FEATURE ARTICLES

CAPE VULTURE RINGING IN SOUTHERN AFRICA

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Introduction

The only Old World vulture that has been extensively ringed is Gyps coprotheres, the Cape Vulture. The majority of birds have been ringed by past and present members of the Witwatersrand Bird Club, and nearly all operations to date have taken place in the Magaliesberg mountains of the central Transvaal. A small number of nestlings has been ringed in the Cape Province and Botswana, but none in the Orange Free State or South West Africa where colonies of unknown size are believed to exist.

Previously ringing was conducted with only two aims in mind, to see how far the birds would disperse from their place of hatching and to get some idea of how long vultures live in the wild. By the end of June 1972, 2 635 birds had been ringed and 76 rings recovered. While this was by far the most significant ringing of any African raptor, we must admit that the results to date are meagre and can be used for little practical application. This is an inherent disadvantage of any ringing programme which does not allow for regular recapture of birds to provide additional information - a ringed vulture only becomes 'useful' when it has died and the ring is reported. In terms of effort, cost and risk to human life therefore, the Cape Vulture ringing programme had produced little information of real biological value. For 1973 we decided to increase the amount of data collected during ringing operations, and this article is a preliminary report on the work we did - and hope to continue for several years to come.

The 1973 Ringing Trip

Preparations for our five day expedition (31st August to 4th September) were, as usual, left somewhat late and a frenzied last-minute rush took place in Johannesburg. In the space of a few days "Darvic"PVC coloured sheets were located and bought, a new vulture colour-ring designed and hastily manufactured, and our computer expert pressured into producing print-outs of the various colour combinations we intended using.

The cliff nesting sites are reached by abseiling from the top down to the ledges, then working along horizontally doing the ringing, before descending further. Problems of communication on the cliffs between more experienced workers and our mountaineers were solved by using walkie-talkie radios, which proved to be outstandingly successful and essential for future expeditions.

We spent three days at Roberts' Farm, Rustenburg district, one night in Gaborone, then a day and a night at Mannyelanong with a quick visit to the Ootsi colony on our way back to Johannesburg via Lobatsi.

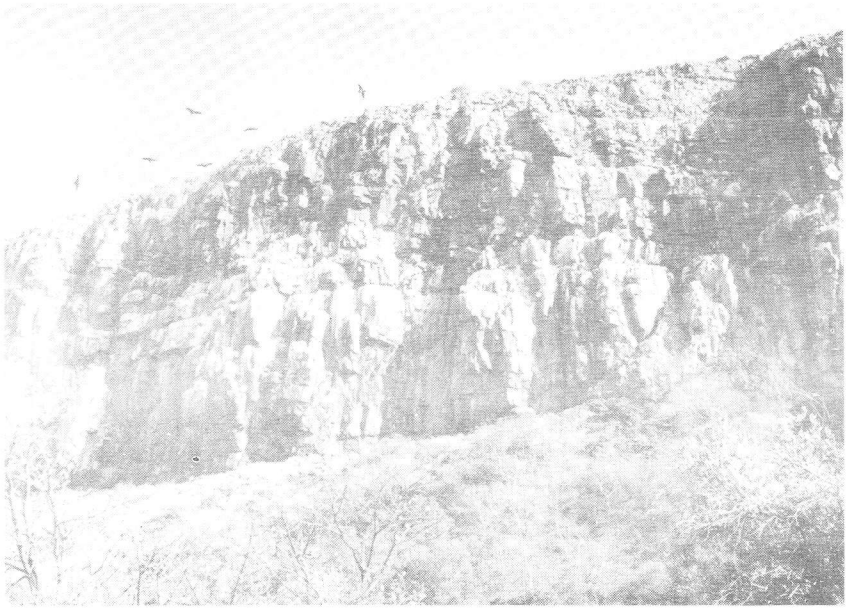

Fig.1. The impressive West Face of Roberts' Farm

Aims and Preliminary Observations

We started our programme with various aims, some of which are bound to be modified in years to come. For most of these, results worthy of publication will not be available until 2 or 3 ringing seasons have passed. However we made several observations worth noting now.

1. Colour Ringing

One of our main aims was to colour-ring as many of the nestlings as possible. We believe colour-ringing to be essential if we want to increase the amount of information accruing from the study. A tantalising sighting of a ringed Cape Vulture was made by Sauer (1973) in the Namib Desert, but of course the number could not be read. Had the bird been colour-ringed, it could then have been identified and would have been more valuable than a recovery, since it could have been resighted on one or more subsequent occasions. We only hear about metal ringed birds when they are dead, and often do not know for how long they have been dead. A bird wearing colour rings is conspicuous throughout its life and has a definite identity. Sightings of colour-ringed birds may provide information on post-fledging dependence, movement, speed of flight, foraging area, nesting places, nest-site fidelity, age at first breeding, etc. Once a colour-ringed bird has been found breeding at a particular colony, it can be followed through subsequent years with ease and the information collected will be precise and of great biological value.

The earliest stage at which young chicks can be ringed is when the feathers just start emerging. (See Fig.2.) At this age the young are docile and easy to handle. Nestlings were ringed with a metal ring, and on the other leg a combination of three "Darvic"

rings, or (after we ran out of rings for 3-ring combinations), a single "Darvic" ring or one of the NUBRA spiral rings as used by PJM for his vulture study in Rhodesia. We did not like the idea of the single colour ring, but in the circumstances went ahead, for at least we can tell the origin and date of ringing of any bird seen subsequently, although we cannot link it to a definite individual. We used a different colour at each colony. In future years, we will ensure that every bird gets a unique colour combination.

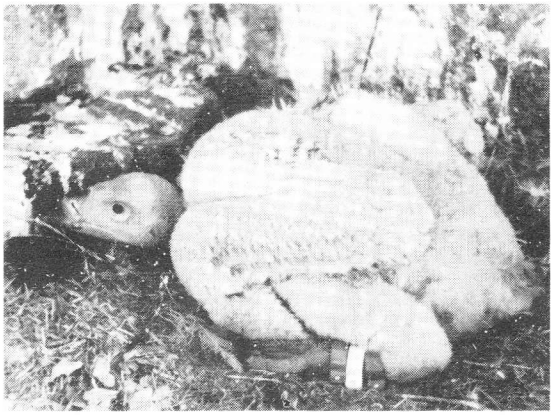

Fig.2. A young chick showing three colour rings on the left leg.

2. Past observations had revealed that a proportion of vultures never fly because of broken bones which later re-set badly. Such birds have been found dead under the nesting cliffs at Roberts' Farm, and we therefore kept a lookout for skeletal fractures among the nestlings. with the following results:

a) At Roberts'Farm one bird had two broken wings and was removed (under T.P.A. permit) by PJM for hand rearing; another had one broken wing; a third had a protruding scapular bone and a fourth a broken leg.

b) At Ootsi one bird had a broken wing which had already mended crookedly - we doubted that this chick would ever be able to fly.

3. Eleven parameters were taken from a sample of the chicks (weight, bill length, width and height, tarsus, longest toe, hind claw, wing, longest primary vane,tail, longest tail vane), and growth curves will be drawn from which we can see how the nestlings grow in respect of each dimension and as a percentage of the average adult size, as well as the variability around each curve. Certain of the curves, possibly those for wing and tail or the vanes of their feathers, can then be used to estimate the age of the chicks when only one visit to a nest is possible. We looked hard at free-flying vultures taking note of plumage characters and eye colour as possible indications of age (see also Mundy 1973).

4. There is a widespread hypothesis (e.g. Darling, 1938) that the courtship activities of the birds in a colony help to synchronise their egg-laying. At Roberts'Farm we estimated that the first egg was laid in late April, the majority in May and the last about 8th July. An interesting observation was that the peak of egg-laying at Mannyelanong (24.48 S, 25.43 E) was some weeks later than at Roberts'

Farm (25.51 S, 27.18 E).

5. We looked at temperatures of chicks with respect to exposure of the nest to sun, and to the age of the chicks (related to their developing control over body temperature). Preliminary readings at Roberts' Farm, where nests are in permanent shade for much of the breeding season, gave cloacal temperatures of 38,0 - 40,8°C (mean 39,7 °C, n=28), and at Mannyelanong, where most nests are exposed to the sun all day, the temperatures were 40,2 - 41,9 °C (mean 40,9 °C, n=9). Although these readings are not strictly comparable, they indicate that temperature measurements would be worth following up, and also suggest that a comparison between south- and north-facing breeding sites with respect to parental behaviour in warming or shading their young would be interesting.

6. Incubation and fledging periods: these are said to be 53 and 80 to 90 days respectively (McLachlan & Liversidge, 1970). We believe the latter figure especially to be a gross underestimate, and have evidence that the fledging period is close to five months.

7. Details of nests in terms of breeding density, nest material used, size, growth over the years, and presence of fresh green leaves.

8. Nest fauna, ectoparasites, bacteriological and virological screening: quite a lot is known about nest fauna and ectoparasites as a result of work done by the Entomology Department of the S.A. Institute for Medical Research. We collected lice and the blood-sucking mite Haemolaelaps patersoni from the chicks. A large number of the Argasid tick Argas zumpti (known only from Roberts' Farm) were collected and 100 of these processed for possible arbovirus activity by the S.A.I.M.R. - results were negative. Furthermore a number of mouth swabs were taken from the chicks to check for the possible presence of Anthrax and Plague bacilli - again negative.

9. Egg sizes and weights, related to specific nests: over the years this could possibly give an indication of whether the same or a different female is laying in a particular nest. Four addled eggs, two each from Roberts' Farm and Mannyelanong, were removed for pesticide analysis.

10. Survey of the type of feed brought to the chicks: we found the following in crop regurgitations - mostly soft meat, intestine and other internal organs; also bone chips, larger bone pieces and animal teeth; small stones, fragments of china, plastic and glass; hair, grass and twigs. One chick, found dead at the foot of the cliff with a 22cm length of animal rib stuck in its throat, was recovered.

11. Estimates of numbers of birds at each colony: we reckoned the Roberts'Farm colony to hold about 250 breeding pairs, giving a vulture population of perhaps 600 or more independent birds and 200 nestlings. The figure of 250 was calculated from the ratio of dead ringed chicks to dead non-ringed chicks found at the base of the cliff during a follow-up visit in November, and adding about 20% for breeding failure before chicks were ringed (From Table 1). Such a population of 800 or so birds, each requiring about 500gm of food per day for maintenance, is consuming the equivalent of about four head of cattle (in poor condition) every day. At Mannyelanong there were an estimated 70 nests. Qotsi, which ten years ago was a thriving colony and had many accessible nests, gave us a shock for although about 100 birds flew off at our approach, we could only find 7 nests on the whole cliff face.

TABLE 1

Cape Vulture Ringing in 1973

	Roberts' Farm	Botswana
No. of nests seen	126	56
No. of chicks ringed	105	23
No. of chicks colour-ringed	95	22
No. of chicks too small to ring	5	16
No. of chicks not ringed *	3	1
No. of dead chicks	6	0
No. of eggs seen +	5	11
Empty nests (minimum)	2	5

* Two not ringed because nests were inaccessible (though the chicks were big enough) and two because of broken wings.

+ Two eggs at Mannyelanong had the chicks cheeping inside.

Also in November, at Roberts' Farm we estimated the nestling mortality from a group of 23 nest which PJM is especially studying, at 45%, and the overall breeding success from this group at 52% (chicks fledged from eggs laid). This figure can be compared with a 40% success rate for the Hooded Vulture Necrosyrtes monachus in Northern Nigeria (Mundy & Cook, in prep.). We think one cause of chick mortality occurs when they start exercising their wings and topple from the cliffs, or are attacked at this stage by neighbouring adults. Other contributory causes to juvenile mortality include the activities of baboons, Black Eagles and people. We are not able to say at this stage how much interference by wild animals actually takes place on the nesting ledges.

12. Conservation is the underlying purpose of most of our activities. We intend bringing whatever pressure we can on the authorities to implement conservation measures, where we feel we have enough information to state our case convincingly. Hugh Roberts is to be congratulated on a fine vulture sanctuary on his farm - its success is entirely due to his vigilance in preventing human interference, and it is a happy thought that the future of this most important breeding colony seems secure. Unfortunately the same cannot be said of the two Botswana colonies known to us. The cause of the tragic decline of the Ootsi colony is unknown, but is almost certainly due to human interference. At Mannyelanong we found long sticks which were obviously being used to lever chicks off the ledges, and other signs of human disturbance. We intend approaching the relevant authorities in Botswana to extend strict protection measures to these colonies - if this is not done in the near future we can confidently predict that the Cape Vulture will disappear as a breeding bird in Botswana.

Other Transvaal Ringing in 1973

Martin Johannsmeier of the Northern Transvaal Ornithological Society works on the Skeerpoort colony near Hartebeestpoort Dam, and this year ringed over 100 birds with his Exploratio team from Pretoria University. They placed 69 single colour rings on their birds, and since the Skeerpoort and Roberts' Farm colonies are close together, they should provide interesting comparative data. We are therefore looking forward to close cooperation between our two groups in the future.

Discussion

A number of interesting points have emerged from our first

season of detailed work. Among these we would emphasise the difference in peak egg-laying between the Roberts' Farm and Mannyelanong colonies, the number of chicks with skeletal fractures and the amount of worthless material that many chicks are given as food. Dr.M.Jarvis had previously mentioned to us his discovery of pieces of coloured china beneath breeding colonies in the Cape Province, and to us this would appear to be the result of birds swallowing the china in mistake for bone. The presence of glass and plastic however is ridiculous, and suggestive of commensal crows rather than wild vultures. Perhaps the skeletal fractures are partly due to a lack of calcium - the parents when supplying the china, glass and plastic may think they are providing bone.

We feel the Cape Vulture to be particularly worthy of research effort. It is wide-ranging throughout southern Africa, the breeding colonies are apparently rather few, and to our knowledge no colony lies within a game- or nature reserve, which makes them all potentially vulnerable. Cape Vultures appear to be declining in numbers, at least in certain parts of southern Africa (see Jarvis, Siegfried and Currie, 1973) and effective conservation measures will in the end depend on a reliable and thorough knowledge of the species' biology.

An Appeal for Cooperation

At the Wildlife Management Symposium held in Pretoria in June, 1973, it was suggested that a vulture study group be formed to co-ordinate all work on vultures in southern Africa. The aim is to see that information is circulated between workers to avoid duplications of effort, to standardise procedures of data collection to allow more valid comparison and, most important, to ensure that colour-ring combinations or other marking methods are not duplicated by workers unaware of other studies in the same field. We appeal to anybody who intends making any kind of study on any species of vulture to get in touch with Mr.J.A.Ledger.

We also ask all readers of this article to give our vulture colour-ringing study as much publicity as possible among members of the public, amateur naturalists and visitors to game reserves. Game- and Nature Conservation Department personnel should be asked to keep a special lookout for marked vultures, which should be reported to AL, giving colour combination (reading from the foot upwards), the leg bearing the colour ring/s and the date, locality and circumstances of the sighting.

Acknowledgements

We are most grateful to Messrs Hugh Roberts and Alec Campbell (Director of Wildlife and National Parks, Botswana) for permission to work at the colonies under their control. PJM has made several visits to Roberts' Farm, and thanks the Roberts family for their boundless hospitality. We thank the other members of the ringing party and particularly the Wits University Mountain Club members, for their fine spirit and valuable assistance, Dr.Fred Mueller for his help in Gaborone and Steven Piper for the programme and print-out of colour combinations. Special thanks are due to the Roberts Construction Company (Pty) Ltd for the loan of radios, and to Mr.Peter Jupp and Dr.M.Isaacson of the S.A.I.M.R. for the arbovirus and bacteriology investigations of our material.

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VULTURE RINGING IN THE KRUGER NATIONAL PARK

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The decimating effects of anthrax in wild animal populations of the Kruger National Park (K.N.P.) was dramatically demonstrated during the 1959, 1960, 1962 and 1970 anthrax epizootics. During these outbreaks a minimum of 1532 animals, representing 22 species was found to have succumbed to the disease. This figure includes 83 roan antelope, a notoriously rare species in South Africa. This represents a fair proportion of the estimated 250 odd roan antelope for the K.N.P. and 300 to 350 total for the Republic of South Africa.

By virtue of a regular incidence and seasonal occurrence, the Pafuri area of the K.N.P. has already attained the reputation of being an enzootic anthrax region. The disease sporadically spreads from the lower lying Pafuri area onto adjoining regions to set up foci of infection which may flare up as epizootics, such as happened during 1970. The rest of the K.N.P., therefore, is exposed to the constant and dreaded threat of anthrax. A research programme was subsequently initiated with the object, inter alia, of devising practical and effective methods to curb the spread of the disease to neighbouring and maybe more distant areas in the K.N.P.

The probable ways and distance of dissemination from an infected focus,therefore, had to be determined. As vultures have acquired the disreputable reputation as one of the chief distributors of the disease, at least a part of the research programme had to be directed to them and their activities.

Evidence which has been accumulated seems to point to vultures as one of the chief disseminators of Bacillus anthracis organisms during anthrax epizootics in the K.N.P. Vultures were observed to visit watering places immediately after gorging themselves on dead animals, in order to bathe and/or drink. Here they invariable commence washing off the gore adhering to their feathers and also sometimes vomit excess ingesta into the water or along the edges, thereby forming prolific mechanical means of transmission. Presum-