

# THE RHINOCEROS OF BORNEO: A 19TH CENTURY PUZZLE

by

L.C. ROOKMAAKER

## Preface

The sudden death of Tom Harrisson was a great loss for many people in a great number of disciplines, among them those interested in the South-East Asian rhinoceroses. During many of Harrisson's expeditions through Borneo, he tried to assess the status of the animal, both by talking to others and through personal observation. In 1956 he wrote a paper about the Bornean rhinoceros in the *Sarawak Museum Journal* incorporating older stories and some of his own findings. This has remained practically the only major contribution to the subject. After this he occasionally wrote about the rhinoceros, mainly in Borneo.

In the last years of his life he became aware of the very precarious situation now facing especially the Sumatran rhinoceros. This species, more than any of the other rhinos (except the Northern white rhinoceros), is in grave danger of becoming extinct. The numbers are low and the animal occurs in many different small areas separated from each other and located throughout most of the South-East Asian countries. Harrisson clearly saw that this situation cannot last very long and that drastic protective measures must soon be taken. He died with the hope to do something about it. A continuation of his efforts for this cause would have pleased him greatly.

Harrisson's name is aptly immortalised in the name of the Bornean sub-species of the Sumatran rhinoceros. Although he often expressed his doubts about the validity of the subspecies, he was (I think) more pleased with it than he was willing to admit. In any case, this name is a fitting tribute to Harrisson's contributions to rhinocerotology.

## Introduction

In 1840 it was realised that a rhinoceros inhabited Borneo. While not everybody immediately accepted this, a discussion on its possible identity was started. Two rhinoceros species are known from South-East Asia: the one-horned Javan rhinoceros (*Rhinoceros sondaicus* Desmarest, 1822), and the two-horned Sumatran rhinoceros (*Dicerorhinus sumatrensis* (Fischer, 1814)), and a choice between these two had to be made. Many speculations, wrong identifications and controversies followed until at last, in 1895, the problem was solved. It was decided that *Dicerorhinus sumatrensis* (hereafter referred to merely as *sumatrensis*) alone lived on Borneo and that the one-horned *Rhinoceros sondaicus* (hereafter as *sondaicus*) had never existed there. It is important to keep this undoubted fact in mind. The rhinoceros is very rare on Borneo at present and it is unlikely that more than five or ten animals still survive there. This essay will contribute little to its protection. But some action should be taken to prevent the extinction of the Sumatran rhinoceros; Borneo may not be the best place for this, but it should not be forgotten.

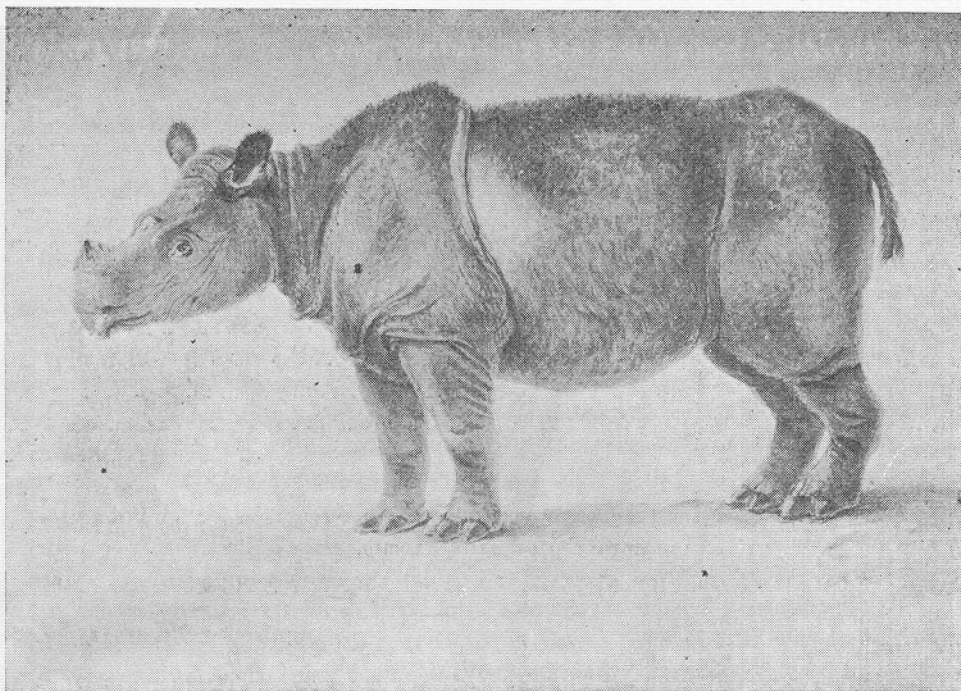


Plate 1. Sumatran rhinoceros (*Dicerorhinus sumatrensis*). Like Plates 2 and 3, this is a coloured sketch in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden, Holland. Although unsigned, they were probably made by P. van Oort, who stayed in the Dutch East Indies from 1826 to 1834, connected with the Dutch "Natuurkundige Commissie." The rhinoceros article in Temminck (1839-45) was, for some unknown reason, illustrated by new, less good, drawings by H. Schlegel. Published by permission of L. Schlawe, Berlin (who provided the photo) and the Rijksmuseum van Natuurlijke Historie, Leiden.

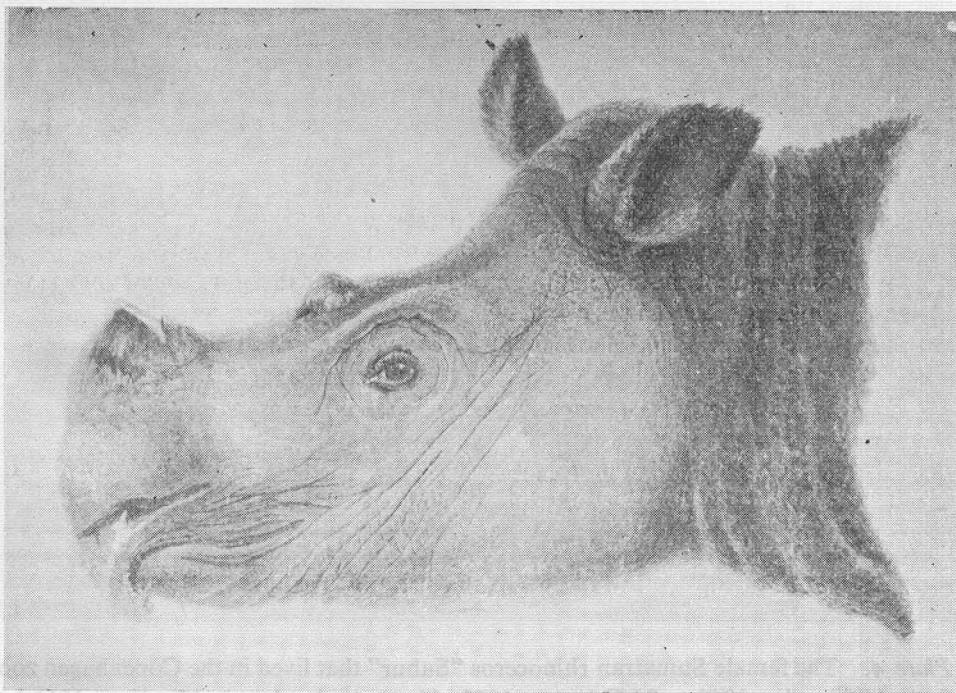


Plate 2. Head of a Sumatran rhinoceros, from a coloured sketch. Published by permission of L. Schlawe, Berlin, and the Ryksmuseum van Nakuurlyke Historie, Leiden.

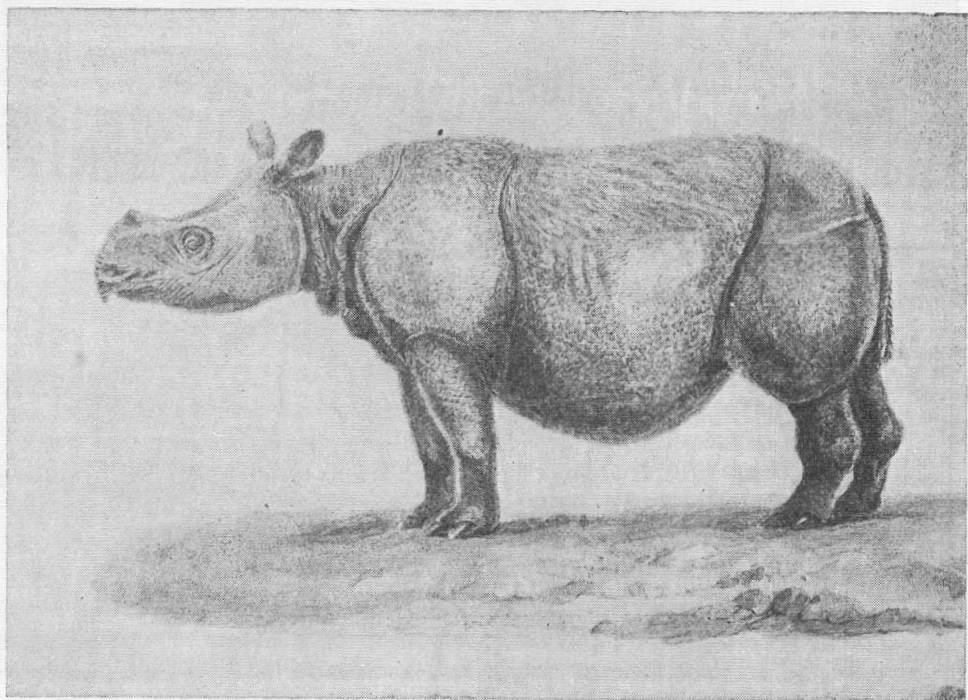


Plate 3. Javan rhinoceros (*Rhinoceros sondaicus*). Published by permission of L. Schlawe, Berlin, and the Rijksmuseum van Natuurlijke Historie, Leiden.

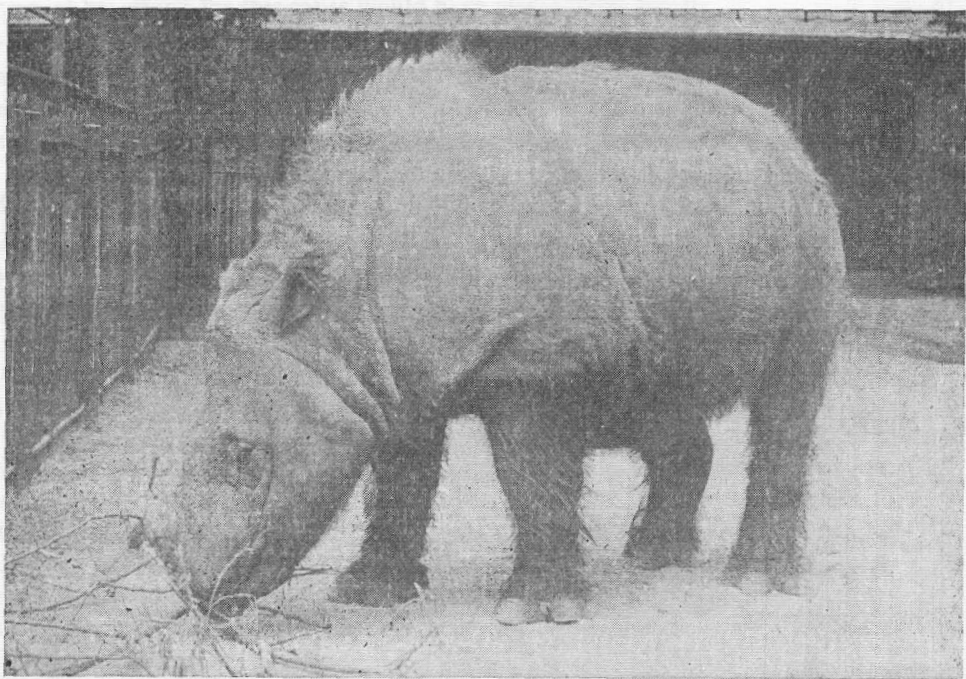


Plate 4. The female Sumatran rhinoceros "Subur" that lived in the Copenhagen zoo from 4 December 1959 to 24 February 1972. Photograph taken in May/June 1961 by L. Schlawe, Berlin, and published with his permission.

This paper is almost solely based on references to the subject in literature. Although I have aimed at completeness, I realise that further writers in the 19th century have mentioned (or failed to mention, which is sometimes just as important) the Bornean rhinoceros. Hopefully, however, I have provided a fair survey of the main opinions that have been held at different times.

### Taxonomic considerations

In the early 1860s the British Museum in London obtained a rhinoceros skull from a dealer, who asserted that it came from Borneo (Gray, 1862: 282, no.c). Gray (loc.cit.) originally assigned it to "*Rhinoceros javanicus*", and this is less strange, considering the locality, than one would think today. At that time *sondaicus* was the only species more or less generally accepted for Borneo (see below). In fact, Gray was correct for this skull (BMNH., no.723c) "fits well into the sample of the typical race" (i.e. *R. sondaicus sondaicus*) (Groves, 1967:234). The locality "Borneo" was still accepted by Pocock (1946:307), but it is more likely that the skull came from Java (Groves, 1967:234).

Five years later, Gray described his *Rhinoceros nasalis* with "Habitat: Borneo" (Gray, 1867:1012-1015, figs. 1-2; repeated in Gray, 1869: 304-307, figs. 34-35) and the 'Bornean' skull no. 723c became its type specimen. A second skull that he ascribed to the new species, BMNH., no.723b, was from an unknown locality (Pocock, 1946: 308). The label on the specimen, however, stated that "Java" was its place of origin, which "habitat may depend on the person having decided it to be *R. sondaicus*" (Gray, 1867: 1013). Gray unfortunately made the same mistake: he decided that the skull belonged to *R. nasalis* and that, therefore, it came from Borneo. Against such logic a protest was raised by Murray (1868). *Rhinoceros nasalis* luckily never found much acceptance in taxonomic literature. Almost immediately it was demonstrated that there were insufficient characters to distinguish it from *sondaicus*, of which the name *nasalis* became a junior synonym (Owen in Murray, 1868:441; Flower, 1876: 450; Pocock, 1946:307-308; Groves, 1967:234). Von Martens (1876:257) mentioned a *Rhinoceros frontalis* Gray from Borneo but almost certainly he meant *nasalis* (cf. Sody, 1959: 168).

The two-horned Sumatran rhinoceros had to wait almost a whole century before its Bornean subspecies was recognised. "The Bornean rhinoceros will eventually have to be recognized as a peculiar species", wrote Blyth (1872a:403) concerning the two-horned rhinoceroses, and later (Blyth, 1875:53) he added that it "would appear to be a still smaller species." Obviously his material was insufficient to separate it from *Dicerorhinus sumatrensis*. The decision to designate a new subspecies was taken by Dr. Colin P. Groves as late as 1965 and he named it '*Didermocerus sumatrensis harrissoni*', after Tom Harrisson (Groves, 1965:130; see Harrisson, 1965:xix for a comment). Groves (loc.cit.) gave as diagnosis: "skull markedly smaller than in other subspecies; occiput forward-sloping, with a higher surface than in other subspecies." The type specimen is BMNH. 1901.8.15.1, the skull of a young female from Suan-Lambah in Sabah (Appendix 1, no.11).

Actually, the two-horned Bornean rhinoceros had already been provided with a name. In 1912 Hose and McDougall ([1912] 1966:3) wrote about the existence on Bor-

neo of, among others, "the rhinoceros (*R. borniensis*, closely allied to *R. sumatranus*)." Later in the book (p.145) it is described how rhinos are hunted by Punans, but neither a description nor an illustration of the animal is given. Therefore, the name *borniensis* must be considered a *nomen nudum*.

### The historical development

1. As far as I have been able to ascertain, Houttuyn (1761:330) was the first to mention a rhinoceros from Borneo. His source is unknown and this statement has remained largely unnoticed. In about 1839, presumably, a *sondaicus*-skull was sent to the Natural History museum in Brussels (no.1207) by the collector Henrici and it was said to have been from Borneo (Dr. X.Misonne, in litt., 9 January 1975). This specimen never appeared in the 19th century literature and its influence was probably minimal. I shall have reason to return to it later. The world had to wait for the very influential account by Salomon Müller, to whom the actual discovery of the rhinoceros on Borneo may be ascribed. He wrote (translated from the Dutch): "In an equally uncertain manner, we heard from different Malays and Dayaks that rhinoceroses would occur in several places in Borneo. [...] According to a rough sketch by a Bejadjoe-Dayak, who once, when he was young, had seen a male rhinoceros in the upper region of the river Kahayan, the animal was as big as a large buffalo but armed with only one horn. Immediately the question raises itself whether it could be, perhaps, the Rhinoceros Sondaicus, at present only known from Java, or that the Bornean animal belongs to the rhinoceros of the mainland, or constitutes a species of its own" (Müller, 1840:39).

Five years later nothing could be added to this by Müller and Schlegel (1845). What facts had been presented by Müller? He had stated that a rhinoceros existed on Borneo and that it had one horn, and he based himself on one, or maybe a few, conversations with Bornean people. His words allowed for quite a few conclusions, four of which were already suggested by Müller himself. The correct one, that a *sumatrensis* with a very poorly developed posterior horn had been seen, was never considered during the 19th century.

For some time after the publication of Müller's account, silence reigned, at least in print. Nobody, as far as I know, wrote about the subject in the 1840s, except Temminck (1847:410) who edited the "Verhandelingen over de natuurlijke geschiedenis der Nederlandsche overzeesche bezittingen" in which Müller's paper appeared. He wrote, surprisingly unaware of what he himself had helped to publish: "Il n'est pas encore clairement démontré que Bornéo ne nourrit point d'Eléphant ni de Rhinocéros, vu que les parties montueuses de l'intérieur et du nord n'ont jamais été parcourues; mais partout où des voyageurs dignes de confiance ont pu se rendre, ou ont à même d'interroger sur ce point les indigènes, il n'existe nulle part quelque indice de l'existence de ces deux grands pachydermes dans cette île" (Temminck, 1847, II:410).

In the fifties only a few people dared to touch this vexed question. There were some (Veth, 1854, I:xii) who said that the existence of the rhinoceros on Borneo was doubtful. Others accepted its presence but conceded that its specific identity was unknown (Anonymous, 1851:454; Schwaner, 1853:36; Gervais, 1855, I:165), which had

in fact been Müller's conclusion also. The species to which it should be assigned remained a great problem and owing to the animal's alleged unicornity, three possibilities had to be considered. Firstly that it was a hitherto unknown species, secondly that it was identical with the "rhinoceros of the mainland", which is *Rhinoceros unicornis*, and thirdly, that it was the one-horned Javan *sondaicus*.

The suggestion that the animal might belong to an undescribed species did not meet with much response until much later (when Gray described his *Rhinoceros nasalis*). It was obviously thought to be unrealistic to hold such a view before all other possibilities had been ruled out. And that would take some time.

The second possibility (that it was *R. unicornis*) was mentioned by Müller (1840: 39), but this idea too was never taken over by any later author. Today it seems very strange to propose such a view since the 'rhinoceros of the mainland'—and it may be stressed that certainly the Indian *unicornis* was meant—has never been observed east of Assam and Bengal. In the first half of the 19th century, however, this fact had not yet been established. Helfer (1838:860), for instance, asserted that *unicornis* was found in the northern parts of Tenasserim and Cantor (1846:262) agreed with him, listing the species for the Malayan Peninsula. These publications may have been influential and it is likely that general opinion accepted this distribution for some time (cf. for instance Giebel, 1859:208). Blyth (1862:162) began to doubt it and later (Blyth, 1875: 51) he had to reject *unicornis* for Burma and any country to the east of it. Flower (1900: 367) had no other choice.

Since neither of the first two possibilities seemed very likely, there remained only one other to consider, that the Bornean rhinoceros was *Rhinoceros sondaicus*, at that time only known from Java, although it also exists, or existed until very recently, on Sumatra and much of the South-East Asian mainland. It took some time before this final conclusion was reached but in the early 1860s, or maybe somewhat earlier, and for the next thirty years, this was the generally accepted opinion (Blyth, 1862:151, 1863b:137; Weinland, 1862:128; Jerdon, 1867:234; Noll, 1873:54). Almost as soon as people were convinced that *sondaicus* lived on Borneo, however, contradictory evidence came to Europe. This kept the discussion alive, but we should realise that until the early 1890s the general view remained in favour of the one-horned Javan rhinoceros.

2. In the early 1860s Edward Blyth saw a posterior horn from Borneo in the collection of A.D. Bartlett. He had therefore no other choice, at that time, than to state that *sumatrensis* "would exist together with *Rh. sondaicus*" (on Borneo) (Blyth, 1863a:157). A few years later Wallace (1869:232) boldly said that "a *distinct* species [i.e. not *sondaicus*] is found in Borneo and Sumatra." Matters were further complicated by Andrew Murray who refused to believe that any kind of rhinoceros inhabited Borneo, saying that there was no real evidence to support its occurrence. He wrote to this effect in 1868. Two years earlier (Murray, 1866:172, 338) he obviously had the same opinion but he was careful enough to mention *sumatrensis* (not *sondaicus*!) as "doubtful" for the island.

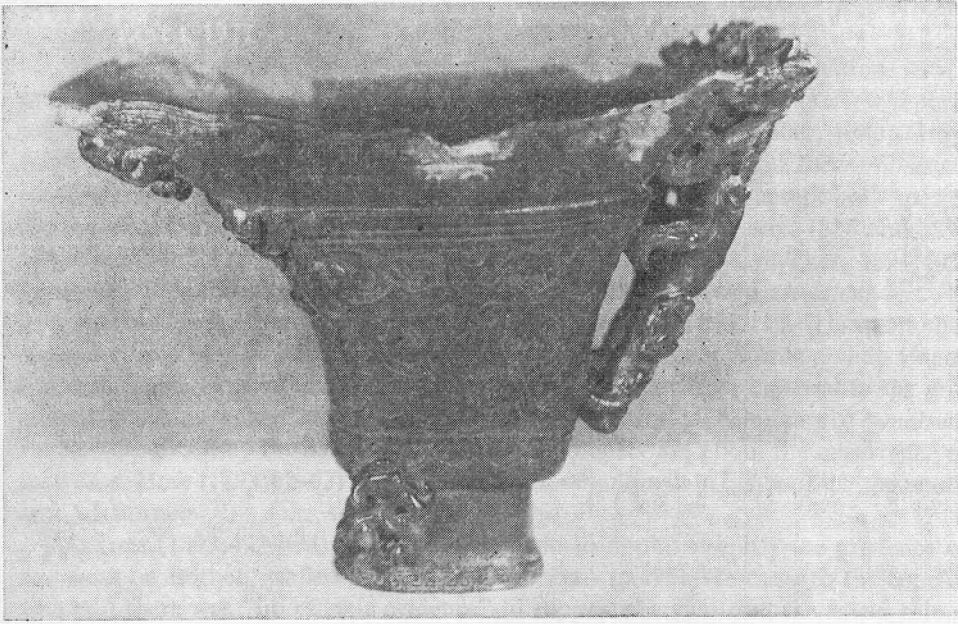
And should we not have agreed with Murray? The only 'evidences' supporting the presence of a Bornean rhinoceros were Müller's (1840) second-hand story and the two skulls on which Gray had based his *R. nasalis*: but there were no unequivocal

facts that could stand the test of criticism. People in London were confused at the end of the sixties. Was it *sondaicus* on Borneo (still the accepted view), or maybe *sumatrensis*, or both, or did the animal not exist at all there? In reply to a letter from the Zoological Society of London, Fraser (1869:529) wrote from Surabaya, Java: "I believe you can accept it as a certain fact that the Rhinoceros is an inhabitant of Borneo." Members of the crew of a Bornean ship had told him that they knew the animal well and that it lived in the interior.

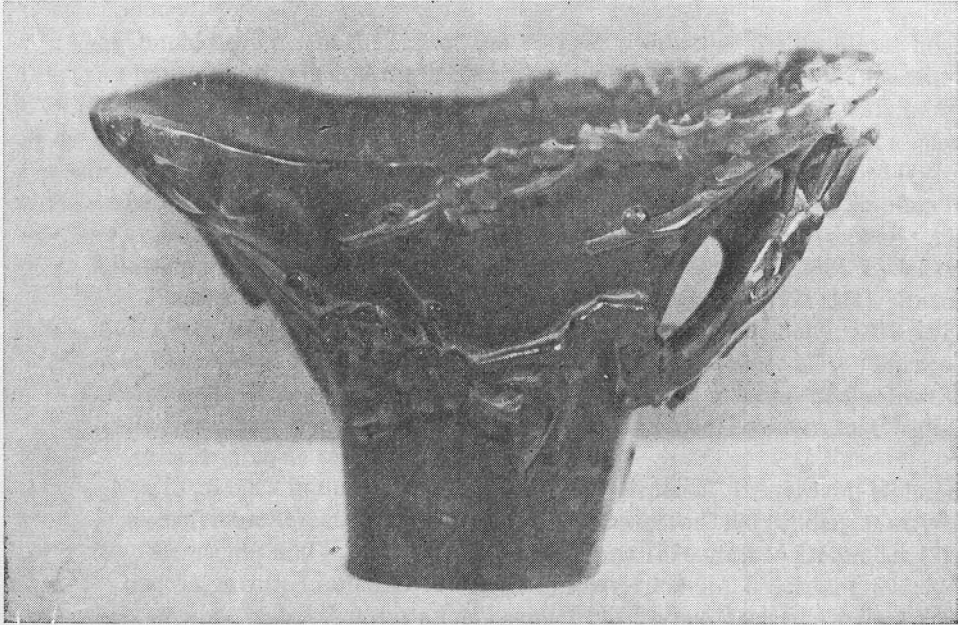
3. Thus the occurrence of the rhinoceros on Borneo was once again attested beyond any doubt, but the burning question of its identity remained. While *sondaicus* was usually still stated as the only species, a few allusions to *sumatrensis* had already been made. The existing preference for the one-horned species was once more strengthened by George Busk. In 1869, he described two semifossil M2 molars which Rajah James Brooke had sent to Charles Lyell, probably from Sarawak. These teeth "belong to a species not distinguishable by its dental characters from *R. sondaicus*", concluded Busk (1869:415) after examining them. In this way it had been 'unquestionably' proved that *sondaicus* "formerly inhabited the country about Sarawak." Nobody was in a position to question Busk's identification (Noll, 1873:54; Bartlett, 1874:499; Wallace, 1876:242) and indeed, who had any reason to disbelieve him? Busk's publication was to become very influential on later thought and it was mainly on account of this paper that the presence of *sondaicus* on Borneo was hardly doubted by anybody until the early nineties. The original two molars were donated by Busk to the Museum of the Royal College of Surgeons of London (no.2140) (Flower & Garson, 1884:420). Not until 1945 did Hooijer (1945:252-253; 1946:10) establish with certainty that these molars "must be referred to *sumatrensis* rather than to *sondaicus*" (cf. Sody, 1959:168; Medway, 1965:80).

While Busk's paper supported and confirmed the general opinion, more and more material and reports of the two-horned species came to Europe in the 1870s, but hardly anything that could possibly be attributed to *sondaicus*. Schlegel (1872:133), for one, was convinced that *sumatrensis* lived on Borneo (cf. Blyth, 1872a:403, 1872b: 3108), but it is not quite clear on what evidence he based himself. From Northern Borneo came Everett's report that according to the natives the rhinoceros of that region possessed two horns (Wallace, 1874). This was accepted by Blyth (1875:53), who began to doubt the existence of *sondaicus* on Borneo, which was an unusual view at that time. Several rhinoceros specimens were sent to European museums from Borneo in the 1870s, for instance by W.B. Pryer (see Appendix 1). A few reports from Borneo (Burbidge, 1880:302; Pryer, 1881:395) also spoke in favour of the two-horned *sumatrensis*.

4. Amidst all this evidence one suddenly notices, in a book published in 1883, the statement that there would be no confirmation that the rhinoceros exists on Borneo, as "noch immer hat keiner der Naturforscher, welche im neuerer und neuester Zeit in das Innere dieser grossen Insel gedrungen sind, ein Rhinoceros daselbst gesehen" (Mohnike, 1883:420). Mohnike was obviously out of touch with the developments of the last years, but his opinion was repeated in an anonymously published article in a Dutch magazine (Anonymous, 1884:401). This led Jentink (1884) to review what was in fact known about the Bornean rhinoceros and he concluded that a rhinoceros of some kind lived there: a safe conclusion, but very minimal.



*Plate 5.* Rhinoceros Horn Libation Cup. Ming period.



*Plate 6.* Rhinoceros Horn Libation Cup. Early Ching period.  
Both Cups are the property of Mr. Chan Yew How of Malacca.

*Note:* Rhinoceros Horn Libation Cups were used by the Emperors and nobility in ancient China. It was believed that the horn would show the presence of poison, if it was introduced into a drink in such a cup.



In the first half of the eighties, therefore, the following was the situation: it was an established fact that a rhinoceros inhabited Borneo, there were quite a few reports saying that it was one-horned, viz. *Rhinoceros sondaicus* (e.g. Muller, 1840; Gray, 1867; Busk, 1869) and much information concerning the two-horned *Dicerorhinus sumatrensis*. It is clear that there was no other alternative than to accept both species for the island, and such remained the general opinion between, say, 1884 and 1893 (Blanford, 1888-91; W.L. Sclater, 1891:203, 204; Flower & Lydekker, 1891:405; Lydekker, 1892). Sterndale (1884:410), however, only mentioned *sondaicus*.

In those years other reports came from Borneo. Bock (1887:110-111) wrote that the rhinoceros was distributed throughout Central and North Borneo, while Hagen (1890:105) asserted that *sumatrensis* lived there. The rhinoceros material in the museum of Kuching, consisting of four heads and three horns, all belonging to *sumatrensis*, was described by Bartlett (1891). He also was uncertain about the occurrence of *sondaicus*. Hose (1893:62-63) too only describes *sumatrensis* in his book on the mammals of Borneo.

Everett (1893:493-494) was one of the first to doubt seriously the existence of *sondaicus* on Borneo, while he accepted *sumatrensis* (p.496). He came to the conclusion that there was "no reliable evidence" to support the view that the Javan rhinoceros ever was found there. On account of Busk's molars, however, he had to mention that it was possible that the one-horned animal still lived in the "unexplored interior." In 1895 Jentink (loc.cit.) again reviewed the whole question, concluding that *sondaicus* does not exist, nor ever had existed on Borneo, and that it was *sumatrensis* that lived in that country.

That should have meant the end of the Bornean *sondaicus*. The tradition, however, had been very strong and the species now and then reappears in the literature as an inhabitant of Borneo. Tjeenk Willink (1905:203) listed *sondaicus* in his summary of the Mammalia in the Dutch East Indies, but he was careful enough to put a question-mark after Borneo, because Trouessart (1898-99:753) denied it. Shelford (1916:42) again had to state clearly that he had no idea why *sondaicus* appeared so often in literature on Borneo. But the mistake can still be found in, for instance, (though some of the following mention *sumatrensis* as well) Sclater & Sclater (1899:288), Lydekker (1900:27), Flower (1900:368), Hanitsch (1908:8), Wroughton (1921:311), Raven (1935:261), Deuve & Deuve (1962:100), etc. (cf. Loch, 1937:145; Sody, 1959:167). In 1951 Frechkop (1951:1) still found it unnecessary to question the locality "Borneo" of the *sondaicus*-skeleton no.1207, already mentioned, in the museum of the Institut Royal des Sciences Naturelles de Belgique in Brussels. He added, however, that "actuellement l'espèce semble ne plus exister sur cette île."

In 1896, to go back in time again, the zoological garden of Amsterdam, Holland, bought a young female Sumatran rhinoceros from H.Owen for 2400 guilders. It arrived on the s.s. Telemachus and lived in the zoo from 1 June 1896 until 16 December 1896 (Amsterdam zoo, in litt., 3 January 1975 and Reynolds, 1960:36). If Sclater (1896:784) was correct when he stated that this animal came from Borneo, then it is the only rhinoceros ever exported alive from that island that reached Europe.

In conclusion it can be said that the two questions initially raised in 1840 about the occurrence and the identity of the rhinoceros of Borneo, were finally solved by

1895. Since that year everybody could have stated with absolute certainty that *sondaicus* never existed there. The 20th century, therefore, at last could occupy itself with the actual distribution and status of the animal. That will be the subject of a later essay.

### Acknowledgements

I am most grateful to Dr. P.J.P. Whitehead, London, and Prof. Dr. M.J.S. Rudwick, Amsterdam, for reading an earlier draft of the manuscript and commenting on it. Additional information was kindly provided by Dr. C.P. Groves, Canberra, Dr. T. Harrison, Brussels, Dr. D.A. Hooijer, Leiden, Dr. J. Jewell, London, Dr. X. Misonne, Brussels and the Amsterdam zoological garden, which is greatly appreciated. The assistance of the libraries that made this study possible, is also acknowledged.

Mr. Lothar Schläawe, Berlin, has been kind enough to provide me with all the photographs appearing with this paper. His generosity is much appreciated. Thanks are also due to Prof. Dr. L.B. Holthuis, Rijksmuseum van Natuurlijke Historie, Leiden, for granting permission to publish the 19th century rhinoceros sketches in that museum (plates 1-3).

### Summary

In 1840 Müller called attention to the fact that a rhinoceros occurred on Borneo. Its identity long remained puzzling. In the early 1860s it was decided that the one-horned *Rhinoceros sondaicus* existed on Borneo. The assignment of two semifossil molars from Sarawak to this species by Busk in 1869 confirmed this. Until the early 1890s, therefore, the existence of *sondaicus* on Borneo was hardly ever doubted. But from 1870 onwards much material of the two-horned *Dicerorhinus sumatrensis* was sent from Borneo. Between 1884 and 1895 usually both species were accepted. In 1895 Jentink and Everett showed that only *sumatrensis* ever lived on Borneo. The few remaining individuals constitute a distinct subspecies, *Dicerorhinus sumatrensis harrissoni* (Groves, 1965).

## APPENDIX 1

List of the material of the Sumatran rhinoceros that was sent from Borneo to Europe in the 19th century.

1. Two semifossil germs of M2 molars in the museum of the Royal College of Surgeons, London, no. 2140. Probably they came from Sarawak and were sent by James Brooke to Charles Lyell. George Busk presented them to the museum in 1882 (Busk, 1869; Flower & Garson, 1884:420).
2. A young skull was obtained near Labuan, Sabah, by Lowe. In 1875 Higgins gave it to the British Museum (BMNH. 1875.8.9.18) (Flower, 1876: 450; 1880: 69; Jentink, 1884: 558; B.M.N.H., in litt., 19 June 1975).
3. A.H. Everett sent some horns from North Borneo to London in 1874 (Wallace, 1874: 498).

4. W.B. Pryer in 1879 presented a skull, the skin of the head and two horns to the British Museum (BMNH. 1879.3.11.1). They originated from Sagaliut, Sandakan district, Sabah (B.M.N.H., in litt., 19 June 1975) or from Elopura in the same district (Jentink, 1884: 558). This was identified by Flower (1880: 69-70) as typical "*Rhinoceros sive Ceratorhinus sumatrensis*."
5. The Cambridge Zoology Museum has an adult skull from Sandakan, Sabah, presented by Pryer in 1880 (no. H.6834) (Groves, 1967: 233, fig. 4e).
6. In 1886 Pryer sent another skull from Sandakan to the British Museum, BMNH. 1886.12.20.8 (B.M.N.H., in litt., 19 June 1975).
7. Pryer also sent a skull from the Sandakan district to the Rijksmuseum van Natuurlijke Historie at Leiden (Jentink, 1897: 64), but the specimen cannot be found at present (Dr.D.A. Hooijer, in litt., 10 Sept. 1975).
8. W.B. Tegetmeier received a skull from north Borneo, from Pryer, in 1882 (Jentink, 1884: 559). Possibly it was this (young) specimen that Tegetmeier donated to the Royal College of Surgeons, London (no. 2145), also in 1882 (Flower & Garson, 1884: 422).
9. In 1896, a skull from Kalulong, Baram district, Sarawak, was given by C. Hose to the Cambridge Zoology Museum, no. H.6383 (Groves & Kurt, 1972: fig. 2).
10. Hose presented in 1898 another skull to the Cambridge Zoology Museum, no. H.6381, again from the Baram district, Sarawak (Dr. C.P. Groves, in litt., 26 June 1975).
11. In 1899 H.D. Rowe presented a young female skull with mandible to the British Museum, BMNH. 1901.8.15.1. It came from Suan-Lambah, Sabah, and was selected the holotype of *Dicerorhinus sumatrensis harrissoni* (Groves, 1965: 130; B.M.N.H. in litt., 19 June 1975).

#### Bibliography

- Anonymous, 1851. Opsomming der thans bekende zoogdieren van den Indischen Archipel, getrokken uit de Zoology of the voyage of H.M. Ship Samarang (Lond. 1850). Natuurk. Tijdschr. Ned. -Indie, 2:443-455.
- Anonymous, 1884. De olifant en de rhinoceros op Borneo. Tijdschr. Ned. Aardrijksk. Genoot., (2) 1: 400-401.
- Bartlett, A.D., 1874. [Exhibition of a rhinoceros-horn stated to be from Borneo]. Proc.zool.Soc. London, Nov. 3, 1874:499.
- Bartlett, Edward, 1891. Notes on the Bornean rhinoceros. Proc.zool.Soc.London, Dec. 1, 1891:654-655, 1 fig.
- Blanford, W.T., 1888-91. The fauna of British India, including Ceylon and Burma. Mammalia: i-v, i-xx, i-xiii, 1-617 (London, Taylor & Francis).
- Blyth, Edward, 1862. A memoir on the living Asiatic species of rhinoceros. J.Asiat.Soc.Beng., 31(2): 151-175, pls. 1-4.
- Blyth, Edward, 1863a. On some horns of ruminants. Proc.zool.Soc.London, April 21, 1863:155-158, 2 figs.
- Blyth, Edward, 1863b. Catalogue of the Mammalia in the Museum Asiatic Society: 1-3, 1-187, iii-xiii (Calcutta, Savielle & Cranenburgh).
- Blyth, Edward, 1872a. On the species of Asiatic two-horned rhinoceros. Ann.Mag.nat.Hist., (4) 10: 399-405.
- Blyth, Edward, 1872b. Asiatic rhinoceroses. Zoologist, (2) 7: 3104-3108.
- Blyth, Edward, 1875. Catalogue of mammals and birds of Burma. J.Asiat.Soc.Beng., 44(2, extra no.): 1-167.

- Bock, Carl, 1887. Reis in Oost-en Zuid-Borneo van Koetei naar Banjermassin, ondernomen op last der Indische regeering in 1879 en 1880: i-v, i-lxxi, 1-129 ('s-Gravenhage, Martinus Nijhoff).
- Burbridge, F.W., 1880. The gardens of the sun: or a naturalist's journal on the mountains and in the forests and swamps of Borneo and the Sulu Archipelago: i-xix, 1-364 (London, John Murray).
- Busk, George, 1869. Notice of the discovery at Sarawak in Borneo of the fossilized teeth of rhinoceros and of a cervine ruminant. Proc.zool.Soc.London, June 10, 1869:409-416, figs. 1-9.
- Cantor, Theodore, 1846. Catalogue of Mammalia inhabiting the Malayan peninsula and islands. J. Asiat.Soc.Beng., 15:241-279.
- Deuve, J. & M. Deuve, 1962. Note sur les Rhinocerotidae du Laos. Bull.Soc.r.Sci.nat.Laos, no. 3:99-105, 2 figs.
- Everett, A.H., 1893. A nominal list of the mammals inhabiting the Bornean group of islands. Proc.zool.Soc.London, May 16, 1893:492-496.
- Flower, Stanley Smith, 1900. On the Mammalia of Siam and the Malay peninsula. Proc.zool.Soc.London, April 3, 1900:306-379, 1 fig.
- Flower, William Henry, 1876. On some cranial and dental characters of the existing species of rhinoceroses. Proc.zool.Soc.London, May 16, 1876:443-457, figs. 1-4.
- Flower, William Henry, 1880. Exhibition of, and remarks upon, the skull of a two-horned rhinoceros from Borneo. Proc.zool.Soc.London, Feb. 17, 1880:69-70.
- Flower, William Henry & John George Garson, 1884. Catalogue of the specimens illustrating the osteology and dentition of vertebrated animals, recent and extinct, contained in the museum of the Royal College of Surgeons of England, part II—class Mammalia, other than man: i-xliii, 1-779 (London, Royal College of Surgeons).
- Flower, William Henry & Richard Lydekker, 1891. An introduction to the study of mammals living and extinct: i-xvi, 1-763 (London, Adam and Charles Black).
- Fraser, William T., 1869. Letter regarding the existence of the rhinoceros in Borneo. Proc.zool.Soc.London, Nov. 25, 1869: 529.
- Frechkop, Serge, 1951. Sur un foetus de rhinoceros de la Sonde. Bull.Inst.Roy.Sci.Nat.Belg., 27 (2): 1-7, pls. 1-4.
- Gervais, Paul, 1855. Histoire naturelle des mammiferes avec l'indication de leurs moeurs, et de leurs rapports avec les arts, le commerce et l'agriculture, I: i, 1-341 (Paris, L. Curmer).
- Giebel, C.G., 1859. Die Säugethiere in zoologischer, anatomischer und palaeontologischer Beziehung, 2nd ed.: i-xvi, 1-1108 (Leipzig, Ambrosius Abel).
- Gray, John Edward, 1862. Catalogue of the bones of Mammalia in the collection of the British Museum: i-iv, 1-296 (London, Trustees British Museum).
- Gray, J.E., 1867. Observations on the preserved specimens and skeletons of the Rhinocerotidae in the collection of the British Museum and Royal College of Surgeons, including the descriptions of three new species. Proc.zool.Soc.London, Dec. 12, 1867:1003-1032, figs. 1-6.
- Gray, John Edward, 1869. Catalogue of carnivorous, pachydermatous, and edentate Mammalia in the British Museum: i-vii, 1-398 (London, Trustees British Museum).
- Groves, Colin P., 1965. Description of a new subspecies of rhinoceros, from Borneo, *Didermocerus sumatrensis harrissoni*. Säugetierk.Mitt., 13 (3): 128-131.
- Groves, Colin P., 1967. On the rhinoceroses of South-East Asia. Säugetierk.Mitt., 15 (3):221-237, figs. 1-4, tabs. 1-5.
- Groves, Colin P. & Fred Kurt, 1972. *Dicerorhinus sumatrensis*. Mammalian Species, no. 21:1-6, figs. 1-4.
- Hagen, B., 1890. Die Pflanzen- und Thierwelt von Deli auf der Ostküste Sumatra's. Naturwissenschaftliche Skizzen und Beiträge. Tijdschr.Ned.Aardrijksk.Genoot., (2) 7 (2):1-240, 1 pl.
- Hanitsch, R., 1908. Guide to the zoological collections of the Raffles Museum, Singapore: i-iii, i-iv, 1-112 (Singapore, Straits Times Press).
- Harrisson, Tom, 1965. Editorial preface. Sarawak Mus.J., (N.S.) 12 (25/26):ix-xxi.
- Helper, J.W., 1838. Note on the animal productions of the Tenasserim provinces; read at the meeting of the 10th October, 1838. J.Asiat.Soc.Beng., 7 (2):855-863.
- Hooijer, D.A., 1945. Over subfossiele neushoorns van Sumatra en Borneo. Verh.geol-mijnb.Genoot. Ned., 14:249-258, fig. 1.
- Hooijer, D.A., 1946. Prehistoric and fossil rhinoceroses from the Malay archipelago and India. Zool. Meded.Leiden, 26:1-138, pls. 1-10, tabs. 1-8.
- Hose, Charles, 1893. A descriptive account of the mammals of Borneo: i-78 (London, Edward Abbott).
- Hose, Charles & William McDougall, 1966. The pagan tribes of Borneo, with an appendix by A.C. Haddon, I, 2nd impression: i-xv, 1-283 (London, Frank Cass). 1st impression of 1912.

- Houttuyn, F., 1761. *Natuurlyke historie of uitvoerige beschrijving der dieren, planten en mineraalen, volgens het samenstel van den Heer Linnæus. Met naauwkeurige afbeeldingen. Eerste deel, tweede stuk, vervolg der zoogende dieren: i-vi, 1-504* (Amsterdam, F. Houttuyn).
- Husson, A.M. & L.B. Holthuis, 1955. The dates of publication of "Verhandelingen over de natuurlijke geschiedenis der Nederlandsche overzeesche bezittingen" edited by C.J. Temminck. *Zool.Meded. Leiden*, 34 (2):17-24.
- Jentink, F.A., 1884. De olifant en de rhinoceros op Borneo. *Tijdschr. Ned. Aardrijksk. Genoot.*, (2) 1: 554-559.
- Jentink, F.A., 1895. On the rhinoceroses from the East-Indian-Archipelago. *Notes Leyden Mus.*, 16: 231-233.
- Jentink, F.A., 1897. Zoological results of the Dutch Scientific expedition to Central Borneo. The mammals. *Notes Leyden Mus.*, 19:26-66, pls. 2-3.
- Jerdon, T.C., 1867. The mammals of India; a natural history of all the animals known to inhabit continental India:1-7, i-xxi, 1-319, i-xv (Roorkee, Thomasen College Press).
- Loch, Charles W., 1937. *Rhinoceros sondaicus. The Javan or lesser one-horned rhinoceros and its geographical distribution. J.Malay. Brch R.Asiat.Soc.*, 15 (2): 130-149, pls. 3-4, 1 map.
- Lydekker, Richard, 1892. Notes on rhinoceroses, ancient and modern. *Field*, June 18, 1892: 903, fig. 1.
- Lydekker, R., 1900. The great and small game of India, Burma, & Tibet:i-xviii, 1-416 (London, Rowland Ward Ltd.).
- Martens, Eduard von, 1876. Die Preussische Expedition nach Ost-Asien. Nach amtlichen Quellen. *Zoologischer Teil, I, Allgemeines und Wirbeltheire:i-xii, 1-412* (Berlin, R.F.Decker).
- Medway, Lord, 1965. Rhinoceros in late quaternary Borneo. (Niah cave animal bone, 8). *Sarawak Mus.J.*, (N.S.) 12 (25/26):77-82, pl. 21.
- Mohnike, Otto, 1883. *Blicke auf das Pflanzen- und Thierleben in den Niederländischen Malaienländern: i-iv, 1-694* (Munster, Aschendorff).
- Muller, Salomon, 1839-40. Over de zoogdieren van den Indischen Archipel:1-57, i-vi in: C.J. Temminck, *Verhandelingen over de natuurlijke geschiedenis der Nederlandsche overzeesche bezittingen, zoologie*. Leiden, 1839-44. See Husson & Holthuis, 1955:22 for the dates of this publication.
- Muller, Sal. & Herm. Schlegel, 1845. *Bijdragen tot de natuurlijke historie der rhinocerosen van den Indischen Archipel: 183-193, pls. 33-34 in C.J. Temminck, Verhandelingen over de natuurlijke geschiedenis der Nederlandsche overzeesche bezittingen, zoologie*. Leiden, 1839-44.
- Murray, Andrew, 1866. The geographical distribution of mammals: i-xvi, 1-420 (London, Day and Son).
- Murray, Andrew, 1868. Note on the alleged occurrence of the rhinoceros in Borneo. *Proc.zool.Soc. London*, June 25, 1868: 440-442.
- Noll, F.C., 1873. Die Rhinoceros-Arten. *Zool.Gart., Frankf.*, (A.F.) 14 (2):47-55, 1 fig.
- Pocock, R.I., 1946. Some structural variations in the second upper premolar of the lesser one-horned rhinoceros (*Rhinoceros sondaicus*). *Proc.zool.Soc.London*, 115 (3/4):306-309, fig. 1.
- Pryer, W.B., 1881. Animal life in Borneo. *Zoologist*, (3) 5 (58): 393-398.
- Raven, Henry C., 1935. Wallace's line and the distribution of Indo-Australian mammals. *Bull.Am. Mus.nat.Hist.*, 68 (4): i-ii, 179-284, 1 map.
- Reynolds, Richard J., 1960. Asian rhinos in captivity. *Int.Zoo Yb.*, 2:17-42.
- Schlegel, H., 1872. De dierentuin van het Koninklijk Zoologisch Genootschap Natura Artis Magistra te Amsterdam:i-xv, i-xxviii, i-vi, 1-292, i-vii, 1-174, i-iii, 1-64 (Amsterdam, van Es).
- Schwaneer, C.A.L.M., 1853. Borneo. Beschrijving van het stroomgebied van den Barito en reizen langs eenige voornam rivieren van het zuid-oostelijk gedeelte van dat eiland, op last van het gouvernement van Nederl: Indie gedaan in de jaren 1843-1847, I:i-iv, 1-234 (Amsterdam, P.N.van Kampen).
- Sclater, P.L., 1896. On continental menageries. *Proc.zool.Soc.London*, Nov. 17, 1896:783-785.
- Sclater, W.L., 1891. Catalogue of Mammalia in the Indian Museum, Calcutta, II:i-xxix, 1-375 (Calcutta, Trustees Indian Museum).
- Sclater, William Lutley & Philip Lutley Sclater, 1899. The geography of mammals:i-xviii, 1-335 (London, Kegan Paul, Trench, Trubner & Co.).
- Shelford, Robert W.C., 1916. *A naturalist in Borneo:i-xxviii, 11331* (London, T.Fisher Unwin).
- Sody, H.J.V., 1959. Das javanische Nashorn, *Rhinoceros sondaicus*, historisch und biologisch. *Z. Säugetierk.*, 24 (3/4): 109-240, pls. 5-8, figs. 1-7.
- Sterndale, Robert A., 1884. Natural history of the Mammalia of India and Ceylon:i-xxxii, 1-540 (Calcutta, Thacker, Spink & Co.).

- Temminck, C.J., 1847. Coup-d'Œil general sur les possessions Neerlandaises dans l'Inde archipelagique, II:i-vi, 1-471 (Leiden, A. Arnz & Comp.).
- Tjeenk Willink, H.D., 1905. Mammalia voorkomende in Nederlandsch-Indie. *Natuurk. Tijdschr. Ned. Indie*, (10) 65 (9):153-345.
- Trouessart, E.-L., 1898-99. *Catalogus mammalium tam viventium quam fossilium. Nova editio (prima completa)*, II:i-v, 665-1469 (Berolini, R. Friedlander & Sohn).
- Veth, P.J., 1854 *Borneo's wester-afdeeling. Geografisch, statistisch, voorafgegaan door eene algemeene schets des ganschen eilands*, I:i, i-xix, i-xcviii, 1-383 (Zaltbommel, Joh. Noman).
- Wallace, Alfred Russel, 1869. *The Malay Archipelago: the land of the orang-utan, and the bird of paradise. A narrative of travel, with studies of man and nature*, I:i-xxiii, 1-478 (London, MacMillan & Co.).
- Wallace, Alfred Russel, 1874. Exhibition of some rhinoceros-horns obtained by Mr. Everett in Borneo. *Proc.zool.Soc.London*, Nov. 3, 1874:498-499.
- Wallace, Alfred Russel, 1876. *Die geographische Verbreitung der Thiere nebst einer Studie über die Verwandtschaften der lebenden und ausgestorbenen Faunen in Ihrer Beziehung zu den früheren Veränderungen der Erdoberfläche. Deutsche Ausgabe von A.B. Meyer*, II:i-ix, 1-658 (Dresden, R.v.Zahn). Original London, 1876.
- Weinland, D.S., 1862. Ueber den Regents-Park bei London. *Zool.Gart., Frankf., (A.F.)* 3 (6) 125-134
- Wroughton, R.C., 1921. Summary of the results from the Indian mammal survey of the Bombay Natural History Society, part VII. *J.Bombay nat.Hist.Soc.*, 27 (2):301-322.

**JOURNAL**  
**OF THE**  
**MALAYSIAN**  
**BRANCH**  
**OF THE**  
**ROYAL**  
**ASIATIC SOCIETY**

**The Rhinoceros of Borneo: A  
19th Century puzzle**  
by L.C. Rookmaker

*Memorial Issue*

Volume L Part 1  
1977

KDN 10545 — MC(P) No. 324/1.77  
Published in June 1977