Breeding Behaviour of the OSTRICH *Struthio camelus massaicus* Neumann in Nairobi National Park

by

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I hereby declare that the work herein reported is, to the best of my knowledge, original and has been carried out by me, except where other wise stated. This thesis has not been submitted for a degree at any other University.

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Date May 28, 1979

I, A. W. Diamond, hereby declare that this thesis has been submitted for examination with my approval as University Supervisor.

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Summary

The field work for this study was done in Nairobi National Park (112 km^2) in Kenya, mainly during the years 1971 and 1972. The birds studied were part of a free ranging population of Struthio camelus massaicus indigenous to the area, and able to travel at will in and out of the southern part of the Park. Breeding of the population was systematically monitored. Of 1978 young and adults (mean of 10 monthly counts), 15 breeding pairs hatched and led 152 chicks from their nests in 1971.

Three aspects of the study provided background information on the species, used in analysis of the breeding system: 1. An inventory of social communications was made, in which 18 major displays and 25 non-ritualized social signals were described. 2. The main breeding behaviours were also described, with emphasis on courtship, copulation, nidification, incubation, hatching and nest leaving. 3. As the largest bird extant, the implications of size in relation to breeding were examined, especially the extremely small relative size of the egg.

Five aspects of the study provided information on the dynamics of breeding at the individual and population level: 1. Group size. Change in group size reflected breeding behaviour. Groups of 5 to 9 adults of both sexes were typical outside the breeding season. Groups then dwindled to 3 or 4 with many solitary individuals also seen, as cocks became territorial, and hens moved among territories alone or in small groups.

2. Social spacing. Cocks were classically territorial, defending territories averaging 2 km^2, while hens had breeding home ranges 3 times that size. 3. Mating System. Both sexes typically copulated with more than one of the opposite sex. However, each territorial cock had a pair bond with a single (major) hen that lasted for one or more seasons. Parental care was typical of monogamous systems, both the cock and major hen investing in incubation and in escorting the young. In spite of the seemingly promiscuous copulations, mating choice by both sexes was commonly observed. 4. Communal laying. Indirect evidence from 5 nests suggested that 11 hens[1] laid in each nest (10 minor hens, and 1 major, incubating, hen)despositing a mean of 43 eggs. Only the major hen incubated with the territorial cock, pushing out of the nest all eggs over ca. 21, the number one adult could cover. 5. Creching. Natality was more closely synchronized than in any other large animal species also resident in the Park. After leaving nests, the broods were progressively merged by escorting parents until all or most of the broods of the population were in a single creche. This unusual behaviour is interpreted as an anti-predator adaptation of the individuals involved.

Sexual strategies of the territorial cocks, major hens, minor hens, and escorts are discussed in terms of the apparent altruism of the major hen and cock. Minor hens exploit available incubation space under a nesting cock and hen. The results of this act are apparently ambiguous; there appear to be both risks and possible benefits to the established cock and hen as

[1] A mean of 11 hens, a range of 5 to 18 hens.

a result of such communal laying. The risks are the possible cuckolding of both the cock (incubating eggs he did not fertalize) and the major hen (incubating eggs she did not lay). In some nests, communal laying is apparently disadvantageous to the established pair.

However, on average, the share of eggs belonging to the major hen is estimated to be twice that of the average minor hen, and there are indications that her advantage can be increased by certain behaviours. And the cock apparently reduces the risk of cuckoldry by a mating strategy, including choice amoungst the minor hens with whom he mates.

The behaviour of some hens and cocks in escorting the creched chicks of others is apparently not altruistic either. The additional chicks probably decrease the chances that the escorts own chicks are predated. Thus the communal pooling of eggs from many hens, and later chicks from many nests, can be explained in terms of benefits to individuals, and not to altruistic behaviour or group selection.