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Cover: The scientific basis for reducing the South African seal population is described in the article on page 179. Photograph: *The Argus*, Cape Town.

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Gesamentlik uitgegee deur die Geassosieerde Wetenskaplike en Tegniese Verenigings van Suid-Afrika en die Buro van Wetenskaplike Publikasies van die Stigting vir Onderwys, Wetenskap en Tegnologie onder die beskerming van die Raad vir Wetenskaplike Publikasies met finansiële hulp verleen deur die Departement van Nasionale Opvoeding.

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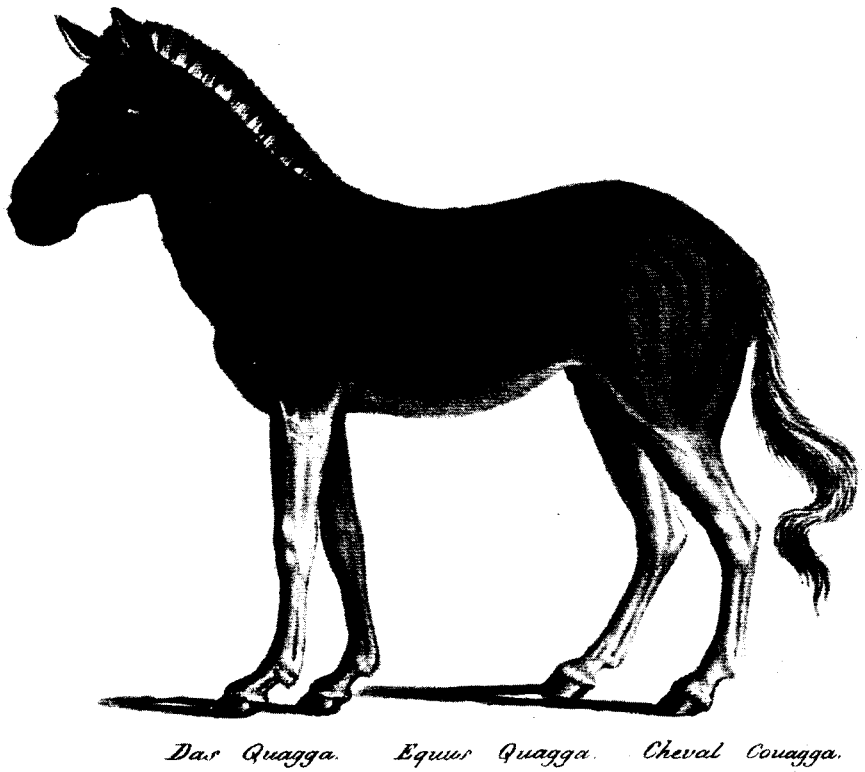
dividuals with a fainter striping pattern over the hind quarters in a manner reminiscent of the quagga are not that uncommon. Perhaps the quagga is not strictly speaking extinct at all; its genes are possibly merely diluted in and dominated by those of the plains zebra. In which case it should be possible to retrieve these genes from the extant population by selective breeding. There are two aspects of the coat pattern that characterize the quagga—the paucity or absence of stripes over the posterior part of the body and legs, and the presence of a rich brown as the ground colour of the upper parts of the body. The key justification for such an attempt at selective breeding is the demonstration that the quagga was not a separate species. If that had been the case a selective breeding attempt would be quite unjustifiable, and even if apparently successful the product would be only a quagga lookalike with no true claim to be the genuine article. Since it is the same species, however, if within a few generations of selective breeding an animal with the characteristics of the quagga can be produced, it will be possible to state that it is indeed a genuine quagga. The only thing that defines the quagga as separate from the plains zebra are the colour characteristics described above, and if the genes producing them can be brought together again in one animal, then one can aver that the quagga has been genuinely retrieved from the population of plains zebra.

To this end a project under the auspices of the South African Museum in Cape Town, chaired by its director, Dr Mike Cluver, and with committee members drawn from veterinarians, animal scientists, zoologists, nature conservationists and molecular biologists, has been started, with nine selected zebras from Etosha National Park now housed in a selective breeding centre at Vrolijkheid near McGregor. This is a unique experiment in selective breeding. If in a few generations it is successful, and a quagga once more walks the plains of the Cape Province, we will be able to claim that we have in a small way regained some of the damage done by the wanton destruction of so many of this continent's natural fauna over the last few centuries.



An early painting of the quagga, dated circa 1850. (Courtesy South African Museum)

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The taxonomic importance of C.P. Thunberg's revision of South African mammals (1811)

L.C. Rookmaaker

Carl Peter Thunberg (1743 – 1828) was a student of Linnaeus at the University of Uppsala, who consistently followed his teacher's principles of taxonomy and nomenclature. On completion of his studies, Thunberg undertook a long journey to Japan from September 1770 to March 1779, visiting Indonesia, Sri Lanka and South Africa on the way. He returned to Sweden with an extraordinary collection of plants and animals, which he donated to the University of Uppsala in July 1785. Thunberg was put in charge of the natural history museum of that institution, a position he held until his death.

Thunberg is well known for his travels and for his contributions to botany. He published an account of his journeys in Swedish between 1788 and 1792. His first task was to sort the plant specimens, which resulted in regional floras like the *Flora Iaponica* (1784) and the *Flora Capensis* (1807 – 1820). His botanical achievements overshadow his zoological work. For instance, his entomological papers, which number about 46, rate a mere mention in his biographies.[1] His mammalogical publications are even more obscure.

Thunberg's mammal papers

Thunberg apparently reviewed the mammals living at the Cape of Good Hope in 1810 and 1811. He studied the specimens available in Uppsala and consulted the available literature. This resulted in one major revision and three minor papers on South African mammals. The revision is the subject of this article.[2] Two short papers, both published in 1811, gave the first descriptions of *Antilope monticola*[3] and *Viverra felina*.[4] It is not possible to ascertain which of these three papers of 1811 appeared first. In the revision Thunberg referred to the other two descriptions, which could have been similar to our present procedure of quoting articles 'in press'. Several years later he added another contribution in which he described *Hyaena brunnea* for the first time.[5] It is unlikely that this was based on material which he himself had brought from South Africa.

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The *Animalia Capensia*

The full title of the 1811 revision was *Animalia Capensia, recensita et illustrata*. I do not understand why it was said to be 'illustrated' because there are no accompanying plates in the two copies I consulted (library of the University of Utrecht and the British Museum (Natural History), London). It was written in Latin, and has been rarely consulted. The work is sometimes quoted in checklists of (South) African mammals, as it contains two new names in current use; Roberts[6] and Mohr[7] also referred to it. However, when studying it in detail, I found another species name which had never been noticed before.

Thunberg listed 59 South African mammals in this revision. All of them are provided with a binominal name together with a short diagnosis or description and sometimes references to older literature. Clearly all these names are available for purposes of nomenclature. Among the 59 species, two names refer to domesticated animals.

It is interesting to compare Thunberg's results with our present understanding (Table 1). The number of species enumerated by him can be compared with that known today as reviewed in the valuable work by Smithers.[8] Smithers listed 123 species found in the Cape Province south of 30°S and west of 24°E, which is roughly the region explored in Thunberg's time. These figures alone, however, create an imbalance, because some larger mammals especially, that were well known in the Cape Province at the time, are now no longer found there.[9] I have therefore added to the recent total 15 species which formerly occurred in the Cape Province: 4 Carnivora, 2 Perissodactyla and 9 Artiodactyla. The comparison shows that the smaller mammals were practically unknown in Thunberg's time. Among the Insectivora, Chiroptera, Lagomorpha and Rodentia Thunberg recorded 9 out of 83 species only (11%). His score for the larger mammals was much better, with 48 out of 58 species noted (82%).

At the end of the revision, Thunberg[2] also listed the specimens present in the museum of the University of Uppsala. He had brought all the South African mammals to Sweden himself, if we are to believe his word *'in Europam attuli'* ('I have brought to Europe'). He listed 36 species represented by 41 specimens (38 skins, 3 skulls). Out of these 36 species, 3 (*Myrmecophaga capensis, Hippopotamus amphibius* and *Bos caffer*) were represented by skulls only and the others by one or two skins. If a species is mentioned in this list, I have added an * to the name in the enumeration of the contents below.

Mammals known to Thunberg

The following species were listed by Thunberg.[2] The first column gives the serial number and name provided by Thunberg, the second column the present identification according to Meester *et al.*[10] A short annotation is included only when necessary.

Thunberg's name	Present name
1. *Simia sphinx* (p. 301)*	*Papio ursinus* (Kerr, 1792)

There were skins of a male and a female in the museum.

2. *Simia sabaea* (p. 301)*	*Cercopithecus aethiops* (L., 1758)
3. *Myrmecophaga capensis* (p. 301)*	*Orycteropus afer* (Pallas, 1766)
4. *Canis aureus* (p. 302)*	*Lycaon pictus* (Temminck, 1820)
5. *Canis mesomelus* (!) (p. 302)*	*Canis mesomelas* Schreber, 1778
6. *Hyaena maculata* (p. 302)	*Crocuta crocuta* (Erxleben, 1777)
7. *Felis leo* (p. 303)*	*Panthera leo* (L., 1758)

There were skins of a male and female in the museum.

8. *Felis pardus* (p. 303)*	*Panthera pardus* (L., 1758)
9. *Felis jubata* (p. 304)*	*Acinonyx jubatus* (Schreber, 1775)
10. *Felis capensis* (p. 304)*	*Felis serval* (Schreber, 1776)
11. *Felis chaus* (p. 304)*	*Felis lybica* Forster, 1780

There were skins of a male and female in the museum.

12. *Felis caracal* (p. 304)*	*Felis caracal* (Schreber, 1776)
13. *Viverra tetradactyla* (p. 305)	*Suricata suricatta* (Schreber, 1776)
14. *Viverra ichneumon* (p. 305)*	*Herpestes ichneumon* (L., 1758)
15. *Viverra grisea* (p. 305)*	*idem*?

Both 14 and 15 are now taken together as the South African subspecies *Herpestes ichneumon caffra* (Gmelin, 1788). I am not sure whether I agree, because Thunberg had two skins which differed slightly. Roberts[6] stated that Thunberg's *Viverra grisea* was an Asiatic species, which cannot be true unless Thunberg mixed up the locality connected with the skin in Uppsala.

16. *Viverra barbara* (p. 306)*	?*Atilax paludinosus* (Cuvier, 1829)

Mustela barbara L., 1758 is now referred to the South American *Eira barbara*. Thunberg's description could point to the species mentioned.

17. *Viverra tigrina* (p. 306)*	*Genetta tigrina* (Schreber, 1776)
18. *Viverra felina* (p. 306)*	*Genetta genetta felina* (Thunberg, 1811)

The usual and acceptable reference to this name given is in the separate paper by Thunberg[4].

19. *Viverra zorilla* (p. 306)*	*Ictonyx striatus* (Perry, 1810)
20. *Meles mellivora* (p. 306)*	*Mellivora capensis* (Schreber, 1776)
21. *Talpa asiatica* (p. 307)	*Chrysochloris asiatica* (L., 1758)
22. *Hyrax capensis* (p. 307)*	*Procavia capensis* (Pallas, 1766)
23. *Arctomys maritimus* (p. 307)*	*Bathyergus suillus* (Schreber, 1782)
24. *Arctomys capensis* (p. 308)*	*Georychus capensis* (Pallas, 1779)
25. *Arctomys vigil* (p. 308)	*Parotomys brantsii* (A. Smith, 1834)

The only animal marked 'nova species', although no specimen was available. It is discussed below.

26. *Lepus cuniculus* (p. 309)	*Oryctolagus cuniculus* (L., 1758)
27. *Lepus capensis* (p. 309)	*Lepus capensis* L., 1758
28. *Dipus caffer* (p. 309)	*Pedetes capensis* (Forster, 1778)
29. *Sciurus capensis* (p. 309)	*Xerus inauris* (Zimmermann, 1780)
30. *Hystrix cristata* (p. 310)*	*Hystrix africaeaustralis* Peters, 1852
31. *Camelopardalis giraffa* (p. 310)	*Giraffa camelopardalis* (L., 1758)
32. *Antilope oreotragus* (p. 311)	*Oreotragus oreotragus* (Zimmermann, 1783)
33. *Antilope capreolus* (p. 312)	*Pelea capreolus* (Forster, 1790)
34. *Antilope nictitans* (p. 312)	*Sylvicapra grimmia* (L., 1758)
35. *Antilope melanotis* (p. 312)	*Raphicerus melanotis* (Thunberg, 1811)
36. *Antilope campestris* (p. 313)	*Raphicerus campestris* (Thunberg, 1811)

The current names for the grysbok and steenbok are based on this description by Thunberg.[2] These are the first valid names, but not the first descriptions with binominal names.[11]

37. *Antilope oryx* (p. 313)*	*Oryx gazella* (L., 1758)
38. *Antilope leucophaea* (p. 313)*	*Hippotragus leucophaeus* (Pallas, 1766)
39. *Antilope orcas* (p. 314)*	*Taurotragus oryx* (Pallas, 1766)
40. *Antilope eleotragus* (p. 314)*	*Redunca arundinum* (Boddaert, 1785)

The skin in the museum was that of a male.

41. *Antilope monticola* (p. 314)*	*Philantomba monticola* (Thunberg, 1789)

The skin in the museum was that of a male. This small antelope was described separately by Thunberg.[3] The date in the citation is taken from the travel account where it was noted and named.

42. *Antilope sylvatica* (p. 315)*	*Tragelaphus scriptus* (Pallas, 1766)
43. *Antilope maculata* (p. 315)*	*Damaliscus d. dorcas* (Pallas, 1766)
44. *Antilope pygarga* (p. 315)*	*Antidorcas marsupialis* (Zimmermann, 1780)
45. *Antilope dorcas* (p. 316)*	*Alcelaphus buselaphus* (Pallas, 1766), subsp. *caama* (G. Cuvier, 1804)
46. *Antilope strepsiceros* (p. 317)*	*Tragelaphus strepsiceros* (Pallas, 1766)

There were skins of an adult and young in the museum.

47. *Ovis aries: capensis* (p. 317) — domestic sheep
48. *Bos caffer* (p. 318)* — *Syncerus caffer* (Sparrman, 1779)
49. *Bos gnu* (p. 318)* — *Connochaetes gnou* (Zimmermann, 1780)
50. *Bos indicus* (p. 319) — domestic cow
51. *Equus zebra* (p. 319)* — *Equus zebra* L., 1758

There were skins of an adult and young in the museum.

52. *Equus quagga* (p. 319) — *Equus quagga* Boddaert, 1785
53. *Sus africanus* (p. 320) — *Potomachoerus porcus* (L., 1758)
54. *Sus aethiopicus* (p. 320) — *Phacochoerus aethiopicus* (Pallas, 1766)
55. *Rhinoceros bicornis* (p. 320) — *Diceros bicornis* (L., 1758)
56. *Elephas africanus* (p. 320) — *Loxodonta africana* (Blumenbach, 1797)
57. *Hippopotamus amphibius* (p. 321)* — *Hippopotamus amphibius* L., 1758
58. *Phoca antarctica* (p. 321) — *Arctocephalus pusillus* (Schreber, 1775)

There is no description, only a locality: 'mare australe inhabitat'. Meester *et al.*[10] said it was a *nomen nudum*.

59. *Phoca leonina* (p. 322) — ? *Mirounga leonina* (L., 1758)

At the end of the revision, Thunberg[2] mentioned another two species about which he was undecided. The first was the wild horse Levaillant[12] saw in the country of the Great Namaquois, the present southern Namibia. He said it could be either *Equus hemionus* or a totally new species. The second species was the *Mus pumilio* described by Sparrman.[13] Thunberg suggested its similarity with *Mus barbarus*, a species not listed among the South African mammals. Stockholm being near to Uppsala, and Sparrman being known to Thunberg, it is a little strange that Thunberg expressed this doubt.

Arctomys vigil

This rodent was the only new species included in the revision according to Thunberg. There was no specimen in Uppsala, meaning that he must have followed his memory or notes in the description. It reads as follows in the original:

25. *Arctomys vigil,* nova species. In desertis, siccissimis, Carro dictis, hunc inveni imprimis numerosum, ubi in terra argillacea cuniculos, orientem versus apertos et oblique descendentes construit. Sole oriente claustra dimidia exit gregarius et difficile plumbo occiditur, ad visum ignem ocyssime se retrahens. Magnitudine Ratti rufescens, lateribus subtusque griseus. Cauda corpore triplo brevior, setosa. Dentes bini primores utrinque, truncati, cuneati seu basi crassiores; superiores extus sulco exarati: canini nulli: molares plures, truncati. Palmae tetradactylae; plantae pentadactylae, unguiculatae.

This can be freely translated as:

25. *Arctomys vigil,* new species. I have found it particularly numerous in the driest deserts called Caro [Karoo]. There it constructs subterranean burrows in the clayish soil, which open towards the east and descend in a slope. When the sun is in the east, it comes out of the openings, and it is difficult to kill with a bullet, as it jumps back inside very quickly when it sees the light. It is the size of a rat, with a reddish colour, but the flanks and belly are grey. The tail is three times shorter than the body, with bristly hairs. There are two front teeth on both sides, truncated, cuneiform. The upper teeth are clearly grooved. No canini, many molars, truncated. The hands have four fingers, the feet have five, with claws.

This description, especially the notes about its habits, must refer to the species now named Brants' whistling rat, *Parotomys brantsii* (A. Smith, 1834) which lives in burrows in drier regions, has a tail about one third of its body length and has grooved upper incisors.[8,10] The identification was suggested by J. Meester, of the University of Natal. It is unfortunate that the name given by Thunberg antedates the current one. Because this would upset the stability of nomenclature and because Thunberg's name has been forgotten, an application has been sent to the International Commission for Zoological Nomenclature to request the suppression of *Arctomys vigil*.

Table 1. A comparison of the mammals described by Thunberg[2] and the number of species recorded by Smithers[8] from the Cape Province. Some species which have now disappeared from the region have been added to the totals of Smithers.

Order	Thunberg	Smithers	Date of first description 1758–1799	1800–1820	1821–1850	1851ff.
Insectivora	1	19	1	1	7	10
Chiroptera	–	20	1	6	7	6
Primates	2	2	1	–	1	–
Lagomorpha	2	5	2	–	2	1
Rodentia	6	39	8	–	22	9
Carnivora	17	26	14	3	8	1
Pinnipedia	2	7	2	1	2	2
Tubulidentata	1	1	1	–	–	–
Proboscidea	1	1	1	–	–	–
Hydracoidea	1	1	1	–	–	–
Perissodactyla	3	3	3	–	–	–
Artiodactyla	21	22	19	3	–	–
Total	57	146	54	14	49	29

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