

E. Afr. Wildlife Journal 5 (1967)

**A record of twin foetuses in the African Elephant**

On the 31st January, 1963 a large female elephant was shot in the Galana Game Management Scheme in the course of routine cropping operations. In the process of butchering, it was found to be pregnant and carried twin male foetuses. Though not measured they appeared equal in size, approximately 76 cms. in height at the shoulder. The female was the largest in a family unit of five.

We acknowledge permission of the Chief Game Warden, Kenya to publish this Game Department record.

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**Eggs of the Arabian Ostrich**

The Arabian Ostrich *Struthio camelus syriacus* Rothschild is believed to have been extinct since 1941 (Meinertzhagen 1954: 574, Bannerman 1964: 570). Meinertzhagen only knew of 11 eggs (all in Tring), so the discovery of two further eggs is of considerable interest. Both were collected in Arabia by members of the Desert Locust Survey who, unfortunately, cannot now be traced.

In June, 1964 I was shown one of these eggs in the Aden Museum by the Director, Mr. D. B. Doe, to whom I am grateful for permission to publish these details. It is inscribed 'AM436; MR; 17.10.46.30; LOCUST'. From the Museum catalogue I found that it was presented by the Desert Locust Survey on 3rd July, 1953; it was collected at 17°10'N., 46°30'E., and was 'one of a clutch of about 8 found in desert'. Its Museum number is 436. I wrote the following description: 'creamy-coloured, brownish stained (?exposure) at one

end, other end chalky and eroded, otherwise polished. Pores fine and evenly distributed. Measures c. 156 x 121 mm'.

The second egg is in the National Museum, Nairobi and is inscribed '21.2.52; 17°25'N., 46°25'E.; GS'. This egg has evidently been exposed to the elements for some time as it is dulled, and one end has an eroded 'blister' to such an extent that the shell is holed. It measures c. 157 x 127 mm.

These measurements are very slightly larger than those recorded by Meinertzhagen (120.5-150 x 100-124 mm), and compare well with the Somali and Southern races (*S.c.molybdophanes* Reichenow and *S.c.australis* Gurney respectively); those of the Masai race (*S.c.massaiicus* Neumann) are rather larger.

Both these eggs have obviously lain in the desert for some time, and it is interesting to speculate whether a clutch of ostrich eggs would survive for more than ten years in such conditions. If not, the Arabian Ostrich evidently survived after 1941 — any information on this point would be most valuable. When this race became extinct the last population of ostrich outside continental Africa died with it.

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**The square-lipped rhino (*Ceratotherium simum cottoni* (Lydekker) in Uganda**

**Introduction**

The square-lipped rhino is more frequently, though misleadingly, referred to as the white rhino. However it is no

lighter in colour than the black rhino and these names refer better to the temperament of the respective species. Both rhinos assume the colour of their most recent mud bath and consequently are generally either black, grey, brown or rufous. "White rhino" seems to have been derived from a phonetic translation of the Afrikaans *witrenoster*, while a literal translation is "wide rhino" referring to the wide mouth in the square-lipped species.

There are two highly disjunct subspecies of square-lipped rhino in Africa. *C. s. simum* (Burchell) occurred 100 years ago south of the Cunene and Chobe Rivers in Angola and the Zambezi River on the east coast, south to the edge of the bushveld, but is now confined to the Umfolozi Game Reserve, the State lands adjoining, and the Hluhluwe Game Reserve, an area of some 212,000 acres in Natal (Player and Feely, 1960). The northern race *C. s. cottoni* (Lydekker) has also had its range drastically reduced since the introduction of firearms but still occurs over a wider area than its southern relative. It is indigenous only to the west of the White Nile, being found in the West Nile District of Uganda, Bahr el Ghazal and Equatoria Provinces of the Sudan and the north-east Congo (Garamba National Park).

It appears that large rivers have been major barriers to the species: it has not been found east of the Nile watershed in recent times. However this species has been reported from the upper part of Bed II at Olduvai Gorge, Tanzania, ca. 400,000 years B. P. (Leakey, 1965), and it probably ranged over most of the continent before more efficient hunting methods by tribes greatly reduced its numbers. The range of the species continued to shrink throughout most of Africa until very recently due to encroachment of squatters and to poaching for rhino horn.

Sidney (1965) gives a very thorough review of the status of the square-lipped rhino and describes Uganda's population as it was up until about ten years ago. In spite of her most recent reference being 1957, she states that "today,

estimates show that they now exceed 300 in the West Nile and West Madi districts, whilst some observers consider that 500 is nearer the true total." Unfortunately the present figure is closer to 60 animals.

Political disturbances in the Congo in 1963 wiped out about 900 of the 1000 square-lipped rhino living in Garamba National Park (Curry-Lindahl, 1966).

In an attempt to protect the population remaining in Uganda the Uganda Game Department, with the financial aid of the East African Wildlife Society and the World Wildlife Fund, established the Ajai's White Rhino Reserve at Inde, West Nile District. The Reserve contains about 60 rhino in 61 square miles (159 hectares). The few dozen rhino in the area not protected by the Reserve were under such severe poaching pressure that an attempt was made to move some of the animals east of the Nile to the safety of Murchison Falls National Park. This was accomplished in two operations, the first in March, 1961, from which six rhino are still surviving, and the second in June, 1964, which introduced another six. The total number of square-lipped rhino now in the Park is 12, of which three are adult females and four are immature females (Savidge, 1964). Recently a calf has been born. Six square-lipped rhino were also introduced in 1966 to Meru National Park, Kenya from South Africa and are doing well.

The following brief notes were made by the author in the White Rhino Reserve, Uganda during December, 1964 and June, 1965.

#### *The White Rhino Reserve*

The Reserve is located on the western side of the Albert Nile about 50 miles down the river from Lake Albert and includes the town of Inde (Figure 1). Vegetation communities include *Echinochloa* grassland in the swamps bordering the river, *Combretum* - *Acacia* - *Hyparrhenia* savannah, and the post-cultivation community of *Eragrostis* - *Chloris* - *Hyparrhenia* on the better drained ground, and *Combretum* - *Terminalia* - *Loudetia* savannah on the

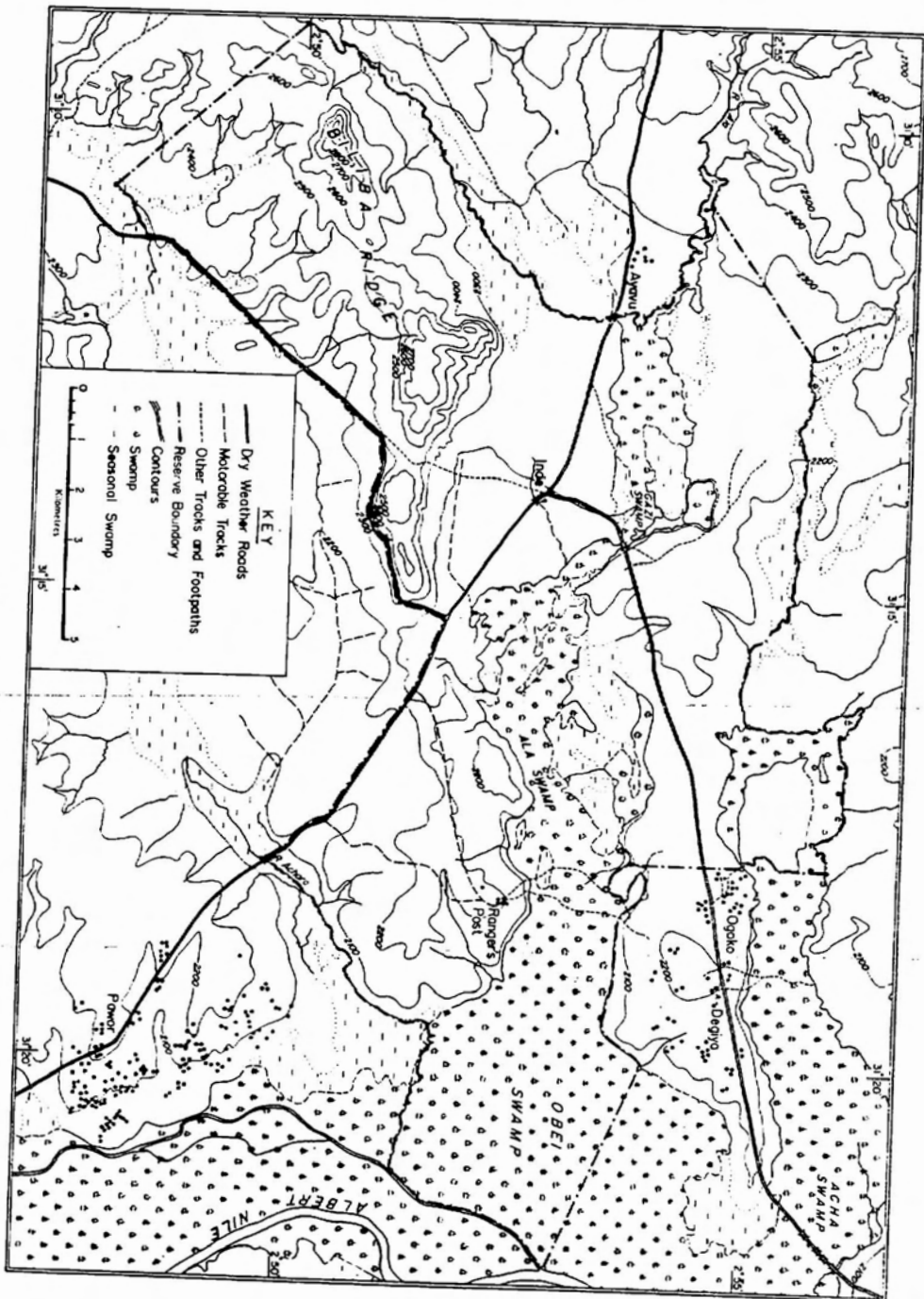


Figure 1  
The White Rhino Reserve, Uganda.

summit of Biliba Hill. The presence of long grass in the Reserve often made it difficult to locate the rhino. However the chattering cries of the oxpeckers (*Buphagus erythrorhynchus* (Stanley)) who attend these animals frequently led to their detection.

### Notes on the Square-lipped Rhino

#### 1. Herd size and structure

While the black rhino is often aggressive toward man, the square-lipped species is very rarely so and then only when a calf is present. This differing tolerance toward man extends to intraspecific aggregations. The black rhino frequently occurs singly; the square-lipped rhino only rarely. Of 16 groups of the latter seen near Inde, single animals were seen only twice — an adult male and a pregnant female with a snare on its leg. Rangers at Inde report that the rhino were commonly seen in groups of a dozen or more, but since regular patrols of the Reserve were initiated, the concomitant disturbance has broken the herds into smaller groups. For this reason, patrols are now kept to a minimum.

Of the 16 herds seen, six consisted of a female and calf; one of an adult male, female and calf; one of 2 adult males and a female; two of 2 adult males; one of an adult male and female; one of 3 males; one of 2 females and 2 calves; one of 2 adult males, a female and calf; and the single animals mentioned above. Of the 13 females seen, ten had calves and at least one was pregnant.

While the square-lipped rhino tends to live in larger herds than the black, fighting, especially between males, does occasionally occur with mortality sometimes resulting (Player and Feely, 1960). Such an outcome may well depend on the high population of rhino in Natal; fatalities from combat have not yet been observed at Inde though fighting does occur. For example, on one occasion when a female and calf was approached by a young male, the female lowered her head and uttered a deep growl. A larger male ran up and with

a side swipe of its horn sent the smaller male running off into the bushes making excited bird-like chirps. This action was repeated several times by the same animals.

#### 2. Movements

The movements of the rhino within the Reserve are clearly correlated with the occurrence of rain. Water is probably necessary for regular watering and mud wallows may also be an essential part of the habitat. During the dry season the rhino descend into the Ala and Obei swamps bordering on the Albert Nile. At this time they are extremely difficult to observe except when they make their occasional wanderings onto higher ground. When the rains come the animals move inland at least 10 km, to the Biliba Ridge area in particular. Rhino trails, marked with dung heaps and mud wallows, are more commonly seen running inland from the swamps. Some border the bottom of the Ridge while others run diagonally up its side. After a short rain most fresh rhino footprints lead inland from the swamp, while after a dry period the trend is reversed.

#### 3. Feeding

Much time would be necessary to assess accurately the food preferences of the rhino throughout a year. It can now be mentioned that the square-lipped rhino is a grazer (in contrast to the browsing black rhino), and that the following species of grasses are eaten in the Reserve: *Chloris gayana* Kunth, *Panicum maximum* Jacq., *Heteropogon contortus* (L.) Beauv. ex R. & Sch., and *Brachiaria brizantha* (Hochst. ex A. Rich.) Stapf. This list is undoubtedly not complete. Apparently the widespread *Sporobolus festivus* Hochst. was not being eaten at the time I was making my observations.

Sidney (1965) makes the erroneous statement that the square-lipped rhino never eats grass taller than 10 cm.; the animals in the Reserve were frequently seen cropping grass over 30 cm tall.

#### 4. Management

The Uganda Game Department is presently keeping poaching to within reasonable limits. A greater danger is the growing population of the nearby tribes with their demand for land resulting in squatters moving into the Reserve. Provided the poachers and squatters can be kept in check it appears that this vigorously growing population may eventually outrun its food supply. Presently fire sweeps most of the grassland each year and contains the spread of bush. However there are areas which appear to be overgrazed thereby preventing burning which allows the bush to spread. Eventually it might become necessary to reduce some of the bush and tree cover to allow the return of the grass. At the same time any surplus population of rhinos could be used to populate other areas.

#### Acknowledgements

I wish to express my gratitude to Mr. F. X. Katete, Director of Uganda National Parks, Mr. L. D. Tennant, former Chief Game Warden of Uganda, and the East African Herbarium for aiding this brief study.

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#### Local migration of *Tilapia grahami* Boulenger in Lake Magadi, Kenya in response to diurnal temperature changes in shallow water

Lake Magadi lies close to the border of Kenya and Tanzania in the floor of the Rift Valley. This highly alkaline lake is bounded by latitudes 1° 43'S. and 2°00'S., and longitudes 36° 13'E. and 36° 18'E.

The lake's surface lies at an altitude of 1,987 ft above sea level and is, except during periods of flood, covered by a layer of crystalline trona up to 15 ft thick. This material is composed of 80%  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$ , 15% combined water, small quantities of  $\text{NaF}$  and  $\text{NaCl}$ , and a trace of  $\text{Na}_2\text{SO}_4$ . It has been suggested that the unusual purity of these deposits is due largely to periodic flooding and subsequent evaporation (White, 1953).

At the present time the edges of the lake are fed by a number of alkaline springs which Stevens (1932) calculated were responsible for the addition of nearly 10,000,000 ft<sup>3</sup> of water per day. The addition of this large quantity of alkaline water adds up to 4,300 tons of soda per day to the main lake. This apparently continuous supply of water prevents crystallisation in the vicinity of springs and in this way maintains large areas of trona-free water around the lake's margin.

These lagoons are isolated for variable periods from one another by trona, and are populated by a small Cichlid fish, *Tilapia grahami* Boulenger, which although resembling fish from other alkaline lakes in the Rift Valley is distinct and endemic to Magadi. Studies of the biology of this fish have been made by the author in most of the lagoons surrounding the lake (Coe, 1966) but present remarks are confined to observations carried out on what are known as the South-Western Lagoons.

These lagoons are fed by a number of springs that issue under pressure from volcanic ground water, at temperatures ranging from 42-46°C (Baker, 1958). Most of these springs arise from a large rocky platform (Figure 1) and