

Explanation of Lettering on Text-figures.

<i>a.</i> , auditory nerve.	<i>ma.</i> , mandibular arch.
<i>ac.</i> , auditory capsule.	<i>md.</i> , mandibular branch of trigeminal.
<i>acp.</i> , ascending process of quadrate.	<i>mds.</i> , mesoblast of mandibular arch.
<i>as.</i> , auditory sac.	<i>mt.</i> , myotome 1-6.
<i>bp.</i> , branchial plexus.	<i>mth.</i> , mouth.
<i>br.</i> , branchial branch of vagus.	<i>mx.</i> , maxillary branch of trigeminal.
<i>brn.</i> , brain.	<i>na. 1.</i> , neural arch.
<i>brs.</i> , mesoblast of branchial arches 1-4.	<i>nch.</i> , notochord.
<i>brsl.</i> , branchial slit 1-4.	<i>ns.</i> , nasal sac.
<i>emm.</i> , median mandibular cutaneous branch of facial.	<i>oc.</i> , occipital arch.
<i>col.</i> , columella auris.	<i>ocp.</i> , optic cup.
<i>ctr.</i> , crista trabeculæ.	<i>opn.</i> , optic nerve.
<i>e.</i> , eye.	<i>per.</i> , pericardium.
<i>et.</i> , epiblastic thickening.	<i>poc.</i> , preoccipital arch.
<i>f.</i> , facial nerve.	<i>pop.</i> , preorbital process.
<i>fac.</i> , floor of auditory capsule.	<i>prf.</i> , profundus nerve.
<i>foc.</i> , oculomotor foramen.	<i>prn.</i> , pronephros.
<i>fop.</i> , optic foramen.	<i>q.</i> , quadrate.
<i>gf.</i> , facial ganglion and its epiblastic thickening.	<i>s. 1, 2, ...</i> , metaotic somite.
<i>ggl.</i> , ganglion of glossopharyngeal.	<i>sh.</i> , hyomandibular somite.
<i>gl.</i> , glossopharyngeal nerve and its epiblastic thickening.	<i>sk.</i> , hind limit of skull.
<i>gt.</i> , glottis.	<i>sm.</i> , mandibular somite.
<i>gtr.</i> , ganglion of trigeminal and its epiblastic thickening.	<i>sop.</i> , superior ophthalmic nerve.
<i>gv.</i> , ganglion of vagus and its epiblastic thickening.	<i>sp.1.</i> , first spinal nerve.
<i>h.</i> , hyomandibular branch of facial.	<i>sp.2^d & v.</i> , second spinal nerve, dorsal and ventral root.
<i>hda.</i> , hyoid arch.	<i>spg.</i> , spinal ganglion.
<i>hyp.</i> , hypoglossal nerve.	<i>spl.</i> , spiracular slit.
<i>hypm.</i> , hypoglossal muscle.	<i>svr.</i> , ventral root of spinal nerve.
<i>im.</i> , internal mandibular branch of trigeminal.	<i>tr.</i> , trabecula cranii.
<i>j.</i> , anastomosis of Jacobson.	<i>trg.</i> , trigeminal ganglion.
<i>ll.</i> , lateral line nerve.	<i>trp.</i> , trabecular parachordal.
<i>m.</i> , medulla.	<i>tso.</i> , tectum synoticum.
	<i>v.</i> , vagus nerve.
	<i>vll.</i> , ventral lateral line nerve.
	<i>vr.</i> , roots of vagus and glossopharyngeal.
	<i>vrt.</i> , ventral root.

9. The Mammals of the Tenth Edition of Linnæus ; an Attempt to fix the Types of the Genera and the exact Bases and Localities of the Species. By OLDFIELD THOMAS, F.R.S., F.Z.S.

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The tenth edition of Linné's 'Systema Naturæ' is the recognized basis and commencement of all systematic zoological work, but doubtful questions in its interpretation are very numerous, and there is probably nothing more desired, by mammalogists at least, than a methodical examination of this important work, with suggestions, obtained on some definite and uniform system, for the identification of its types, both of genera and species.

For many years I have taken a very great interest in this subject, and have now ventured to prepare the present paper, with the hope that it may be of service to other mammalogists less favourably situated as regards books and specimens than I have

the privilege of being. For in all the work I have scarcely in a single instance been unable to obtain from the library of the Natural History Museum what books I have wanted to verify Linnæus's quotations, however rare and obscure they have been. Without such an advantage it would have been impossible to do the work at all.

With regard to the method used for finding the type-species of the Linnean genera, I would draw attention to the very considerable extent to which the principle of tautonymy is available. In a great proportion of cases Linnæus selected as a generic name a term which had been used by earlier writers for the single name of a member of the genus, so that among the species of any given genus there is commonly one which has among its synonyms the name used by Linnæus for the genus.

These names are generally quoted from Gesner, and comprise the most conspicuous and best-known members of each genus, so that in nearly all cases the genotype selected on this system is the very one which by general consent we should wish to have for the type. Any other rule that has been suggested, either "first species" or "elimination," is liable to produce results by no means so satisfactory—indeed, the many objections to both are too well known to need any insistence upon here. Nor can any later and arbitrary selection of types without reason assigned be taken as necessarily valid.

In two cases only, those of *Simia* and *Dasypus*, are results arrived at different from those obtained by previous writers. The shifting of the latter name from the rarer "*Euphractus*" to the really common *Tatusia* is unfortunate, but is necessary if we are to get the benefit of the general stability which is obtainable from the acceptance of the principle of tautonymy.

The case of *Simia*, however, is very different, and I confess to hoping that the suggestions which are now being made for some overruling decision in the case of certain well-known but technically misapplied names may be carried out, both as to a number of such names in general and to *Simia* in particular.

But it seems advisable, nevertheless, to put the technical case irrespective of the prospect of any such decision, and therefore (while hoping that a fiat attaching *Simia* to the Orang may go forth) I have to point out that this name should be applied to the Macaques, with *S. sylvana* (the Barbary Ape) as its type, while *Anthropopithecus* will remain available for the Chimpanzees.

Should no such fiat as I speak of ever come to pass, this allocation of *Simia* is at least better than its application to the Chimpanzees. Not only is it less confusing in itself, owing to the consequent total abolition of the combination *Simia satyrus*, connected for a century with the Orang, but now sought to be applied to the Chimpanzee, but also the genus to which it goes, that of the Macaques, is already marked as the victim of a nomenclatural change, for *Pithecus* antedates *Macaca*, and therefore one change is not much worse than the other.

Moreover, the Macaques are far less often dealt with or spoken of by outside writers, not up to date in nomenclatural technicalities, than are the Anthropoid Apes, among whom such a change has the maximum of inconvenience.

[After the completion of the present paper, there has come into my hands a copy of the "Opinions rendered by the International Commission on Zoological Nomenclature," dated July 1910, but received by members of the Gratz Congress only at the end of October.

In this publication the question of Linnean Genera in general and *Simia* in particular is dealt with, certain conclusions are come to not differing widely from my own, and the principle of tautonymy as applied to the names in Linnæus is on the whole approved of.

Two genera (*Mus* and *Camelus*) have types definitely fixed for them, twenty are mentioned as "seeming to retain as types" the species I fix for them by tautonymy, though this is "not a ruling by the Commission," and *Dasypus* is ignored.

With regard to *Simia*, the Commissioners, while seeing that the rule brought the type on to *sylvanus*, would appear to have thought it a benefit for zoology that *satyrus* should be considered as such, an opinion in which I believe but few zoologists on careful consideration would be found to agree with them. Under this idea a brief but rather far-fetched and unconvincing argument is adduced to avoid the simple conclusion about *sylvanus*, viz. :— that "an examination of Gesner's text shows that he did not use *Simia* in the specific sense of 'the simia,' and that therefore *Simia* Gesner, as used in the synonymy of *S. sylvanus*, cannot be considered as the name of a species."

Now I have carefully examined Gesner (three editions, including that quoted), and can only say that his use of *Simia* is exactly the same as his use of other names which are accepted as tautonyms. On p. 847 he writes "de *Simia*," and gives a figure of the Barbary Ape, and then on p. 855 he begins on other monkeys under the heading "de *Simiis diversis*." Exactly in the same way we have "de *Mure*" on p. 714 (*Mus musculus*) and "de *Muribus diversis*" on p. 731; "de *Mustela*" on p. 752, "de *Mustelis diversis*" on p. 762.

It is true that the Commissioners do not definitely accept as a ruling of the Commission the above-mentioned twenty names on the rigid basis of tautonymy, but seem to take as valid Palmer's selection of the types as published in his Index (1904).

But the latter work cannot be accepted as that of a "reviser" in the true sense of the term. It is merely a bibliographical work giving an indication of what species have been currently accepted as types, without special revision by authors with all the facts before them. In no case could I admit that it should override the clear case for tautonymy presented by *Simia* equally with the twenty genera in which its results are agreed to both by Palmer and the Commissioners]

The question of the species is not so simple as that of the genera, having been complicated by the pages and pages which commentators have thought it necessary to write balancing the pros and cons in each case, weighing the importance of this reference or that, and deciding that such and such is the "primary quotation" and should be taken as the basis of the Linnean name. This balancing method, however charming an exercise of the writer's ingenuity it may provide, is unfortunately full of the personal equation, and therefore objectionable, while any method which works automatically should be welcomed by those desirous of coming to a final and impersonal decision on such points.

The system I advocate is that Linnæus's quotation of his own earlier writings should be given an absolutely overriding importance, and that, where these exist and can be traced back, all others should be ignored.

This principle is not an arbitrary one, but is quite reasonable. For when in 1758 Linnæus gave a binomial name to an animal to which he had already given in 1748 a species-number and a diagnosis (quoting it in the tenth edition), his idea of the species would clearly have been formed at the earlier date, the later edition only adding the binomial name. To accept as of primary importance in the determination of the latter some reference which was not in existence at the time of the earlier edition appears to me little short of ridiculous.

But if we take Linnæus's own Linnean quotations—which are, in most cases, of the sixth edition—we get our field of selection narrowed down at once to one or two easily traceable references, from which the basis of the author's original idea of each species is readily obtainable.

So important did Linnæus himself think the sixth edition that practically every species of Mammal in it is quoted in the tenth, and that merely by its page and number, as if that were the one edition to which attention should be paid.

Curiously enough, this does not seem to be the case in other groups than Mammals, the references to the sixth edition being omitted, and primary stress laid on the 'Fauna Suecica.'

With regard to type localities, I have made every effort to identify the places from which the specimens came that were the original bases of Linnæus's names. His own statements of habitat are for the most part too vague to be of any use, while accepting them literally would sometimes lead to grotesque errors, such as the assertion, based on Linnæus's "*Hab. in Indiis*," that "some Indian Armadillo" (!) should be taken as the basis of *Dasypus septemcinctus*. "In Indiis," in fact, hardly amounts to more than a statement that the species is exotic.

But many localities can be settled from the authors quoted, as, for example, in the case of Marcgrave, on whose descriptions* Linnæus's names for a large number of the commoner Brazilian

* 'Historiæ Rerum Naturalium,' Brasiliæ, 1648.

species were based. With all these we are able to fix as a type locality Pernambuco, for Marcgrave stayed at "Moritzstadt," now Recife, most of his time, 1640-1644, while even his excursions were limited to the coast region between $5^{\circ} 45'$ and $11^{\circ} 11'$ S., thus taking in little more than from Rio Grande do Norte to Alagoas, a region at the centre of which Pernambuco lies.

Again, with regard to species named from the figures in Seba's 'Thesaurus,' it would not be unjustifiable to suggest that in the case of all tropical South American animals, Surinam—the great source of all Dutch collections—should be accepted as the type locality, except when the preservation of the type specimen or some incompatibility in the description shows this to have been impossible.

The alterations in nomenclature that have proved to be necessary are fortunately comparatively few, certainly far fewer than I had originally feared would be the case. Those not previously published are the following:—

- Simia*. Genotype not *satyrus* but *sylvanus*. p. 125.
- Anthropopithecus satyrus* for Chimpanzee. p. 125.
- Technical name of Barbary Ape, *Simia sylvana*. p. 125.
- Pygathrix* a distinct genus from *Presbytis*. p. 127 (footnote).
- Macaca syrichta* for *M. philippinensis* auct. p. 129.
- Manis pentadactyla* for *M. dalmani* Sund. p. 133.
- Dasypus* for *Tatu*; *Euphractus* for "*Dasypus*." p. 141.
- Arvicanthus striatus* for *A. pulchellus* Gray. p. 148.
- Physeter catodon* for *Ph. macrocephalus* Linn. p. 157.

Other names here confirmed, which are unfamiliar, though not now published for the first time, are those indicated for the Whalebone Whales by Mr. F. W. True, those of certain monkeys (*Cebus*, *Mandrill*, &c.), recently pointed out by Dr. Elliot, *Presbytis aygula* for *P. mitratus*, *Cynocephalus volans* for the Philippine Colugo, *Elephas maximus* for the Indian Elephant, and *Myrmecophaga tridactyla* for *M. jubata*.

In one respect the present paper does not complete the examination of all the Linnean 1758 species, for a certain number are still unidentified pending the study of typical specimens formerly in the "Museum Regis Adolphi Friderici," and no doubt in many cases still in existence. I would commend to my colleagues in Sweden an examination of the old collections there preserved, with an identification of such types as are still extant. Perhaps Dr. Einar Lönnberg may be able to forward this final completion of the study of the "Zoological Bible" written by his immortal compatriot.

In the following pages the genera and species are arranged as in the 'Systema,' while opposite the name of each species on the right-hand side of the page I have placed the name of the recognized modern genus into which that species falls.

4. MURINA. p. 55. *Marmosa.*

Linnean reference: Amœn. Acad. i. p. 279.—This is an error, the only Opossum referred to being the large *Didelphis marsupialis*.

Second reference: Seba, Mus. i. p. 48, pl. xxxi. figs. 1-2, which must be taken as the basis of the name.

Murine Opossum.

Co-types in British Museum, Nos. 67.4.12.541-542 (see P. Z. S. 1892, p. 314).

Suggested type locality: Surinam.

5. DORSIGERA. p. 55. *Marmosa.*

Primary reference to Seba, Mus. i. p. 49, pl. xxxi. fig. 5.

Synonym of *Marmosa murina*.

Type in British Museum, No. 67.4.12.546.

Suggested type locality: Surinam.

Genus 22. RHINOCEROS. p. 56.

Two species. Type by tautonymy: *R. unicornis* ("Rhinoceros, Jonst.").

Species:

1. UNICORNIS. p. 56. *Rhinoceros.*

Linnean reference: Syst. Nat. (6) p. 11, no. 1.

One-horned Indian Rhinoceros.

From Jonston's 'Quadrupeds' (p. 67, 1657), the first work quoted in the 10th edition, we get the

Type locality: Bengal.

2. BICORNIS. p. 56. *Diceros.*

Linnean reference: Syst. Nat. (6) p. 11, no. 2, where no further quotation is given.

Always accepted as the African Two-horned Rhinoceros.

Type locality not determinable, except that the Cape may generally be considered the place whence early specimens were brought. "Habitat in India" may, as usual, be entirely ignored.

Genus 23. HYSTRIX. p. 56.

Five species. Type by tautonymy: *H. cristata* ("Hystrix, Gesn.").

Species:

1. CRISTATA. p. 56. *Hystrix.*

Linnean reference: Syst. Nat. (6) p. 9, no. 1, where the first quotation is to Ray (Quadr. p. 206), whence we find

Type locality: Rome.

Common Porcupine.