very remarkable

<sup>1)</sup> For further details see:- DAMMERMAN, Een tocht naar Soemba, Natuurk. Tijdsch. Ned. Ind. LXXXVI, 1926 p. 27.

feature which is found also among all other groups of animals (except winged forms, such as birds, bats, or insects) and even among the plants. There is every evidence of the island having never been connected with the Timor Archipelago or Australia. Although the mammals show such a strong relation to those of Java we may not deduce, from the mammalian fauna at least, that the island has been connected formerly by a land-bridge with one of the other Lesser Sunda Islands, as all mammals, bats excepted, could have been introduced by human agency. In the following pages one will find for many species reasonable evidence for such an introduction. That no mammals from the eastern part of the Archipelago have been introduced may be due to the following facts:- there are no game animals among those eastern mammals worthy of importation; moreover, once introduced, either on purpose or accidentally, these mammals, belonging to an older fauna, are usually unable to extend their range of distribution and to withstand the competition of members of a more modern fauna. Finally, Sumba being an extremely dry country, there are but few mammals which could hold their own under such unfavourable environmental conditions. As soon as some more groups of animals have been worked out we will in a future paper discuss more in detail the zoogeographical relations of the island.

In the following descriptions the specimens were collected by the author himself if no collector is mentioned.

#### PRIMATES.

##### **Macaca irus mordax** THOS. & WROUGHT.

*Macaca mordax*

1909. THOMAS & WROUGHTON, Ann. Mag. N.H. (8) III, p. 380.

*Macacus cynomolgus*

1926. DAMMERMAN, Natuurk. Tijdsch. Ned. Ind. LXXXVI, p. 38.

1926. DAMMERMAN, Tijdsch. Ind. Taal-, Land- en Volkenk., LXVI, p. 206.

Kambara, E. Sumba, III 1925, 1 ♂ (866), 1 ♀ (865), leg. P. FRANCK;  
Mao Marroe, E. Sumba, 450 m., V 1925, 1 ♂ (867), 2 ♀♀ (868,869), leg.  
P. FRANCK.

For measurements see p. 301 & 302.

In the Sumba macaque the upperparts are light brownish olive, speckled with black; the longer hairs are blackish banded with yellowish, the tips being black. Underparts pale smoke grey, sometimes with a buffy tinge. Face greyish; above the eyes a black superciliar band and between the eyes a small black stripe; some blackish hairs forming a black line on sides of face above the mouth angles. Outer side of the ear naked, inner side haired. On top of head a very small crest. The limbs are of somewhat lighter colour; hands and feet more greyish. Tail above dark grey at base becoming lighter towards the tip; underside paler.

The naked skin between and above the eyes is bluish white in the male with a broad brown stripe in the middle which is prolonged on the root of the nose. The colour of the eyes is amber brown; eye-lids blackish brown.

The female has the upperparts less bright, more greyish.

The Sumba macaque comes very near to the Javan subspecies *mordax*; it seems to be somewhat smaller in size, but it may be we did not get very large specimens. Our series has on the whole somewhat deeper colours, but there are specimens from Java in our collection which match it exactly as to colouration.

As to the skulls I find one remarkable difference:- in all our Sumba skulls the nasals are much more slender than in the Javan skulls and they reach beyond a line connecting the centres of the orbits, whereas in Javan specimens they seldom reach this line; the length and breadth of the nasals in Javan skulls is, however, subject to a good deal of variation. Another difference is the tooth rows being straight in the Javan race and slightly curved in the Sumba specimens, especially those of the upper jaws.

The Timor subspecies, *limitis* SCHWARZ, differs from *mordax* by the skull being broader and the zygomatic breadth being much larger and in some other characters; in all these respects the Sumba form agrees with *mordax*. From the description by SCHWARZ it seems that the colour of *limitis* is not essentially different from that of *mordax*.

I think we may safely refer the Sumba macaque to *mordax* as the small differences, enumerated above, are not constant enough to justify the establishment of a new subspecies.

The vernacular name of this macaque is "buti" in E. Sumba and "kedu" in W. Sumba. These monkeys were very fond of the dark red fruits of a cactus (*Opuntia elatior*), a species introduced from America and much used for hedges in the East Indies.

Measurements (in mm.)

Mus. Btzt. No.	<i>limitis</i> Timor ♂ type	<i>mordax</i> Sumba					<i>mordax</i> Java		
		♂ 866	♂ 867	♀ 865	♀ 868	♀ 869	♂ type	♂ 574	♀ 575
head and body . . . . .	530	452	363	406	357	326	600	576	467
tail . . . . .	300	503	382	404	441	405	610	—	539
ear . . . . .	—	41	33	33	31	31	43	—	—
hind foot . . . . .	—	125	107	108	112	105	155	—	—

## Measurements of skulls.

Mus. Btzig. No.	<i>limitis</i> Timer ♂ type	<i>mordax</i> Sumba					<i>mordax</i> Java		
		♂ 866	♂ 867	♀ 865	♀ 868	♀ 869	♂ type	♂ 574	♀ 575
total length . . . . .	—	121	94	94.5	96.5	93	124	132	103
basilar length . . . . .	83	88	63	66.5	67	60.5	90	95	72
occipito-nasal length . .	—	103	83	80	82	82	102	110	92
zygomatic breadth . . .	86	81	60	64.5	61.5	57	84	83	71
cranial width . . . . .	58	55	51	49	48	49.5	58.2	61	56
least postorbital breadth .	57.7	38.5	38	37	34	36	42.5	45	41.5
median length of nasals .	—	32	24	24	22.5	21.5	18	21	13.5
breadth of comb. nasals .	—	6.5	7	6.5	7	5.5	—	8.5	8
palatal length . . . . .	44.5	48	34.5	37.5	38	33	52	56	30
width between m <sup>3</sup> —m <sup>3</sup> , intern. . . . .	—	19.5	14.5	18	13	14.5	—	22	18.5
length upper molar series.	28.9	30	—	28	29	—	33	36	—
length of mandible . . .	—	88	66.5	69.5	70	61	91.7	93.5	75

## CHIROPTERA.

**Rousettes amplexicaudatus** E. GEOFFR.*Pteropus amplexicaudatus*

1810. E. GEOFFROY, Ann. Mus. H. N. XV, p. 96, Pl. IV.

*Cynonycteris amplexicaudata*

1894. TEN KATE, Tijdsch. Aardr. Gen. 2e S. XI, p. 582.

This widely distributed species was not caught by us but is mentioned from Sumba by TEN KATE; there are, however, no specimens from Sumba in the Leyden Museum.

**Pteropus alecto morio** K. AND.*Pteropus morio*

1908. ANDERSEN, Ann. &amp; Mag. N. H. (8) II, p. 369.

1912. ANDERSEN, Cat. Chir. Brit. Mus. I, p. 370.

1926. DAMMERMAN, Natuurk. Tijdsch. Ned. Ind. LXXXVI, p. 46.

Pajeti, III 1925, 5 ♂♂ (873, 875, 876, 877, 883), leg. KRIJGER; Mao Marroe, E. Sumba, 450 m., V 1925, 2 ♂♂ (881, 882), 2 ♀♀ (879, 880); Karoni, W. Sumba, 7 IV 1925, 1 ♂ (878), leg. P. FRANCK.

For measurements see below.

Two specimens of this series (Nos. 873 & 875) agree with the type of *morio*, with which they have been compared, the mantle being deep chocolate not well defined from the colour of the back. The head above is almost black; the back and rump blackish, sprinkled with whitish hairs; underparts dull blackish. The hairs of the head consist of straight blackish hairs and undulating thinner hairs of somewhat paler hue; those of the mantle of straight blackish hairs and wavy pale chestnut hairs, darker towards the end; the back has straight black hairs and wavy blackish and white hairs. The other specimens of the series differ from the typical *morio* by the much lighter mantle, which varies from mars yellow to mars brown, and is well demarcated from the colour of the back. In these respects the specimens agree with some specimens of *Pt. gouldi*, which I have seen in the British Museum, but *gouldi* is much larger, the forearm being 153—180 mm. and the greatest length of the skull 68—75.5 mm. The colour of the head above also varies greatly, in some specimens (876) it is almost black with the muzzle ochraceous and conspicuous rings around the eyes of the same colour; in other specimens the head is more brownish, sometimes strongly sprinkled with whitish hairs. I do not think that we must refer our specimens to two different species, *morio* and *gouldi*, both being apparently subspecies of *alecto*, as our series is homogenous as to arm length and skull measurements. The skulls also vary, two specimens, 875 and 882, have the zygomatic breadth remarkably larger than the other skulls, 875 belonging to the typical *morio*, 882 agreeing with *gouldi* in colouration. I cannot find any constant character by which to separate the two *morio*-like specimens from the other ones except the colour of the mantle, but I think the gap existing now in our series will be filled up as soon as we have more material at our disposal. The only characters by which the Sumba form can be distinguished from other members of the *alecto* group is the size of the forearm (128—144 mm.) and the length of the skull (62—65 mm.).

The vernacular name for flying foxes is "pani" in E. Sumba and "paniki" in W. Sumba.

Measurements of *Pteropus* species from Sumba  
(all measurements taken in the flesh).

Mus. Btzg. No.	♂ 872	♂ type	♂ 875	♂ 876	♂ 877	♂ 878	♀ 879	♂ 882	♀ type	<i>gouldi</i>
length of body . . . . .	238	—	223	211	196	167	217	218	—	—
forearm . . . . .	138	135	141	144	133	121	128	138	141.5	153—180
ear . . . . .	30	—	26	28	27	27	26	28	—	—

## Measurements of skulls.

Mus. Btztg. No.	<i>gilvus</i>	<i>gilvus</i>	<i>morio</i>	<i>morio</i>	<i>morio</i>	<i>morio</i>	<i>morio</i>	<i>morio</i>	<i>morio</i>	<i>gouldi</i>
	♂ 872	♂ type	♂ 875	♂ 876	♂ 877	♂ 878	♀ 879	♂ 882	♀ type	
greatest length . . . .	67	66	65	62	61	56	64	64	65.5	68—75.5
basilar length . . . .	60.5	—	58	57	55	50.5	58	58	—	—
front of orbit to tip of nasals. . . . .	21.5	21.2	22.5	21.5	20.5	19	22	—	21.8	24—28
zygomatic breadth . . .	37.5	36	37.5	32	32	29.5	32.5	37	36.2	37—42.5
least postorb. breadth .	8	9	8	7.5	8	9	7	9	7.8	7—9.7
cranial width . . . .	23.5	24.8	23.5	22	22.5	22	22	24	23.7	24.5—26.5
width between p <sup>4</sup> —p <sup>4</sup> , internally . . . . .	11	10.2	11	9	9.5	9	10	11	—	10.2—12.2
upper teeth, c—m <sup>2</sup> . .	28	27.7	23	23	22	21	23	23	23.8	25—27.8
length of mandible . .	52	52.2	50	48.5	47	43	49	50	51.7	52.5—59.5

***Pteropus mackloti gilvus* K. AND.***Acerodon gilvus*

1909. ANDERSEN, Ann. &amp; Mag. N.H. (8) III, p. 24.

1912. ANDERSEN, Cat. Chir. Brit. Mus. I, p. 423.

*Pteropus gilvus*

1926. DAMMERMAN, Natuurk. Tijdsch. Ned. Ind. LXXXVI, p. 46.

One male (872) from Pajeti, 16 III 1925, leg. P. FRANCK.

For measurements see above.

I was able to compare this specimen with the type in the British Museum which exactly matches it in colouration. The skull is a little larger and the forearm somewhat longer. Our specimen comes very near as to colour and measurements to *P. mackloti floresii* GRAY and we may safely consider the Sumba form a subspecies of *mackloti* TEMM.

The colour of our specimen may be described as follows:-

Anterior half of upperparts yellowish cream-buff, posterior part darker, especially on the rump more brownish. Mantle golden buff, on the sides more raw sienna. Muzzle sparsely haired; a paler ring around the eyes. The hairs on head and back mixed yellowish white ones and brown ones, the latter white-tipped; those of the mantle yellowish white with yellow tips, on the sides golden yellow, flattened and wrinkled.

The lower surface is darker as the brownish hairs show through; mantle less wide than on the back, the middle of it having about the same colour as the rest of the underparts.

**Dobsonia peroni sumbana** K. AND.*Dobsonia sumbana*

1909. ANDERSEN, Ann. &amp; Mag. N. H. (8) IV, p. 531.

1921. ANDERSEN, Cat. Chir. Brit. Mus. I, p. 471.

This species was not collected by us but I think we must refer the Sumba form to *peroni* as the small differences in size (total length of skull 46.5 against 48.8—51.7 mm.; forearm 106 against 108.5—117) do not justify considering it a distinct species.

## CARNIVORA.

**Paradoxurus hermaphroditus sumbanus** SCHWARZ.*Paradoxurus musanga*

1892. JENTINK, Cat. Syst. Mamm. Mus. H.N. Pays-bas XI, p. 115

1894. TEN KATE, Tijdsch. Aardr. Gen. 2e S. XI, p. 582.

*Paradoxurus sumbanus*

1910. SCHWARZ, Ann. Mag. N.H. (8) V, p. 422.

1926. DAMMERMAN, Natuurk. Tijdschr. Ned. Ind. LXXXVI, p. 71.

*Paradoxurus hermaphroditus*

1926. DAMMERMAN, Tijdsch. Ind. Taal-, Land- en Volkenk. LXVI, p. 207.

One male (870) from Palla, W. Sumba, 18 IV 1925; caught by native.

The Sumba musang has been described as a separate species by SCHWARZ. As to colouration our specimen agrees very well with the type in the British Museum; the skulls match each other exactly.

SCHWARZ calls the Sumba Paradoxure very distinct from every form hitherto described, but his type and our specimen come very near to specimens from Java, the differences are the smaller size, the less developed white markings on the head and the less distinct dorsal rows of black spots. The skulls too are not so different from skulls of Javan specimens as SCHWARZ' description would suggest. The skull of the Sumba form is much smaller; our specimen, which is larger than the type, is a full-grown male but not a very old one as the teeth are not worn. The skull has the same general shape as skulls of Javan specimens, it is distinguished by the nasals being more slender and the postorbital processes being more acutely prolonged. The teeth are also not essentially different from those of the Javan race; the characteristics given by SCHWARZ are more peculiar to young individuals and seem to be lost in older specimens.

The juvenile specimen (skin and skull) from North Sumba collected by TEN KATE 1891, kindly sent on loan by the Leiden Museum to Buitenzorg, shows the characters by which the Sumbanese subspecies can be separated

Measurements (those of the type in brackets):-

Head and body, 488 mm. (470); tail, 435 mm. (405); ear, 39 mm.; hind foot, 76 mm. (72).

## Measurements of skulls.

	<i>sumbanus</i> type	<i>sumbanus</i> 870	Java 792
greatest length . . . . .	—	97·5	116
basilar length . . . . .	87	91	106
zygomatic breadth. . . . .	58	55·5	70
cranial width. . . . .	32	33	39
least postorb. breadth . . . . .	12	13	11·5
length of a nasal. . . . .	20	20·5	25·5
breadth of comb. nasals . . . . .	9·8	9	12·5
palatal length. . . . .	42	42	47
width between m <sup>2</sup> -m <sup>2</sup> , intern. . . . .	—	23	26
length upper molar series. . . . .	31	30	35

The Sumba form is certainly not a distinct species but must be referred to the widely distributed *P. hermaphroditus*, coming very near to the Javan race.

In my paper on Sumbanese names of animals and plants (cited above) I supposed that the musang was introduced into Sumba either from Java or some neighbouring island. I thought the vernacular names "lambaku" in E. Sumba and "lamboku" in W. Sumba, would also indicate an origin from abroad, as these names might perhaps have been derived from the word "luwak" used in Java. Dr. L. ONVLEE, an authority on Sumba languages, has, however, called my attention to the fact that the Sumbanese names are probably derived from a root-word "mbaku" with a prefix "la", so there is no evidence of these vernacular names indicating the origin of the animal.

## RODENTIA.

**Mus musculus L.**

1758. LINNAEUS, Syst. Nat. Ed. X, p. 62.

Only one specimen, a female (827), trapped in a godown near the landing-stage at Waikelo, W. Sumba, 25 IV 1925.

The Malayasian house-mouse has been referred to *Mus musculus homourus* HODGSON, differing from the European type by the more ochraceous underparts. Now the specimen from Sumba has the lower surface very little washed with brown and it agrees in this respect with some



specimens from Java. BODEN KLOSS<sup>1)</sup> has further called attention to the fact that one finds in the Malay Archipelago in passing eastwards a marked loss of molars with this species, but our specimen has all four third molars well developed. The locality where this mouse was trapped, the dark grey lower parts, and the presence of all molars, all prove for the specimen having been introduced by ship, most probably from Java. As it does not show clearly the characters by which the eastern subspecies is separable I leave it for the moment under the species name.

### *Mus rattus* L.

There are in the Malay Archipelago three common subspecies or races of the species *rattus*. These are found all over the islands from the Malay Peninsula to New Guinea, they are not geographical races but are different as to their habitat and life-history. These three subspecies may be distinguished as follows:-

1. The Indo-Australian house-rat, found almost exclusively in houses, making its nest preferably in the upper parts of buildings, never burrowing in the ground.  
Underparts always dark but very variable in colour, greyish, rufous or yellowish brown, with or without a darker median line.  
Tail usually larger than head and body, 90 — 125%.  
Mammae 2 — 3 = 10.
2. The Indo-Australian field rat, an outdoor rat, found on dry grounds, living in the soil, sometimes more arboreal.  
Underparts always white or very pale whitish grey; colour of upper and lower surface sharply separated.  
Tail longer than head and body, 100 — 125%.  
Mammae 2 — 3 = 10.
3. The Indo-Australian sawah rat, a race especially adopted to life on irrigated rice fields (Malay: sawah), making its nest preferably in the bunds of rice fields.  
Underparts mostly greyish white or silvery grey.  
Tail usually shorter than head and body, 80 — 105%.  
Mammae 3 — 3 = 12.

The three forms are mostly well defined in islands like Java where the differentiation in habitat has progressed considerably, but in mountain districts or in less civilised islands, where there are no extensive villages or irrigated fields, we often find forms which are difficult to allocate. The most primitive form is certainly the white-bellied field rat.

Now, coming to the proper names for these races, we find much confusion. Formerly all these subspecies were called simply *rattus*, until THOMAS, and subsequently many other authors, used for the Malay re-

<sup>1)</sup> Treubia Vol. II 1921, p. 119.

representative of *rattus* JENTINCK's name of *neglectus*. After 1910, when the plague appeared in Java and the rats were more intensively studied on account of their economic importance, house-rats and sawah rats were well separated, the former being called *griseiventer* BONH., the latter *diardi* JENT., until it became evident, that *diardi* is a true house-rat, *griseiventer* being a synonym. The sawah rat was then named *brevicaudatus* HORST & DE RAADT. The Malay field rat was still called "*neglectus*", but recently I had an opportunity to reexamine the type of *neglectus* in the Leyden Museum and found it to be a true Malay house-rat also, not distinguishable from JENTINK's *diardi*. At the same time I was able to compare Indo-Australian field rats with BONHOTE's *jalorensis* from the Malay Peninsula and found them identical. As, moreover, *jalorensis* has been regarded as a synonym of *neglectus*, I think the proper name for the Indo-Australian field rat must be now *jalorensis* BONH.

Still more names have been used for these rats and I hope to disentangle this confusion and to give the full synonymy in a future paper on the rats of Java.

The three subspecies may be determined by the following key:-

- 1 a. Under surface white or whitish with well-defined lateral line of demarcation; tail longer than head and body; mammae 2—3=10 (field rat). . . . . *M. r. jalorensis*.
- b. Under surface darker; lateral line of demarcation not well defined
- 2 a. Under surface pale greyish; tail short, 80—105 % of head and body length; mammae 3—3=12 (sawah rat). . . . . *M. r. brevicadatus*.
- b. Under surface mostly darker; tail usually longer than head and body, 90—125 %; mammae 2—3= (house-rat) . . . . . *M. r. diardi*.

The dorsal surface in all the three races is very similar; the colour is grizzled brown, fur consisting of long blackish bristles, long dark hairs, brown towards the end, dark-tipped, flat white spines with the distal third end blackish, and short grey woolly hairs. The hind foot in adult specimens reaches a length of 34—40 mm.

The skull varies also greatly and there seem to be no constant characters by which these subspecies may be distinguished except the auditory bullae being in the sawah rat larger and more inflated.

The vernacular name for rats is "kalau" in East and "malagho" in West Sumba.

### ***Mus rattus jalorensis* BONH.**

*Mus jalorensis*

1903. BONHOTE, Fasc. Mal. Zool. I, p. 28.

One female (828) from Mao-Marroe, E. Sumba 450 m., 9 V 1925.

For measurements see p. 309 & 310.

The specimen was trapped in the native village.

**Mus rattus diardi** JENT.*Mus diardii*

1879. JENTINK, Notes Leyden Mus. II, p. 13.

Waingapoe, 27 V 1925, 1 ♀ (840); Mao-Marroe, E. Sumba, 450 m., 5 V 1925, 1 juv. ♂ (837); Kananggar, E. Sumba, 700 m., V 1925, 1 ♀ (829), 2 ♂♂ (841 & 842).

For measurements see below.

Nr. 829 is a very large individual, trapped in the field. If it has been a male I should have named it "*brevicaudatus*", on account of the very pale colour of the underparts and the rather short tail, but as the mammar formula is 2—3=10 we must consider it a house-rat. Because the specimen was caught in the field is no reason to consider it a sawah rat, two other specimens, from Kananggar, which are undoubtedly house-rats with dark bellies, being trapped also in the field in the neighbourhood of the resthouse. In such countries as Sumba where many of the products are stored outside the houses house-rats may be found foraging in the field.

**Mus rattus brevicaudatus** HORST et DE RAADT.*Mus rattus brevicaudatus*

1918. HORST &amp; DE RAADT, Zool. Meded. IV, p. 69.

Kamera, E. Sumba, III 1925, 2 ♂♂ (830, 831), 1 ♀ (832); Kananggar, E. Sumba, 700 m., V 1925, 3 ♀♀ (833, 834, 839), 1 juv. ♂ (838), 2 juv. ♀♀ (835, 836).

For measurements see below.

Nr. 830 has the underparts darker and more brownish than the other specimens and at first sight it was classed with the house-rats, but it must be called a sawah rat because of its short tail and the more inflated auditory bullae. The specimen was trapped in a maize field. All females, even the very young specimens Nos. 835 and 836, show clearly the 12 mammae. Nearly all specimens were caught in the field, the majority in the rice fields, except the Nos. 835 and 836, two young individuals, which were trapped in the native village.

Measurements of Sumba rats  
(all measurements taken in the flesh).

Mus. Btzig. No.	<i>jalorensis</i>	<i>diardi</i>	<i>diardi</i>	<i>diardi</i>	<i>diardi</i>	<i>brevicaud.</i>	<i>brevicaud.</i>	<i>brevicaud.</i>	<i>brevicaud.</i>	<i>brevicaud.</i>
	♀ 828	♀ 829	♀ 840	♂ 841	♂ 842	♂ 830	♂ 831	♀ 832	♀ 833	♀ 834
head and body . . . . .	220	224	176	172	191	184	204	194	176	183
tail . . . . .	237	224	184	176	182	175	165	193	180	173
hind foot. . . . .	40	40	35	37	40	36	36	37	35.5	36
ear . . . . .	25	23	22	22	22	21	22.5	21	21	22

## Measurements of skulls.

Mus. Btzg. No.	<i>jalorensis</i>	<i>diardi</i>	<i>diardi</i>	<i>diardi</i>	<i>diardi</i>	<i>brevicaud.</i>	<i>brevicaud.</i>	<i>brevicaud.</i>	<i>brevicaud.</i>	<i>brevicaud.</i>
	♀ 828	♀ 829	♀ 840	♂ 841	♂ 842	♂ 830	♂ 831	♀ 832	♀ 833	♀ 834
greatest length . . .	50	49	43	42	45	43	44.5	43.5	42	43
basilar length . . . .	45	44	38	36.5	39	38	39	39	38.5	38.5
zygomatic breadth . .	23	23.5	21	20.5	21	20	21.5	21.5	21.5	21
least interorb. breadth .	7	7	6.5	7	7	6.5	7	7	6	6
cranial width . . . .	17	18	16.5	17	17	16	16.5	16	16	16.5
length of a nasal . . .	19	17.5	15	14.5	15.5	15	16	16	14	15
greatest br. comb. nasals	5	5	4	4	4	4	4.5	4	4	4
length of diastema . .	14	13	11	10.5	12	11.5	12.5	12	11.5	11.5
length upper molar ser.	8.5	8.5	8	8.5	8.5	8	8	8	8	8

**Mus concolor ephippium JENT.***Mus ephippium*

1879. JENTINK, Notes Leyden Mus. II, p. 15.

Pajeti, E. Sumba, III 1925, 1 ♂ (844), 2 ♀♀ (843, 845); Kambara, E. Sumba, III 1925, 2 ♀♀ (846, 847); Mao Marroe, E. Sumba, 450 m., V 1925, 1 ♀ (852); Kananggar, E. Sumba, 700 m., V 1925, 2 ♀♀ (853, 854); Karoni, W. Sumba, IV 1925, 2 ♂♂ (849, 850), 2 ♀♀ (848, 851).

A few specimens of the series, notably No. 853, have a very spiny upper fur but otherwise the Sumba form is not distinguishable from *ephippium* of the lowlands of Java or Sumatra. Only three specimens (Nos. 846, 847, 853) were trapped in the field, all others in houses.

## UNGULATA.

**Cervus hippelaphus F. CUV.***Cervus hippelaphus*

1819. F. CUVIER, Hist. nat. Mamm. I, pl. 108.

1926. DAMMERMAN, Natuurk. Tijdsch. Ned. Ind. LXXXVI, p. 119.

1926. DAMMERMAN, Tijdsch. Ind. Taal-, Land- en Volkenk. LXVI, p. 206.

During our expedition we did not succeed in shooting specimens of the Sumba deer, but secured only one female kept alive at Waingapoe and bought some antlers from a Chinese dealer.

This female deer, which was said to be two years old, lived at Buitenzorg for about three years and died February 1928. The specimen

(No. 855) has a body length of 1325, tail 120, ear 122, height at the shoulder 710 mm.

The colour above is grizzled brown; the hairs on the back are flat, undulated, for the greater part greyish, towards the end yellow-brown, black-tipped; a dark stripe runs along the middle of the back; head above in the middle and outer parts of ears bister; inner surface of ears with long white hairs. Underparts and inner sides of legs yellowish white; middle part of chest brownish; head and neck below greyish brown; chin and lips white and middle of throat greyish. Legs above more wood brown, above the hoofs yellow-brown with dark centre; on the hind legs a yellow-brown patch beneath the heel. Tail above coloured like back, towards the end darker; below, except tuft, whitish.

Measurements of skull (those of a Javan female in brackets):-

Greatest length, 259 (291); basilar length, 237 (260); zygomatic breadth, 108 (114); cranial width, 63 (75); least postorbital breadth, 62 (69); median length of nasals, 92 (96); greatest breadth of combined nasals, 25 (34); length of upper molar series, 72 (86).

The only difference, except for size, between the Sumba skull and that of the Javan specimen is in the nasals being relatively longer and narrower in the Sumba form. As we have not got male deers from Sumba we can only compare the antlers. In the Sumba deer the antlers are much shorter and usually less wide than in Javan specimens (see measurements). Nr. 857 are abnormal antlers, the front tine of the terminal fork of the right beam being much stronger than the tip of the main beam.

#### Measurements of antlers.

	Java	S u m b a				
	597	856	857	858	859	860
greatest length . . . . .	750	510	390	532	500	525
basal girth . . . . .	134	130	131	133	129	134
tip-to-tip expanse . . . . .	360	268	120	206	288	234
greatest width of main beams . .	509	340	237	340	365	305
median height <sup>1)</sup> . . . . .	630	455	305	467	434	480
relative width <sup>2)</sup> . . . . .	81	75	78	73	84	64

<sup>1)</sup> measured in a straight line from the middle of a line connecting the lower bases of burrs to the middle of a line connecting the tips.

<sup>2)</sup> greatest width of main beams: median height.

Most probably the Sumba deer has to be referred to the Timor subspecies, *C.h. timoriensis* BLAINV., which is much smaller than the Javan

race, the male having sometimes a whitish streak which runs from under the eye across the cheek to the side of the neck. But as long as we have no males we better leave this race under its specific name.

There is some evidence that deer, too, are not indigenous in Sumba, but have been introduced either from Java or from Flores. They are not spread all over the island, being absent in West Sumba; if their distribution was a natural one they ought to be found in the first place in the western part of the island and not in the eastern part. The deer were evidently imported into one of the bigger ports, which are situated in East Sumba and have spread from there over the eastern and middle parts of the island.

The vernacular names also, being "ruha" in East and "ruza" in West Sumba and apparently derived from the Malay "rusa", seem an indication for an origin from abroad.

### **Bos bubalis L.**

*Bos bubalis*

1757. LINNAEUS, Syst. Nat. Ed. X, p. 72.

*Bos bubalus*

1921. 'T HOEN, Buffel en Rund, p. 4, fig. 3 & 14.

*Bos bubalus*

1927. MERKENS, Karbouw en karbouwenteelt in Ned. Oost-Indië, p. 87, Afb. 6.

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1926. DAMMERMAN, Natuurk. Tijdsch. Ned. Ind. LXXXVI, p. 89:

The buffalo or kerbau does not occur in a wild state in Sumba but is often kept by the natives and much used for offerings. Large herds roam about without any attendance and these semi-wild animals often show enormous horns. The largest were seen in Rende, East Sumba, where the skulls were used as steps at the entrance of the houses. The Buitenzorg Museum possesses a frontlet with horns from Rende (No. 760) which has the following measurements:—greatest length of one horn, 1700 mm.; basal girth, 495 mm., frontal interval between the bases of the horns, 270 mm., tip-to-tip expanse, 2935 mm. This is possibly the specimen figured by 'T HOEN. Much larger horns are recorded from wild Indian buffaloes, the largest specimens of their kind, according to LYDEKKER, measuring  $77 \frac{3}{8}$  inches (1965 mm.) in length.

MERKENS reproduces a photo of a kerbau from Sumba which is spotted in colour.

### **Sus.**

A great many species of wild swine have been described from the eastern part of the Malay Archipelago, but in our opinion many, if not all, are based upon tame or semi-domesticated pigs. That so many pigs in this part of the archipelago run wild is due to three facts. First, in the eastern islands nearly all tribes are still pagan and they all keep pigs; secondly these pigs are not kept in confinement but roam about the vil-

lages, easily running wild and mixing with wild species or feral individuals, and thirdly the absence of the bigger beasts of prey, such as tigers, panthers and wild dogs, permits domesticated pigs living a wild life to hold their own. In the western part, however, on the so-called Greater Sunda Islands, owing to the early introduction of Mohammedanism pigs are not kept by the natives, but largely by Chinese and are bred chiefly in bigger towns, where the animals are carefully kept in enclosures. Moreover, a single individual run wild here is either expelled by the genuine wild species or is wholly absorbed by the wild blood. In the eastern part there are probably no original wild species and the introduced specimens are possibly all of Chinese origin. These domesticated Chinese pigs are mostly descendants from *Sus leucomystax*, a near relative of *Sus vittatus*, the common wild swine of the Greater Sunda Islands. Both species may be placed in the Formenkreis of the European wild swine, *Sus scrofa*. So this whole large group of domesticated and wild swines are all near relatives. Domesticated pigs run wild, will either still exhibit some characters peculiar to tame individuals or after some generations of wild life they may regain the external appearance of a wild species.

To distinguish such tame or semi-domesticated individuals from truly wild species occurring in the Malay Archipelago the following key may be found useful <sup>1)</sup>.

- A. Colour mostly black, sometimes partly white; hoofs often wholly or partly bone-coloured. The young from the same litter often different, some striped, others black, uniformly coloured or variegated.

Skull (in adults) generally short and broad, often with abnormal excrescences; profile line more or less concave; tooth rows seldom parallel; nasals generally less than 130 per cent. the length of frontal; orbits usually large and of irregular form, the greatest length vertical; post-orbital processes sometimes in one line with the orbital processes of the zygoma or even in front of it; upper anterior part of zygoma hollow; lacrymal short and anteriorly slightly concave; infraorbital foramen large and rounded . . . . Domesticated or semi-wild pigs.

- B. Adults uniformly coloured, with or without a distinct whitish facial band. Young striped or the stripes almost obsolete, but the young from the same litter all alike.

Skull (in adults) elongated; profile line straight or convex; tooth rows parallel; nasals at least 130 per cent. of the length of frontal; orbits rounded; postorbital processes always behind the orbital processes of the zygoma; upper anterior part of zygoma not concave; lacrymal

<sup>1)</sup> See also BÄUMLER, Die morphologischen Veränderungen des Schweineschädels unter dem Einfluss der Domestikation, Archiv. f. Naturg. Bd. 87 A 1921, p. 140. BAUSCHKE, Schweinerassen in den deutschen Kolonien der Südsee, Archiv f. Naturg. Bd. 77 I 1911, p. 1.

HOESCH, Die Schweinezeit, Hannover 1911.

longer than high and deeply hollowed anteriorly; infraorbital foramen narrow and oval . . . . . Wild swine.

**Sus vittatus** TEMM.

*Sus vittatus*

1835. TEMMINCK, Faune du Japon, Introd., p. VIII.

1926. DAMMERMAN, Natuurk. Tijdsch. Ned. Ind. LXXXVI, p. 40, 65, 113.

1926. DAMMERMAN, Tijdsch. Ind. Taal-, Land- en Volkenk. LXVI, p. 207.

The only specimen of wild pig we got is a young male (862) bought from the natives, which was said to have been caught in the jungle near Kodi, W. Sumba. This piglet apparently belongs to *vittatus* but I do not venture to refer it to a certain subspecies as I am not quite convinced of the wild state of this individual and we did not get adult specimens. The head and body length is 445 mm.; tail 95 mm. General colour above hazel, mixed with black hairs; head above sprinkled with many black hairs, which form a distinct superciliar band; eyelids with blackish hairs; a black stripe along the middle of the back, becoming faint on the posterior half; on each side three distinct yellowish stripes, those along the black dorsal stripe being narrowest, the most lateral ones being less distinct connected with the second ones at the shoulder. Underparts sparsely haired with white and black hairs which are brownish in the middle and white towards the tip. Chin with blackish hairs and a band of brown hairs posteriorly; throat, breast and inguinal region almost naked. Legs with greyish hairs along the outer margin and on the anterior part above. Last two thirds of the tail with white hairs.

We bought a young domesticated pig at Kampera, E. Sumba (♂, 861), being also striped and from a litter composed of three striped and two entirely black animals, the sow being small and entirely black too. This juvenile is somewhat older, head and body measuring 472 mm.; it looks like a true *vittatus* young, but differs from the above-mentioned specimen as follows. General colour above paler and stripes less distinct; beneath with irregular spots of black hairs, a large black spot under the right eye at the mouth angle, a smaller one behind it; the throat with many black hairs on the right side only; a distinct black spot on the left side of the body. The right fore leg on the inside with black hairs instead of white ones. Hoofs of the hind legs partly bone-coloured. These partly coloured hoofs and the irregular black spots on the under surface are strong evidence that the specimen is not pure-bred.

The skulls of these two specimens do not yet show the differences referred to in the key given above, many characters exhibited by tame pigs being juvenile ones.

Besides these two young individuals we collected two skulls of domesticated pigs (863,864) which probably belong to a Chinese race, both being almost entirely black in pelage. The skulls clearly show some of the peculiarities of tame pigs, in other respects they come very near



the skull of *vittatus*. We saw many other skulls of tame pigs in the native houses and once a series of mandibles, which had peculiar excrescences, protuberances at the roots of the tusks, these having grown outwardly. According to the Sumbanese people all these mandibles were from tame individuals, but they would not sell us a single specimen, all being "taboo" derived from pigs which had been offered at sacrificial feasts. These excrescences, I think, are evidence too of the specimens being domesticated ones; the Buitenzorg Museum possesses a skull of a tame pig which shows very clearly the same peculiarities. Now it is on this very same feature that JENTINK based his *Sus floresianus* and I am convinced that just because of this character his species cannot be considered a truly wild one but is based upon a tame or perhaps a semi-domesticated pig. These Flores skulls were collected by WEBER who himself states that he obtained them from somebody else and that it was not obvious whether they were from pure-bred or semi-domesticated pigs.

The vernacular Sumbanese names for swine are "wéj", "waj", "wawi", all these being derived from the Malay word "babi". These vernacular names too may be an indication that swine are not indigenous in Sumba as in all islands where truly wild swine occur there are own names for these beasts.

#### SIRENIA.

##### **Halicore dugung** ERXL.

*Trichechus dugung*

1777. ERXLBEN, Syst. Reg. Anim., p. 599.

*Halicore dugong*

1926. DAMMERMAN, Tijdsch. Ind. Taal-, Land-, en Volkenk. LXVI, p. 208.

The duyong occurs on the North coast of Sumba, where it is hunted by the natives, who eat the flesh; from the tusks of the males cigarette-holders are carved. The vernacular name in Sumba is "ringu".

We have not seen or caught any specimen during our expedition.

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