FEATURE ARTICLES

SOUTH WEST AFRICAN CONTRIBUTION TO RAPTOR MEASUREMENT AND PLUMAGE STUDY

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Eagles, Hawks and Falcons trapped by the Balchatri technique are ringed, photographed, measured in detail and released. The basic aim of the study is to compare aspects of the anatomy of the different raptor species from a functional viewpoint. At present two persons in SWA are involved, as part of a joint project under Dr A.C. Kemp of the Transvaal Museum.

Legal aspects: In SWA a permit from Tourism and Nature Conservation is required, plus the written permission of the landowner (even when ringing on a public road through the farm). To this end, about 250 farmers, on whose farms I regularly work, were circularised. The response was good and also produced a certain amount of incidental information about nests etc.

Data obtained from the bird: Firstly all birds are ringed. They are then colour photographed from back and front, with wings stretched out in a particular way (so that wing area, in cm^2, can be determined later, from the projected slide . The ring number, a scale and photographic colour control charts are included in the photo. In this way it is hoped to build up a total collection of all plumages of all age groups, sex variations and colour variations in as many raptor species as possible.

Certain species appear to have only two plumages (juvenile and adult) but have considerable variation between individuals e.g. Rock Kestrel R 123. Here probably 100 or more individuals will have to be photographed to obtain a reasonable idea. Species with only two plumages and little variation between individuals e.g. Chanting Goshawk R 165 need a smaller collection. Other

Controlled back photograph of a Steppe Eagle ring no. G-08960 (reproduced from a colour slide). A particularly vicious individual trapped near Omitara. Although this is a spectacular catch, it is not very meaningful in terms of the measurement section of the project, as it is unlikely that 20 individuals will be trapped.

species again e.g. Tawny-Steppe Eagles R 134/5 have 3 - 6 sub-adult plumages and an adult plumage(s) with considerable individual variation in each plumage. A fully representative photographic series of such birds would probably involve several hundred photos.

Good photographs of perched or flying (untrappable) birds are also collected to attempt to increase the number of plumage types. Fresh road kills and captive birds are also photographed and measured if available.

Good flight shots of all species in various flight attitudes, even if only in silhouette, are also collected to help clarify species identification on the wing, and to help understand various modes of flight.

The third part of the processing involves detailed measurements with calipers and sliding tapes, of head structure, leg structure, and tail structure. There are about 25 measurements in all, and they are used in functional calculations such as:

$$\text{Swallowing volume} = \pi\left(\frac{\text{gape width}}{2}\right)^2 \times \text{gape length}$$

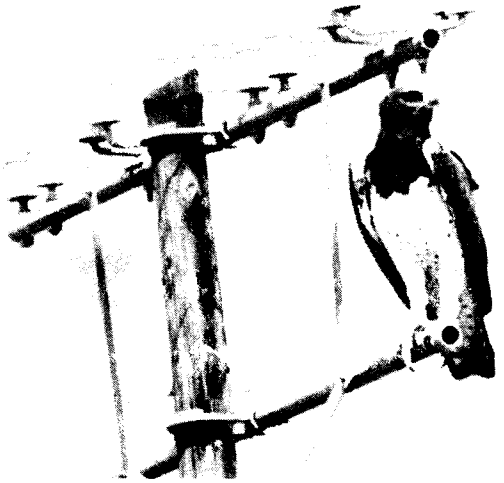
Preliminary analysis of data shows, for instance, that Snake eagles have a swallowing volume almost twice the size of that of Martial or Hawk Eagles.

$$\text{Wing structure length} = \text{humerus length} + \text{ulna length} + \text{wing length}$$

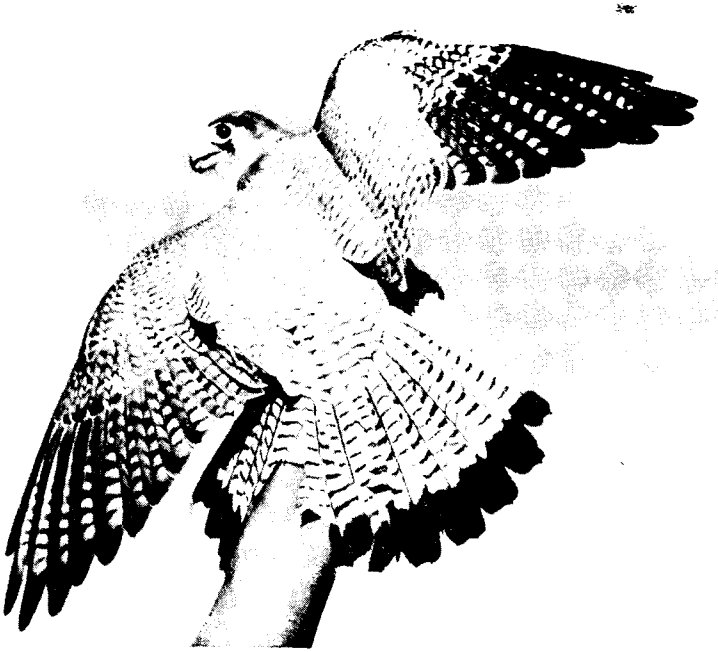
Preliminary analysis shows that the wing structure length of the Black-breasted Snake-Eagle is far greater than that of the Aquila eagles.

In the early stages of the project problems were experienced with accuracy of measuring, but the sources of error were investigated and a quality control check instituted. The exact

Controlled front photograph of African Hawk Eagle ring no. 9-16509 (reproduced from a colour slide). Note the straight angle at which the wing is held (alula ignored) so that a standard wing area determination can be done from the slide later. This bird was trapped in the Namib Desert along a watercourse with only a few camelthorn trees.



Good photos (for this purpose meaning shots showing plumage features well) of perched birds are taken to add to plumage series. Martial Eagle, not interested in Balchatri trap, near Outjo. From colour slide.



Red-necked Falcons can be trapped or budgies near the edge of the Namib Desert. From colour slide.

Good photos (for this purpose meaning shots showing flight pattern features well, even if figures small and in silhouette) of flying raptors are taken to help with identification of species on the wing. Although this is reproduced from a colour slide, black and white shots can be just as meaningful here.

range of accuracy of each measurement is now known, and all new measurers joining the project have to standardise with the original measurers.

Laborious manual analysis of data with a hand calculator produced promising results, and it was decided to collect data for a trial computer run later this year. At least 20 individuals of each species (20 of each sex for sex characters) must be collected to produce reasonable results.

Other data collected includes full state of moult, notes on body condition, ectoparasites, and mass (in g). The wing loading $\left(\frac{\text{mass}}{\text{wing area}}\right)$ is then calculated later.

If a measured bird is retrapped, it is remeasured for interest but not for the series. (Most raptors appear to fledge from the nest "full grown" i.e. their final size, and with few exceptions (Bateleur) do not undergo changes in shape of wing or tail). Change in mass and progress in state of moult is naturally noted.

While travelling on the roads looking for raptors to trap and photograph, a count of raptors seen is kept, with a note made against each entry of the veld type, the locality, the time, and the activity (perched, soaring, eating etc.). This is not, as originally thought, of much use in censusing raptors, but it has added to knowledge of distribution and daily activity patterns. Each hunting attempt is noted in as much detail as possible, with an entry SHA (successful hunting attempt) or UHA (unsuccessful hunting attempt).

Trapping Potential of SWA

Central SWA is a trapping paradise, for the following reasons:

1. Terrain generally open.
2. Few perches in semi-desert areas - birds use telephone poles.
3. There is generally a high density of raptors (less so in the Khomas Hochland) with tremendous build-ups often seen after good rains in the semi-desert areas.

Particular success can be achieved in trapping large numbers of:

= 124 Lanner

= 132 Greater Kestrel (Pro-Namib, Kalahari)

= 133 Rock Kestrel

= 141 African Hawk Eagle

= 142 Martial Eagle

= 146 Black-breasted Snake-Eagle

= 165 Chanting Goshawk

Also fairly common and trappable are:

= 117 Red-necked Falcon (Pro-Namib)

= 131 Western Red-footed Kestrel (migrant following rain)

= 136 Pygmy Falcon (Pro-Namib, Kalahari)

= 139 Black-shouldered Kite (locally common e.g. Okahandja, Kalkveld)

= 137 Wahlberg's Eagle (Bushveld)

= 152 Jackal Buzzard

= 153 Augur Buzzard (Khomas Hochland)

= 154 Steppe Buzzard

= 161 Shikra (Little Banded Goshawk)

= 162 Gabar Goshawk.

Present in large numbers, difficult to trap:

= 128/9 Black and Yellow-billed Kite

= 134 Tawny Eagle (have trapped 1)

= 135 Steppe Eagle (rain migrant; have trapped 1)

Any persons interested in obtaining more information

i) About the project in general, should contact

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ii) About raptors or raptor-trapping in SWA, should contact the author.