

still not given birth efforts were made to establish the presentation of the calf per vagina. However, only the trunk of the calf could be felt when examined, and its head could not be reached. All attempts to remove the calf through the normal genital passage failed though Padmavathi was making valiant efforts.

Dr Geoffrey Bird of the Holdsworth Memorial Hospital was contacted, but his efforts also were of no avail and it was therefore decided that a Caesarean section was the only possible chance of saving the mother. On Sunday morning Dr Bird and Dr John Eswariah started the marathon operation, the first of its kind in the elephant world. Anaesthesia was induced by 34 g of pentothal given intravenously and maintained by ether inhalation. Intravenous dextrose saline was admin-

istered before and after the operation. Dr Dorothy Robb of the Redtera Mission Hospital, Hassan, lent a hand in keeping the animal anaesthetised.

An incision 1 m (3 ft) long was made in the animal's flank. Dr Geoffrey Bird had to enter the abdomen of the mother up to his shoulders to remove the dead male foetus which was 1 m (3 ft) in length, 80 cm (2½ ft) high and weighed about 136 kg (300 lb).

The last stitch was fastened at 1700 hours and after the operation Padmavathi appeared normal. However, she survived only 19 hours.

REFERENCE

KRISHNE GowDA, C. D. (1969). A brief note on breeding Indian elephants *Elephas maximus* at Mysore Zoo. *Int. Zoo Yb.* 9: 99.

Birth and growth of a male White rhinoceros

Ceratotherium simum simum

at Hanover Zoo

L. DITTRICH

Scientific Director, Zoologischer Garten Hannover, Hannover, Germany

On 2 January 1971 a male White rhinoceros *Ceratotherium simum simum* was born, probably early in the morning, at Hanover Zoo. This was the first birth of this species outside Africa. The female, adult though rather small, arrived in an advanced state of pregnancy on 13 October 1970, together with an immature male. According to information received from the dealer this female was captured together with other rhinoceroses during May 1970, during her ninth month of pregnancy, in the Umfolozi Game Reserve and shipped to Europe during September and October. It was not too difficult to keep the pair together in the enclosure, but during December the female became more and more aggressive towards the male. We therefore separated them on 21 December. By this time the female's udder had considerably increased in size and her vulva was obviously swollen. Although her abdomen was very enlarged, foetal movements were not observed.

On the morning of 2 January 1971 the newborn offspring was on its feet and had started suckling

about 0900 hours. The calf sucked about one every 1 to 1½ hours for 4-6 minutes at a time as did our three Black rhinoceros *Diceros bicornis* calves born here during the past five years. Unfortunately it was impossible to weigh the calf, because the mother was nervous and reacted aggressively towards disturbances. But, by comparison with the birth-weights of the three Black rhinoceros calves, we estimated that of the White rhinoceros baby to be about 40 kg (88 lb). This calf looks somewhat larger and longer, especially the head and the ears.

Despite our apprehension the calf grew very well and in accordance with the development of our black rhinos. Up to the present (April 1971) the mother is eating only hay or lucerne and refuses other food-stuffs such as rolled oats or protein enriched pellets, carrots, fruits and supplementary minerals and vitamins. Nevertheless she presumably produces enough milk, probably about 20 l (4½ gal) a day, because the baby increased in weight by an estimated 1250 g (44 oz) daily during the first three months. The female

	WHITE RHINOCEROS (MALE) BORN 2 JANUARY 1971 HANOVER ZOO		WHITE RHINOCEROS (FEMALE) 'ZULUANA' PRETORIA ZOO (BIGALKE <i>et al.</i> , 1950)		BLACK RHINOCEROS (MALE) BORN 29 JUNE 1970 HANOVER ZOO	
	DAY	cm	DAY	cm	DAY	cm
Height at withers	26	62	17	59.3	9	52
			30	59.3	12	66
	51	68	64	59.8		
			94	59.8		
	105	72			150	85
	155	81			200	95
	180	87	186	71.8	200	95
	210	91			236	97
	239	95	276	75.8		
	282	97	365	82.3	292	103
				365	108	
Length of body (edge of upper lip to the tip of tail, excluding the hair tuft)	26	149			9	131
	51	162			12	158
	105	184				
	155	200			150	205
	180	216			200	233
	210	230			236	235
	239	238			292	263
	282	258			365	282
Length of the head (edge of upper lip to swelling just behind the occiput)	26	43			42	39
	51	45				
	105	50				
	155	51			150	49
	180	55			200	52
	210	59			236	53
	239	62			292	59
	282	69			365	65
Length of the tail (underside from root to tip excluding the hair tuft)	26	28	17	26.1	9	30
			30	26		
	51	28			12	30
			64	26.1		
			94	26.8		
	105	28				
	155	30			150	45
	180	33	186	29	200	45
	210	35			236	45
	239	36				
282	36	276	31.8	292	45	
		365	33.3	365	46	
Girth at thorax	26	103			9	94
					12	109

continued

	WHITE RHINOCEROS (MALE) BORN 2 JANUARY 1971 HANOVER ZOO		WHITE RHINOCEROS (FEMALE) 'ZULUANA' PRETORIA ZOO (BIGALKE <i>et al.</i> , 1950)		BLACK RHINOCEROS (MALE) BORN 29 JUNE 1970 HANOVER ZOO	
	DAY	cm	DAY	cm	DAY	cm
Girth at thorax	51	113			150	159
	105	128			200	168
	155	137			236	175
	180	149			292	182
	210	155			365	197
	239	156				
	282	172				
Length of ears	26	17			9	13
	51	18			42	15
	105	19				
	155	20			150	19
	180	22			200	20
	210	23			236	22
	239	24			292	24
	282	26			365	26
Length of anterior horn					9	0.5
	26 (sec Zuluana day 17)		17 rounded boss about 2.5 cm at the highest point			
	51	1.5	30 (as day 17)		42	2
	105	5	64 (as day 17)			
	155	6	94 slight protuberance			
	180	8			150	5
	210	8	156 2.4			
	239	9	186 2.8		200	6
	282	11			236	8
			276 4.7		292	9
			365 5.6		365	10
Length of posterior horn					9	—
	26	—			42	—
	51	—	from day 94 up to day 365 slight protuberance with horn fibres visible			
	105	0.5			150	2
	155	0.75			200	3.5
	180	1.25			236	4.5
	210	1.75			292	5
	239	2.25			365	6.75
	282	2.5				

continued

Weight	DAY	kg	DAY	kg	DAY	kg
	26	75*	17	47.7		
			30	48.5	41	80
	51	100*			53	95
			64	53.75		
Weight			94	62.8	94	137
	105	145*			121	163
			125	73	155	205
			156	91		
			186	109.3		
	210	325*	218	121.6	200	325
			247	122.5	236	350
	282	385*	276	136.1		
			337	156.5		
			365	188.2	365	410

* Estimated weights

Table 1. Comparison of growth of naturally-reared and hand-reared rhinoceros calves.

usually suckles her calf while standing but occasionally she does so while lying down on her side like a sow. Since the second week the calf started to eat from its mother's droppings, and from the middle of the second month it also ate hay.

In the literature few data are recorded concerning the growth of African rhinoceros calves. In Table 1, therefore, we compare our measurements of both male White and Black rhinoceroses born at Hanover Zoo with data published by Bigalke, Steyn, de Vos & de Waard (1950) on the female White rhinoceros calf 'Zuluana' artificially reared at Pretoria Zoo. Comparison of the

data shows that the growth of the Pretoria calf was too slow, perhaps due to the artificial rearing, and the growth and development of our male White rhino was very similar to that of one of our male Black rhino calves. However, the growth of the posterior horn was slower than in the White rhino calf.

REFERENCES

BIGALKE, R., STEYN, T., DE VOS, D. & DE WAARD, K. (1950). Observations on a juvenile female square-tipped or white rhinoceros (*Ceratotherium simum simum* (Burch.)) in the National Zoological Gardens. *Proc. Zool. Soc. Lond.* 120: 519-528.

	WHITE RHINOCEROS (MALE) BORN 2 JANUARY 1971 HANOVER ZOO		WHITE RHINOCEROS (FEMALE) 'ZULUANA' PRETORIA ZOO (BIGALKE <i>et al.</i> , 1950)		BLACK RHINOCEROS (MALE) BORN 29 JUNE 1970 HANOVER ZOO	
	l	r	l	r	l	r
p1 Upper jaw	?	?	358	410	158	195
Lower jaw	?	?	389	380	140	174
p2 Upper jaw	55	55	90	90	50	52
Lower jaw	45	46	88	88	48	48
p3 Upper jaw	54	55	78	78	46	48
Lower jaw	47	42	77	77	41	43
p4 Upper jaw	?	?	140	140	?	?
Lower jaw	?	?	83	83	140	140

Table 2. Comparison of age in days of eruption of deciduous premolars through gums in rhinoceros calves.