A REPORT ON THE BIRD LIFE OF THE KALAHARI GEMSBOK NATIONAL PARK

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INTRODUCTION

During the period 18th to 21st February, 1957, the writer made a brief survey of the bird life in the Park. The area surveyed consisted of the Auob River bed from Twee Rivieren to Mata-Mata and the Nossob River bed from the Auob-Nossob confluence to Rooikop 94 miles north.

The report takes the form of a general Check List incorporating the observations of Drs. Rudebeck and Swanberg and Mr. Le Riche, with those of the writer. The status of each species is discussed and though a detailed subdivision of the various bird habitats would be ideal for the application of bird conservation, the writer feels that the accumulated knowledge is not sufficient to merit such a step at this stage.

From the Check List the following subjects are discussed:—

I. Influence of migratory birds on the bird population of the Park.
II. Influence of water on the general dispersal of birds.
III. Influence of trees on the general dispersal of birds.
IV. Conclusions.

The nomenclature followed is that used by Vincent in "A Check List of the Birds of South Africa". The English and Afrikaans names are taken from Roberts' "The Birds of South Africa".

FAMILY STRUTHIONIDAE, OSTRICHES

1. *Struthio camelus* (Ostrich, Volstruis).

Commonly seen, it is evidently a bird generally distributed throughout the park. Usually seen in small flocks numbering four to five birds. Breeds in the early summer months.

FAMILY PODICIPIDAE, GREBES

2. *Podiceps ruficollis* (Cape Dabchick, Dopertjie).

A very occasional visitor to the sheets of water flooding the river bed vegetation after good rains (Le Riche). The creation of permanent sheets of water with aquatic vegetation would no doubt attract this species, in small numbers.

FAMILY ARDEIDAE, HERONS

3. *Ardea melanochephala* (Black-headed Heron, Swartkop-reier).

Another infrequent visitor which was noted by Le Riche following good rains in the Park.

FAMILY SCOPIDAE, HAMMERHEADS

4. *Scopus umbretta* (Hammerhead, Hamerkop).

Irregularly seen in the summer months (Le Riche). It would no doubt keep to the river beds in the vicinity of water as it subsists almost entirely on frogs.

FAMILY CICONIIDAE, STORKS

5. *Ciconia ciconia* (White Stork, Wit-ooievaar).

Rudebeck records a single specimen near Twee Rivieren on 15th May, 1956. Nearly 100 White Storks were seen on the wing over the Nossob River early in February, 1957 (Le Riche). This record probably constitutes part of a flock migrating locally within its winter quarters. I saw none and doubt whether there are sufficient locusts, grasshoppers and the like, to support these birds for any length of time.

FAMILY ANATIDAE, DUCKS

6. *Anas undulata* (Yellowbill Duck, Geelbek-eend).

Has been noted at Jansedraai in the small dam (Le Riche).

7. *Anas erythrorhyncha* (Red-billed Teal, Rooibek-eendjie).

Unusual to record four Red-billed Teal at St. John's dam on 20th February. There was no sign of any aquatic life on which they could feed in the muddy waters.

FAMILY SAGITARRIIDAE, SECRETARY BIRDS

8. *Sagittarius serpentarius* (Secretary Bird, Sekretarisvoël).

Judging from my census figures which were taken in the river beds, a pair or singleton were seen roughly every ten miles, which does point to their being territorial. No census was made in the dune country but there is also no reason to expect the Secretary Bird to be any less common in areas away from water.

FAMILY AEGYPIIDAE, VULTURES

9. *Pseudogyps africanus* (White-backed Vulture, Witrug-aasvoël).

Undoubtedly the commonest vulture in the park, outnumbering the Black Vulture four to one on the three observations made at the dead gemsbok eight miles up the Nossob from Twee Rivieren on 19th, 20th and 21st February. Probably generally distributed in the park.

10. *Torgos tracheliotus* (Black Vulture, Swart Aasvoël).

As Rudebeck says "Widely distributed and not rare, but, as expected, seen in much smaller numbers than the preceding species". Unfortunately I had

no opportunity to study the peck order of the vultures round a carcass where the Black Vulture is said to have priority.

11. *Necrosyrtes monachus pileatus* (Hooded Vulture, Monnik Aasvoël).

Five were recorded in company with four Black Vultures and five White-backed Vultures bathing in shallow pools of water in the road shortly after a rainstorm ten miles east of Mata-Mata on the 18th. Decidedly less common than the two preceding species (Le Riche).

FAMILY AQUILIDAE, KITES, EAGLES AND HAWKS

12. *Milvus migrans* (Black kite, Swart Wou).

Over 150 Black kites were found roosting in the dunes some 23 miles up the Nossob River from the confluence on 20th February. As is the case with many of the predatory migrants, the kites tend to keep together and collectively no doubt have a profound influence on the predatory pressure within the park (see Influence of migratory birds on the bird population of the park). According to Le Riche they are annual visitors in such numbers to the Park.

13. *Milvus aegyptius parasitus* (Yellow-billed kite, Geelbek-wou).

Only one Yellow-billed kite was quite definitely identified, some 35 miles up the Auob River from the Auob-Nossob confluence on 18th February. This kite is a bird with definite migratory tendencies within Africa and may be found in company with the migrating Black kites, though I found no evidence of this in the Kalahari Park.

14. *Elanus caeruleus* (Black-shouldered kite, Wit-valkie).

Occurs in the central and northern part of the Park.

15. *Aquila wahlbergi* (Wahlberg's Eagle, Bruin-arend).

Evidently found in the northern areas of the park, but by no means common.

16. *Hieraaetus fasciata spilogaster* (African Hawk Eagle, Hoenderjaer).

I noted two up the Nossob River both in the vicinity of Kameelsleep. According to Le Riche this eagle shows a preference for the park-like savanna one finds in the northern part of the park.

17. *Polemaetus bellicosus* (Martial Eagle, Breëkop-arend).

This impressive eagle is well distributed within the park. I noted an immature bird on an old nest in the Gemsbok plain and what I took to be the parent some three miles further on. I watched two Lanner Falcons *(Falco biarmicus)* mob a Martial Eagle so successfully that it was forced to decamp without drinking at the windmill, at Kameelsleep on the 19th.

18. *Circaetus pectoralis* (Black-breasted Harrier Eagle, Swartbors-uilarend).

It was seen a few miles north of Ooikolk on 20th February. Current

literature points to the Harrier eagles as subsisting to a large extent on snakes, thus one could expect its distribution in the park to be general.

19. *Aquila rapax* (Tawny Eagle, Roof-arend of Tjok-arend).

Undoubtedly the commonest of the large eagles. It was seen daily, singly or in pairs. It was most unusual to see eleven Tawnies congregated round St. John's dam on the 19th. This species is not normally gregarious.

20. *Terathopius ecaudatus* (Bataleur, Berghaan).

I can only endorse what Rudebeck said, namely "Widely distributed but not common. The number of pairs per square unit must be much lower than in the Kruger National Park".

21. *Accipiter minullus* (Little Sparrowhawk, Klein sperwer).

Recorded by Rudebeck at Grootkolk on 18th May. Probably limited to the wooded areas one finds in the north. Were the southern parts of the Nossob River bed to be replanted with trees, this species would most probably extend its range southwards.

22. *Accipiter ovampensis* (Ovambo Sparrowhawk, Ovambo sperwer).

Swanberg's record near Kwang on 17th May must be considered unusual and probably the most southerly for the species.

23. *Melierax musicus* (Cape Chanting Goshawk, Groot-witvalk).

Surprisingly common. In the southern areas of the Auob and Nossob Rivers where the trees are sparse one can expect to find a pair in almost every tree. My census figures along the Nossob River bed point to a distribution of roughly one every six miles. It is by far the most numerous of the medium size predators. As Rudebeck states "Its abundance may be higher along the river beds than in the dry country, but it is not limited to the well watered areas".

24. *Melierax gabar* (Gabar Goshawk, Klein-blouvalkie).

I found this bird decidedly less common than Rudebeck did, possibly because our surveys were made in different seasons of the year. My sole record was from the windmill 30 miles up the Nossob. The rare melanistic phase which Rudebeck recorded twice, I never saw.

25. *Circus maurus* (Black Harrier, Swart-kuikendief).

Swanberg's record of this rare species north-west of Twee Rivieren still constitutes the only one in the park.

26. *Circus pygargus* (Montagu's Harrier, Blou-kuikendief).

A male and female recorded near the Gemsbok plain on the morning of the 18th. The same afternoon I deprived a Peregrine Falcon *(Falco peregrinus)* of a male Montagu's Harrier which it had obviously just caught as

the bird was still warm, near Kamfersboom. As the female Montagu's was recorded two miles further on alone, I am of the opinion that the killed male was the same bird as the one I had seen during the morning. The Peregrine is known to prey on predatory mammals and reptiles and was indeed trained to do so in falconry, but the record of one species of predator preying on another is unusual. Rudebeck (Oikos 3. II 1951 p. 210) cites three instances of one specific Peregrine preying successfully on three Sparrowhawks *(Accipiter nisus)*. He also cites an example of the Peregrine successfully hunitng a kestrel *(Falco tinnunculus)*. He concludes that the choice of prey was very unusual and states that similar cases are known to have occurred. (Engelmann 1928, Niethamer Witherby). In this connection it is of interest to quote Rudebeck: "I have seen the Peregrine hunt . . . 252 times. Out of these only 19 were successful, giving a percentage of 7.5. Thus the hunts are usually unsuccessful". This fact should be stressed as the literature often gives one the impression that the Peregrine can catch its prey quite at will, or at least very easiliy.

FAMILY FALCONIDAE, FALCONS AND KESTRELS

27. *Falco peregrinus* (Peregrine Falcon, Sleg-valk).

As Rudebeck has no record of this species in May, I can safely assume the Peregrines I noted were migrant birds from Europe. Up the Auob River one was noted every 11 miles, though the figure is a bit misleading as five of the six were noted in the mor ewooded areas of the river bed, i.e. north of the Gemsbok plain. Up the Nossob River bed to Rooikop one was seen every 30 miles, as was also the case with the Lanner Falcon *(Falco biarmicus)* which I found absent along the Auob.

28. *Falco biarmicus* (Lanner Falcon, Edel-valk).

This species was as common as the former along the Nossob River bed. As both these species prey on the concentrations of doves round the waterholes, one can expect them to be widely distributed in the park but far less common in the dune country away from water. The Lanner is probably a resident species.

29. *Falco subbuteo* or *cuvieri* (Hobby, Boomvalk).

The status of this species is uncertain. I definitely identified a Hobby Falcon at Kameelsleep on the 19th. It is quite imposisble to differentiate the migratory Hobby *(Falco subbuteo)* from the resident Cuvier's Falcon *(Falco cuvieri)* in the field. Its identification poses an interesting problem.

30. *Falco chicquera* (Rufous-necked Falcon, Rooinek-valkie).

Rudebeck's two records near Kaspersedraai and Mata-Mata on 19th and 24th May respectively, stand as the only two in the park.

31. *Cerchneis rupicolus* (Rock kestrel, Rooi-valkie).

Possibly less common than Rudebeck implies — my sole record of this species comes from 18 miles up the Nossop.

32. *Cerchneis rupicoloides* (Greater kestrel, Groot-rooivalk).

A common bird of prey in the open and almost treeless areas north of Twee Rivieren.

33. *Polihierax semitorquatus* (Pigmy Falcon, Dwerg-valkie).

I noted two pairs both in the immediate vicinity of Sociable Weavers' nests i nthe Auob River bed. On the Nossob I found the species absent. Both Rudebeck and Le Riche state that this species is not rare in the Park.

FAMILY NUMIDIDAE, GUINEAFOWL

34. *Numida mitrata* (Crowned Guineafowl, Tarentaal).

An irregular visitor to the Park north of Rooikop in certain seasons (Le Riche).

FAMILY PHASIANIDAE, FRANCOLINS AND QUAILLS

35. *Coturnix africana* (African Quail, Afrikaanse kwartel).

Swanberg's record of three quails in the dunes north-west of Twee Rivieren on 22nd May is confirmed by Le Riche. This quail evidently invades the Park in fair numbers during the winter months.

FAMILY TURNICIDAE, BUTTON QUAILS

36. *Turnix lepurana* (Kurrichaine Button Quail, Bosveld-kwarteltjie).

Thus far Rudebeck's three records are the only ones for the Park.

FAMILY OTIDIDAE, BUSTARDS AND KORHAANS

37. *Ardeotis kori* (Kori Bustard, Gom-pou).

Both Rudebeck and I estimated one bird every six miles in the Auob River bed. In the Nossob my figures are one Kori every 20 miles. It seems therefore that the Kori Bustard prefers the dune country round the Auob to the grassland savanna of the Nossob. As this species is not dependent on water to any degree the distribution in the dunes is probably the same as that of the river beds.

38. *Neotis dehami stanleyi* (Stanley Bustard, Veld-pou).

Generally distributed in the park (Le Riche).

39. *Eupodotis vigorsii* (Karoo korhaan, Vaal-korhaan).

Widely distributed but partial to the dune country (Le Riche).

40. *Afrotis atra afraoides* (White-quilled korhaan, Witvlerk-korhaan).

The same as the preceding species. I observed it twice in the dunes just north of Twee Rivieren.

FAMILY BURHINIDAE, DIKKOPS

41. *Burchinus capensis* (Cape Dikkop, Gewone-dikkop).

Heard calling on the night of the 18th near Twee Rivieren. As the call is quite unmistakable, this record can be considered authentic.

FAMILY RALLIDAE, COOTS

42. *Fulica cristata* (African Coot, Bleshoender).

A rare visitor to the park noted by Le Riche.

FAMILY CHARADRIIDAE, PLOVERS

43. *Charadrius tricollaris* (Treble-band Sandplover, Drieband-strandlopertjie).

A single specimen was observed at the first waterhole in the Auob Valley. This is one species utterly dependent on water.

44. *Stephanibyx coronatus* (Crowned Plover, Gewone kiewietjie).

Common along the river beds, where it kept mainly to the dry and flat areas with short and scanty vegetation.

45. *Hoplopterus armatus* (Blacksmith Plover, Bont kiewietjie).

Mr. Le Riche recorded three Blacksmiths near the confluence in October 1956.

FAMILY GLAREOLIDAE, COURSERS AND PRATINCOLES

46. *Rhinoptilus africanus* (Double banded Courser, Dubbelband-drawwertjie).

Seen by both Rudebeck and Le Riche. Although it was summer I found no evidence of the bird.

FAMILY PTEROCLIDAE, SANDGROUSE

47. *Pterocles namaqua* (Namaqua Sandgrouse, Kelkiewyn).

On the mornings of the 18th and 19th at Twee Rivieren I counted over 300 Sandgrouse on both occasions flying due south in flocks of 30 to 50 birds, during the first hours of daylight. As the northern areas of the park were known to be very dry at this time, the sandgrouse were possibly migrating southwards in search of more favourable conditions. Following this local migration all the sandgrouse were not absent, as I observed isolated flocks numbering ten or so birds up the Nossob River.

48. *Pterocles burchelli* (Variegated Sandgrouse, Sandpatrys).

A comparatively common bird in the dunes (Le Riche).

FAMILY COLUMBIDAE, PIGEONS AND DOVES

49. *Columbia guinea* (Cape Rock Pigeon, Bosduif).

Present in the eastern areas of the park at certain times of the year (Le Riche).

50. *Streptopelia capicola* (Cape Turtle Dove, Gewone-tortelduif).

Common in both the Auob and Nossob valleys where these doves congregate in great numbers around the waterholes especially at sunrise and sunset. As the species is dependent on water, one can expect it to be far less common in the open grassland and dune country especially where trees are lacking.

51. *Stigmatopelia senegalensis* (Laughing Dove, Lagduifie).

Very much less common than the preceding species though generally distributed in the park. I did not notice any attachment of his species to human habitation in the park as is often the case elsewhere.

52. *Oena capensis* (Namaqua Dove, Namakwa-duifie).

Found everywhere in the park though not in great numbers. This is most noticeable in the area north of Twee Rivieren where trees are largely lacking, yet the Namaqua dove still is commonly seen as it is a ground frequenting species.

FAMILY CUCULIDAE, CUCKOES

53. *Cuculus solitarius* (Red-chested Cuckoo, Pietmyvrou).

Occurs as amigrant in the wooded areas of the north.

54. *Clamato jacobinus serratus* (Jacobin Crested Cuckoo, Gewone Nuwejaarsvoël).

I was fortunate to observe two about a mile apart from one another near the Gemsbok plain.

FAMILY CORACIIDAE, ROLLERS

55. *Coracias garrulus* (European Roller, Europese Troupand).

A migrant from Europe and Western Asia which occurs in the wooded areas of the park during the summer months.

56. *Coracias caudata* (Lilac-breasted Roller, Gewone Troupand).

Common in both the Auob and Nossob valleys where trees occur. Entirely absent in the treeless areas in the south. Not dependent on water to any marked degree.

57. *Coracias naevius mosambicus* (Mozambique Roller, Groot-troupand).

Rudebeck records two specimens from Mata-Mata, 24th May. Possibly commoner than these two records would imply.

FAMILY MEROPIDAE, BEE-EATERS

58. *Melittophagus hirundineus* (Swallow-tailed Bee-eater, Mikstert-byvreter).

I noted five birds at the third windmill up the Auob River on 18th Fberuary. Rudebeck saw it repeatedly along the Nossob. Probably resident.

FAMILY BUCEROTIDAE, HORNBILLS

59. *Lophocerus nasutus epirhinus* (South African Grey Hornbill, Grys-neushoringvoël).

Recorded by Rudebeck in the northern part of the Nossob vally. Lacking south of Rooikop.

60. *Lophoceros flavirostris leucomelas* (Yellow-billed Hornbill, Geelbek-neushoringvoël).

Common in the wooded parts of the river beds. Not noted in the Auob valley.

FAMILY UPUPIDAE, HOOPOES

61. *Upupa africana* (African Hoopoe, Afrikaanse-hop).

An arboreal species noted both in the Auob and the Nossob River beds.

FAMILY PHOENICULIDAE, WOOD HOOPOES

62. *Phoeniculus purpureus damarensis* (Red-billed Wood Hoopoe, Blou-kakelaar).

Observed two specimens in a kameeldoring tree at Kaspersedraai on 20th February. Judging from their behaviour I would say they were nesting in the immediate vicinity .

63. *Rhinopomastus cyanomelas* (Scimitar-bill Hoopoe, Swartbek-kakelaar).

Not a common bird but seen by Le Riche and Rudebeck in the wooded river beds.

FAMILY STRIGIDAE, OWLS

64. *Tyto alba affinis* (Cape Barn Owl, Nonnetjie-uil).

I disturbed this owl from a kameeldoring at Ooikolk on the 21st. Le Riche reports this to be the species nesting in the wells 20 miles up the Nossob River.

65. *Otus scops latipennis* (Cape Scops Owlet, Klein-ooruil).

Le Riche cites a record from Twee Rivieren, in one of the trees in his backyard.

66. *Bulro lactea* (Giant Eagle Owl, Reuse-ooruil).

I was fortunate in finding three of these owls 18 miles up the Nossob

River on 19th February. As I approached them they flew off and were immediately mobbed by two Chanting Goshawks *(Melierax musicus)*, an indignity all owls have to bear.

FAMILY CAPRIMULGIDAE, NIGHTJARS

67. *Caprimulgus pectoralis* (South African Nightjar, Suid-Afrikaanse nag-uiltjie).

Heard calling at Twee Rivieren on the night of the 21st. The Bushmen believe that if you shoot and bury a Nightjar on its back it will bring rain (Le Riche).

FAMILY COLIDAE, COLIES

68. *Colius colius* (Cape Coly, Kaapse-muisvoël).

Recorded by Le Riche in the far north.

FAMILY CAPITONIDAE, BARBETS

69. *Tricholaema leucomelas* (Pied Barbet, Bont Houtkapper).

Not seen by the writer but noted by Rudebeck in the northern half of the park and at Mata-Mata.

FAMILY PICIDAE, WOODPECKERS

70. *Dendropicos fuscescens* (Cardinal Woodpecker, Kardinaal-spegt).

A bird I expected to find in the large kameeldoring trees unobtrusively searching the bark for insects. I noted a female at Kameelsleep but it is very likely that this species has been overlooked and is a lot commoner than one record would imply.

FAMILY APOPIDAE, SWIFTS

71. Sp. *Apus* (Swift, Windswawel).

Two large flocks numbering over 300 birds in the Auob valley and 500 birds in the Nossob valley were noted on the 18th and 20th respectively. The species was either the resident Black Swift *(Apus barbatus)*, or the migratory Common Swift *(Apus apus)*. Unfortunately it is impossible to differentiate these two species in the field. The Black Swift breeds in the crevices of krantzes and seldom flocks together in large numbers. As suitable breeding areas for this species are lacking in the park and as it was not recorded by Rudebeck in the winter, it seems more likely to be the migratory Swift from Europe. The collection of a series of these birds would be the only means of establishing their identity.

FAMILY ALAUDIDAE, LARKS

As a group these birds are extremely difficult to differentiate from one another in the field, especially when field observations are made from a car. Furthermore it should be remembered that my opportunities to investigate the dune country were limited and that the larks are one of a few groups of birds that have fully adapted themselves to semi-desert conditions and are almost entirely independent of water.

72. *Mirafra africanoides* (Fawn-coloured Lark, Vaal-bruin-lewerkie).

More commonly seen in the sandy areas to the south, as far north as Jansedraai. Seems partial to areas of low bush and scrub with intervening strips of sand.

73. *Chersomanes albofasciata* (Spike-heeled Lark, Vlak-voëltjie).

Seen in both the Auob and Nossob valleys as well as the dunes east of Twee Rivieren (Rudebeck).

74. *Eremopterix verticalis* (Grey-backed Finch-lark, Grys-kaffertjie).

Extremely common in the sandy river beds in the south. It is this species that is put to flight in such numbers from the very wheels of an approaching car in the river beds. At Kijky this Finch-lark is superseded by the little Scaly Feathered Finch *(Sporopipes squamifrons)* especially in the wooded areas.

75. *Calandrella conirostris* (Pink-billed Lark, Rooibek-lewerkie).

Fairly common on the exposed dunes near Twee Rivieren, probably widespread in the dune country.

FAMILY MOTACILLIDAE, WAGTAILS AND PIPPITS

76. *Motacilla capensis* (Cape Wagtail, Kaapse-kwikkie).

Last seen in the park by Le Riche 20 years ago, and that was on the Gemsbok plain.

77. *Anthus* sp. (Pippits, Koesters).

As was the case with Rudebeck, pippits were seen, but I was not in a position positively to identify any of them.

FAMILY TIMALIIDAE, BABBLERS

78. *Turdoides bicolor* (Pied Babblers, Wit-katlagter).

Two records north of Kaspersedraai (Rudebeck). I did not note these birds south of Rooikop, which is possibly then their southernmost limit.

FAMILY PYCNONOTIDAE, BULBULS

79. *Pycnonotus xanthopygos layardi* (Layard's Bulbul, Swartoog-tiptol).

Recorded by Le Riche in the Nossob River in April. As this species feeds almost exclusively on berries and fruit, its presence in the park is determined by the periods that its food supply becomes available.

FAMILY MUSCICAPIDAE, FLYCATCHERS

80. *Parisoma subcaeruleum* (Tit-babbler, Tjeriktik).

Can be considered common in the Kameeldoring trees in the Auob and Nossob River beds, lacking in the dune country in the south as it is a species dependent on trees for its habitat.

81. *Bradornis mariquensis* (Marico Flycatcher).

Undoubtedly the commonest of its family — dependent on trees, thus one would expect it to be generally distributed in the northern areas but lacking in the south.

82. *Bradornis infuscata* (Chat Flycatcher, Groot-vlieëvanger).

Noted in the river beds — prabably generally distributed.

83. *Batis pririt* (Pririt Flycatcher, Geelkeel-bontrokkie).

Rudebeck noted a female near Grootkolk on 18th May, while I also noted a female near Kamqua on 18th February.

FAMILY TURDIDAE, THRUSHES, CHATS, ROBINS

84. *Turdus litsipsirupa* (Groundscraper Thrush, Gevlekte-lyster).

Not noted south of Rooikop but evidently common north thereof.

85. *Oenanthe pileata* (Capped Wheatear, Skaapwagter).

As Rudebeck states, "Very numerous in the river beds especially in the open areas just north of Twee Rivieren".

86. *Cercomela familiaris* (Familiar Chat, Spekvreter).

Noted only at Twee Rivieren but as Rudebeck states it may well be found to be numerous, though usually a solitary species.

87. *Myrmecocichla formicivora* (Ant-eating Chat, Swartpiek).

Common and widely distributed within the park. A ground frequenting species, the Ant-eating Chat is in no way dependent on trees for its habitat.

FAMILY SYLVIIDAE, WARBLERS

88. *Erythropygia paena* (Kalahari Scrub Robin, Wipstert).

A bird as common in the river beds as the open savanna, except in areas devoid of bushes.

89. *Calamonastes fasciolata* (Kalahari Barred Warbler, Gebande ruigte-sanger).

Swanberg cites a record at Grootkolk on 19th May.

90. *Eremomela icteropygialis* (Yellow-bellied Eremomela, Geelbuikbossanger).

Seen at Mata-Mata on 23rd May (Swanberg).

91. *Cisticola spp.* (Grass Warblers, Tingtinkies).

I had no opportunity to investigate this large genus of nondescript birds, some of which show four plumage changes during the course of a year. Only by collecting a large series could these species be positively identified.

92. *Priniops pectoralis* (Rufous-eared Warbler, Rooioor-kleinjantjie).

Observed close to Twee Rivieren, 16th and 22nd May (Rudebeck).

93. *Prinia flavicans* (Black-chested Prinia, Swartbors-langstert-tingtinkie).

The common warbler of the river beds, even noted from a car.

94. *Hirundo rustica* (European Swallow, Europese-swawel).

It is significant to note that I did not record a single swallow in the park, and Swanberg's record of a single specimen 12 miles north of Twee Rivieren should be considered an isolated record. The nearest that European Swallows were seen to the park was some 70 miles west of Kuruman, in the Kuruman River bed.

95. *Ptyonoprogne fuligula* (Cape Rock Martin, Kransswawel).

One or two pairs have been resident at Twee Rivieren for the last three years.

FAMILY DICRURIDAE, DRONGOS

96. *Dicrurus adsimilis* (Fork-tailed Drongo, Mikstert-byvanger).

A tree perching species that is common in the wooded areas.

FAMILY LANIIDAE, SHRIKES

97. *Lanius minor* (Lesser Grey Shrike, Europese-grys-laksman).

A migratory species from Europe that I recorded in both the Auob and Nossob River beds. These two records are possibly the southernmost limits of this Shrike in Africa.

98. *Lanius collaris subcoronatus* (Fiscal Shrike, Gewone Fiskaal).

More often seen in the southern portion of the park, though not common. The conspicuous superciliar stripe makes the identification of the subspecies *subcoronatus* a simple matter in the field, unlike nearly all other subspecies.

99. *Lanius collurio* (Red-backed Shrike, Rooirug-laksman).

A migratory shrike that is more plentiful than the Lesser Grey *(Lanius minor)* in the park. The Red-backed Shrike is a lot less plentiful in the park than it is in more settled areas.

100. *Lanius atro-coccineus* (Crimson-breasted Shrike, Rooibors-kokkewiet).

This magnificent bird is confined to the heavily wooded areas and would accordingly be absent in the south and the open country away from the river beds.

101. *Tchagra australis* (Three-streaked Redwing Shrike, Kleinrooivlerk-laksman).

A single speciment noted north of the Gemsbok plain on 18th February — probably common in the wooded areas.

102. *Chlorophoneus sulphureopectus similis* (Orange-breasted Bush Shrike, Oranjebors-boslaksman).

A skulking shrike with a very beautiful call which I found at Ooikolk on 20th February. Probably overlooked by Rudebeck.

103. *Nilaus brubru* (Brubru Shrike, Bontrok laksman).

Rudebeck collected a specimen at Mata-Mata on 24th May. The systematic position of this bird seems to be doubtful. Both Vincent and Benson place it with the Flycatchers while Mackworth-Praed and Grant, and Roberts retain it under the Shrikes.

FAMILY PARIDAE, TITS

104. *Parus afer cinerascens* (Ashy Tit, Pietjoujou).

Not noted by the writer, but widely distributed along the river beds according to Rudebeck. If the Ashy Tit does occur in the dry areas it will be limited to the parklike savanna in the north.

105. *Anthoscopus minuta* (Penduline Tit, Kapokvoël).

The only record in the park is Rudebeck's observation of two specimens in the dune country east of Kwang Pan on 19th May.

FAMILY CORVIDAE, CROWS

106. *Corvus capensis* (Black Crow, Swart-kraai).

Noted only near the Auob-Nossob confluence but evidently occurring often in the river beds even in the north (Rudebeck and Le Riche).

FAMILY STURNIDAE, STARLINGS

107. *Creatophora cinereus* (Wattled Starling, Vaal-spreeu).

Seen in small flocks over the greater part of the wooded areas in the park.

108. *Lamprocolius nitens* (Cape Glossy Starling, Klein-glansspreeu).

Widely distributed in the wooded stretches of the rive beds, but considerably less common, if not lacking, in the drier areas especially in the south.

109. *Lamprotornis australis* (Burchell's Glossy Starling, Groot-glansspreeu).

Noticed for the first time three miles south of Rooikop, which is possibly its southern-most limits in the park. In the Kruger National Park Rudebeck and I found this species suddenly to disappear as we reached what must have been its southern-most limits, but there was no appreciable change in the area we were passing through.

FAMILY NECTARINIIDAE, SUNBIRDS

110. *Cinnyris fuscus* (Namaqua Sunbird, Namakwa-suikerbekkie).

Rudebeck observed one specimen at Grootkolk on 18th May.

FAMILY BUBALORNITHIDAE, BUFFALO-WEAVERS

111. *Bubalornis albirostris niger* (Buffalo-weaver, Buffel-wewer).

Two specimens were noted near the Gemsbok plain on 18th February. This species is usually seen in small communities near large trees and may well be widespread in the park where conditions are suitable. (Not recorded by Rudebeck or Le Riche).

FAMILY PLOCEIDAE, WEAVERS, WAXBILLS, WIDOW BIRDS

112. *Plocepasser mahali* (Sparrow-weaver, Koringvoël).

Plentiful in the Nossob River Bed where I also noticed nest building activity, especially around Kameelsleep.

113. *Philetairus socius* (Sociable Weaver, Familievoël).

Very common along both river beds, nesting in many of the large Kameeldoring trees. Its abundance does depend on the availability of suitable nesting sites and as these are more plentiful along the river beds than in the dune country, one must expect to find the population in the areas well away from water considerably less than that of the river beds.

114. *Sporopipes squamifrons* (Scaly-feathered Finch, Baardmannetjie).

Exetremely common and distributed throughout the park. Not limited to trees, for it breeds in the dune scrub as willingly as it does in the trees.

115. *Ploceus velatus* (Masked Weaver, Swartkeel-geelvink).

Males in breeding plumage were commonly seen ,but as most of the numerous nests hanging from the tips of Acacia trees had already been abandoned, the breeding cycle had been completed. As the Masked Weaver is a species dependent on water, one found more nests near the windmills and probably the species is limited to a large degree to the river beds.

116. *Quelea quelea* (Red-billed Quelea, Rooibek-vink).

The writer did not note this species at all, which points to the Quelea breeding beyond the confines of the park. As this species is locally migratory the Queleas Rudebeck saw were probably vagrants from Bechuanaland, where they are known to breed in fantastic numbers.

117. *Amadina erythrocephala* (Red-headed Finch, Ropikop-mossie).

Concentrated round the waterholes — almost entirely absent in the areas devoid of trees and water.

118. *Granatina granatina* (Violet-eared Waxbill, Koningblousysie).

I evidently found this bird somewhat more commo nthan Rudebeck and Swanberg did as I noted it in both the Auob and Nossob valleys, whereas their records are confined to Grootkolk.

119. *Vidua regia* (Shaft-tailed Widow Bird, Pylstrert).

Males in breeding plumage were seen in both the Auob and Nossob Rivers, congregated round the waterholes. Certainly lacking in the areas away from the river beds.

FAMILY PASSERIDAE, SPARROWS

120. *Passer melanura* (Cape Sparrow, Mossie).

One is so used to finding the Cape Sparrow near human habitation that it comes as a surprise to see this Sparrow in the wild and unspoilt vastness of the Kalahari. Within the park its distribution seems general, though it does seem to prefer the wooded river beds to the dune country, and as it is dependent to some degree on water, concentrations round the waterholes are common. Nevertheless it is a good example of a bird that has adapted itself to semi-desert conditions.

121. *Passer grisea diffusa* (Grey-headed Sparrow, Gryskop mossie).

It is this species that is constantly being put to flight in small flocks every few hundred yards by an approaching car in the north. From Kameelsleep northwards it is very common, but considerably less so in the south, and in the Auob. Another species dependent on trees for its habitat.

FAMILY FRINGILLIDAE, SEEDEATERS

122. *Serinus flaviventris* (Yellow Seed-eater, Geel-sysie).

A brightly coloured and conspicuous bird one always notices amongst the flocks of seed-eaters in both the Auob and Nossob valleys. Rudebeck noted it in the stunted bushes on the dunes too.

I. INFLUENCE OF MIGRATORY BIRDS ON THE BIRD POPULATION OF THE PARK.

It might be as well to first enumerate the migrants. They are:—

Ciconia ciconia	White Stork
Milvus migrans	Black Kite
Milvus parasitus	Yellow-billed Kite
Circus pygargus	Montagu's Harrier
Falco peregrinus	Peregrine Falcon
Falco subbuteo	Hobby
Coturnix africana	African Quail
Cuculus solitarius	Red-chested Cuckoo
Clamater jacobinus	Jacobin crested Cuckoo
Coracius garrulus	European Roller
Hirundo rustica	European Swallow
Lanius minor	Lesser Grey Shrike
Lanius collurio	Red-backed Shrike

This means that 13 out of 123 recorded species are migrants. Of these the only migrants of real significance are the Peregrine Falcon and Black Kite, and their significance lies in the numbers in which they invade the park during the summer months. The predatory pressure exerted on game must be considerably increased by the populations of these two predators. Furthermore, inter-specific competition for game may be of such an order that these two migrants possibly account for the absence of the Ovambo and Little Sparrowhawk and also the greatly reduced numbers of Gabar Goshawk in the summer months. Naturally much research remains to be done on this interesting problem.

The Hobby *(Falco subbuteo)* can be considered as a rarity. The Quail *(Coturnix africana)* does invade the park in considerable numbers at certain times of the year, but their migration is of a more local nature than the annual flights of the trans-equatorial Paleartic migrants. The Quails are not known to compete ecologically with any other species and accordingly they would have little or no effect on the resident populations.

With the exception of the Peregrine Falcon and Black Kite, the migratory populations are in my opinion considerably less in the park than in other parts of Southern Africa.

II. INFLUENCE OF WATER ON THE GENERAL DISPERSAL OF BIRDS.

Birds which must drink regularly are obviously limited in their distribution. So it follows that by creating artificial waterholes one extends their range. Some have developed migratory habits so that they occur in dry areas such as the Kalahari only in the rainy season, while many species appear in numbers in otherwise dry areas only after rainfall. Others again are utterly dependent on permanent water to meet their ecological needs.

Accordingly the erection of windmills does have an effect on the dispersal of many species, especially if these windmills are surrounded by suitably sized trees which then afford the more timid species some measure of protection when they are coming down to drink. I was unfortunately unable to make a census of the birdlife round one such windmill, but even with casual observation one was impressed by the flocks of seed-eaters, doves, and the less common species, with the inevitable bird of prey in attendance, gathered round the water.

I should add that the majority of birds congregate round the windmills only in the early morning and late afteroon, retiring to the shade of the river bed trees during the heat of the day. One exception to this is the birds of prey which utilize the rising thermal currents while soaring, and will as readily come down to drink at midday as at sunset.

There can be no doubt that from the tourist point of view these windmills are a great feature, as they do attract and concentrate a variety of species.

III. THE INFLUENCE OF TREES ON THE GENERAL DISPERSAL OF BIRDS.

In the park one gets the impression that the birds are far more dependent on trees than water for their distribution. Along the Nossob River to Rooikop the distribution of windmills is roughly the same in the treeless area in the south as in the wooded areas in the north. Nevertheless the variety of birdlife is more than halved when one passes from the wooded to the open river bed.

Birds do adapt themselves to semi-desert conditions by a variety of physiological adjustments, but when it comes to breeding their adaptability is considerably less flexible. In fact, it is most unusual to find a bird adapting itself to nesting on the ground after having nested in trees for countless generations. An interesting case in this connection is the Sociable Weaver which continues to breed in its apartments even when the huge structure has fallen to the ground, as long as the nest entrances are not covered.

As the open river beds were covered by trees before the intervention of man, it seems quite feasible that these areas could successfully be replanted

(ignoring for the moment the economic implications). Once these trees have re-established themselves, the food they would supply would as a matter of course attract the tree-frequenting species, and be repopulated. Conditions for the birds would then simulate those that prevailed before man eradicated the trees.

IV. CONCLUSIONS.

Species with a wide distribution in the dry African bush were well represented, but the most striking feature of birdlife in the park is undoubtedly the variety and abundance of predatory birds, numbering 22 species in all. Assuming that the numbers of these predators fluctuate within narrow limits (as is almost certainly the case for the resident predators) and with the exception of the migrants, the balance or proportion of predatory birds to hteir prey remains constant.

The current consensus of opinion, overseas, is that predatory birds do tend to exercise a selective effect on injured or otherwise inferior prey, as these are the most easily obtained. In short, they serve as a kind of "sanitary police". Thus, assuming the conditions in the park remain unchanged, there seems little likelihood of the stock of a species degenerating either by over-population or disease. Attempted measures of conservation at maintaining the "balance of nature" is most inadvisable as it is done on a basis of our extremely imperfect knowledge of the synecology of the species concerned. In doing so we greatly over-estimate our present level of knowledge.

The other significant feature of birdlife within the park is that the majority of the species recorded owe their occurrence to the rich vegetation and water in the river beds. Were these lacking the variety of birdlife would indeed be greatly reduced, but on the other hand the task of characterising the area zoographically would be much simplified, as the types that do characterise the Kalahari Subregion would predominate.

As my observations in the dune country were extremely limited, I am not in a position to ascertain the status of the semi-desert frequenting species, but it is quite obvious that the birdlife of the dry river beds and their vicinity have little or nothing to do with the desert fauna.

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