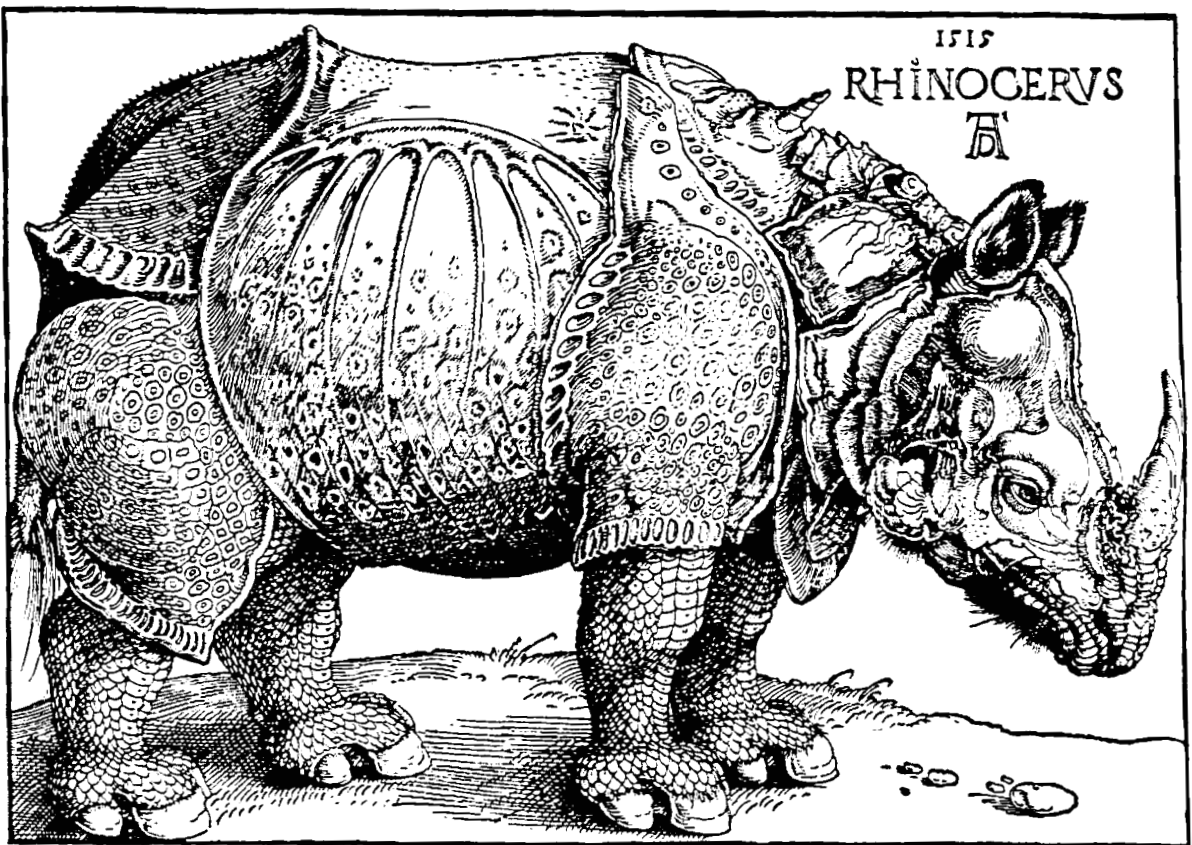


THE RHINOCEROS IN CAPTIVITY

by L.C. Rookmaaker



SPB Academic Publishing bv

THE RHINOCEROS IN CAPTIVITY

**A list of 2439 rhinoceroses kept from
Roman times to 1994**

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1. Introduction

'To see the Rhinoceros (a friend told me), I decided to take a walk.' The German author C.F. Gellert wrote these lines when a rhinoceros was being shown in the town of Leipzig in 1747. How many people have taken such a walk and returned home, thrilled and educated by seeing a rhinoceros in a cage, or a baby rhinoceros jumping around the enclosure, or a group of white rhinos peacefully grazing in a paddock? The rhinoceros has always fascinated us by its prehistoric bulk, its massive power and its lack of conventional beauty. Through the ages, many individual rhinoceroses have been kept by human beings, sometimes to entertain, sometimes to educate.

It was my aim to collect information about each individual rhinoceros which has been

kept in captivity from the earliest times to the present. This is, of course, a quite impossible task, because I necessarily had to depend on the records left by our ancestors. I had three reasons for attempting to discover some details about every single rhinoceros. First, a rhinoceros exhibited in a zoo potentially helps to increase our knowledge of the species. How much would we know today about the reproductive behavior, morphological variations or anatomical details of rhinoceroses if we had only seen the animals in the wild? How many people have become interested in the species after observing a rhinoceros in an enclosure at a zoo? I am not really sure, but perhaps the fact that I saw a black rhinoceros at Artis Zoo in Amsterdam or an In-



Fig. 1. Sumatran rhinoceros 'Mahatu' at Los Angeles Zoo, November 1992.

dian rhinoceros in Antwerp when I was a child, subconsciously kindled my decision to study the animal, and many other people may have had similar experiences. The second reason for studying the captive population of rhinoceroses is the alarming decline of the animals in the wild. If the rhinoceros would disappear from its original habitat through poaching and human pressures, there is at least a chance of keeping the species alive in captivity. The rhinoceros is generally a slow breeder, and it needs an all-out effort to maintain even existing numbers. It is possible that history can teach us valuable lessons so that we can avoid future mistakes. The third reason is simply a personal fascination with the historical record. Much of the information in this book is elusive, but it has given me great pleasure to try to discover as many details as possible.

The term 'captivity' is interpreted in rather a broad sense. It is obvious that a list of animals in a captive situation must include those kept, for example, in zoological gardens, safari parks, travelling menageries, circuses, and private collections. However, the definition is less clear when rhinos are kept within their own area of distribution. When, for instance, a group of rhinos is kept in an enclosure of a thousand acres, this group would obviously be captive if the enclosure were located in Europe or America. However, if that enclosure were in Africa or Asia, bordering a national park, there could be disagreement as to whether the animals kept there would be captive, semi-wild or wild. It is very difficult to judge each situation on its own merits without personal knowledge of the area or the background of the case. I have been liberal in including some information about such groups of rhinos kept on private land within the area of distribution of the species, although, generally, the animals have not been counted in the totals.

The rhinoceros has been well served by historians and record keepers. In the present survey, I could build on a solid foundation consisting of information contained in the literature, and, in particular, the papers by Reynolds and the studbooks, as well as personal communications with a great number of people interested in animals and the history of animal exhibits. Richard J. Reynolds III of Atlanta, Georgia, is a retired lawyer with a particular interest in circuses and also in other ways of exhibiting wild animals. He compiled all the available records on the rhinoc-

eros in captivity and published the results in a series of papers in the *International Zoo Yearbook* of London in the early 1960s. Why he decided to focus on the rhinoceros in favor of elephants or giraffes (although he also wrote about those animals), remains a mystery in his publications. My own correspondence with Richard Reynolds started in about 1973 and has continued ever since. Many valuable data and much encouragement have reached me from the other side of the Atlantic, thanks to our shared interest. Reynolds studied the history of circus owners in the United States, which I have always found to be a particularly difficult and elusive subject. All the facts about rhinoceroses in American circuses or travelling menageries have been provided by Reynolds from his various sources.

The studbooks of the various species provided data for rhinoceroses that, more recently, have been kept in a captive situation. The studbook for African black and white rhinoceroses has been kept by Berlin Zoo since 1966, that for the Indian rhinoceros by Basel Zoo since the late 1960s, and that for the Sumatran rhinoceros by the International Rhino Foundation. These studbooks are published with a certain regularity. They contain many valuable data on the specimens that were alive in the period during which the studbook was kept. There is a small gap between the publication of the lists of captive rhinos by Reynolds in 1960 and 1964, and the start of the studbooks. A few specimens which arrived and died during those few years in the 1960s were not recorded in either of these sources.

In 1993, I tried to compile the information contained in these various sources: the studbooks, the papers by Reynolds, the literature in general, and personal communications. The



Fig. 2. Pair of White rhinoceros at Berlin Zoo, 26th June 1965.



Fig. 3. Black rhinoceros 'Toto' at St Louis, 1993.

next step was to write to all collections of animals which had exhibited the rhinoceros, in order to check these data and possibly add to my information. In October 1993, therefore, I sent out 572 general inquiries regarding the completion and rectification of the available data. Of these inquiries, 267 were sent to collections known to have shown at least one rhinoceros: I received 109 replies (41%). A further 305 letters were sent to places where a rhinoceros could have been exhib-

ited, but for which no information was available. I received 75 replies (25%) from this latter category, including a few with information on hitherto overlooked specimens.

When I had compiled all this information, I found that there were still quite a number of questions and uncertainties. During the latter stages, I have been greatly assisted by Sgt. Marvin Jones, the then Registrar of San Diego Zoo. He visited many collections all over the world and studied the local records, and his encyclopedic mind can still recall some specific data from different specimens. He has contributed enormously to filling in the blanks. In various other ways, I have also benefitted from Ken Kawata's knowledge of Japanese zoos, from Clin Keeling's of historical records, and from John Edwards' of European zoos and photographic records.

The present list has details of about 2439 individual specimens belonging to one of the five living species of rhinoceros (Table 1). The Indian rhinoceros (*Rhinoceros unicornis*) has been consistently exhibited in small numbers from the 16th century up to the present. The black rhinoceros (*Diceros bicornis*) was first



Fig. 4. Indian rhinoceroses at Basel Zoo.



Fig. 5. White rhinoceroses at Whipsnade

imported in 1868, and has been shown regularly ever since. The Javan rhinoceros (*Rhinoceros sondaicus*) is a very rare exhibit, while the Sumatran species (*Dicerorhinus sumatrensis*) was imported during the second half of the 19th century, and again in recent years. The white rhinoceros (*Ceratotherium simum*) is now the most common species, but this is a recent development since the first specimen was only seen in 1946.

The rhinoceros is not the most photogenic of animals, and, as such, it is remarkable that so many images have been taken throughout the years. In the present work, a selection of the available material, both old and new, has been made. Some of the pictures are of rather poor quality, and they have only been included to complete the historical record and to show what has been preserved. Most of the recent pictures were supplied by zoos in response to the questionnaire, and I am very grateful for their cooperation and interest.

What to expect

You should be able to find some information about each and every rhinoceros ever kept in captivity. Actually, I would prefer to use the English equivalent of the German 'Menschen-obhut', 'in human hands', or 'under human care', in order to avoid the cage or enclosure idea associated with captivity. There is no limit to time or place. It should not matter whether the rhinoceros was kept in 2000 BC or in 1990 AD, in China, Siberia, Iceland or the Cape of Good Hope. You can expect to find the date of arrival, date of death, gender, name and most important happenings during its life. If the zoo in, for example, Amsterdam or Rangoon exhibited rhinos, there is also information on which species, how many,

when, etc. If you saw a rhinoceros in a 'Tarzan' movie, it could be that this list will give you some of its background.

Of course, this book will fall far short of your (and my) expectations. Some rhinoceroses, probably quite a large number in fact, do not figure here, simply because nobody recorded their presence on paper or in art, while others have simply escaped my notice. For the historian or scientist it is a sad fact that it is very hard to cover any subject completely, unless it is very carefully and precisely demarcated. I would be pleased to hear about any shortcomings in this list.

Kees Rookmaaker

Easter 1997

How to use this book

Arrangement of records

There are five living species of rhinoceros. The records of captive specimens of each species are arranged each in a separate chapter. Some records from Roman times and from other old civilizations are mentioned in Chapter 3. A few statistics on demography and reproduction are summarized in Chapter 2.

Each of the Chapters 4 to 8 on the five species starts with a short introduction on the maintenance of that particular species, with information on its history in captivity, sub-specific classification, origin of imports and longevity. The introduction in each chapter is followed by:

1. A table of *Collections where the species has been exhibited*, listing the number of collections by continent and country. This table also shows when and in which country the animal was first exhibited in each continent, and in which collection in each country. The place with the largest number of rhinos throughout the ages has also been listed, but only when there were more than five specimens; smaller lists have been deleted.
2. A table of *Population changes* showing the number of specimens imported, born, and those that died within each decennium since its first exhibition. Changes in the captive population can easily be studied from these tables.
3. A *Chronological list of all known specimens* giving the historical details of each specimen in abbreviated form. The main list is arranged by collection, and specimens which were fre-

stated as, 'To .../ 'From ...' with the name of the town. If it was imported from the wild, this is always written in full to avoid confusion ('Imported from...', 'Caught in ...').

† in the entry of an individual rhinoceros after a date means: the animal died at that time in that collection.

Acknowledgments

In many ways, this book is the culmination of a long standing interest. Throughout the years, I have received much encouragement and active assistance from a number of people with similar ideas. Although there is little reward in being mentioned in a section of acknowledgments, I hope that it will give them an idea of the extent of my gratitude. In alphabetical order, my thanks go to Peter van Bree (Amsterdam, The Netherlands), the late Tim H. Clarke (Ashford, UK), Michael Dee (Los Angeles, USA), John Edwards (London, UK), Marvin L. Jones (San Diego, USA), Ken Kawata (Kansas City, USA), Clin Keeling (Guildford, UK), Heinz-Georg Klös (Berlin, Germany), Dennis R.H. Levy (Bournemouth, UK), Esmond Bradley Martin (Nairobi, Kenya), Jim Monson (Tourette-Levens, France), Florence Pieters (Amsterdam, The Netherlands), Herman Reichenbach (Hamburg, Germany), Richard J. Reynolds (Atlanta, USA), Lothar Schlawe (Berlin, Germany), Marjorie Shaw (San Diego, USA), Kathleen Tobler (Basel, Switzerland). Without the patience and understanding of these people in my continuous quest for more data, this book would look very different today.

Special assistance in specific cases was readily given by many people, among whom I am happy to mention: John Bank (Lorena, Texas, USA), Susanta Bhattacharyya (Zoological Gardens, Calcutta, India), Bernhard Blaszkiewicz (Tierpark Berlin-Friedrichsfelde, Germany), L.E.M. de Boer (Apenheul, Apeldoorn, The Netherlands), Herb Clement (former director of Central Park Zoo, New York, USA), D.H.M. Cumming (WWF Multispecies Animal Production Systems Project, Harare, Zimbabwe), J.C. Daniel (former Curator of Bombay Natural History Society, India), F. Dieterlen (Staatliches Museum für Naturkunde, Stuttgart, Germany), T.J. Foose (International Rhino Foundation, Columbus, USA), Gwyn Griffiths (Crewe, UK), Barbara Herzig (Naturhistorisches Museum, Vienna, Austria), Bengt

Holst (Copenhagen Zoo, Denmark), D. Philip King (Assiniboine Zoo Park, Winnipeg, Canada), Andrew Kitchener (National Museums of Scotland, Edinburgh, UK), Georges Lenglet (Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium), the Assistant Director of the Government Museum (Madras, India), P. Newbegin (Help A Child of India, Bangalore, India), G. Nogge (Cologne Zoo, Germany), Julio Perla (Monkey Jungle, Miami, USA), Mark Sorrell (Benfleet, UK), Donald W. Wixom (Sunset Zoological Park, Manhattan, USA), F.J. Zeehandelaar (New Rochelle, USA).

Many people took the time and trouble to respond to my questionnaire of captive rhinos in 1993. In some cases, those responsible obviously went to a lot of trouble to photocopy the available material, look for old records, or find suitable pictures. I trust this book will show them that their time was well spent, and that hopefully I have done justice to their records. At the end of this chapter, there is a list of all collections that exhibited a rhinoceros, in which those that responded to the questionnaire are marked by an *, a simple mark for special gratitude. The staff of those collections that never exhibited a rhinoceros, but who still wrote to me, are listed separately below.

Mistakes will certainly have been made in the transfer of information or on decisions about names and dates. I take the responsibility for all of them.

List of collections replying in 1993-1994 that they never owned a rhinoceros:

Austria	Innsbruck, Alpen Zoo
Belgium	Ieper, Bellewaerde Park
Belize	Belize City, The Belize Zoo
Bermuda	Bermuda Aquarium, Natural History Museum and Zoo
Canada	Bowmanville, Bowmanville Zoo Edmonton, Valley Zoo Charlesbourg, Jardin Zoologique du Quebec Shubenacadie, Provincial Wildlife Park Vancouver, Stanley Park Zoological Gardens
Chile	Santiago, Santiago Zoo
Czech Republic	Plzen, Zoologicka a Botanicka Zahrada
Denmark	Odense, Odense Zoo
Dubai	Dubai, Zoological Gardens
Germany	Bochum, Tierpark

Finland	Rostock, Zoologischer Garten		Colwyn Bay, Welsh Mountain Zoo
France	Helsinki Zoo		Cricket St. Thomas, Westcountry Wildlife Park
	Montpellier, Parc de Lunaret		Dudley, Dudley & West Midlands Zoological Society
	Mulhouse, Parc Zoologique et Botanique		Great Yarmouth, Thrigby Hall Wildlife Gardens
Ghana	Strasbourg, Parc Zoologique Orangerie		Huntingdon, Hamerton Wildlife Centre
Hong Kong	Kumasi, Kumasi Zoological Gardens		Matlock, Riber Castle Wildlife Park
India	Zoological and Botanical Gardens		Twycross, Twycross Zoo
	Ahmedabad, Kamla Nehru Zoological Garden		Abilene, TX, Abilene Zoological Society
Israel	Haifa, Biological Institute	USA	Apple Valley, MN, Minnesota Zoo
Netherlands	Amersfoort, Dierenpark		Como, MN, St. Paul's Zoo
	Apeldoorn, Apenheul		Erie, PA, Erie Zoo
	Rhenen, Ouwehands Dierenpark		Grand Rapids, MI, John Ball Zoological Garden
Russia	Ekaterinburg, Zoopark		Naples, FL, Jungle Larry's Zoological Park
	Kishinev, Zoo		Providence, RI, Roger Williams Park Zoo
	Novosibirsk, Zoo		Racine, WI, Racine Zoological Society
Saudi Arabia	Riyadh, King Khalid Wildlife Research Center		Roanoke, VA, Mill Mountain Zoo
Slovakia	Bojnice, Zoological Garden		Rochester, NY, Seneca Park Zoo
Spain	Cantabria, Zoologico de Santillana del Mar		Santa Ana, CA, Santa Ana Zoo
	Gran Canaria, Los Palmitos, Maspalomas		Seattle, WA, Woodland Park Zoological Gardens
Sweden	Jerez de la Frontera, Zoo Jerez		Syracuse, NY, Burnet Park Zoo
Switzerland	Eskilstuna, Parken Zoo		Tacoma, WA, Point Defiance Zoo & Aquarium
Trinidad	Gossau, Walter Zoo		Utica, NY, Utica Zoo
	Port-of-Spain, Zoological Society of Trinidad & Tobago		West Palm Beach, FL, Dreher Park Zoo
Ukraine	Nikolaev, Nikolaev Zoo		
United Kingdom	Alfriston, Drusillas Park		
	Banham, Banham Zoo		
	Blair Drummond, Safari and Leisure Park		
	Chessington, World of Adventure		
		Uzbekistan	Tashkent, Zoopark

List of collections which exhibited a rhinoceros

Arranged by country

Species exhibited are abbreviated as follows:

CS	<i>Ceratotherium simum simum</i> (Southern White rhino)
CSC	<i>Ceratotherium simum cottoni</i> (Northern White rhino)
DB	<i>Diceros bicornis</i> (Black rhino)
DS	<i>Dicerorhinus sumatrensis</i> (Sumatran rhino)
RS	<i>Rhinoceros sondaicus</i> (Javan rhino)
RU	<i>Rhinoceros unicornis</i> (Indian rhino)

X stands for specimens of unknown species listed in Chapter 3.

The number of specimens exhibited follows the abbreviated species name in the last column.

* Collections with this mark responded to the 1993 questionnaire or have otherwise volunteered information about their rhinoceroses.

Country/place	Name of collection	Species exhibited
Abu Dhabi, UAE		
Al Ain	Zoological Park and Aquarium	CS 3, CSC 1
Afghanistan		
Kabul	Coll. Amir Abdul Rahmann	DS 1

<i>Country/place</i>		<i>Name of collection</i>	<i>Species exhibited</i>
Argentina			
Buenos Aires		Circo Fuentes Gasca	CS 1
Buenos Aires	*	Jardim Zoologico	DB 8
La Plata		Zoologico La Plata	CS 2, DB 1
Margarita		Unidentified	CS 3
Mendoza		Zoological Gardens	DB 1
Australia			
Adelaide	*	Adelaide Zoo	DB 3, RS 1
Dubbo	*	Western Plains Zoo	CS 12, DB 15
Melbourne		Zoological Board of Victoria	DB 3
Perth	*	Zoological Gardens	CS 2, DB 1, DS 1
Queensland		Ashton's Animal Kingdom	DB 1
Sydney	*	Taronga Zoo	CS 2, DB 23
Werribee	*	Zoological Gardens	CS 3
Winnellie		Tipperary Sanctuary	CS 2
Austria			
Salzburg	*	Salzburger Tiergarten Hellbrun	CS 4
Vienna	*	Schönbrunner Tiergarten	DB 5, RU 1, RS 1, DS 2
Bangladesh			
Dhaka		Coll. Matthew Day	RU 1
Belarus			
Grodno		Grodno Zoo	DB 1
Belgium			
Antwerp	*	Jardin Zoologique	CS 5, CSC 2, DB 5, RU 13, DS 4
Genk		Limburgse Zoo Zwartberg	CS 6
Planckendael		see Antwerp	
Sprintmont		Unidentified	CS 1
Brazil			
Belo Horizonte	*	Fundação Zoo-Botanica	CS 2
Porto Alegre		Jardim Zoologico	DB 1
Rio de Janeiro	*	Jardim Zoologico	CS 2, DB 5
Sao Leopoldo		Parque Zoologico do Rio Grande	CS 2, DB 3
Sao Paulo	*	Fundação Parque Zoologico	CS 2, DB 4, RU 1
Bulgaria			
Sofia		Zoological Gardens	CS 3
Burma	see	Myanmar	
Cambodia			
Angkor-Vat		Early civilization	RS ?
Canada			
Aldergrove		Vancouver Game Farm	CS 5
Calgary	*	Calgary Zoological Society	CS 3
Edmonton		Alberta Game Farm	CS 2
Granby	*	Société Zoologique de Granby	CS 2, DB 7
Hemingford		Parc Safari Africain	CS ?
Penticton		Okanangan Game Farm	CS 1
Rockton	*	African Lion Safari	CS 5
St. Félicien	*	Zoo Sauvage	DB 2
Toronto	*	Metro Toronto Zoo	CS 9, DB 2, RU 5

<i>Country/place</i>	<i>Name of collection</i>	<i>Species exhibited</i>
China		
Beijing	Zoological Gardens	CS 2, DB 5, RU 4
Canton	Zoological Gardens Kwangchow	CS 2
Chengdu, Sichuan	Zoological Gardens	DB 2
Choushun	Zoological Gardens	CS 2
Early specimens		X 19
Guangzhou	see Canton	
Harbin	Zoological Gardens	CS 2
Kwangchow	see Canton	
Peking	see Beijing	
Seito	see Chengdu	
Shanghai	Zoological Gardens	CS 3
Shenyang	Zoological Gardens	CS 3
Taiyuan	Zoological Gardens	CS 3
Tensin	Zoological Gardens	CS 3
Colombia		
Medellin	Hacienda Napoles	CS 2
Croatia		
Osijek	Zoological Gardens	DB 1
Zagreb	* Zoological Gardens	CS 2, DB 4
Cuba		
Havana	Zoological Gardens	CS 7, DB 2
Czech Republic		
Dvur Kralove	Zoological Gardens	CS 18, CSC 13, DB 33, RU 5
Lesna	* Zoological Gardens and Castle	CS 2, DB 2
Liberec	* Severoceska Zoologicka Zahrada	CS 4, RU 1
Ostrava	Zoologicka Zahrada	CS 2
Prague	Zoologicka Zahrada	CS 3, DB 3
Usti nad Labem	Zoologicka Zahrada	CS 7
Denmark		
Aalborg	* Aalborg Zoo	CS 5
Bandholm	Knuthenborg Safari Park	CS 6
Copenhagen	* Zoologiske Have	CS 9, DB 2, DS 1
Givskud	Lovepark Safariland	CS 5
Dominican Republic		
Santo Domingo	Parque Zoologico y Botanico	DB 2
Santo Domingo	Parque Zoologico Nacional, Zoodom	CS 11
Egypt		
Alexandria	Zoological Gardens	CS 1
Alexandria	Specimens in Roman Empire	X 2
Cairo	Giza Zoological Gardens	CS 5, DB 8, RU 2
Cairo	Early specimens	X 2
Estonia		
Tallinn	Tallinn Zoo	DB 2
Europe		
Early specimens		DB 2
Travelling menageries		CS 11, RU 4

<i>Country/place</i>		<i>Name of collection</i>	<i>Species exhibited</i>
Travelling menagerie		Planet Menagerie	RU 1
Travelling menagerie		Bach Menagerie	DB 1
Wingst		Baby Zoo	CS 1
Wuppertal	*	Zoologischer Garten	DB 2
Greece			
Athens		Circo de Madrid	CS 1
Hungary			
Budapest	*	Zoological Gardens	CS 2, DB 2, DS 1
Veszprem	*	Kittenberger Zoo	CS 1, DB 1
India			
Bangalore		Lal Bagh Park	RU 1
Baroda		see Vadodara	
Barpali		Coll. Rajah of Barpali	RU 1
Bhubaneswar		Nandankanan Biological Park	RU 2
Bombay		Zoological Gardens	RU 3
Calcutta		Alipore Zoological Gardens	RU 15, RS 2, DS 5
Calcutta		Barrackpore Park	RU 5
Calcutta		Coll. Nabab of Chittpour	RU 1
Calcutta		Coll. Raja Rajendra Mallick	RU 2
Calcutta		Coll. Maharajah of Burdwan	RU 1
Calcutta		Harbor (transit)	DS 2
Calcutta		Hugli Trading Post	RU 1
Calcutta		Jamrach (dealer)	RS 1
Calcutta		Rutledge (dealer)	RS 1
Calcutta		Coll. Wajid Ali Shah, King of Oudh	RS 1
Chandigarh		M.C. Choudhery Zoological Park	RU 3
Delhi		Zoological Gardens	DB 5, RU 7
Early specimens			RU 9, RS 2
Gauhati	*	Assam State Zoo	CS 1, RU 72
Guwahati		see Gauhati	
Gwalior		Coll. Maharajah of Gwalior	RU 1
Hyderabad	*	Nehru Zoological Park	RU 6
Jaipur		Zoological Gardens	RU 1
Kanpur		Allen Forest Zoo	RU 7
Kassimbazar		Private collection	RU 1
Lucknow		Coll. King of Oudh	RU ?
Lucknow		Zoological Gardens	RU 4
Madras		Zoological Gardens	RU 2, DS 1
Mysore		Sri Chamarajendra Zoo	CS 3, DB 11, RU 7
New Delhi		see Delhi	
Patna		Sanjay Gandhi Biological Park	RU 6
Poona		see Pune	
Pune		Royal Menagerie	RU 1
Trivandrum		Zoological Gardens	RU 4
Udaipur		Zoological Gardens	RU 1
Unknown Zoo			RS 1
Vadodara		Coll. Maharajah of Baroda	RU 2
Vadodara		Zoological Gardens	DB 2, RU 1
Indonesia			
Bogor		Presidential Palace	DS 1
Bogor		Taman Safari Indonesia	CS 7, DS 3
Jakarta		Ragunan Zoological Gardens	CS 3, DS 2
Java		Early collections	RS 9
Sepilok		Capture operation	DS 8
Sumatra		Atjeh, Sultan Iskander	DS 1

<i>Country/place</i>	<i>Name of collection</i>	<i>Species exhibited</i>
Sumatra	Coll. Max Peser	DS 1
Sumatra	Coll. Coenraad-Uhlig	DS 1
Sumatra	Danish Sumatran Rhino Expedition	DS 3
Sumatra	Coll. Harry Gillmore	DS 3
Sumatra	Sumatra Rhino Capture Operation	DS 18
Surabaya	Kebun Binatang Surabaya	CS 2, DS 2
Iran		
Esfahan	Early specimens	X 3
Teheran	Zoological Gardens	DB 7
Ireland		
Dublin	* Dublin Zoo	CS 5, DB 7, RU 2
Israel		
Jerusalem	Biblical Zoological Garden	DB 2
Ramat-Gan	* Zoological Centre, Tel Aviv	CS 27, DB 2
Tel Aviv	see Ramat-Gan	
Italy		
Belpasso	Parco Zoo di Sicilia	CS 1
Bussolengo	Circo Medrano	CS 4
Fasano	Zoosafari di Fasano	CS 3, DB 1
Langato	Autosafari - Parco Zoo del Garda	CS 5
Milan	Dealer collection	RU 1
Naples	Giardino Zoologico	DB 10
Pistoia	Giardino Zoologico 'Citta di Pistoia'	CS 2
Rome	Giardino Zoologico	CS 2, DB 6, RU 1
Rome	Grunvald Zoo	CS 1
Rome	Safari Park	CS ?
Rome	Specimens of Roman Empire	X 12
Torino	Giardino Zoologico	CS 2, DB 2
Verona	Langato Safari	DB 2
Japan		
Fujiwara, Shizuoka Pref.	Fuji Safari Park	CS 14
Fukuoka, Kyushu Island	Fukuoka Zoo	CS 2, DB 3
Gunma Pref.	Gunma Safari World	CS 13
Himeji City	Himeji Central park	CS 9
Hiroshima	Asa Zoo	DB 14
Hitachi	Kamine Zoo	DB 9
Hokkaido Pref.	Haiji Farm	CS 1
Iwaki City	Iwaki World Safari	CS 1
Izu, Shizuoka Pref.	Waling Safari Izu Bio Park	CS 5
Kagoshima	* Hirakawa Zoological Park	CS 2, DB 3
Kamine	see Hitachi	
Kanazawa	see Yokohama	
Kobe	Oji Zoo	CS 2, DB 8
Kumamoto	Kumamoto Zoo	CS 3, DB 4
Kyushu, Anjin-in-Cho	Kyushu African Lion Safari	CS 21
Miyazaki	Miyazaki Safari Park	CS 17
Morioka City	Zoological Gardens	CS 3
Nagasaki	Nagasaki Bio Park	CS 2
Nagasaki	Nagasaki Safari Park	CS 4
Nasu	Nasu Safari Park	CS 3
Nagoya	Higashiyama Zoo	DB 12, RU 4
Okinawa	Okinawa Kodomonoki Park	CS 1
Onuma, Hokkaido Pref.	Subaru Park	CS 3
Osaka	Tennoji Zoo	DB 10, DS 1

<i>Country/place</i>	<i>Name of collection</i>	<i>Species exhibited</i>
Sapporo	Maruyama Zoo	DB 1
Sendai City	Yagiya Zoological Park	CS 3
Shizuoka	Municipal Nihondaira Zoo	CS 2
Susono City	see Fujiwara	
Tobu, Saitama Pref.	Tobu Zoo	CS 2
Tohoku	Safari Park	CS 3
Tokyo	Tama Zoological Park	RU 4
Tokyo	* Ueno Zoo	CS 2, DB 4
Toyohashi	* Toyohashi Zoo and Botanical Park	CS 3
Travelling Shows	Circus	DB 3
Wakayama Pref.	* Adventure World	CS 20, DB 1
Yamaguchi Pref.	Akiyoshidai Safari Park	CS 6
Yokohama	Kanazawa Zoo	CS 2, DB 3, RU 2
Yoshikawa	Unidentified	DB 1
Kazakhstan		
Alma Ata	Zoopark	DB 3
Kenya		
Lake Nakuru National Park		CS ?
Lewa Downs Ranch	*	CS 5, DB 9
Maasai Mara Game Reserve		CS 10
Meru National Park		CS ?
Nairobi	* Animal Orphanage	DB 2
Nairobi	* David Sheldrick Wildlife Trust	DB 8
Nanyuki	Ol Pejeta Game Reserve	DB 2
Ngare Seroi Sanctuary	*	CS 10, DB 26
Nyeri	* Solio Ranch	CS ?, DB ?
Rumuruti	Farm of Carr Hartley	CSC 2
Rumuruti	Coll. Stanton	DB 1
Voi	Coll. Kearney	DB 1
Libya		
Tripoli	* Tripoli Zoo	CS 2
Lithuania		
Kaunas	* Kaunas Zoo	CS 2
Malaysia		
Dindings	Capture Site	RS 1
Jelevu	Coll. Datok Rajah Kiah	DS 1
Kuala Lumpur	Zoo Negara	CS 1, DB 2
Melaka	Zoological Gardens	CS 2, DS 14
Tabin Wildlife Reserve		DS 1
Mexico		
Cuernavaca-Taxco	Zoofari	CS 1
Guadalajara	* Zoologico Guadalajara	CS 4
Guadalupe	Zoologico 'La Pastora'	CS 2
Leon	Parque Zoologico	CS 2
Mexico City	Alfonso L. Herrera Zoological Park	CS 2, DB 5
Morelia	Zoologico de Morelia, Parque Juarez	CS 7
Puebla	African Safari	CS 8
Toluca	Zacango Zoo	CS 3
Travelling circus	Bell's Brothers Circus	DB 1
Morocco		
Temara	Parque Zoologique National	CS 2

<i>Country/place</i>	<i>Name of collection</i>	<i>Species exhibited</i>
Mozambique		
Lourenco Marques	see Maputo	
Maputo	Unidentified	CS ?
Myanmar		
Rangoon	see Yangon	
Theyboon	Monastery	DS 1
Yangon	Zoological Gardens	CS 2, RU 4, DS 1
Namibia		
Okahandja	Zoopark	DB 2
Nepal		
Kathmandu	Coll. King of Nepal	RU 6
Kathmandu	Zoological Gardens	RU 4
Netherlands		
Amsterdam	* Artis Zoo	DB 10, RU 4, DS 2
Arnhem	* Burgers Zoo	CS 20, DB 7
Emmen	* Noorder Dierenpark	CS 3
Hilvarenbeek	Safaripark Beekse Bergen	CS 21
Rotterdam	* Zoo Blijdorp	CS 3, DB 4, RU 3
New Zealand		
Auckland	* Auckland City Zoological Park	CS 2
Christchurch	Orana Park Wildlife Reserve	CS 9
Wellington	Zoological Gardens	CS 3
Nigeria		
Jos	Jos Museum Zoo	DB 2
Maiduguri	Kyarimi Park Zoo	DB 3
North Korea		
Pyongyang	Zoological Park	CS 4, DB 4
Pakistan		
Indus Civilization	Early specimens	RU ?
Lahore	Zoological Gardens	CS 2
Philippines		
Manila	Zoological and Botanical Gardens	DB 2
Poland		
Breslau	see Wroclaw	
Gdansk	* Zoological Gardens	CS 1
Katowice	Slaski Ogród Zoologiczny	CS 7
Lodz	* Miejski Ogród Zoologiczny	CS 1, DB 1
Wroclaw	Kallenberg's Menagerie	RU 1
Wroclaw	* Miejski Ogród Zoologiczny	CS 3, DB 6, RU 1, DS 1
Portugal		
Lisbon	Coll. King Manuel I	RU 1
Lisbon	Coll. King Philip II	RU 1
Lisbon	* Jardim Zoologico	CS 4, DB 8
Puerto Rico		
Mayaguez	see Puerto Rico	
Puerto Rico	Jardin Zoologico, Zoorico	CS 2

<i>Country/place</i>		<i>Name of collection</i>	<i>Species exhibited</i>
Qatar			
Doha		Municipal Zoological Gardens	CS 2
Romania			
Calarasi		Municipal Zoo	CS 2
Russia			
Kaliningrad	*	Kaliningradskii Zoopark	CS 2
Leningrad		see St. Petersburg	
Moscow	*	Moskovskii Zoologicheskii Park	CS 1, DB 1, RU 1
Rostov		Rostovskii Na-Donu Zoologicheskii Park	CS 2
St. Petersburg		Zoological Gardens	DB 3, RU 2
Saudi Arabia			
Mecca		Early specimens	X 1
Riyadh		Zoological Gardens	CS 2, CSC 2
Singapore			
Singapore		Botanic Gardens	DS 3
Singapore	*	Zoological Gardens	CS 5, RU 8
Slovakia			
Bratislava	*	Zoologicka Zahrada	CS 3
Somalia			
Expedition		Count Potocki	DB 1
South Africa			
Addo National Park		Released specimens	DB ?
Bloemfontein	*	Kings Park	CS 4
Broederst Brook		see Sandton	
Durban		Natal Zoological Gardens	CS 2
Durbanville	*	Tygerberg Zoological Preservation Trust	CS 2
Johannesburg	*	Zoological Gardens	CS 5, DB 4
Lapalala		Home of Fam. C. Walker	DB 1
Lichtenburg	*	Breeding Centre of Pretoria Zoo	CS 31
Potgietersrus	*	Breeding Centre of Pretoria Zoo	CS 6, DB 4
Pretoria	*	National Zoological Gardens	CS 24, DB 10
Private Ranches			CS ?
Sandton		Dealer	CS 2, DB 2
South Korea			
Pusan		Unidentified	DB 1
Seoul		Grand Park Zoo	DB 2, RU 1
Spain			
Barcelona	*	Parc Zoologic	CS 4, DB 4
Fuengirola		Parque Zoologico	CS 4
Madrid		Coll. King Philip II	RU 1
Madrid		Safari Park El Quexigal	CS ?
Madrid	*	Zoo de la Casa de Campo	CS 4, DB 1
Mallorca		Auto Safari Reserva Africana	CS 2
San Roque		Auto Safari Andaluz	CS 4
Valencia	*	Jardin Zoologico	CS 1
Various		Coll. Salvadore Dali	DB 1
Villaescusa	*	Parque de la Naturaleza de Cabarceno	CS 4

<i>Country/place</i>		<i>Name of collection</i>	<i>Species exhibited</i>
Sri Lanka			
Colombo		National Zoological Gardens, Dehiwala	DB 6
Sudan			
Khartoum		Zoological Gardens	CSC 5
Sweden			
Boras	*	Boras Djurpark	CS 2
Boras		Coll. Sigvard Berggren	DB 1
Kolmarden		Kolmardens Djurpark	CS 3
Switzerland			
Basel	*	Zoologischer Garten	DB 2, RU 31, DS 1
Rapperswil	*	Circus Knie	CS 2, DB 1
Zurich		Zoologischer Garten	CS 2, DB 15
Syria			
Aleppo		Early specimens	X 1
Taiwan			
Kaohsiung City		Zoological Gardens	CS 3
Taipei	*	Taipei Zoo	CS 9, DB 3
Taipei		Leofoo Village Safari Park	CS 20
Tanzania			
Mwanza		Saanane Island Game Reserve Zoo	DB 3
Thailand			
Bangkok		Bangkok Safari	CS 4
Bangkok		Dusit Zoo	CS 2, DB 1, DS 1
Bangkok		Private collections	RS 4
Chiangmai	*	Zoological Gardens	RU 3
Tunisia			
Tunis		Parc Zoologique	CS 5
Turkey			
Istanbul		Early specimens	X 1
Ukraine			
Kiev	*	Kievski Zoologicheskii Park	CS 3, DB 1
United Kingdom			
Bekesbourne		Howletts Zoo Park	DB 4
Bewdley	*	West Midland Safari Park	CS 4
Blackpool	*	Municipal Zoological Gardens	CS 4
Bristol		Bristol, Clifton & West of England Zoological Society	DB 9
Burford	*	Cotswold Wildlife Park	CS 3
Chester	*	North of England Zoological Society	CS 2, DB 15, RU 1
Cleethorpes		Marineland and Zoo	DB 1
Colchester	*	Colchester Zoo	CS 2
Edinburgh	*	Royal Zoological Society of Scotland	CS 11, DB 3
Edinburgh		Travelling collection (Atkins)	RU 1
Glasgow		Zoological Society of Glasgow	CS 3
Howletts Zoo Park		see Bekesbourne	
Kirby Misperton	*	Flamingo Land	CS 1
Knowsley Park		see Prescott	
Liverpool		William Cross (dealer)	DS 1

<i>Country/place</i>	<i>Name of collection</i>	<i>Species exhibited</i>
Liverpool	Zoological Gardens	RU 1
London	Early Specimens	RU 4
London	Exeter 'Change	RU 3
London	Jamrach (dealer)	RU 4, RS 1
London	Olympia	RU 1
London	Rice (dealer)	RU 1, DS 2
London	Surrey Zoological Gardens	RU 1
London	Zoological Society of London	CS 1, CSC 2, DB 21, RU 12, RS 1, DS 9
Longleat	see Warminster	
Manchester	Belle Vue Zoological Gardens	DB 7, RU 4
Manchester	Zoological Garden	RU 1
Marwell	see Winchester	
Paignton	Zoological and Botanical Gardens	CS 3, DB 2
Port Lympne	Zoo Park	DB 19, DS 3
Prescot	* Knowsley Safari Park	CS 9, CSC 1
Southampton	Zoological Gardens	CSC 1, DB 2
Travelling menageries	Wombwell's Menagerie	RU 7
Travelling menageries	Manders' Royal Menagerie	RU 1
Warminster	Longleat Park	CS 16
Whipsnade	Whipsnade Park	CS 70, DB 15, RU 14
Winchester	* Marwell Zoological Park	CS 5, DB 2
Windsor	Royal Windsor Safari Park	CS 8
Woburn	* Woburn Wild Animal Kingdom	CS 10
USA		
Albuquerque, New Mexico	Rio Grande Zoological Park	CS 2
Almo, Idaho	Jungle Wonder Circus	CS 1
Alvin, Texas	Bayou Wildlife Park	CS 4
Amityville, New York	Frank Buck's Jungle Camp	RU 1
Asheboro, N. Carolina	North Carolina Zoological Park	CS 5, DB 3
Atlanta, Georgia	* Atlanta Zoo	DB 5
Baker, Louisiana	* Greater Baton Rouge Zoo	CS 5
Baltimore, Maryland	Zoological Gardens	CS 2
Birmingham, Alabama	Birmingham Zoo	CS 3
Boston, Massachusetts	Franklin Park Zoo	DB 3
Brownsville, Texas	* Gladys Porter Zoo	CS 8, RU 2
Buffalo, New York	Buffalo Zoological Gardens	DB 6, RU 1
Catskill, New York	* Catskill Game Farm	CS 2
Center Hill, Florida	Rare Feline Breeding Compound	CS 3
Chicago, Illinois	Chicago Zoological Park, Brookfield	CS 2, DB 19, RU 3
Chicago, Illinois	Lincoln Park Zoological Gardens	DB 3
Cincinnati, Ohio	* Cincinnati Zoo	DB 22, RU 4, DS 4
Cleveland, Ohio	Cleveland Metroparks Zoological Park	CS 3, DB 4
Clifton, Texas	Texas Safari Inc.	CS 6
Colorado Springs, Colorado	Cheyenne Mountain Zoological Park	DB 10
Columbia, South Carolina	* Riverbanks Zoological Park	CS 3, DB 2
Columbus, Ohio	* Columbus Zoo	CS 6, DB 10
Cumberland, Ohio	The Wilds	CS 7
Dallas, Texas	* Marsalis Park Zoo	DB 8
Davis, Oklahoma	Arbuckle Wilderness	CS 1
Deland, Florida	Nautilus Corp., Idle Hour Farm	CS 2
Denver, Colorado	Denver Zoological Gardens	DB 17
Detroit, Michigan	* Detroit Zoological Park	DB 15
Doswell, Virginia	Kings Dominion	CS 15
Duluth, Minnesota	* Lake Superior Zoo	DB 1
El Paso, Texas	* El Paso Zoo	CS 3
Encino, Texas	Bass Ranch	DB 6

<i>Country/place</i>		<i>Name of collection</i>	<i>Species exhibited</i>
Evansville, Indiana	*	Mesker Park Zoo	DB 1
Fort Worth, Texas	*	Zoological Park	CS 8, DB 6, RU 2
Fresno, California	*	Chaffee Zoological Gardens	CS 2, DB 5
Garden City, Kansas	*	Lee Richardson Zoo	DB 3
Gentry, Arkansas		Wild Wilderness	CS 1
Glen Rose, Texas		Fossil Rim Wildlife Centre	CS 10, DB 7
Grand Prairie, Texas		Lion Country Safari	CS ?
Haines City, Florida		Circus World	CS 1, DB 1
Harwood, Texas		Noah's Land Wildlife Park	CS 2
Holland, Michigan		Coll. George F. Getz	DB 1
Hollywood, California		Studio Metro-Goldwyn-Mayer	DB 1
Honolulu, Hawaii	*	Honolulu Zoo	CS 4
Houston, Texas		Bush Gardens	CS 3, RU 2
Hudson, New Hampshire		Benson's Wild Animal Farm	CS 4
Idaho Falls, Idaho		Tautphaus Park Zoo	CS 2
Inman, South Carolina		Hollywild Animal Park	CS ?
International Animal Exchange (IAE)			CS 74
Jackson, Mississippi		Jackson Zoological Park	CS 5
Jackson, New Jersey		Six Flags Great Adventure	CS 32
Jacksonville, Florida	*	Jacksonville Zoological Park	CS 20, DB 4
Johnson City, Texas		McCombs Ranch	CS 1
Kansas City, Missouri		Kansas City Zoo	CS 5, DB 11
Kings Island, Ohio		Wild Animal Safari	CS 31
Kingwood, Texas		Kingwood Safari	CS 1
Knoxville, Tennessee	*	Zoological Gardens	CS 29
Laguna Hills, California		Lion Country Safari	CS 28
Lansing, Michigan		Potter Park Zoo	DB 3
Linn, Texas		Calvin Bentsen's La Coma Ranch	DB 12
Litchfield Park, Arizona	*	Wildlife World Zoo	CS 1
Little Rock, Arkansas	*	Zoological Gardens	CS 2
Llano, Texas		Sandstone Mountain Ranch	CS 3
Los Angeles, California	*	Los Angeles Zoo	CS 2, DB 14, RU 10, DS 3
Louisville, Kentucky	*	Zoological Gardens	CS 8
Madison, Wisconsin	*	Henry Vilas Park Zoo	CS 2
Memphis, Tennessee	*	Overton Park Zoo	CS 11, DB 7
Miami, Florida		Crandon Park Zoo	DB 3
Miami, Florida		Miami Metro Zoo	CS 4, DB 14, RU 3
Milwaukee, Wisconsin		Milwaukee County Zoological Park	CS 3, DB 6, RU 4
Mitchellville, Iowa		Wild World	CS 4
Monroe, Louisiana	*	Louisiana Purchase Gardens and Zoo	CS 2
Mountain Home, Texas		Waters Ranch	CS 2
Nashua, New Hampshire		John Benson's Animal Farm	DB 1
New Orleans, Louisiana	*	Audubon Park Zoological Garden	CS 6
New York, NY	*	Bronx Zoo	CS 2, DB 6, RU 13, DS 2
New York, NY		Central Park Zoo	DB 3, RU 4
New York, NY		Prospect Park, Brooklyn	DB 2
Norfolk, Virginia	*	Virginia Zoological Park	CS 2
Ocala, Florida		Unidentified	CS 1
Oklahoma City, Oklahoma		Oklahoma City Zoo	CS 2, DB 16, RU 5
Omaha, Nebraska	*	Henry Doorly Zoo	CS 3, RU 2
Pawtucket, Rhode Island		Slater-Memorial Park Zoo	DB 1
Philadelphia, Pennsylvania	*	Zoological Gardens	CS 3, DB 3, RU 13, DS 2
Phoenix, Arizona	*	Phoenix Zoo	CS 10
Pittsburgh, Pennsylvania		Zoological Gardens	CS 2, DB 8
Plain Dealing, Louisiana		Wild World	CS 2
Portland, Oregon		Portland Zoological Gardens	RU 1
Portland, Washington		Washington Park Zoo	DB 2
Redwood City, California	*	Marine World Africa USA	CS 2

<i>Country/place</i>		<i>Name of collection</i>	<i>Species exhibited</i>
Royal Oak		see Detroit, Michigan	
Salina, Kansas		Rolling Hills Wildlife Preserve	CS 1
Salt Lake City, Utah	*	Hogle Zoo	CS 3
San Antonio, Texas	*	Zoological Gardens	CS 15, DB 11
San Diego, California	*	San Diego Zoo	CS 12, CSC 1, DB 13, RU 8, DS 4
San Diego, California	*	San Diego Wild Animal Park	CS 109, CSC 8, DB 15, RU 28
San Francisco, California		Zoological Gardens	CS 2, DB 15, RU 2
San Jose, California	*	San Jose Baby Zoo	CS 1
Santillana		Unidentified	DB 2
Sequim, Washington		Olympic Game Farm	CS ?
Sioux Falls, South Dakota		Great Plains Zoo	CS 1
St Louis, Missouri	*	Saint Louis Zoo	CS 4, CSC 2, DB 16, RU 1
Stockbridge, Georgia		Lion Country Safari	CS 12
Tampa, Florida		Lowry Park Zoo	RU 1
Tampa Bay, Florida	*	Busch Gardens	CS 2, DB 12
Thousand Oaks, California		Louis Goebel's Jungle Land	DB 2
Toledo, Ohio	*	Zoological Gardens	CS 4, DB 2
Travelling menageries and circuses			CS 3, DB 18, RU 23, DS 6
Tucson, Arizona		Gene Reid Zoological Park	CS 2
Tulsa, Oklahoma	*	Tulsa Zoo	CS 5, DB 1
Tyler, Texas		Caldwell Zoo	DB 5
Vallejo, California		Marine World Africa	CS 3
Waco, Texas	*	Cameron Park Zoo	CS 2
Washington, DC	*	National Zoological Gardens	CS 2, CSC 2, DB 12, RU 10, DS 1
Wellford, South Carolina		Holly Wild Animal Park	CS 1
West Palm Beach, Florida		Lion Country Safari	CS 36
Wichita, Kansas	*	Sedgwick County Zoo	DB 9
Winston, Oregon	*	Wildlife Safari	CS 10
Yulee, Texas		White Oak Wildlife Center	CS 10, DB 4
Uruguay			
Montevideo		Jardim Zoologico	CS 1
Uzbekistan			
Bukhoro		Court	X 1
Venezuela			
Barquisimeto		Parque Zoologico Bararida	CS 5
Carabobo		Parque Safari	CS 7
Caracas		Parque Zoologico Caracuaao	CS 2
Zimbabwe			
Expedition		Coryndon	CS 1
Expedition		Selous	CS 1
Marondera		Imire Game Ranch	DB 7
Salisbury		J. Condy	DB 1

2. Statistics on demography and reproduction

This book contains essential information on 2439 specimens from the five surviving species of rhinoceros exhibited in captivity. While the data on each animal are set out in the following chapters, a few general statistics have been combined here to help in the comparison between species. The data are presented here with little embellishment, because the present study was not designed to cover reproductive behavior in detail. I feel certain that the data can easily be compared with other studies.

Demography

Total numbers

Of the 2439 specimens, about two-thirds were imported from the wild and one-third was born

Table 1. Total number of imports and births of the five species of rhinoceros in captivity from early times until 1994

Species	Imported animals	Births	Total	
Unknown	44		44	1%
<i>R. unicornis</i>	260	137	397	16%
<i>R. sondaicus</i>	22	0	22	1%
<i>D. sumatrensis</i>	92	4	96	4%
<i>D. bicornis</i>	483	292	775	32%
<i>C. simum</i>	626	479	1105	46%
Total	1527	912	2439	
	62%	38%		

in captivity. About a quarter belong to the three Asiatic species of rhinoceros, while all the others come from Africa (Table 1). The rhinoceroses have been seen in 501 collections spread over 79 different countries (Tables 2 and 3). Only in London Zoo has every form been exhibited, including the Javan rhinoceros and the Northern white subspecies.

This is a summary of the tables of collections in each chapter.

Sex ratio

The sex ratio of animals imported from the wild and those born in captivity is summarized in Table 4. From the statistics for specimens born in captivity, it would appear that, in each species (except for the Sumatran rhinoceros with only four births), there is a preponderance of males.

Table 3. Number of countries and collections where each species of rhinoceros has been exhibited

Species	No. of countries	No. of collections
<i>R. unicornis</i>	28	116
<i>R. sondaicus</i>	9	15
<i>D. sumatrensis</i>	20	49
<i>D. bicornis</i>	50	203
<i>C. simum simum</i>	60	314
<i>C. simum cottoni</i>	9	14

Table 2. Number of countries and collections exhibiting one or more species of rhinoceros

Continent	No. of countries	No. of collections	No. of rhinoceros (sub-)species					
			1	2	3	4	5	6
Africa	12	39	30	9				
Asia	25	127	96	25	6			
Australia	2	11	7	3	1			
Europe	29	169	110	31	22	4	1	1
North America	2	127	89	22	8	6	2	
South America	9	28	22	5	1			
Total	79	501	354	95	38	10	3	1

Data are based on the list of collections in Chapter 1

Collections with six rhinoceros (sub-)species: London, UK

Collections with five rhinoceros (sub-)species: Antwerp, Belgium; San Diego, USA; Washington, USA

Table 4. Sex ratio of the rhinoceros in captivity

Species	Imported animals		Births		Total	
	σ/q	%	σ/q	%	σ/q	%
<i>R. unicornis</i>	105/92	116:100	79/55	143:100	184/147	127:100
<i>R. sondaicus</i>	4/6	67:100	-	-	4/6	67:100
<i>D. sumatrensis</i>	26/47	57:100	1/3	33:100	27/50	55:100
<i>D. bicornis</i>	226/231	97:100	145/134	107:100	371/365	101:100
<i>C. simum</i>	265/359	73:100	254/220	115:100	519/579	90:100

This table only includes specimens of known sex. It presents the actual numbers of imported animals and captive born specimens of each sex, and has been translated into percentages with the number of females confirmed at 100%

Longevity

Some information on long-lived specimens is contained in the chapters on each species. The maximum longevity in captivity is set out in Table 5. These calculations exclude the time before the animal entered a collection, because the exact age at arrival is seldom known. This explains some of the differences in the maxima given by Jones (1993), who recorded higher ages for the Sumatran and East African black rhinoceros. The present data are not separated by subspecies, but it is unlikely that there would be major differences. A 40-year-old rhinoceros is old, but in exceptional cases they can reach the age of about 45 years. Table 6 presents the average ages of rhinoceroses in captivity. The first category of '0' years is rather unnatural since it includes specimens with insufficient data. However, it still appears that at least half the specimens live for less than ten years in a captive situation. Only very few reach old age.

Reproduction

The Javan rhinoceros was never known to reproduce in captivity, while both the Suma-

Table 5. Maximum recorded age in captivity

Species	Maximum age	
<i>R. unicornis</i>	40 years 4 months	(14,742 days)
<i>R. sondaicus</i>	20 years 7 months	(7,603 days)
<i>D. sumatrensis</i>	28 years 6 months	(10,425 days)
<i>D. bicornis</i>	44 years 9 months	(16,337 days)
<i>C. simum</i>	40 years 8 months	(14,845 days)

This table only includes data on specimens which died in 1995 or earlier, and which have been listed in this book. Details can be found in the chapters on each species

tran and Northern white rhinos only gave birth four times. The other three forms have done reasonably well, although the number of births remains low (Table 8). The year in which the first captive birth was recorded is noted in Table 7. At least three quarters of all rhinoceros births in captivity occurred after 1970, before that this was a very rare experience (Table 9). Rhinoceroses of all species have been bred in 141 collections in 36 countries (Table 10).

Unfortunately, it is quite common that a rhinoceros dies at birth or soon thereafter (Table 11). This is especially common in the Indian rhinoceros. The young are born throughout the year (Table 12), and it is dif-

Table 6. Average longevity of rhinoceroses of all species in captivity (shown in percentage)

Years	<i>unicornis</i> n=397	<i>sondaicus</i> n=22	<i>sumatrensis</i> n=96	<i>bicornis</i> n=775	<i>simum</i> n=1105
0	26	81	31	15	8
1-9	34	0	60	45	32
10-19	17	14	7	23	26
20-29	16	5	2	13	31
30-39	6	-	-	3	3
>39	1	-	-	1	0.1

This table records the percentage of the total number of specimens of each species which lived during a certain number of years. It includes both imported specimens and those born in captivity

Table 7. Year of first known birth of each species

Species	Year
<i>R. unicornis</i>	1824
<i>R. sondaicus</i>	-
<i>D. sumatrensis</i>	1872
<i>D. bicornis</i>	1941
<i>C. simum simum</i>	1967
<i>C. simum cottoni</i>	1980

Table 8. Number of captive births of each species up to 1994

Species	Total	M	F	Unknown
<i>R. unicornis</i>	137	79	55	3
<i>R. sondaicus</i>	0			
<i>D. sumatrensis</i>	4	1	3	
<i>D. bicornis</i>	292	145	134	13
<i>C. simum simum</i>	475	253	217	5
<i>C. simum cottoni</i>	4	1	3	
Total	912			

Table 9. Percentage of captive births of rhinoceros over time

Period	unicornis n=137	sumatrensis n=4	bicornis n=292	simum n=479
Before 1940	1	75	-	-
1940-1949	1	-	1	-
1950-1959	2	-	3	-
1960-1969	13	-	15	1
1970-1979	21	-	27	31
1980-1989	39	25	30	52
1990-1994	23	-	24	16

difficult to recognize a pattern, although there could perhaps be a slight preference for the months of October to December in the African species.

The gestation period was not part of this survey. A few data have been published previously and are summarized in Table 13 (see also, Jones DM, 1979:243). The higher values

Table 11. Number of babies born dead (stillbirths)

Species	No.	%	
<i>R. unicornis</i>	28	20	12/13/3
<i>R. sondaicus</i>	-		
<i>D. sumatrensis</i>	-		
<i>D. bicornis</i>	33	11	16/6/11
<i>C. simum</i>	35	7	19/13/3

Table 12. Distribution of known births per month of the year (shown in percentage)

Month	unicornis n=137	sumatrensis n=4	bicornis n=292	simum n=479
January	13	25	9	7
February	6	25	6	4
March	6		8	7
April	5		5	7
May	8	25	8	8
June	6		5	7
July	12		6	8
August	13		11	10
September	6		8	9
October	10		13	10
November	7		10	11
December	8	25	11	12

for the white rhinoceros seem excessive and the average also appears to be a little on the high side. Roughly, the gestation of each species is 16 months, with some individual variation.

It is a strange phenomenon that females in captivity rarely produce many offspring. About half the mothers only give birth once or twice (Table 16). The interval between consecutive births in a young mother is a minimum of 16 months. This has been found in all three reproducing species (Table 17), and means that the females can conceive again very soon after giving birth (some data on the black rhinoceros in Smith and Read, 1992).

Table 10. Number of countries and collections where the rhinoceros was bred

	No. of countries	No. of collections	RU	No. of animals bred			Total animals
				DS	DB	CS	
Africa	4	8	0	0	4	32	36
Asia	11	33	34	3	47	68	152
Australia	1	2	0	0	9	6	15
Europe	14	39	59	1	89	128	277
N. America	2	53	44	0	136	228	408
S. America	4	6	0	0	7	17	24
Total	36	141	137	4	292	479	912



Fig. 6. Female Black rhinoceros 'Kathleen' with Harry Warwick, London 1928 to 1939.

Table 13. Gestation periods

Species	Mean	Range
<i>R. unicornis</i>	478	462-489
<i>R. sondaicus</i>	-	
<i>D. sumatrensis</i>	-	
<i>D. bicornis</i>	457	438-493
<i>C. simum simum</i>	514	480-548
<i>C. simum cottoni</i>		482-485

The periods are given in days, based on the literature and information from collections in the survey

The age of sexual maturity can be calculated in females born in captivity and giving birth to second-generation zoo-born animals (Table 14). A few Indian and white rhinos have given birth when they were four years and four months old, which means that they were barely three years old when they mated successfully. No such early parturitions have been observed in the black rhinoceros. The males mature slightly later (Table 15), although some white rhinos were just over three years when they sired their first calf.

Table 14. Age of captive born females at first parturition

Age in years	<i>unicornis</i> (%) <i>n</i> =18	<i>bicornis</i> (%) <i>n</i> =26	<i>simum</i> <i>n</i> =18
4	22	-	11
5	5	-	6
6	12	19	39
7	5	12	11
8	5	15	11
9	18	4	-
10	5	23	6
>10	28	27	16

Youngest mothers:

4 yrs 4 mo	6 yrs 6 mo	4 yrs 4 mo
4 yrs 6 mo	6 yrs 6½ mo	4 yrs 11 mo



Fig. 7. Sumatran rhinoceros baby at Melaka, born 23rd May 1987.



Fig. 8. White rhinoceros mating at Ramat-Gan, 12th January 1988.



Fig. 9. Male Indian rhinoceros at Antwerp in 1880, drawn by A. Heins.

Table 15. Age of captive born males at the birth of first offspring (not at the time of mating)

	Age	
	years	months
<i>R. unicornis</i>	5	10
	7	11
<i>D. bicornis</i>	5	8
<i>C. simum</i>	3	2
	4	4

Table 16. Number of births and percentage of females giving birth in each species

<i>No. of births</i>	<i>unicornis</i> <i>n=39</i>	<i>bicornis</i> <i>n=91</i>	<i>simum</i> <i>n=126</i>
1	33	41	44
2	26	15	13
3	18	14	9
4	5	13	6
5	5	9	3
6	2.6	4	13
7	2.6	2	3
8	-	2	4
9	2.6	-	3
10	2.6	-	1
11	2.6	-	-
12	-	-	1

Table 17. Shortest intervals in days between captive births in each rhinoceros species

<i>R. unicornis</i>	<i>D. bicornis</i>	<i>C. simum</i>
457	483	409
494	494	451
501	525	469
512		506

In the case of multiple births in one female, the interval between parturitions can be calculated; the shortest intervals are given here

3. Early rhinoceroses in Rome, China and the Near-East

1. The Roman world

In the period that the Romans were in power, from the first century BC to the third century AD, a number of rhinoceroses were exhibited in Alexandria and Rome. Several summaries of the evidence about these rhinoceros are available, including Jennison (1937), Gowers (1950), Toynbee (1973: 125-127) and Störk (1977: 307-403). The information in the various contemporary sources is often limited to indications that a rhinoceros was present in a certain year or period. The animal is rarely described, and, even when it is, the details are often second-hand.

Specific identity

It is a vexing question as to which species of rhinoceros was known to the Romans. Some of the references dating from the first century AD refer to single horns. It is quite possible that these refer to specimens of the Indian rhinoceros (*Rhinoceros unicornis*). The exact origin of these specimens from the Indian subcontinent will inevitably remain speculative. The species was found in Pakistan or Western India (Rookmaaker 1984b) and the rhinos may have reached Rome from there.

Other rhinoceroses in Rome were described as double-horned or 'Ethiopian'. Gowers (1950) suggested that such animals must have been white rhinos (*Ceratotherium simum*), presumably from the Sudan or Ethiopia. His thesis is not generally accepted. The latest contribution on this subject is by Colls *et al.* (1985), who recorded the discovery of a statuette of a rhinoceros in Port Vendres, France, dating from the second part of the second century AD (see Fig. 10). This statuette is clearly a black rhinoceros (*Diceros bicornis*). Although we can continue to argue about differences in species with regard to shape of the head, relative size, shape and size of the horn(s), there can now be no doubt that the majority of animals known to the Romans were African black rhinos. The Romans could have obtained them from the regions around the Red Sea coast or from the hinterland of the present Eritrea and Ethiopia. The black rhinoceros was found in those areas until at least the

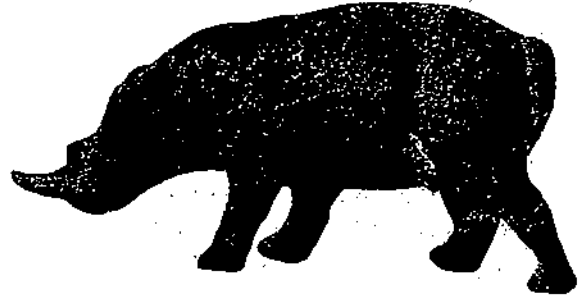


Fig. 10. Black rhinoceros statuette from Roman times, discovered at Port Vendres, France.

last century (Yalden *et al.* 1986:42-45, fig. 5). The white rhinoceros has not been recorded in those areas in recent times. We can conclude that the Romans knew both the single-horned Indian and double-horned black rhinoceros.

Alexandria, Egypt

275 BC, Procession for Ptolemy II

On an unspecified date, Ptolemy II Philadelphus (283-246 BC) held a great procession in the city of Alexandria. Athenaeus, who wrote his *Deipnosophists* in the third century AD, based on earlier lost works, noted (V, 201c) that the procession included 'one Aethiopian rhinoceros'.

100 BC

Strabo's *Geography* (XVI.4.15) contains an argument on the size of the rhinoceros, taken from a lost work written around 100 BC by Artemidorus of Ephesus. Strabo disagrees with a statement made by Artemidorus, although the latter says that he saw the animal at Alexandria.

Rome, Italy

29 BC, the Games of Augustus

In *Roman History* (22, 5) written in the third century, Dio Cassius stated that the Emperor Augustus organized games in 29 BC, at which "wild beasts and tame animals were slain in vast numbers, among them a rhinoceros and a hippopotamus, beasts then seen for the first

time in Rome". The rhinoceros "has also a horn on its very nose". Gaius Suetonius (ca. 70-140 AD) wrote his *De Vita Caesarum* around 120 AD. He mentions (II, 43,4) that Augustus exhibited rare animals in the Roman arena, including "a rhinoceros at the Septa" and a tiger. He does not give a date.

8 AD, the Games of Augustus

Dio Cassius (*Roman History*, LV, 33,4) reported that a rhinoceros was once again seen at games organized by Augustus. This time, "an elephant overcame a rhinoceros".

55 AD, the Games of Pompey

Gaius Plinius Secundus (23-79 AD) wrote about the animals seen at the games organized by the Emperor Pompey in 55 AD to celebrate the opening of a new amphitheater. Besides a lynx and a giraffe, there was "a rhinoceros with one horn on the nose [*unius in nare cornus*] such as has often been seen. Another bred here to fight matches with an elephant gets ready for battle by filing its horns on rocks" (Plinius, *Naturalis Historia*, VIII. 71). The second sentence in Latin starts with the words '*alter hic genitus*', which H. Rackham translated as 'another bred here.' While this is a rather intriguing statement, I assume that Plinius did not mean to imply that the animal was born in captivity, since the remark is rather too short and general.

Around 200 AD, Solinus wrote in his *Collectanea Rerum Memorabilium* (chapter 43) that the rhinoceros was unknown at the Roman games before the time of Pompey.

80 AD, the Games of Titus

On the occasion of the dedication of the Colosseum in Rome in 80 AD, the Emperor Titus organized shows lasting for 100 days. Martialis (40-102 AD) wrote two epigrams in his *Liber de Spectaculis* (IX and XXII) indicating the presence of a rhinoceros. Apparently, the rhinoceros was made to fight a bear. The penultimate line of the 22nd epigram, in which Martialis wrote, "*namque gravem gemino cornu sic extulit ursum*" ["for a heavy bear he tossed with his double horn"] has become famous. This 'double horn' greatly bothered chroniclers in the 16th and 17th centuries, trying every ingenious trick to explain this anomalous number of horns (summary in Rookmaaker 1981:111-112).



Fig. 11. Coins from the reign of Domitian with double-horned rhinoceros.

81-96 AD, the Reign of Domitian

Several coins showing a double-horned rhinoceros are known, dating from the reign of the Emperor Domitian (e.g., Gowers 1950:69, Störk 1977:371; see Fig. 11). There is no independent information about the rhinoceros itself. It is quite possible, as suggested by Toynbee (1973:126), that these coins were modelled on the rhinoceros exhibited at the games of Titus in 80 AD.

98-117 AD, the Reign of Trajanus

A coin with a double-horned rhinoceros was produced during the reign of the Emperor Trajanus (Störk 1977:371). A rhinoceros may have been shown in Rome during this period.

127 AD, the Reign of Hadrian

Another double-horned rhinoceros can be seen on a coin made during the reign of Hadrian (117-138 AD), dated 127 AD (Gowers 1950:69, Störk 1977:371).

138-161 AD, the Reign of Antoninus Pius

In his *Historiae Augustae* (Anton. Pius, X. 9), Capitolinus recorded that 'rhinoceroses' (plural) were among the animals shown during the reign of Antoninus Pius. This possibly refers to the games of 148 AD, celebrating the tenth anniversary of the Emperor's accession.

180-192 AD, the Reign of Commodus

The Emperor Commodus was famous for personally slaying many animals in the circus, including five hippopotamuses and a giraffe. Dio Cassius (*Roman History*, LXXIII, 10, 3) writes that there were 'rhinoceroses' among these victims. The word is in the plural, but is not qualified further.

211-217 AD, the Reign of Caracalla

A rhinoceros was killed in the arena during one of the blood-thirsty games organized by the Emperor Caracalla (Dio Cassius, *Roman History*, LXXVIII, 6, 2). There was a medal struck during Caracalla's reign showing a wrecked ship, with underneath it a rhinoceros which is clearly single-horned.

218-222 AD, the Reign of Elegabalus

Lampridius (*Historiae Augustae*, XXVIII, 3) reported that many Egyptian animals were imported during the reign of the Emperor Antonius Elegabalus. Among them there was a 'rhinoceros' (singular), as well as hippopotamuses and a crocodile.

248 AD, the Games of Philippus Arabicus

The *Historiae Augustae* (XXXIII, 1) contains a list of animals brought together for the Persian Triumph of Gordianus III, but which were shown by Philip the Arabian in 248 AD. There was only one rhinoceros, which may point to its relative rarity, as other species were present in large numbers, for instance, 32 elephants, ten tigers, 60 tame lions, 30 tame leopards, ten hippos, ten giraffes, and many others.

2. Early China

The rhinoceros was frequently seen at the Chinese court. These animals were given as gifts by the rulers and citizens of the different Chinese provinces and neighboring countries, such as Malaysia and Indonesia. Brentjes (1973:253) illustrates a bronze statuette of a double-horned rhinoceros made in the Shang-Yin period (second century BC). As it is quite naturalistic, he suggests that it was made from a captive specimen (see Fig. 12).

The rhinoceroses seen at the Chinese courts or other animal collections before 1500 have not been documented in detail. I have no access to the Chinese literature and have only been able to find a few references, and it is likely that this is just a fraction of the available evidence. Laufer (1914:80-81), in one of his lengthy footnotes, gave a list of rhinos received as tributes until about 1400. This is supplemented by Shafer's review (1985:83).

Yule and Burnell (1886:363, sv. ganda) refer to a statement by Fernao Mendes Pinto that, during their siege of Peking, China, in July 1544, the army of the Kings of the Tar-

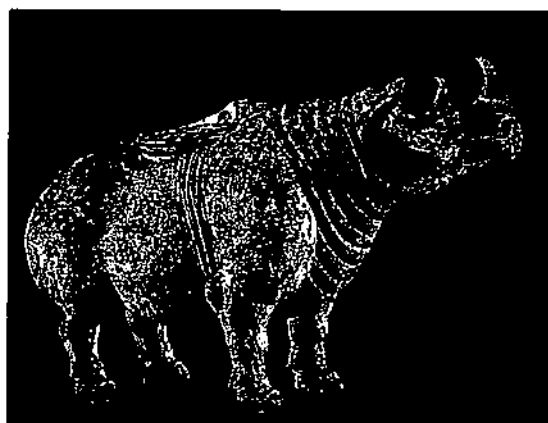


Fig. 12. Rhinoceros wine container from China, Eastern Zhou Dynasty (475-221 B.C.).

tars included 'four score thousand rhinoceroses'. The word used in the original seems to have been 'bada', normally (like 'abada') referring to the rhinoceros. A modern edition of Pinto's *Travels* edited by Rebecca D. Catz (University of Chicago Press, 1989) argues that the animal meant was more likely to be the yak, and she (p. 241) translates the passage to say that the army travelled "overland with a train of 80,000 yak laden with all their food and supplies". Surely, this would be a more sensible translation.

2 AD

The country of Huang-Chi, south of Tonkin, sent a living rhinoceros as a tribute to the court of China (Ts'ien Han shu, chapter 27B, p. 17b). Huang-Chi may have been the Malay Peninsula (Laufer 1914:80, Reynolds 1961a: 18).

84 AD

A living rhinoceros was offered to the Chinese court by the Man I beyond the boundary of Jinan (Laufer 1914:81 from Hou Han shu, chapter 116, p. 3b).

94 AD

The tribes of South-Western Szechuan made a gift of a rhinoceros and an elephant (Laufer 1914:81 from Hou Han shu, chapter 116, p. 8b).

168-188 AD, the Reign of the Emperor Ling
Kiu-chen of Tonking despatched a living rhinoceros to the Chinese court (Laufer 1914:81 from Ta Ming i t'ung chi, ed. 1461, chapter 90, fol. 5).

568 AD

Funan sent a living rhinoceros to the Chinese court (Laufer 1914:81 from Liang shu, chapter 54, p.4).

ca. 620 AD

Early in the seventh century (at the beginning of T'ai Tsung's reign), the Chams of Champa sent a tame rhinoceros to Ch'ang-an (Schafer 1985:83 from Chiu T'ang shu, 197, 3609d).

640 AD

The people of Champa sent 11 rhinoceroses 'communicating with the sky' to China (Schafer 1985:83 from T'ang hui yao 98, 1751).

ca. 650 AD

Sometime in the seventh century, a trained rhinoceros arrived as a gift from an unidentified country called Ziam-pak (Schafer 1985:83 from Ts'efu yuan kuei, 970, 15a).

730 AD

A rhinoceros arrived as a tribute from Persia (Schafer 1985:83 from Ts'efu yuan kuei, 971, 8a).

746 AD

Another rhinoceros was received as a tribute from Persia (Schafer 1985:83 from Ts'efu yuan kuei, 971, 15b).

ca. 750 AD

A trained rhinoceros was sent from the Khmer kingdom of Chinrap during the eighth century (Schafer 1985:83 from Ts'efu yuan kuei, 971, 18a; T'ang hui yao, 98, 1752).

793 AD

Another rhinoceros came from Champa in 793 AD, and was displayed in the Grand Shrine to delight the dead as well as the living sovereigns (Schafer 1985:83, from Chiu T'ang shu 13, 3103a; Ts'efu yuan kuei, 972, 5b; T'ang hui yao, 98, 1751). Perhaps this is the same animal as the following one.

796-797 AD

A tame rhinoceros, sent as a tribute to the Chinese court, was kept in the Shang-Lin Palace. The animal died in the winter of 797 AD due to the cold weather. A poem celebrating the rhinoceros was composed by Yuan Chen and Po Ku-i (Laufer 1914:81, Schafer 1985:84).

819 AD

The people of Ho-Ling [Java] presented a living rhinoceros to the Chinese court (Laufer 1914:81 from Kiu T'ang shu, chapter 197, p. 2b).

824 AD

A rhinoceros was sent from Tibet together with other wild animals (Schafer 1985:83 from Ts'efu yuan kuei, 972, 8a).

ca. 850 AD

During the ninth century, a trained rhinoceros arrived from Kalinga (Schafer 1985:83 from Chiu T'ang shu 197, 3610a; Ts'efu yuan kuei, 972, 7b; T'ang hui yao, 100, 1782).

854 AD

From a country to the south of China, 'the Man of the South' sent a royal tribute to China, which was promptly returned (Schafer 1985:83 from Chiu T'ang shu, 18b, 3131d).

1009 AD

The people of Kiao-chi [Annam] presented a tame rhinoceros to the court (Laufer 1914:81 from Sung shi, chapter 489).

1260-1367, Yuan Dynasty

The people of Annam presented a rhinoceros to the Chinese court (Laufer 1914:81 from Ta Ming i t'ung chi, ed. 1461, chapter 90, fol. 5).

3. Northern Africa and the Near East

There are a few, probably quite incidental reports of rhinoceroses kept in a captive setting in Northern Africa in the sixth century and in the Near-Eastern countries in the 16th and 17th centuries.

6th century

Cosmas Indicopleustes wrote *Christian Topographia* around the year 548 AD. In this book, he described a rhinoceros with horns on its nose (XI, 441B). He claimed that while he was "in Ethiopia", he "once saw a live rhinoceros while I was standing at a far distance, and I also saw the skin of a dead one stuffed with chaff, standing in the Royal Palace". It is likely that the living rhinoceros was seen in the wild, not in a captive situation.

975/996 AD, Cairo, Egypt

During the reign of the Cadhi el-Aziz (975-996 AD), a rhinoceros of unknown origin was transported to Cairo; it died on the way. It had a single horn. The skin was mounted, filled with hay, and exhibited in Cairo (Brentjes 1978:151).

1502, Mecca, Saudi Arabia

Ludovico di Varthema from Bologna travelled in Asia from 1502 to 1508. He also visited Mecca. In one of the sacred sites of that city, he saw an enclosure with "two live unicorns, and these are shown as very remarkable objects, which they certainly are". He proceeds to describe their appearance and size. He was told that "these two animals were presented to the Sultan of Mecca ... by a King of Ethiopia, that is, by a Moorish King" (Varthema 1928:22, original Italian published in 1510). The use of the word 'unicorn' would seem to point at an Asian rhinoceros, which contradicts its provenance.

1550, Cairo, Egypt

The traveller André Thevet (1556:145) saw a rhinoceros in the Castle of Cairo in 1550. He did not provide a description, except to say that it had four legs, a single horn on the snout and that it was the enemy of the elephant.

1575, Aleppo, Syria

Leonhart Rauwolf from Augsburg was a medical doctor, who wrote a book about his travels in the Near East from 1573 to 1575. While in Aleppo, Syria in February 1575, he noted that 'a young rhinoceros was carried through the town to Constantinople. It came from the most Eastern parts, and had killed about 20 men before they could take it' (from an English Translation, Rauwolf 1738, II: 181; original German published in 1582). If the animal had in fact come from the East, it must have been an Asian species.

1588, Istanbul, Turkey

Samuel Kiechel of Ulm (1866: 415) saw a rhinoceros in Constantinople during his travels in the Middle East. He gave a rather long description showing that the animal had two horns. Jennison (1928:151) mentions the possibility that it was this animal that was illustrated by Ulisse Aldrovandi, *De Quadrupedibus* (1616), as the 'Asinus cornutus' (see Fig. 13). This small engraving shows an animal

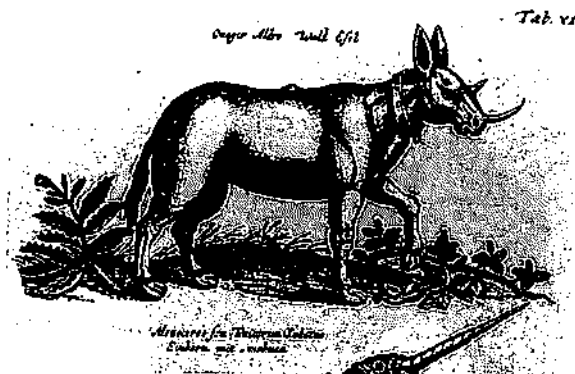


Fig. 13. The 'Asinus Cornutus' of Aldrovandi, 1616.

with two horns on the nose and above the eyes, similar to those of African rhinoceroses. It has a collar around the neck, which could point at a captive life (Rookmaaker 1985:283).

1620, Istanbul, Turkey

A Turkish illustration made between 1620 and 1622 shows a (single-horned) rhinoceros being taken by a Persian ambassador as a gift for the Turkish Sultan Osman II (1603-1622), together with four elephants (Störk 1977:480).

1669, Bukhoro, Uzbekistan

In 1669, an emissary from Russia, Boris Pazuchin, was sent to King Khan Abdul Aziz of 'Buchara'. While being entertained at the court, a rhinoceros ['karka'] was paraded in front of him: "und dem am Hofe des Khans, unter anderen Tieren, auch ein Rhinoceros vorgeführt wurde" (Unbegaun 1956:549).

1675, Esfahan, Iran

Jean Chardin (1711: 45, pl. XL) saw a rhinoceros in the Royal Stables at Esfahan, when he first arrived in the city. He had many opportunities to observe it and he gave a good description of the animal, accompanied by an obviously original drawing. The animal shared its quarters with two elephants and had been presented by an Ambassador from Ethiopia. The rhinoceros depicted in the plate is clearly single-horned (Indian). In his description, Chardin also mentions only one horn. It is hard to explain this presumed African origin.

The Englishman John Fryer visited Esfahan in 1676, and among the animals kept by the Emperor, he saw a rhinoceros said to have come from 'Bengala'. It could be the same animal seen by Chardin. Fryer (1698:287) gave a long description of the animal with a single horn.



Fig. 14. Engelbert Kempfer's Karkadann in Esfahan in 1683.

1683, Esfahan, Iran

Engelbert Kempfer was given an album of drawings during his stay in Esfahan in 1684 and 1685. It contains a depiction of a 'karkadann' (rhinoceros) which was seen alive in the Royal Gardens on 30 July, 1683 (preserved in the British Museum, Department of Oriental Drawings; see Rookmaaker 1978b:33, No. 8.4). The drawing itself would appear to be a copy of an engraving of the second Lisbon rhinoceros made in 1586 by Philippe Galle (Clarke 1986: 166, Fig. 131; see Fig. 14).

1699, Persia

A rhinoceros was donated by an Indian ruler to the King of Persia, but it died on the journey. It contained a bezoard stone, which was taken to Paris and preserved in the Cabinet du Roi (Daubenton in Buffon 1764: 210, No. 1056).

Chronological list of rhinoceroses of unknown species

275 BC	Alexandria: Ptolemy
100 BC	Alexandria
29 BC	Rome: Augustus
2 AD	China: court
8 AD	Rome: Augustus
55 AD	Rome: Pompey
80 AD	Rome: Titus
81 AD	Rome: Domitian
84 AD	China: court
94 AD	China: court
98 AD	Rome: Traianus
127 AD	Rome: Hadrian
138 AD	Rome: Pius
168 AD	China: Ling
180 AD	Rome: Commodorus
211 AD	Rome: Caracalla
218 AD	Rome: Elegabalus
248 AD	Rome: Philippus
568 AD	China: court
620 AD	China: court
640 AD	China: court
650 AD	China: court
700 AD	Ethiopia (Cosmas)
730 AD	China: court
746 AD	China: court
750 AD	China: court
793 AD	China: court
796 AD	China: court
819 AD	China: court
824 AD	China: court
850 AD	China: court
854 AD	China: court
975 AD	Cairo: el Aziz
1009 AD	China: court
1260 AD	China: court
1502 AD	Mecca
1550 AD	Cairo
1575 AD	Aleppo
1588 AD	Istanbul
1620 AD	Istanbul
1669 AD	Bukhoro
1675 AD	Esfahan
1683 AD	Esfahan
1699 AD	In transit to the King of Persia

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Fig. 162. Male black rhinoceros in Tel Aviv (now Ramat Gan) in 1970.

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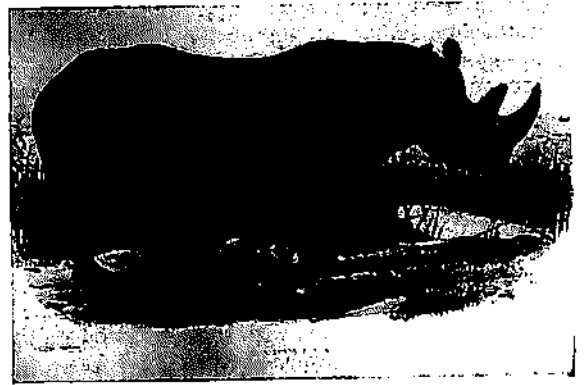


Fig. 163. Male black rhinoceros in London, 1868-1894, painted by J. Wolf.

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Fig. 164. White rhinoceros at Circus Siemoneit-Barum, Einbeck in 1993.

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Fig. 165. Bogor's Taman Safari Sumatran rhinoceros, 1995.

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Fig. 166. Female black rhinoceros 'Kilaguni' with baby 'Saba' at Berlin Zoo on 7th February 1991.

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THE RHINOCEROS IN CAPTIVITY

by L.C. Rookmaker

The earliest available records show that the rhinoceros was seen in the arenas in Rome and at the courts of the Chinese rulers about 2000 years ago. When zoological gardens and travelling menageries became fashionable in the 19th century, the rhinoceros was imported more frequently.

At least 2439 rhinoceroses have been exhibited around the world in 501 collections located in 79 countries. Each specimen which could be traced has been included in the present work, arranged by species and location.

The Indian Rhinoceros was first sighted in Europe in 1515 and, since then, 397 animals have been exhibited outside their native habitat. The Javan Rhinoceros has rarely been seen in captivity, and only 22 specimens could be traced. Ninety-six specimens of the Sumatran Rhinoceros have been seen. The African Black Rhinoceros has been presented by 775 specimens since 1870, and the White Rhinoceros by 1105 examples since 1930. This book details where each animal came from, when it arrived and how long it survived, and also how many animals were born. It is illustrated by 168 photographs which were taken in many of the collections throughout the world.

The author was assisted in his task of compiling this information by Mr. Marvin Jones, Dr. H.-G. Klös and Mr. R.J. Reynolds III. Marvin Jones, former registrar of the San Diego Zoo, reviewed the data of animals living in zoos throughout the world. Dr. Klös, former director of the (West) Berlin Zoo, who has a long-standing interest in the rhinoceros, assembled a comprehensive collection at his zoo, and initiated the studbooks for the two African species. R.J. Reynolds III completed the first lists of rhinoceroses held in captivity in the 1950s and continued to accumulate information on the subject.