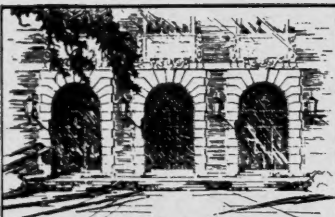




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# DAYS WITH BIRDS

## STUDIES OF HABITS OF SOME EAST AFRICAN SPECIES

V. G. L. VAN SOMEREN

AUG 6 1956

FIELDIANA: ZOOLOGY

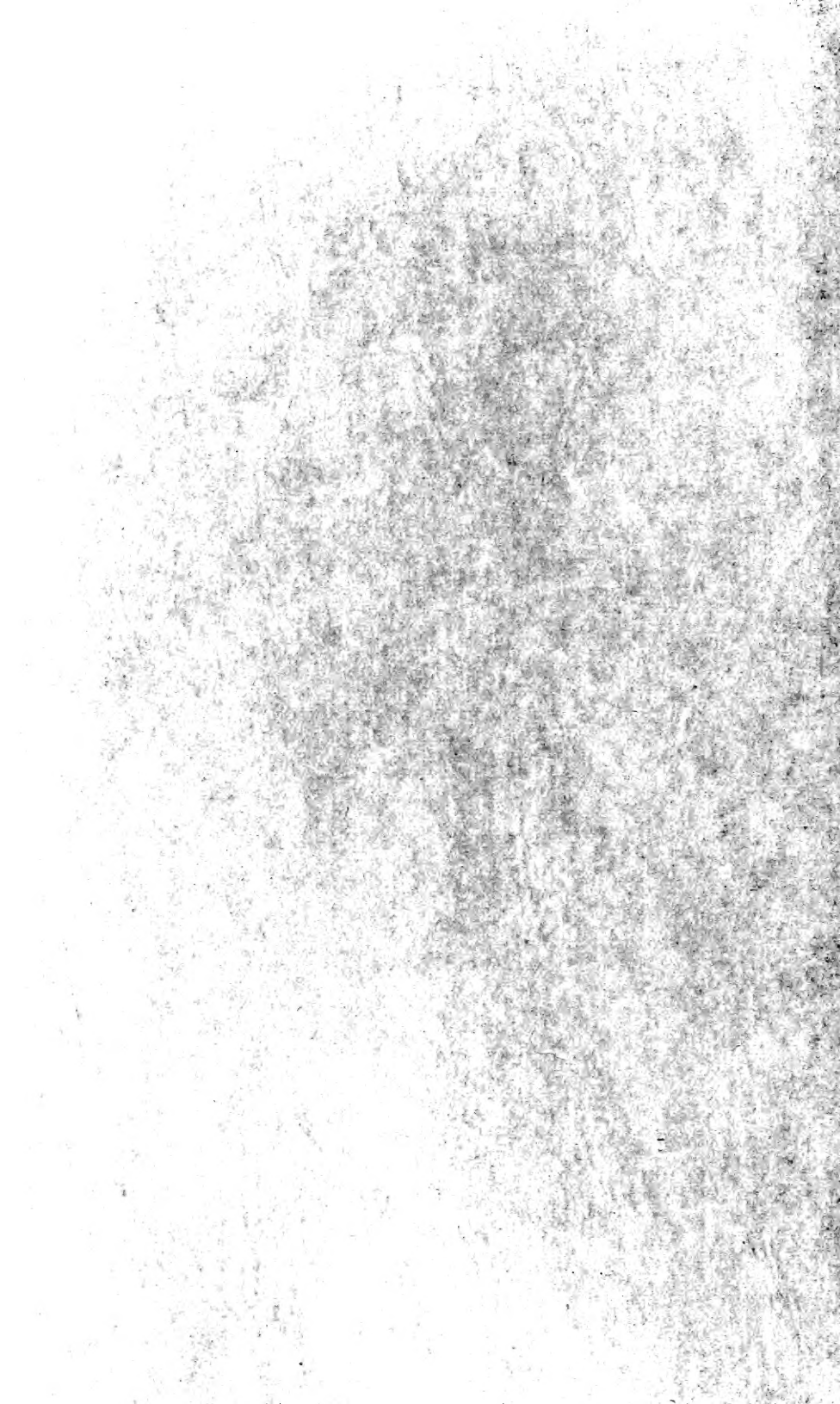
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SECRETARY BIRD  
Alighting in nest tree

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ZOOLOGICAL SERIES

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**DAYS WITH BIRDS**  
**STUDIES OF HABITS OF SOME**  
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V. G. L. VAN SOMEREN

F.L.S., C.M.Z.S., M.B.O.U.

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*Editors*

AUSTIN L. RAND

*Chief Curator, Department of Zoology*

LILLIAN A. ROSS

*Associate Editor, Scientific Publications*

## CONTENTS

	PAGE
List of Illustrations . . . . .	15
Introduction . . . . .	19
<b>DARTERS: Family <i>Anhingidae</i></b>	
African Darter or Snake-neck Bird . . . . .	21
<i>Anhinga rufa rufa</i> Lacép. and Daud.	
<b>HERONS: Family <i>Ardeidae</i></b>	
Green-backed Heron . . . . .	22
<i>Butorides striatus atricapillus</i> Afz.	
<b>IBIS: Family <i>Threskiornithidae</i></b>	
Sacred Ibis . . . . .	22
<i>Threskiornis aethiopicus aethiopicus</i> Lath.	
Hadada Ibis . . . . .	24
<i>Hagedashia hagedash</i> Lath.	
<b>DUCKS: Family <i>Anatidae</i></b>	
Egyptian Goose . . . . .	24
<i>Alopochen aegyptiacus</i> Linn.	
<b>SECRETARY BIRD: Family <i>Sagittariidae</i></b>	
Secretary Bird . . . . .	25
<i>Sagittarius serpentarius</i> Miller	
<b>VULTURES: Family <i>Aegyptiidae</i></b>	
Tawny or White-necked Vulture . . . . .	32
<i>Pseudogyps africanus</i> Salvad.	
Lappet-faced Vulture . . . . .	35
<i>Torgos tracheliotus nubicus</i> Smith	
White-headed Vulture . . . . .	35
<i>Trigonoceps occipitalis</i> Burch.	
Egyptian Vulture . . . . .	37
<i>Neophron percnopterus</i> Linn.	
Hooded Vulture . . . . .	38
<i>Necrosyrtes monachus pileatus</i> Burch.	
<b>FALCONS and HAWKS: Family <i>Falconidae</i></b>	
African Yellow-billed Black Kite . . . . .	48
<i>Milvus migrans parasitus</i> Daud.	

	PAGE
Black-shouldered Kite . . . . .	61
<i>Elanus caeruleus</i> Desf.	
Tawny Eagle . . . . .	69
<i>Aquila rapax rapax</i> Temm.	
Brown Harrier Eagle . . . . .	76
<i>Circaetus cinereus</i> Vieill.	
Red-tailed Buzzard . . . . .	78
<i>Buteo rufofuscus augur</i> Rüpp.	
Red-breasted Sparrow Hawk . . . . .	86
<i>Accipiter rufiventris</i> Smith	
East African Goshawk . . . . .	88
<i>Astur tachiro nyanzae</i> Neumn.	
Gabar Goshawk . . . . .	105
<i>Melierax gabar</i> Daud.	
<b>QUAIL, etc.: Family Phasianidae</b>	
Ukamba Gray-winged Francolin . . . . .	112
<i>Francolinus africanus uluensis</i> Grant	
Kenya Scaly Francolin . . . . .	114
<i>Francolinus squamatus maranensis</i> Mearns	
Orange-throated Spurfowl . . . . .	116
<i>Pternistis leucoscepus infuscatus</i> Cab.	
Black-breasted or Harlequin Quail . . . . .	117
<i>Coturnix delegorguei</i> Deleg.	
<b>RAILS, etc.: Family Rallidae</b>	
African Knob-billed Coot . . . . .	120
<i>Fulica cristata</i> Gmel.	
<b>PLOVER: Family Charadriidae</b>	
Chestnut-banded Plover . . . . .	122
<i>Charadrius venustus</i> Fisch. and Reichw.	
Crowned Plover . . . . .	123
<i>Stephanibyx coronatus</i> Bodd.	
Saddle-backed Plover . . . . .	125
<i>Hoplopterus armatus</i> Burch.	
<b>STONE PLOVER: Family Burhinidae</b>	
Spotted Stone Plover or Dikkop . . . . .	127
<i>Burhinus capensis capensis</i> Licht.	
Streaky Stone Plover or Water Dikkop . . . . .	129
<i>Burhinus vermiculatus vermiculatus</i> Cab.	
<b>PIGEONS: Family Columbidae</b>	
Kenya Dusky Turtle Dove . . . . .	131
<i>Streptopelia lugens funebrea</i> van Som.	

CONTENTS

7

PAGE

Gray-vented Ring Dove or Red-eyed Dove . . . . .	136
<i>Streptopelia semitorquata semitorquata</i> Rüpp.	
White-vented Ring Dove . . . . .	140
<i>Streptopelia capicola tropica</i> Reichw.	
Speckle-necked Laughing Dove . . . . .	141
<i>Stigmatopelia senegalensis aequatorialis</i> Erl.	
Long-tailed Ground Dove or Namaqua Dove . . . . .	142
<i>Oena capensis capensis</i> Linn.	
White-breasted Forest Dove or Tambourine Dove . . . . .	144
<i>Tympanistria tympanistria fraseri</i> Bp.	
Emerald-spotted Ground Dove or Emerald-spotted Wood Dove . . . . .	148
<i>Turtur chalcospilos chalcospilos</i> Wagl.	
Bronze-necked Forest Dove or Lemon Dove . . . . .	151
<i>Aplopelia larvata larvata</i> Temm. and Knip	

CUCKOOS: Family **Cuculidae**

Red-breasted Cuckoo . . . . .	153
<i>Cuculus solitarius</i> Steph.	
Yellow-breasted Emerald Cuckoo . . . . .	156
<i>Chrysococcyx cupreus</i> Shaw	
White-breasted Emerald Cuckoo . . . . .	159
<i>Lampromorpha klaasi</i> Steph.	
Hackle-necked Coucal or White-browed Coucal . . . . .	161
<i>Centropus superciliosus intermedius</i> van Som.	

PLANTAIN-EATERS: Family **Musophagidae**

Blue-crested Plantain-Eater or Hartlaub's Lourie . . . . .	164
<i>Turacus hartlaubi</i> Fisch. and Reichw.	

ROLLERS: Family **Coraciidae**

Lilac-breasted Roller . . . . .	174
<i>Coracias caudatus caudatus</i> Linn.	

KINGFISHERS: Family **Alcedinidae**

Pied Kingfisher . . . . .	176
<i>Ceryle rudis rudis</i> Linn.	
Malachite-crested Kingfisher . . . . .	177
<i>Corythornis cristata cristata</i> Pall.	
Violet-cheeked Kingfisher . . . . .	181
<i>Ispidina picta picta</i> Bodd.	
White-bellied Kingfisher . . . . .	182
<i>Halcyon albiventris orientalis</i> Peters	
Brown-bellied or Gray-headed Kingfisher . . . . .	186
<i>Halcyon leucocephala centralis</i> Neumn.	

	PAGE
<b>BEE-EATERS: Family Meropidae</b>	
Cinnamon-breasted Bee-eater . . . . .	187
<i>Melittophagus lafresnayii oreobates</i> Sharpe	
Red-throated Bee-eater or White-fronted Bee-eater . . . . .	193
<i>Melittophagus bullockoides</i> Smith	
<b>HORNBILLS: Family Bucerotidae</b>	
Red-and-white-billed Hornbill or von der Decken's Hornbill . . . . .	195
<i>Lophoceros deckeni</i> Cab.	
<b>HOOPOES: Family Upupidae</b>	
Somali Crested Hoopoe . . . . .	198
<i>Upupa epops somaliensis</i> Salvin	
<b>OWLS: Family Strigidae</b>	
Pearl-spotted Owllet . . . . .	200
<i>Glaucidium perlatum</i> Vieill.	
<b>NIGHTJARS: Family Caprimulgidae</b>	
Notes on Nightjars of the Ngong Area . . . . .	200
Rufous-necked Nightjar . . . . .	201
<i>Caprimulgus rufigena frenatus</i> Salvad.	
Square-tailed Nightjar . . . . .	201
<i>Caprimulgus fossii</i> Hartl.	
Slender-tailed Nightjar . . . . .	202
<i>Caprimulgus clarus</i> Reichw.	
<b>COLIES: Family Coliidae</b>	
Kenya White-cheeked Coly or Kenya Speckled Mousebird . . . . .	203
<i>Colius striatus kikuyensis</i> van Som.	
<b>BARBETS: Family Capitonidae</b>	
Pied Barbet . . . . .	209
<i>Lybius albicauda senex</i> Reichw.	
Red-fronted Spotted Barbet . . . . .	212
<i>Tricholaema diadematum massaicum</i> Reichw.	
Gray-breasted Tinker Barbet or Kenya Golden-rumped Tinker-bird . . . . .	216
<i>Pogoniulus bilineatus jacksoni</i> Sharpe	
<b>HONEYGUIDES: Family Indicatoridae</b>	
Lesser Honeyguide . . . . .	220
<i>Indicator minor teitensis</i> Neumn.	
<b>WOODPECKERS: Family Picidae</b>	
Uganda Gray-breasted Woodpecker . . . . .	223
<i>Mesopicos goertae centralis</i> Reichw.	
Kenya Gray or Golden-backed Woodpecker . . . . .	224
<i>Mesopicos goertae rhodeogaster</i> Fisch. and Reichw.	

LARKS: Family **Alaudidae**

PAGE

Athi Red-winged Lark or Rufous-naped Lark . . . . .	225
<i>Mirafraga africana athi</i> Hart.	
Kavirondo Flappet Lark . . . . .	228
<i>Mirafraga fischeri kavirondensis</i> van Som.	
Rufous-crowned Finch-lark . . . . .	230
<i>Eremopterix leucopareia</i> Fisch. and Reichw.	
Red-capped Lark . . . . .	233
<i>Tephrocorys cinerea anderssoni</i> Trist.	

PIPITS and WAGTAILS, etc.: Family **Motacillidae**

African Pied Wagtail . . . . .	234
<i>Motacilla aguimp vidua</i> Sund.	
Kenya Tawny Pipit . . . . .	236
<i>Anthus richardi lacuum</i> Meinertz.	
Yellow-throated Longclaw . . . . .	240
<i>Macronyx croceus croceus</i> Vieill.	
Orange-throated Longclaw . . . . .	243
<i>Macronyx aurantiigula</i> Reichw.	
Red-throated Longclaw . . . . .	244
<i>Macronyx ameliae wintoni</i> Sharpe	

BULBULS: Family **Pycnonotidae**

Yellow-vented Bulbul or Brown-capped Geelgat . . . . .	248
<i>Pycnonotus tricolor</i> Hartl.	
White-throated Forest Bulbul . . . . .	251
<i>Phyllastrephus fischeri placidus</i> Shelley	
Yellow-breasted Forest Bulbul . . . . .	255
<i>Chlorocichla flaviventris meruensis</i> Mearns	
Yellow-moustached Olive Bulbul . . . . .	259
<i>Stelgidocichla latirostris eugenia</i> Reichw.	

FLYCATCHERS: Family **Muscicapidae**

Kenya Dusky Flycatcher . . . . .	262
<i>Alseonax minimus interpositus</i> van Som.	
White-throated Swamp Flycatcher . . . . .	265
<i>Alseonax aquaticus infulatus</i> Hartl.	
Ukamba Gray Flycatcher . . . . .	267
<i>Bradornis microrhynchus ukamba</i> van Som.	
White-eyed Slaty Flycatcher . . . . .	269
<i>Dioptornis fischeri</i> Reichw.	
Golden-breasted Flycatcher . . . . .	273
<i>Chloropeta natalensis massaica</i> Fisch. and Reichw.	

	PAGE
Kenya Puff-backed Flycatcher . . . . .	276
<i>Batis molitor puella</i> Reichw.	
Highland Wattle-eyed Flycatcher . . . . .	280
<i>Platysteira peltata jacksoni</i> Sharpe	
Kenya Paradise Flycatcher . . . . .	283
<i>Tchitrea viridis ferreti</i> Guer.	
<b>THRUSHES: Family Turdidae</b>	
Elgon Olive Thrush or Orange-billed Thrush . . . . .	288
<i>Turdus olivaceus elgonensis</i> Sharpe	
Rift Valley Pied Chat . . . . .	292
<i>Oenanthe schalowi</i> Fisch. and Reichw.	
Uganda Black Chat or Ant Chat . . . . .	294
<i>Myrmecocichla nigra</i> Vieill.	
African Stone Chat . . . . .	296
<i>Saxicola torquata axillaris</i> Shelley	
Uganda White-browed Cossypha . . . . .	299
<i>Cossypha heuglini heuglini</i> Hartl.	
Ukamba White-browed Cossypha . . . . .	303
<i>Cossypha semirufa intercedens</i> Cab.	
Gray-bellied Cossypha . . . . .	307
<i>Cossypha caffra iolema</i> Reichw.	
Speckle-breasted Scrub Thrush or Morning Warbler . . . . .	311
<i>Cichladusa guttata guttata</i> Heugl.	
Red-tailed White-winged Bush Chat . . . . .	317
<i>Erythropygia leucoptera</i> Rüpp.	
Kenya Red-tailed Bush Chat . . . . .	320
<i>Erythropygia hartlaubi keniensis</i> van Som.	
<b>WARBLERS: Family Sylviidae</b>	
Long-clawed Papyrus Warbler or Greater Swamp Warbler . . . . .	324
<i>Calamoecetor nilotica</i> Neumn.	
Gray-backed Forest Warbler or Brown-capped Forest Warbler . . . . .	326
<i>Apalis cinerea cinerea</i> Sharpe	
Black-collared or Rufous-flanked Forest Warbler . . . . .	328
<i>Apalis pulchra</i> Sharpe	
Breast-spot Warbler . . . . .	331
<i>Apalis flavida flavocincta</i> Sharpe	
Green-backed Swamp Warbler or Gray-capped Swamp Warbler . . . . .	335
<i>Eminia lepida hypochlorus</i> Mearns	
Buff-breasted Acacia Warbler . . . . .	339
<i>Phyllolais pulchella</i> Cretz.	
Rufous-faced Stumpy-tail Warbler . . . . .	342
<i>Sylvietta whytii jacksoni</i> Sharpe	



## CONTENTS

11

PAGE

White-browed Stumpy-tail Warbler . . . . .	344
<i>Sylvietta leucophrys leucophrys</i> Sharpe	
Yellow-bellied Gray Warbler . . . . .	348
<i>Eremomela griseoflava abdominalis</i> Reichw.	
Green-winged Forest Warbler . . . . .	350
<i>Camaroptera brevicaudata aschani</i> Granvik	
Mottle-backed Bush Warbler . . . . .	353
<i>Cisticola hunteri prinioides</i> Neumn.	
Brown-headed Bush Warbler . . . . .	356
<i>Cisticola cantans pictipennis</i> Madar.	
Rufous-faced Bush Warbler . . . . .	359
<i>Cisticola erythrops sylvia</i> Reichw.	
Lesser Streaky-backed Grass Warbler . . . . .	362
<i>Cisticola galactotes nyansae</i> Neumn.	
Greater Streaky-backed Grass Warbler . . . . .	365
<i>Cisticola robusta ambigua</i> Sharpe	
Short-winged Grass Warbler . . . . .	368
<i>Cisticola brachyptera katonae</i> Madar.	
White-browed or Tawny-flanked Long-tailed Warbler . . . . .	369
<i>Prinia subflava immutabilis</i> van Som.	

SWALLOWS: Family **Hirundinidae**

Kenya Banded Sand Martin . . . . .	373
<i>Riparia cincta suahelica</i> van Som.	
Kenya Dusky Sand Martin . . . . .	377
<i>Riparia paludicola dohertyi</i> Hart.	
Black Saw-winged Martin . . . . .	379
<i>Psalidoprocne holomelaena massaica</i> Neumn.	

CUCKOO-SHRIKES: Family **Campephagidae**

Green-black Cuckoo Shrike . . . . .	380
<i>Campephaga flava</i> Vieill.	

SHRIKES: Family **Laniidae**

Common Fiscal or Long-tailed Pied Shrike . . . . .	384
<i>Lanius collaris humeralis</i> Stanley	
Greater Long-tailed Pied Shrike or Fiscal . . . . .	389
<i>Lanius cabanisi</i> Hart.	
Gray-black Bush Shrike . . . . .	391
<i>Laniarius funebris</i> Hartl.	
Pied Bush Shrike . . . . .	393
<i>Laniarius ferrugineus ambiguus</i> Madar.	
Puff-back Forest Shrike . . . . .	397
<i>Dryoscopus cubla hamatus</i> Hartl.	

	PAGE
Lesser Red-winged Bush Shrike . . . . .	402
<i>Tchagra australis</i> Smith	
Greater Red-winged Bush Shrike . . . . .	406
<i>Tchagra senegala armena</i> Oberhl.	
<b>TITMICE: Family Paridae</b>	
Highland White-bellied Pied Tit . . . . .	407
<i>Parus albiventris albiventris</i> Shelley	
<b>ORIOLES: Family Oriolidae</b>	
Black-headed Oriole . . . . .	411
<i>Oriolus larvatus kikuyuensis</i> van Som.	
<b>CROWS: Family Corvidae</b>	
Pied Crow . . . . .	418
<i>Corvus albus</i> Müll.	
<b>STARLINGS: Family Sturnidae</b>	
King Glossy Starling or Golden-breasted Slender Starling . . . . .	421
<i>Cosmopsarus regius regius</i> Reichw.	
Superb Glossy Starling . . . . .	423
<i>Spreo superbus</i> Rüpp.	
Red-billed Oxpecker or Tick Bird . . . . .	426
<i>Buphagus erythrorynchus caffer</i> Grote	
<b>WHITE-EYES: Family Zosteropidae</b>	
Pale-breasted Zosterops . . . . .	428
<i>Zosterops senegalensis fricki</i> Mearns	
Kenya Golden-fronted Zosterops . . . . .	431
<i>Zosterops kikuyuensis</i> Sharpe	
<b>SUNBIRDS: Family Nectariniidae</b>	
Emerald Long-tailed Sunbird . . . . .	434
<i>Nectarinia famosa aeneigularis</i> Sharpe	
Bronzy Long-tailed Sunbird . . . . .	438
<i>Nectarinia kilimensis kilimensis</i> Shelley	
Kenya Yellow-breasted Sunbird . . . . .	441
<i>Cinnyris venustus falkensteini</i> Fisch. and Reichw.	
Highland Violet-throated Black Sunbird . . . . .	444
<i>Chalcomitra amethystina doggetti</i> Sharpe	
Scarlet-breasted Black Sunbird . . . . .	447
<i>Chalcomitra senegalensis</i> Linn.	
Yellow-breasted Collared Sunbird . . . . .	449
<i>Anthreptes collaris ugandae</i> van Som.	
<b>WEAVERS: Family Ploceidae</b>	
Golden-crowned Weaver Bird . . . . .	451
<i>Othyphantes r. reichenowi</i> Fisch.	

CONTENTS

13

PAGE

Highland Spectacled Weaver . . . . .	455
<i>Hyphanturgus ocularius suahelicus</i> Neumn.	
Masked Red Weaver . . . . .	459
<i>Anaplectes melanotis</i> Lafres.	
Cardinal Weaver Finch . . . . .	461
<i>Quelea cardinalis</i> Hartl.	
Yellow-rumped Whydah . . . . .	464
<i>Euplectes capensis xanthomelas</i> Rüpp.	
Red-hooded Whydah . . . . .	466
<i>Coliuspasser laticauda suahelica</i> van Som.	
Jackson's Dancing Whydah . . . . .	470
<i>Drepanoplectes jacksoni</i> Sharpe	
Bronze-headed Mannikin . . . . .	473
<i>Spermestes cucullatus scutatus</i> Heugl.	
Black-headed Mannikin . . . . .	475
<i>Spermestes nigriceps nigriceps</i> Cass.	
Singing Silver-bill Finch . . . . .	478
<i>Euodice cantans tavetensis</i> van Som.	
Kenya Partridge Finch . . . . .	479
<i>Ortygospiza atricollis mülleri</i> Zedl.	
Black-vented Crimson Finch . . . . .	482
<i>Lagonosticta rubricata hildebrandti</i> Neumn.	
Crimson Fire Finch . . . . .	485
<i>Lagonosticta senegala kikuyuensis</i> van Som.	
Gray-headed Waxbill or Yellow-bellied Waxbill . . . . .	489
<i>Coccyphygia melanotis kilimensis</i> Sharpe	
Masai Barred Waxbill . . . . .	491
<i>Estrilda astrild massaica</i> Neumn.	
Orange-bellied Waxbill . . . . .	495
<i>Sporaeginthus subflava clarkei</i> Shelley	
Crimson-cheeked Blue Waxbill . . . . .	497
<i>Uraeginthus bengalus brunneigularis</i> Mearns	
Pin-tailed or Pied Whydah . . . . .	501
<i>Vidua macroura</i> Pallas	
Steely-blue Pin-tailed Whydah . . . . .	503
<i>Vidua hypocherina</i> Verr.	
FINCHES: Family <b>Fringillidae</b>	
Kenya Canary or Brimstone Serine . . . . .	505
<i>Serinus sulphuratus sharpii</i> Neumn.	
Streaky Serine Finch . . . . .	508
<i>Poliospiza striolata affinis</i> Richm.	

	PAGE
Kenya Black-faced Siskin or Citril . . . . .	510
<i>Spinus citrinelloides kikuyuensis</i> Neumn.	
<b>BUNTINGS: Family <i>Emberizidae</i></b>	
Golden-breasted Bunting . . . . .	513
<i>Emberiza flaviventris</i> Steph.	
Index . . . . .	517

## LIST OF ILLUSTRATIONS

Secretary Bird Alighting in Nest Tree . . . . . Frontispiece

### TEXT FIGURES

	PAGE
Sacred Ibis and Cormorants . . . . .	23
Secretary Bird Regurgitating Food for Young . . . . .	27
Male Tawny Vulture (White-necked Vulture) above Nest . . . . .	33
Female White-headed Vulture Dropping Down to Nest . . . . .	36
Hooded Vulture Alighting in Nest Tree . . . . .	39
Hooded Vulture . . . . .	41
Week-old Chick of Hooded Vulture . . . . .	42
Six-weeks-old Chick of Hooded Vulture . . . . .	45
Black-shouldered Kite Alighting on Nest . . . . .	62
Four Young of Black-shouldered Kite . . . . .	64
Six-months-old Black-shouldered Kite . . . . .	68
Five-months-old Tawny Eagle . . . . .	75
Adult Red-tailed Buzzard . . . . .	81
Adult Red-tailed Buzzard at Nest . . . . .	83
Male and Female East African Goshawk at Nest . . . . .	89
Adult Gabar Goshawk at Nest . . . . .	109
Female Ukamba Gray-winged Francolin . . . . .	113
Female Saddle-backed Plover Sitting on Eggs . . . . .	126
Female Streaky Stone Plover (Water Dikkop) at Nest . . . . .	130
Male Kenya Dusky Turtle Dove and Young . . . . .	133
Female Gray-vented Ring Dove (Red-eyed Dove) Feeding Chick . . . . .	137
Male White-breasted Forest Dove (Tambourine Dove) Beginning to Regurgitate Food . . . . .	146
Male Emerald-spotted Ground Dove (Emerald-spotted Wood Dove) Brooding Young . . . . .	149
Young Red-breasted Cuckoo . . . . .	155
Male Yellow-breasted Emerald Cuckoo . . . . .	157
Female Hackle-necked Coucal (White-browed Coucal) . . . . .	161

	PAGE
Blue-crested Plantain-eater (Hartlaub's Lourie) and Squirrel . . . . .	165
Female Blue-crested Plantain-eater (Hartlaub's Lourie) Feeding Chick . . . . .	168
Male Malachite-crested Kingfisher . . . . .	179
Female White-bellied Kingfisher with Food for Young . . . . .	183
Male White-bellied Kingfisher with Gecko Lizard in Bill . . . . .	184
Cinnamon-breasted Bee-eaters . . . . .	188
Male Red-and-white-billed Hornbill (von der Decken's Hornbill) at Nest Hole . . . . .	197
Female Kenya White-cheeked Coly (Kenya Speckled Mousebird) . . . . .	203
Kenya White-cheeked Colies (Kenya Speckled Mousebirds) Feeding on Cactus Fruit . . . . .	205
Male Pied Barbet at Nest Hole . . . . .	211
Female Red-fronted Spotted Barbet . . . . .	214
Female Gray-breasted Tinker Barbet (Kenya Golden-rumped Tinker-bird) . . . . .	217
Female Athi Red-winged Lark (Rufous-naped Lark) . . . . .	227
Nest of Rufous-crowned Finch-lark . . . . .	231
Male Rufous-crowned Finch-lark Sitting on Eggs . . . . .	232
Female Kenya Tawny Pipit Taking Food to Nest . . . . .	237
Female Yellow-throated Longclaw Taking Food to Young . . . . .	241
Male Red-throated Longclaw at Nest . . . . .	247
Typical Nest of Yellow-vented Bulbul (Brown-capped Geelgat) . . . . .	249
Female Yellow-vented Bulbul (Brown-capped Geelgat) . . . . .	250
Male White-throated Forest Bulbul Taking Long-horn Grasshopper to Nest . . . . .	253
Male Yellow-breasted Forest Bulbul . . . . .	258
Male Kenya Dusky Flycatcher at Nest . . . . .	263
Male White-throated Swamp Flycatcher . . . . .	266
Female Ukamba Gray Flycatcher Standing before Young in Nest . . . . .	268
Female White-eyed Slaty Flycatcher at Nest . . . . .	270
Female Golden-breasted Flycatcher at Nest . . . . .	275
Male and Female Kenya Puff-backed Flycatchers at Nest . . . . .	279
Highland Wattle-eyed Flycatcher . . . . .	282
Male Kenya Paradise Flycatcher at Nest . . . . .	286
Female Elgon Olive Thrush (Orange-billed Thrush) Receiving Food at Nest . . . . .	291
Female Rift Valley Pied Chat . . . . .	293
Male and Female Uganda Black Chats (Ant Chats) . . . . .	295
Male African Stone Chat Carrying Winged Termites . . . . .	298
Uganda White-browed Cossypha at Nest Containing Young Cuckoo . . . . .	301

## LIST OF ILLUSTRATIONS

17

	PAGE
Adult Gray-bellied Cossypha at Nest . . . . .	309
Mud Nest of Speckle-breasted Scrub Thrush (Morning Warbler) . . . . .	312
Young Speckle-breasted Scrub Thrush (Morning Warbler) in Nest . . . . .	315
Adult Speckle-breasted Scrub Thrush (Morning Warbler) About to Feed Young . . . . .	316
Male Red-tailed White-winged Bush Chat . . . . .	318
Female Red-tailed White-winged Bush Chat . . . . .	319
Male Kenya Red-tailed Bush Chat Carrying Food . . . . .	321
Kenya Red-tailed Bush Chat . . . . .	323
Adult Black-collared Forest Warbler (Rufous-flanked Forest Warbler) . . . . .	329
Adult Breast-spot Warbler Carrying Spider . . . . .	333
Male Green-backed Swamp Warbler (Gray-capped Swamp Warbler) at Nest . . . . .	336
Male Buff-breasted Acacia Warbler at Nest . . . . .	341
Adult White-browed Stumpy-tail Warbler at Nest . . . . .	345
Male Yellow-bellied Gray Warbler . . . . .	349
Male Green-winged Forest Warbler at Nest . . . . .	351
Male Mottle-backed Bush Warbler Leaving Nest . . . . .	354
Male Brown-headed Bush Warbler Carrying Long-horn Grasshopper to Nest . . . . .	357
Male and Female Rufous-faced Bush Warblers . . . . .	361
Lesser Streaky-backed Grass Warbler Carrying Beetle Grub . . . . .	363
Greater Streaky-backed Grass Warbler Carrying Moth Larva to Nest . . . . .	366
White-browed or Tawny-flanked Long-tailed Warbler Carrying Caterpillar to Nest . . . . .	371
Female Kenya Banded Sand Martin Carrying Food to Nest . . . . .	375
Typical Nest and Eggs of Green-black Cuckoo Shrike . . . . .	381
Female Green-black Cuckoo Shrike on Nest . . . . .	383
Adult and Young of Common Fiscal (Long-tailed Pied Shrike) . . . . .	387
Male Pied Bush Shrike with Young . . . . .	395
Male Puff-back Forest Shrike . . . . .	401
Female Lesser Red-winged Bush Shrike Sitting on Nest . . . . .	405
Female Highland White-bellied Pied Tit with Moth in Her Bill . . . . .	409
Black-headed Oriole at Nest . . . . .	415
Female King Glossy Starling (Golden-breasted Slender Starling) . . . . .	422
Superb Glossy Starling . . . . .	424
Thorny Barriers to Nest of Superb Glossy Starling . . . . .	425
Red-billed Oxpecker (Tick Bird) on Domestic Animal . . . . .	427
Red-billed Oxpeckers (Tick Birds) on Rhinoceros . . . . .	428
Pale-breasted Zosterops Feeding Young . . . . .	430

Adult Kenya Golden-fronted Zosterops at Nest . . . . .	433
Male Emerald Long-tailed Sunbird Perched near Nest . . . . .	436
Female Bronzy Long-tailed Sunbird . . . . .	439
Male Kenya Yellow-breasted Sunbird near Nest . . . . .	443
Female Highland Violet-throated Black Sunbird Carrying Spider to Nest . . . . .	445
Male and Female Yellow-breasted Collared Sunbirds . . . . .	450
Male Golden-crowned Weaver Bird Carrying Food to Nest . . . . .	453
Highland Spectacled Weaver Adding to Spout of Nest . . . . .	457
Male Masked Red Weaver Constructing Nest . . . . .	459
Female Cardinal Weaver Finch at Nest . . . . .	463
Female and Nest of Red-hooded Whydah . . . . .	467
Jackson's Dancing Whydah (Female) at Nest . . . . .	471
Male Bronze-headed Mannikin at Nest . . . . .	474
Black-headed Mannikin . . . . .	477
Male Kenya Partridge Finch in Front of Entrance to Nest . . . . .	480
Female Kenya Partridge Finch . . . . .	481
Male Black-vented Crimson Finch . . . . .	483
Crimson Fire Finch at Nest . . . . .	487
Female Gray-headed Waxbill at Nest . . . . .	490
Male and Female Masai Barred Waxbills at Nest . . . . .	493
Male Orange-bellied Waxbill . . . . .	496
Male Crimson-checked Blue Waxbill Guarding Nest . . . . .	499
Male Pin-tailed (Pied) Whydah . . . . .	502
Male Steely-blue Pin-tailed Whydah . . . . .	504
Male Kenya Canary (Brimstone Serine) Regurgitating Food for Brooding Female . . . . .	507
Female Streaky Serine Finch . . . . .	509
Female Kenya Black-faced Siskin (Citril) at Nest . . . . .	511
Male and Female Golden-breasted Buntings at Nest . . . . .	514



# Days with Birds

## INTRODUCTION

These sketches of the "home-life" of some East African birds are written for those who take a general interest in the bird life around them, and for the youngsters who are genuinely keen to learn something about birds. The professional ornithologist may find something to interest him, for systematics can no longer be entirely divorced from field work.

I have tried to avoid the use of technical terms as much as possible and in so doing may perhaps have laid myself open to the charge of using slang.

It must be understood that the observations I have recorded are strictly applicable to the birds as I know them within a small area of Ngong district near Nairobi and need not apply to the species throughout its range. Where I have had to go farther afield for my subject, I have indicated it in the text.

I make frequent reference to the use of a hide. I can commend this method to those who have the time and wish to make close-up observations. It has great advantages over watching birds from a distance through binoculars. I also recommend combining observation with photography, for the recording of data by this means is of extreme value. It also adds much interest to the work.

At the time of my intensive study, my sanctuary at Ngong covered an area of some forty-odd acres and I had the free run of adjoining land to the south, in all about ninety acres. It was ideal for the type of work I had undertaken, for it comprised a large area of grass or veldt land to the south, which, during the rains, was converted into patches of swamp with pools of open water, especially in spots where old "borrow pits" with high earth banks held the water; the banks provided nesting sites for kingfishers, martins, and so on. The grassland sloped gently up toward a central patch of indigenous forest about twenty acres in extent, where my house is, and this in turn gave way to bush and scrub on its northward boundary. Here the land dropped gently to a valley where a stream twisted among a dense stance of bush and eventually emptied into a dam about half a mile long. This compact area thus provided suitable nesting environment for a diversity of birds: swamp-loving species, those of veldt and pasture, birds of

woodland and forest, those of scrub and bush, and finally those of reedbeds and open water. No shooting ever took place. The "vermin" and predators were unmolested, for I wished to obtain some insight into Nature's ways of keeping a balance. Leopards, serval cats, genets and mongooses, bushbuck, reedbuck, red and gray duikers, and pigmy antelopes, came and went as they pleased. Tree hyrax and galagos added their cries to the hooting of the owls at night time.

I hope that these notes will stimulate the people of this country to take a greater interest in birds. There is still a vast, unexplored field for investigation into the life and habits of the birds around us.

This is not a treatise or a text book; it is a collection of first-hand observations relating to the life of some of the birds I have been able to study at close quarters.

I trust that the whole will have some appeal to those for whom it is written.

V. G. L. VAN SOMEREN  
*The Sanctuary, Ngong, Kenya Colony*

[This important contribution to African ornithology was originally part of a longer manuscript, prepared for general reading, to be published as a book. It was found impossible to carry out this project, and the manuscript came to Chicago Natural History Museum. I have eliminated certain sections, notably generally worded descriptions of the species, and sections dealing primarily with photography; summarized or simplified some sections; and checked the spelling of names. This is a treatise on life histories, not taxonomy, and to make it as widely useful as possible it seemed advisable to make the scientific names conform with those of Sclater's 1924-30 *Systema Avium Aethiopicarum*, the standard list of African birds. The "common" or vernacular names, which do not always conform to Sclater's usage, are of Dr. van Someren's choosing.

The photographs were chosen from a series of prints supplied by Dr. van Someren.

I have seen the paper through the press, and Dr. van Someren has not seen proof on it.

It may be added here that Dr. van Someren's East African bird collection of more than twelve thousand specimens is now a part of the Chicago Natural History Museum collection.

AUSTIN L. RAND]

## AFRICAN DARTER or SNAKE-NECK BIRD

*Anhinga rufa rufa* Lacép. and Daud.

Some folk who have had the opportunity to canoe slowly along the fringe of papyrus and ambatch trees at various ports on Lake Victoria will have noted the wealth of bird life: black crakes and jacanas or lily-trotters on the floating water-lily pads; various weaver birds on the fringing papyrus and smaller ambatch trees; cormorants and darters on the taller trees or swimming low in the open water; pied kingfishers hovering over the open water between the patches of the blue-, mauve-, and pink-flowered water-lilies. One such place, near Jinja, teems with bird life: on the rocky islets are cormorants, crocodiles, stone plover, and ringed pratincoles.

Darters are numerous, swimming about or perching on the trees. Though most plentiful on Lake Victoria, darters occur on some of our larger rivers—the Tana, the Sabaki, and the Athi—but not in great numbers. Many years ago my brother visited a large breeding colony at the mouth of the Kagera River in southwestern Uganda. In the months from August to December, hundreds of birds nested in the trees standing in water or at the water's edge. The nests were platforms of twigs lined with finer twigs and some bits of reeds; some were near the water, others were quite high. Some nests held eggs, two or three apiece, others had young in various stages. Adults and juveniles out of the nests perched in the larger trees.

The eggs are elongate and chalky-white, but the shell beneath is pale greenish-white. The nestlings are at first covered with close down, grayish or grayish-brown in color. They grow to a fair size before showing any feathering, and as this comes in they present a curious mixture of down and dark feathers. The neck and breast feathers are the last to come in.

The youngsters are fed almost entirely on fish; a nesting colony becomes smelly and the nest trees are coated with the chalky-white excrement, which has an unpleasant odor.

## GREEN-BACKED HERON

*Butorides striatus atricapillus* Afz.

The nest is a rather frail-looking platform of twigs, rather like a pigeon's nest, built on a horizontal spreading branch overhanging the water. Some of the nests have a few reeds added to the structure. From two to four rather rounded, pale blue eggs are laid. If not suddenly disturbed, the bird sits close with body held low and head held straight out but neck drawn in. If the eggs are well incubated, a disturbed hen returns to them readily. Alighting on the tree, she creeps along the branches very slowly, putting her feet forward one after the other with slow motion; then, coming to the nest, she turns the eggs and sits down.

The birds lie up during the day but hunt in the early morning and late afternoon. They stand on a branch just trailing in the water and with a forward dart of the neck seize a tadpole or fish or insect that comes within reach. At other times they stand by a little pool, watching the surface intently. On the stony Athi, I watched two birds fishing at the little runnels between boulders. Here the little fish (*Barbus* sp.) were passing upstream in dozens, in very shallow water, attempting to get from one pool to another, as the river gradually ran lower and lower. These little fish were very active and slippery, but the herons seized them and held them fast, waited a while, and then tossed them a little, getting the head mouthward, and swallowed them. If a fish wriggled much it was tapped against a rock. Some were still wriggling as they went down. The fish were so numerous that the herons soon had a full crop. They then stood on a rock in seemingly deep contemplation, occasionally wriggling their necks.

## SACRED IBIS

*Threskiornis aethiopicus aethiopicus* Lath.

It is a common sight today in some areas to see dozens of these beautiful white birds scavenging on dump heaps and on the dumps of rotting sisal waste. They come to these places for the beetle larvae (*Oryctes*) that occur in thousands there. The sacred ibis also occurs a distance from water on open plains, sometimes after a fire has burnt and scorched the helpless ground insects.

The sacred ibis feeds on insects, crustaceans, small molluscs, and some vegetation. It is partial to frogs and tadpoles; it also takes worms, but these are remarkably scarce in East Africa.

The nest is a platform of twigs lined with reeds or grass and built in low trees by the water's edge or sometimes on rocky islets. During the off-season, these ibises travel long distances; after a short stay in one swampy area they move off to another.



SACRED IBIS AND CORMORANTS

## HADADA IBIS

*Hagedashia hagedash* Lath.

One finds the hadada ibis quite often by temporary swamps and rain pans as well as by lake and river, sometimes in small flocks of a dozen but more often in pairs. I have seen them feeding on water insects. Though they are essentially water-birds, I have seen them on open meadow and plain where caterpillars or other insects attracted them; and near places where cattle drink, I have seen the birds breaking up cow pads and taking larvae and scarabaeid beetles. Nowadays, one sees them on the large sisal-waste dumps in company with the sacred ibis, for here they find numbers of beetle larvae among the rotting waste.

They nest in single pairs, here and there along the rivers and in the small trees in papyrus swamps by the edge of the lake. A few nest not very far from Nairobi.

The nests—large bulky platforms of twigs with the depression lined with a few bits of grass or seeds—are usually rather inaccessible, being placed well out on an acacia bough; if in low trees they are well hid by reeds and vegetation at the water's edge. Incubation lasts three weeks. The young are black and naked but for slight woolly down on the neck and back.

## EGYPTIAN GOOSE

*Alopochen aegyptiacus* Linn.

In East Africa the Egyptian goose is common enough on most of our larger lakes, swamps, and rivers, and quite a few now frequent the many expanses of artificial waters resulting from dam construction. The birds are commonest on the lakes and swamps of the Rift Valley. They spend the hours of day in pairs and small flocks on some sand spit or mud flat or floating island, preening or dozing. At least one bird will be on the alert, ready to give warning should anything untoward appear.

The geese begin to move about in the late afternoon, and just before sunset they take wing to open patches of grassland, where they feed on herbage and grass seed. The evening flight may take them some distance. Once dependent solely on wild fodder, they now visit wheat and barley lands while the crop is still short and when the grain is in ear. A large flock of several dozen birds will do considerable damage to a crop. I have frequently watched a bunch of geese walking slowly over a patch of seeding grass. They walk abreast, six or eight perhaps, systematically stripping the seed-heads as they progress slowly along. They are wary birds and even

when feeding are always on the alert. After a night's feeding on the grasslands there follows the return flight to the resting grounds.

Mature birds split up into pairs at the nesting season, the time of so doing depending on locality. My nest records applicable to Kenya and Uganda cover most months of the year, but in the Kenya Highlands most nests have been located from February to July, and from October to December. I have found nests in a variety of sites: on a rocky islet; in a cliff face; in an eagle-owl's, a vulture's, and a fish eagle's nest; on a grassy islet; on a river bank; and in a reed-bed. The Egyptian goose is an excellent tree percher and it is no surprise to find the birds nesting high. Six to ten cream-colored eggs are laid in a nest made of grass and reeds lined with a thick layer of down from the female bird's breast. Incubation lasts a month.

When the young have been taken to water, I have frequently noted them in company with the parents, just a single brood at first; later on, when the youngsters are feathered, though still unable to fly, one will often see a group of goslings under the charge of an adult or even subadult, and the number will indicate that two broods, if not more, have joined up.

## SECRETARY BIRD

*Sagittarius serpentarius* Miller

The secretary bird is found from the Cape to the Sudan but not in heavily wooded or forest country or mountainous regions. Its habitat is the open grasslands or veldt, where there are scattered trees; in fact, the sort of country inhabited by "plains game": wildebeeste, hartebeeste, gazelle, zebra, and giraffe. Here in Kenya, these quaint birds are a common sight around the great open plains. They are usually in pairs, the pair not necessarily close together (the two birds may be half a mile apart), for each bird hunts on his own. They stride about the grassland and cover a considerable distance in their search for ground prey. All their food is taken off the ground and consists of snakes, lizards, rats, locusts, grasshoppers, beetles, and, sad to say, nestling birds and cheepers and, to my certain knowledge, plovers' eggs. Thus, while they do a great deal of good in dealing with ground "vermin," one has to put a black mark against them for destroying a certain proportion of "cheeper" game birds and other ground nesters.

A bird on the hunt will now and again dart this way and that, often quickening his steps to a run as he pursues a victim. The run is frequently zigzag and is accompanied by a raising of the wings and an alternate beating of them groundward. This wing action is calculated to

confuse the victim and bring him to a crouching or stand-still position; then a foot is thrust forward and the victim is pinned to the ground. Rats are hunted thus. When the bird is hunting snakes, the wing play is intended to confuse the victim. The wings are also used as a defense when a snake turns and strikes; the impact is taken on the outspread primaries. The capture of a snake may take quite a while, and the antics of the bird are most interesting and sometimes amusing to watch. When the opportunity to strike the victim arises, a foot is suddenly thrust forward and the snake is pinned. As it wriggles and squirms the bird holds his body well back; with wings outspread he is ready to clip the victim on right or left should it wriggle free. Once a snake has been pinned down with a foot, it seldom gets away. At an opportune moment the bird bends forward and seizes the snake behind the head. It is then lifted and battered on the ground. When rendered quiescent and flaccid by these tactics it is manipulated so that the head is held toward the captor and the snake is swallowed whole. I have more than once witnessed the tackling of a rather big snake—a cobra more than four feet long—which could not be rendered flaccid by beating. Holding the wriggling and twisting snake behind the head the bird takes wing; taxiing along the ground for a distance it rises, and circling high, lets the snake fall from a height onto hard ground. Stunned with the fall, the snake lies wriggling. Then it is tackled again and beaten to death. This dropping of the victim from a height is not without untoward incident on occasion, for I have witnessed a harrier eagle swoop down and carry off the snake ere it touched ground. The secretary bird is no match for the harrier eagle's superior speed and ability to maneuver. In my account of the tawny eagle I have recorded a combat between a tawny eagle and a secretary bird over a puff-adder. That was a noisy show, eagle and secretary bird screaming at one another.

Although the bulk of food searched for and taken is in a live state, yet at the time of grass fires it is usual to note secretary birds patrolling the burnt-off areas in search of half-scorched rats, snakes, lizards, beetles, and large moth larvae (saturniids). Usually immaculate in plumage, these birds become soiled by the charred grass and vegetation; their yellowish-gray legs become blackened and their orange "faces" smudged over. But this is only temporary, for by preening and ablution—I have seen them bathing in a rock pool—their plumage becomes immaculate once again. Wear and tear to plumage occurs and is most noticeable when the elongate central tail feathers become frayed and the black ends break off.

There are several pairs of secretary birds in the great game reserve to the south of Nairobi, and for many years I have located their several nests.





## SECRETARY BIRD

Male regurgitating food for the young in the nest at his feet

Such are not difficult to find, for although a pair may have a wide range they keep to a given area year in, year out.

One soon becomes acquainted with the range of a pair (I believe they mate for life) and soon learns the sort of trees on which they build their nest. They mate in the early spring—April or May—and nest-building commences soon after; one may be fortunate enough to see the birds carrying twigs. The nest will often be found in a comparatively low acacia or other thorny tree, from 10 to 24 feet above the ground. A nest of the year will be constructed of twigs to form a saucer about 24 inches across and 9 inches deep, with a platform roughly 9 to 12 inches around the edge; the inner lining is of grass and a certain amount of felted fur. But since these birds often use the same nest year after year (if they find the site convenient and are not disturbed), the structure of the nest becomes considerable, for each year fresh twigs and lining material are added and the circumference of the nest assumes an ever-increasing proportion. Some old nests that are still maintained may be six feet across and capable of holding the weight of a heavy man.

At one nest I watched, just before the eggs were due to hatch, a grass fire swept the hillside, scorching the nest tree and partially burning the

nest. Needless to say, the birds had vacated the nest at the oncoming blaze and they deserted it.

In June of 1948 another nest was selected for photography. It was at the top of a 25-foot tree thickly overgrown with thorny *Capparis* and *Gymnosporia*. The nest had been occupied for several years but had not assumed colossal proportions.

I decided to work from a "car-hide." Mention has been made that the secretary birds pair up in April or May. Many raptorial birds are reported as "dry-season nesters"; many are, but in a number of cases the urge to mate comes on in the early part of the year but the eggs are not laid; thus the young are not hatched, owing to a very long incubation period, until the dry season is well advanced. In the case of this pair of secretary birds, the eggs were actually laid at the beginning of June. The hen sat steadily and closely for over 46 days, and then two young were hatched. There was a third egg in the nest but when this was examined it was found to be nest-soiled and cracked and addled. The usual clutch is two, and it is assumed that this third egg was a leftover from the previous season, for we had noted only one young of the previous year in company with the parents. This youngster, by the way, had a broken leg and kept within the range of its parents. This is a point of interest worth interpolating here: it often happens that when one closely observes a nesting pair of raptorial, a third bird is noted as associating with them; this party of three is made up of two adults and one of the previous nesting season (cf. accounts of tawny eagle and hooded and African vultures).

The usual call of the adult secretary bird is a full-throated "ōō-ōk-koc" or "ōu-ōr-kok." One may hear it as the birds occasionally call to each other as they hunt in widely separate parts of their range. The call of annoyance or defiance is more drawn out: "uūū-ōōōrr"; that of surprise and fear is more rapid: "ou-ook ou-ook."

The secretary bird feeds its young by regurgitation. On arrival at the nest side, the adult commences to regurgitate, and bending over the outstretched and open mouth of the youngster, trickles into it semi-liquid and liquid predigested or macerated food. On occasion a large mass is brought up. This is deposited on the side of the nest. More liquid food is trickled into the open maws of the chicks and when another large bit is regurgitated, it, too, is placed on the side of the nest. When the feeding is over, the masses are re-swallowed. With the help of binoculars, and even with the naked eye, one can recognize these large portions as whole rats or partially digested ones. On one visit by the male bird, three whole rats and two partially digested ones were brought up, and much semi-liquid food was fed to the chicks. Regurgitation and the giving of pre-digested or macer-

ated food to the young is analogous to the feeding methods of vultures and young.

The uninterrupted feeding process of a visit may last from 15 to 20 minutes. The parent bird then tidies up the nest, bills the chicks, and sits at the edge of the nest or broods the young for half an hour or so. While the young are being fed, the one not being attended to makes a low "oōū-aa" or "oū-eer" call, oft repeated; the one being fed utters a low "uu-er" of satisfaction. The brooding spell over, the adult takes wing and drops to the ground, re-commencing his patrol for more food. We have been unable to keep observation for a whole day—dawn to dusk—because the nest is far distant from our abode, but we have noted the following: 9-9:30, one adult feeds young, then goes off; 12-12:30, another visit; 2-2:30, a third visit; that is, a periodicity of 2 or 3 hours, the visits being made by male and female alternately.

Between feeds, the chicks sleep or preen themselves. They move about the nest depression on their "haunches"; with legs bent, they propel themselves on the pads of the "knee" (tarso-tibia) joint, the tarsus held up to the semi-upright breast. When another feeding becomes due, the youngsters become restless; they move around and stretch their necks to the full and look around. If one of the parents can be seen striding about the veldt the chicks then become impatient, and they voice this by a curious "sucking" sound—"schuch"—oft repeated. Presently the parent will show signs of wishing to come to the nest. He or she then faces the nest, takes a few steps, shakes the wings, then, running or "taxiing" along the ground, gains buoyancy and in a wide sweep comes to the nest "up-wind" and alights on the side of it, to the accompaniment of "chu-er" calls from the expectant chicks.

When we commenced photography at this nest, the chicks were just three weeks old. Their size was about that of a young pullet, and they were covered all over with close down, ashy-gray in one youngster, lighter gray to whitish in the other; the crown feathers were gray, with a dark patch on the nape; the sprouting crest feathers were already showing plainly, and there were a few whitish feathers on the foreneck. The face was bare and yellowish-orange, the bill grayish-yellow with darker tip, the cere yellowish; the legs were brownish-pink, and the eyes dark gray. A week later, the face coloring had intensified to almost an orange; the bill was more yellowish; the top of the head was completely feathered in dark gray, and the crest feathers, now three inches long and set fanwise, helped to break the continuity of head and body as the chicks lay flat in the nest. Neck feathering was more plentiful, especially on the front. The wing quills were black and showing for over an inch; the tips of the feathers were just out of the quill.

On the occasion of our first spell in the "car-hide" we witnessed an incident worth recording. Down in the valley below the nest site, a pair of red-tailed buzzards were flying around, uttering their familiar calls; occasionally one or the other might fly up the hillside and over the secretary bird's nest, but little notice was taken of it. During the morning a young tawny eagle dove in sight and after gliding up and down the valley it came up-wind low, toward the secretary bird's nest; the chicks crouched and uttered a fierce chorus of sharp "chuck" or "chuckor" calls, and as the tawny came level with the nest, the male secretary bird came sweeping up and drove the intruder off. Perhaps I malign this tawny in thinking he might have tried to take a chick, but I know of one instance in which a tawny eagle, having to provide food for his offspring, took a young black-winged kite from its nest and up to his eyrie.

When the secretary bird's nest was first inspected on June 20, it held three eggs, and the nest was lined with sparse grass and fine twigs; but when the chicks were hatched and the nest examined it was heavily lined with dry grass tufts; some were even felted down. The adding of this new material finds its counterpart in the case of other raptorial birds who add fresh green foliage and leafy twigs to their nests just before the eggs hatch or when the young are very small. I have noted in the case of other birds, not only raptorial, that plucking twigs and foliage, picking up feathers, bits of grass, etc., and bringing them to the nest are indications of nervous reaction under observation.

We had a similar evidence in the case of the secretary bird. Unfortunately, we were unable to have a permanent hide at the nest and the "car-hide" was removed after each visit. Although this particular pair of secretary birds were amenable to interrupted observation, they evinced some nervousness. They tolerated the presence of the car, but not movement of humans at or near it. When the car was "set" for a day's work, the first bird to approach the nest area evinced nervousness. This took the form of a walking circuit round the car and nest tree, at about 50 yards, and at a certain point from which the take-off usually took place, the bird would stoop and pick up a tuft of grass, toy with it and let it fall or even walk about with the grass tuft held in its beak. It once took a large tuft of grass from within 20 yards of the car and carried it to the "take-off" stance, where the grass was dropped. I refer to a "take-off" stance because, after observation, we have noted that the birds almost invariably commence taxiing from one spot and when airborne swing round to face the wind and fly to the edge of the nest.

I have always been interested in and have taken note of the various birds that visit the nest tree of raptorial birds. In many cases the visit is acci-

dental; in others deliberate; in some cases there is a definite association between a raptorial nest and associated nests of other species. Thus, we not infrequently find a cluster of weaver birds' nests below an eagle's or a vulture's nest. But this is rather different from casual visitors. To this particular secretary bird's nest there came daily two pairs of flycatchers (*Bradornis* and *Batis*), a pair of tits (*P. albiventris*), a warbler (*Apalis*), a pair of bulbuls (*Pycnonotus*), a cossypha, and a dove. A sunbird alighted on a twig by the nest, scolded, and went off. Not all of these birds visited the nest; those that did just looked in, twittered, and took no further notice. There is the possibility that insect life would be more abundant in a heavy tree, shady partly because of natural thick growth and partly because of the nest structure, but one cannot altogether rule out the presence of insects directly connected with the decaying twigs, the lining and the accumulation of food debris in the nest, and the attraction which the excreta of the young birds would have for certain forms of insect life. The nest itself was clean, but the accumulated mass below is to my knowledge productive of much insect life.

Up to August 17, only semi-liquid food had been given, yet the youngsters were now feathering fast and able to sit up, but not to stand. Their first efforts at standing were noted on August 23. They were very wobbly and sat down almost immediately. There was no mistaking their identity now, for the general scheme of plumage was very like that of the adult; even the head plumes were well grown, but the gray coverts of the wing were tipped with rusty brown.

A week later, both youngsters were well advanced and filled the whole of the depression of the nest, for their body-bulk was nearly that of an adult. My next opportunity to visit the nest occurred on September 18; it was empty, but judging by fecal matter and food remains it had not long been vacated. This gave a nestling period of about two months. The parent birds were not strutting about their usual hunting grounds, but far across on the opposite side of the valley I saw three birds.

## TAWNY or WHITE-NECKED VULTURE

*Pseudogyph africanus* Salvad.

The tawny or white-necked vulture is quite the commonest of the group, in this area. The nearest eyrie was in a forest reserve not far from my house, in a straight-boled tree branched only near the top, where the trunk divided in two and branched again, the crown forming a double canopy over the cleft.

It was here that I found my first tawny vulture many years ago; the following year the nest was occupied by a buzzard, to be succeeded in each of nine years by pairs of vultures (they may have been the original pair), each adding more material to the structure until it became an immense pile nearly five feet high, in the first fork of the tree. Planning to study the nest, I found it occupied by the vultures again (August 3). An adult bird was standing on a small branch by the nest, and in it, or rather on top of it, was a huge youngster at least two months old. I made a hide in an adjacent tree and entered to watch the nest. No parents turned up, so I amused myself by noting the visitors to the vultures' nest. A dove came along and alighted near its edge, looked the young vulture over and departed. Next came a green tree-lizard. It climbed the tree and disappeared into the body of the nest; then it came out on the edge, where it sat in the sun alongside the vulture and snapped up odd flies that came to feast on the bits of food lying around. That lizard was in attendance each time I was in the hide. A *Charaxes* butterfly fluttered up to the nest. It had scented the decaying food and as these nymphalids feed largely on animal droppings and can be attracted to bait of decaying fish or fowl entrails, I was not surprised to see the first arrival joined by two more.

I could smell the nest from my hide, although it was nearly fifty feet off, for the wind was blowing from that direction. In the afternoon a yellow-vented bulbul visited the nest.

In the canopy of the tree some eight feet above the nest, a pair of weavers (*Ploceus insignis*) were busily constructing their own nest. Between spells of coming and going with tendrils and bark fiber, the birds, especially the male, often hopped to the edge of the vultures' nest and twittered to the occupant, then went about their nest-building operations. To all these visitors the young vulture paid no attention. He was sluggish and hardly moved at all; once or twice he raised his head, only to let it sink again; once he stretched a wing, but this was the only sign of life in him. As this was his behavior on each occasion I visited him, I wondered how it was possible for the feathers on the lower surface of the body to grow.

I was in the hide by 9 o'clock the next morning, but the young bird had already been fed. The "caw" of the white-bellied crow was heard coming



TAWNY or WHITE-NECKED VULTURE

Male above nest

nearer and nearer, and then two crows alighted at the nest, picked up portions of the food, and flew off, "cawing" loudly. Until 2 P.M., when I left, the adults had not appeared.

After a lapse of three days I was at the nest at 8:30 in the morning. The boy sent ahead reported that the birds had been at the nest for nearly an hour after he arrived, but they had gone off and apparently had not fed the youngster.

My expectation of a visit ran high; I longed to witness these huge birds with the enormous wing span come sailing up to the nest. At last they

sailed high overhead and disappeared; there was another long wait and then I saw the male landing on the far side; he had come through a gap in the trees. I watched him disgorge a mass of food which the youngster picked up and swallowed. After a short time he sailed away.

The female came at last, flying high; making a big sweep she dropped to the nest. She stood on the edge of the nest and regurgitated slowly, not in one mass as the male had done. Having fed the youngster, she pushed her way across the nest to perch on a branch. She did very little except stand in one position from 11 A.M. to 3 P.M., except that she scratched her neck once.

The youngster had livened up a little at the arrival of his mother. He had given a slight squawk to her throaty croak as she landed, but then he had become lethargic and flopped, in complete boredom.

I visited the hide two days later. The hen was at her perch by the nest and made off. I settled to watch. In an hour's time she circled in and pitched on the nest, wings held high and fully expanded; a moment afterwards the male landed at the nest with another bird, both of which soon left. The hen regurgitated food, stood for some time, then left.

Another nest, 500 yards away, was found, and a treetop hide constructed. There proved to be only one young in the nest, about six weeks old—rather old to require much parental attention except in the matter of feeding. Two days later, after climbing the 80 feet to the hide, I didn't have long to wait for the parent birds. The male arrived first, followed almost at once by the female, who lit and then scrambled up the nest edge with wings half open; then she regurgitated a crop full of food onto the side of the nest. The youngster, crouching down in front of her, picked the meat up bit by bit, then sank back into the bowl of the nest. The male soon left; the female perched until noon, then left, and neither had returned by 5 o'clock. On a number of occasions three birds were seen at one nest, and perhaps more than three individuals were concerned. The great differences in color with age, up to four years, make it possible to distinguish some individuals. Possibly there was visiting between the two nests watched, but the relationships are still only conjecture.

At both nests the young were seen to take their first flight; in one the young bird was found sitting on a branch near the nest flapping its wings and two adults were croaking to the youngster and encouraging him. Presently all three had flown away over the valley. At the other nest, as I approached, the two adults flew away, and the youngster, after hesitating a while with partly opened wings, took the plunge and with outspread wings sailed out of sight.

These vultures lay a single large white egg, usually immaculate or with rusty smears, with a dull surface, averaging  $88.5 \times 67$  mm. in size. The



same nest may be used year after year, after it has been reconditioned by the addition of twigs and some green leafy branches, usually in May or June. The eggs are laid in July or August. Some birds nest later in the year and eggs may be found in January. Both sexes incubate during a period of 45 days and the nestling period is four months or more.

### LAPPET-FACED VULTURE

*Torgos tracheliotus nubicus* Smith

Among the groups of vultures squabbling over a "kill" or just standing around the bare skeleton of what was once an animal, one may note dark birds with fleshy red and white bare heads standing bigger than any others in the throng. These are the lappet-faced vultures. They stand rather aloof from the rest and appear more dignified. They are in the minority, and one seldom sees more than four or so at a kill. These birds are often seen, just one or two, perched on the top of a tree or standing on the ground. They are quite unmistakable and are rather shy than most.

I have only once located their nest—a large stick structure at the top of an acacia, about 35 feet above the ground. Below the nest in the surrounding branches were numerous weaver birds' nests (*Ploceus spekei*). The nest was being reconditioned and the bird was seen carrying fresh twigs to it. Unfortunately, I was not able to follow up the history of this nest, for a grass fire swept the area and when the flames scorched the tree the birds moved off.

### WHITE-HEADED VULTURE

*Trigonoceps occipitalis* Burch.

In the Southern Game Reserve, on a ridge called Feather Hill, where the vultures and marabous come to preen, in past years I had located a few white-headed vultures at their nests. Some of the nests were re-occupied year after year, so I did the round of the trees and found one nest reconditioned and holding a single large egg, chalky-white with just a few brownish smudges, measuring 84 × 66 mm. A week later the egg was found to be just hatching, and the hen had left the nest as we drove up.

Next morning, after I had watched for two hours and nothing had happened and there was no sign of the parent birds, I grew suspicious. A flock of starlings alighted in the tree, and their calls became excited as they hopped about the nest. There was no protest from a sitting vulture, and the starlings seemed to be pecking at something. I drove the birds off, ascended



WHITE-HEADED VULTURE

Female dropping down to nest

the tree, and found the nest empty except for a downy white chick lying stiff and dead—squashed in the bottom of the nest.

Next year I again visited this area and found a nest, occupied in most years, holding a clean fresh egg. The hen had left her nest on my approach but returned to it almost at once when we vacated the spot. After the hen had sat for 43 days I prepared and entered a hide. The two vultures had been soaring round and round high up in the air; then one of the birds dropped in a great curve, and came sweeping toward the nest. She stood on the branches by the back of the nest for a little while, then walked across the intervening twigs to the nest. Here she settled down and brooded.

The nest was a large structure made of thorn twigs lined inside with finer twigs, bits of reed and coarse grass stems, and numerous sprays of

acacia seed pods. As the nest had been added to year after year for at least six years, during the time I had known it, it was now fully three feet from floor to base and equally wide.

We came back in two weeks, but on arrival no bird flew off, nor was one seen sailing high round about. My boy climbed up to the nest and found an egg half covered with the nest lining, soiled and cold. The egg proved to be infertile. This, then, was a second disappointment with this species.

We visited another nest about five miles off. It was in a solitary tree about 30 feet up. As we came to the spot an adult white-head rose and circled high, to be followed almost at once by a fully grown youngster strong on the wing. The difference between the two was marked, for the young was wholly dark brownish-black even to the down on the back of the head, but the head was of that peculiar triangular shape when seen in profile.

The species is one of the least common of the several vultures of the area, and far less sociable than the others. When vultures are at a kill, it is a late arrival and hangs around the outskirts of the crowd, but when the others have gorged and are standing about in groups, it comes in, and may still be about the spot when the rest have gone.

I have heard no note or call which I can ascribe to this bird; one often hears a babble of grunts, screams and other noises as birds quarrel over a carcass, but it is difficult to say which bird makes any particular call.

## EGYPTIAN VULTURE

*Neophron percnopterus* Linn.

I have found no evidence of nesting in this area, but young of the season are often noted and they have probably been reared somewhere in the neighborhood, perhaps on the cliffs of Lukenia, where I know that one pair has nested.

On the rare occasions when I have seen more than half a dozen birds together, they have usually been standing around a bare skeleton or patrolling an area of grassland that has recently been burned off, where there is a chance of finding scorched rodents, snakes, and the like.

## HOODED VULTURE

*Necrosyrtes monachus pileatus* Burch.

Wandering through my forest sanctuary toward the end of May, in 1938, I noticed that a new and extensive nest had been built in a large tree overlooking the tops of the surrounding growth. "Jane," as I called her, a hooded vulture, proved to be a joint owner, along with an elusive mate who was seldom at home. She was shy, but when the nest was complete and held a single large white egg faintly streaked with brown, I put a hide in a near-by treetop. Jane did not seem to resent the close proximity of a treetop abode, so several days later, on a Saturday in mid-June, I scaled the makeshift ladders and went into the hide with cameras and binoculars.

Jane was not at home but after an hour or so a swish of wing announced her return. She must have been somewhere in the treetops when I took up my position, for she hesitated for more than an hour to alight at her home and when she did so, she came in by a back way, and settling down on her egg she hid her head behind the trunk of the tree supporting her nest. Two hours went by and she remained "glued to" her treasure. The light fading, I left; next morning I found that the treetop with my hide in it had collapsed.

The following week I put up the hide on the topmost branches of another tree and on Sunday I paid a call at the nest. Jane was not at home and the nest was empty. This was a blow. Some marauding monkey<sup>1</sup> or crow must have stolen her treasure, and Jane had vacated.

In May of 1940 two vultures were noted circling over the forest; they moved with hardly a wing beat and finally disappeared into the "blue." They were seen several times in June, but it was not until the end of that month that investigation showed that the old home had been partially renovated. On the fourteenth of July the birds were seen to pair, after which they flew over to the vicinity of the nesting tree. The nest was now heavily reinforced with more branches and was a bulky structure with a deep saucer-shaped depression in the center.

On July 21 the single egg was laid, and from that day on, Jane seldom left the nest. She sat close and was fed by her mate early each morning. At about noon she went off for a while but her place was taken by the male. On her return within an hour or so, the male departed and did not appear again until late in the afternoon, when he regurgitated food for his mate.

<sup>1</sup> I saw a Sykes monkey take an egg from another vulture's nest and, having broken it and swallowed the contents, throw the shell to the ground.



### HOODED VULTURE

Alighting in nest tree

On August 31, I went into the hide. Jane was sitting and took no notice. I took several photographs as she brooded, then sent my watcher to put her off the nest. She was loath to leave, but eventually she sidled along the branch to the side of the nest for a few feet. When the watcher descended the tree, Jane returned to the nest and brooded.

When she was sitting her bare head was whitish, a pallid bluish-white, but when she was put off her nest and stood a few feet off, her bare skin turned pink, then red, then mauve; in fact, she can be said to have "blushed furiously," in response to her agitation. "Blushing" is an apt expression, for on several occasions she was noted to color up whenever the male bird passed overhead or alighted near by.

The egg hatched on the seventh of September; thus the hen had brooded for 46 days. The chick was covered in close gray-brown down except for its bare head and upper neck, which were grayish-pink.

Close watch showed that the hen did not leave the nest for a whole week. She merely moved to the side of the structure when the male arrived and

regurgitated food onto the twigs alongside. She then swallowed the food, and regurgitated small portions, which she held in her bill until the chick took them. The male seldom remained more than sufficient time to deposit a meal; then off he went to a tree close by, to pass farther afield in a few moments.

When 14 days old the youngster was still down-covered, with pallid gray and pinkish head and neck; in size it was about equal to a full-grown pigeon. It was capable of raising itself on its "knees" and flapping its wings, from which sprouted the flight quills in a series of spines. When the mother left it for a few moments the youngster made a low squawk, to which the parent replied with a hoarse croak. At three weeks dark brown feathers appeared on the back, and the tail feathers were noted as growing fast. The breast was still in down, the abdomen bare. At this time the mother was reported by my watcher as leaving the nest between 8:30 and 9 A.M. and returning about an hour later, leaving again about 2 P.M. for the same length of time.

Weekly visits were made to the hide and observations on growth of the chick recorded. By the end of October the youngster was feathered well and about the size of a well-grown cockerel. The hen bird still sat alongside him in the nest. It was not until the offspring was nearly three months old that the parents left him for any length of time. By now, he was well feathered but still sluggish, like an overfed pup. It was not until mid-December that he started to be active and move about the edge of the nest onto the adjacent branches. He was then almost the size of his parents, slightly darker in color, with the head and upper neck a dirty bluish-white with dark down on the neck and sparse down in patches around the ears and cheeks. The crop patch was brown mottled with white.

He took his first flight from the nest on January 10, 1941, about four months after hatching. Thereafter he was noted as circling around with his parents and going off with them on their hunt for carcasses and offal, returning to the nest to roost. By February he had departed for good; the parents were frequently noted around the forest just at roosting time, but during the day there was no sign of them.

In late May of this year, 1941, the birds returned and were seen carrying sticks to the nest. The structure was tidied up, added to, and generally renovated; a single egg was laid in early June. By this time Jane and I had become very well acquainted. She would not step aside if I wanted to examine her egg; she just sat tight, allowing me to put my hand on her back.

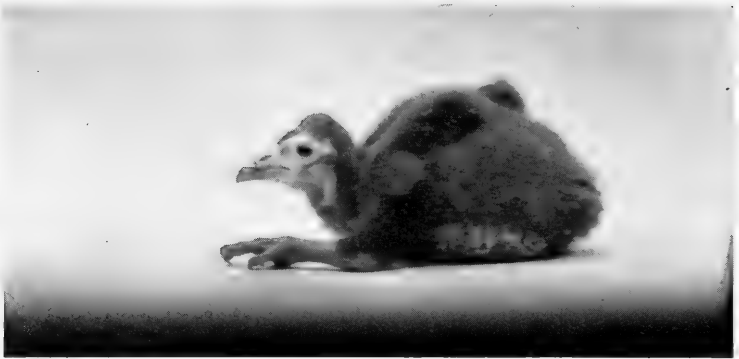
I then decided that a span of 50 feet between Jane and myself might be reduced somewhat. There were no trees close by, so I put up a hide on a giant tripod nearly 55 feet high. I could now look down and into Jane's



HOODED VULTURE

domain from a distance of about 20 feet. She exhibited no resentment; in fact, throughout the two days of erecting the structure, while the workers hammered and shouted, she sat tight on her egg and dozed.

Jane and I are now close friends; I have photographed her in all manner of positions—approaching the nest with outspread curving pinions, landing, folding her wings, sidling along the branches to her nest, at her nest, and brooding. Her response to go into action so that I can photograph her is to blush up to a rosy red, and pale at the idea. One thing we are in full agreement about: treetops are not spots immune from the attention of mosquitoes. Even in the bright sunlight these pests hummed and buzzed around; they worried her as much as they did me, perhaps more so, as she could not cover her bare head and neck with a cloth or apply a repellent. She indicated her annoyance by vigorous shakes of her head, twitching and wrinkling her skin, and scratching.



### HOODED VULTURE

A week-old chick

Jane, like other Raptores, was meticulous in furnishing her nest with fresh green foliage each day. Sprays of mistletoe were her favorite garnishing, and like the buzzard she often broke off a spray, toyed with it, brought it to the nest or dropped it, when agitated. I believe this trait of plucking a spray and dropping it is the result of nervousness and agitation, an effort to do something in connection with her nest and its protection. I have noted that some of our plovers will pick up bits of twig or pebbles when approaching the nest and will lay them round the nest; some species will attempt to bury the eggs farther in the sand.

Jane and her mate have roosted in my forest for many years and with the exception of one season when a young one was lost have raised one youngster in the reconditioned nest each year for seven seasons. The nest has been put into repair about the end of May, and the egg laid toward the end of June. When Jane had hatched her chick in 1944, I thought it would be a good idea to keep a record of the chick's growth and increase in weight and accordingly arranged to weigh him each week. The nest tree was easily climbed, and week after week the youngster was let down from the nest in a "kikapu" by a cord, weighed, examined, hauled up again, and replaced in the eyrie. The chick made no objections and the parent merely flew into a tree near by and watched proceedings, returning to the nest as soon as the youngster had been returned.

The youngster that was lost I had watched from egg to full feather. I saw it take its first short flight after sitting on a branch of the nest tree for several days. The parent birds sat in a tree about thirty yards off and were croaking to their offspring, encouraging it to take wing. They sailed past the branch where it sat, and as they passed, the youngster spread its wings



and made as though to fly; but it just didn't have the courage to leave the branch. Then at last it flapped and flapped and got clear of the tree-tops and went circling with its parents for just a round of the forest. Then it came back to the nest tree.

Three days later when I was patrolling the forest I noticed a dark object about halfway up a medium-sized tree. It was a young vulture, hanging head down, with wings outspread; one leg was free, but the other was wedged tightly in a narrow upright fork of the tree trunk. The youngster was dead! It must have lost its footing when attempting to alight, and falling downward had caught its foot. The more it struggled, the tighter the foot became wedged. What a ghastly end—starved to death in that horrible position!

I have often wondered what became of Jane's youngsters. After a month or two in association with the parents, the youngsters simply disappeared, but where to? I could only think that they joined up with one or other of the odd groups of hooded vultures that frequented the plains and the slaughter house on the outskirts of Nairobi.

Jane and her mate always roosted in my forest, and another pair frequented and nested in an adjoining patch of forest. Toward the beginning of April four vultures came to roost in my sanctuary. Two I knew were Jane and her mate, for I had seen them renovating their nest; but the other two were strangers. Was one of them a youngster of Jane's? I watched this second pair and found that they, too, were breaking off twigs and carrying them to the east boundary of the forest.

It was not long before I located the nest. It was toward the top of a *Maba* tree, and had been built by a pair of goshawks. In it they had reared two youngsters, and it was now being enlarged to accommodate the much bigger vultures. It was nearly twice as big as it had been when the goshawks vacated. On the tenth of May there was a single egg in the nest, and the female sat tight. A weekly check was kept, up to the fortieth day; then followed a daily inspection from a tall near-by tree. The egg hatched on the forty-sixth day. The chick was rather darker than usual, more a brownish gray, with the bare skin of the face brownish flesh-color. The eyes were closed.

When the youngster was thirteen days old, we built a hide in the tall tree overlooking the nest. The mother sat by the chick throughout the building of the hide and exhibited the same tranquillity, perhaps even more, than had Jane during a similar period. One or two small, leafy branches partially hid the approach to the nest, so my boy was sent up the nest tree to do the necessary adjustment. The mother sat until the boy was level with the nest, and then went to a tree ten feet off. The youngster made a low "chiu chiu" note as the boy descended the tree, and before he

got to the bottom the mother was back at the nest and was welcomed with a more audible "cheru, chiu chiu cheru."

Three wet and dull days gave the vultures ample time to become accustomed to the hide—not that the mother minded it in the least. I was in the hide early on the day when the youngster was 17 days old. Both parents were sailing high in the sky to the east, but the hen soon alighted on a tree at the forest margin and then flew to the nest.

She wasted no time in starting to regurgitate, and very soon the chick was having a good meal poured down his throat; then more food was brought up and deposited on a patch of fresh green foliage that had been added to the nest overnight. From this more solid material, small bits were given to the youngster. The chick had waddled over to the side of the nest when his mother had started to regurgitate. This was evidently his first meal, and the chick was hungry, for he was not satisfied with what his parent gave him and began to pick up small portions for himself. He once took up a rather large bit, but the mother pulled it from him and gave him a smaller piece. His little crop distended as the meal went on. When the chick seemed satisfied and had sunk into the bowl of the nest, the mother started to swallow what remained and tidy up the nest.

The sun was well up and hot, so the mother changed her position and came to the east side of the nest and sheltered her youngster. The chick made a low "chiu" note and his mother went farther into the nest, fluffed her breast feathers out, and the chick crawled under her. While she brooded in a semi-upright pose, she preened herself thoroughly; then, moving to one side, she turned her attention to her offspring. She ran her bill gently over the down on his back, along the margins of his "flapper" wings; then she nibbled his neck and breast and, putting her bill below him, turned him over on his back and nibbled the down on his tummy. The chick just lay passive and seemed to enjoy the sensation of having his stumpy quills massaged.

When she was satisfied with the chick's toilet, she allowed him to snuggle into her feathers, for shade. She spent the next full hour in just looking about her and gazing down at the chick.

The chick awakened, and waddling about the nest unsteadily, began to make the low "cheru" call. He was hungry again. The mother moved to the nest edge and began to jerk her neck up and down into her breast; then she stretched her neck and brought it down again until the food was forced up. This time the food was not brought up in bulk, but a little at a time, and the chick took it from the tip of her bill. When a larger bit was regurgitated, the mother held it in her bill and allowed the chick to nibble little bits from it. This second meal was a short one.



## HOODED VULTURE

Six weeks old

The mother walked toward the middle of the nest, sat down, and began to doze with closed eyes. But she was alert; the slightest noise from the ground caused her to look over the edge of the nest, and she occasionally looked skyward. On the last occasion when she looked up her gaze remained fixed, but her head turned slightly as though she were following the flight of some bird. I opened a "peep-hole" and saw a vulture far to the southeast, and by the time I looked toward the nest the mother had come to the nest edge and was looking forward expectantly. In a short while, a large bird alighted on a tree back of the hide. The female bent down at the nest edge and then with an upward hop spread her great wings and sailed from the nest, to alight in the tree behind the hide. I turned to a back "peep-hole" and saw the birds sitting together on a bare branch about fifty feet off.

I had again noticed that the normal color of the bare skin about the female face and neck during tranquillity was pinkish-white, but it turned to a rich pink at the approach of the male bird; on the other hand, when she had looked over the nest edge and had seen my dog, she had turned a bluish-greenish-white color. The chick's face now showed a slight pink color.

Flies had begun to come about the nest after the first meal, and they caused the vulture some annoyance, for she often tried to snap at them but with little success. While I was watching this, a lesser honeyguide came to

my hide and looked in at one of the peep-holes. Then he flew to the vultures' nest and caught a fly or two on the nest edge. He showed no fear of the vulture.

I did another four-hour spell in the hide when the youngster was 21 days old. It was a bright morning. The mother was on the nest edge when I arrived, and she watched me climb the ladder to the hide, but she didn't move. She just stood for a whole hour; then I saw her looking westward and soon heard the male come into a tree behind me. The female joined him.

It was another hour before I heard the swish of wings and a bird alighted at the nest. I judged it to be the male because it seemed to have a smaller wing span. Standing on the nest edge, it began to regurgitate. The youngster sat on his haunches, calling expectantly; as soon as a bit of food was deposited, he picked it up quickly and swallowed it. He seemed very hungry. The parent's crop bulged, yet it seemed quite a time before the first lot of food could be brought up; the rest followed easily. The crop wasn't emptied all at once, and the chick was given time to pick up what he fancied after each regurgitation. On one occasion he picked up a big bit much too large for his gape, so the parent took it from him; but as the chick commenced to flap his wings and tried to get it, the parent held it and allowed the youngster to help himself. The meal over, the chick flopped into the nest, with his head lying on one side. The parent tidied the nest and adjusted a twig here and there.

The next spell in the hide was when the youngster was about three months old. He was almost as big as his parents, well feathered and rather darker in color. The down about the head and upper neck was dark blackish-brown, slightly paler on the forehead. There were patches of dark down around the ear openings, around the gape, on the cheeks, and on the chin. The bare skin was pinkish-gray, with redder patches around the eye; there was also a triangular bare patch on the foreneck.

No parents were present when I entered the hide at 8:30 A.M. It was cold and the youngster lay in the nest with head down until the sun grew warm. He then stirred, began to preen, and lay in the nest with one leg outstretched and the wing expanded over it, to sun it. Then he stood up and stretched first one wing, then the other; then he stretched both above the body and preened all over. Occasionally he scanned the skies and once he grew all excited and turned reddish about the face. A vulture came overhead but it carried on to Jane's nest. The youngster stood gazing toward it and looked very disappointed. Tiring of standing, he went to the body of the nest and flopped down. He toyed with the twigs around, then went to the edge of the nest and lay down with his head hanging over the side. It was now about 10 o'clock. The sun was very hot and beat down

fiercely. The youngster slept but was awakened suddenly by the buzzing of a large cetonid beetle which came to the nest. It was followed by another, and the first entered the body of the nest. (These beetles lay their eggs and the larvae feed in decaying vegetation; the beetles were doubtless intent on using the nest for this purpose.) One beetle continued to fly around the nest and the young vulture snapped at it time after time, turning round in the nest to get at it. The beetle eventually settled on the side and worked its way into the structure.

The youngster was now thoroughly awake, and hungry, too. He spied a creeper hanging down above the nest, and its leaves swayed in the breeze. Stretching himself to full height, he tried to grab them, but they were just out of reach. He tried hopping up to them, but overbalanced and almost fell from the nest. The creeper no longer interested him, so he commenced to preen again. He worked methodically along the primaries of both wings, easing off the sheaths from the base of the quills. The wind freshened and swayed the nest tree, and the youngster was stimulated by it. He walked to the edge of the nest, opened his large expanse of wings and flapped vigorously, facing into the wind. Once or twice I thought he would lose his foothold, but he hung on with one foot.

There were more false alarms as large birds flew overhead, but the vigorous exercise had made him tired. He flopped into the nest and dozed. He was rudely awakened by a chestnut-headed weaver, who, climbing tit-like about the nest tree, eventually came to the nest and above it, and while searching for an insect in a bunch of lichen, dislodged it and it fell onto the vulture's head. He looked upward and yawned, then, squatting on his haunches, opened his wings and commenced to preen his breast. The sun was now passing to the west; it was after 3 o'clock and the youngster had had nothing to eat. He stood in the sun with wings outstretched, facing the hide.

An hour later I saw a vulture coming in over the treetops. The youngster, too, spotted the bird, and gazed intently at it. I watched him following it to a tree behind the hide. He uttered his call of hunger. The parent bird alighted on another tree to the right of the hide and then on the nest tree. The large bird deftly "walked" the thin, swaying treetops toward the nest, by keeping balance with partly open wings. Once at the nest, it commenced to regurgitate. The youngster crouched on his haunches with head held low between his wings and voiced his appreciation of each mouthful by a low "whee-uu" note. Fifteen minutes were taken over that meal. The parent flew to a tall tree toward the back of the hide and perched facing the nest. The youngster gazed at her, flapped his wings and called; he was still hungry.

The youngster was enticed from the nest two days later.

This pair has nested in the sanctuary for four years, but they took over a kite's nest in a tall fig tree. They lost one egg by a thieving Sykes monkey, but so far they have succeeded in raising three youngsters.

## AFRICAN YELLOW-BILLED BLACK KITE

*Milvus migrans parasitus* Daud.

The characteristics of attachment to a locality and selection of a fixed site for the nest, so strongly developed in the Raptores and particularly well marked in kites, have caused me to make special note of the nesting of a pair of these birds, on my property, since 1938.

I am assuming that the birds which arrived with marked regularity year after year were the same pair. In this small compact area of some ten acres of forest there are three tall trees, each holding a large nest. One tree has been occupied by vultures (*Necrosyrtes monachus*) almost continuously; another, either by kites or vultures; the third, by kites, crested hawk-eagles or buzzards.

These kites are not resident on the plot throughout the year, but arrive year after year at about the same time. When the dull weather which succeeds the long rains is beginning to break, and the hot season is commencing; when the majority of the lesser birds have long since reared their last broods, and many are in flocks; when grass fires begin to appear in the open veldt land—then one may expect nesting activity among the Raptores. The seasons are fickle; thus, a week or two either way can be reckoned on when one is on the outlook for the arrival of the birds in their nesting areas.

The male has always arrived at the nesting ground well in advance of the female. The year 1943 is selected as typical. On August 28 a male was seen circling over the plot, and in the evening he was noted as roosting in a large, dead tree. For several days he perched on this very prominent stance and from early morning to evening he uttered his characteristic tremulous call at intervals, while perched or sailing in wide circles over the forest and veldt. This continued until the twentieth of September, when a second bird, a female, was seen high up, and the male left his perch and, calling loudly, ascended in spiral flight toward her. The two birds continued to circle round; then both descended to the dead tree but perched well apart. The male called in a low note for minutes at a time, and he circled in flight round the hen several times and again alighted. The female took wing and after circling low over the treetops rejoined the male. There was no evi-

dence of a courtship, and beyond short flights by the male and the low utterance of a tremulous note, which later on I came to associate with coaxing and encouragement, there was nothing unusual in their behavior. On alighting and calling he bent low and swayed from side to side slowly. There was no evidence of pairing that day.

This perching tree was not far off from a tall *muhugu* on the southern boundary which held a large nest occupied by kites between 1938 and 1940 but used by the crested hawk-eagles in 1941. On September 21, both kites were seen investigating this old nest. The male was heard calling throughout the day and early next morning, varying his usual call with the lower one each time the birds came back to the perch after circling around for a few moments. Later, a third kite appeared on the scene. The male flew after him and after chivvying him and calling angrily, chased him off. In the afternoon, only one bird was seen on the dead tree, but at about 4 o'clock the male alighted with a small rodent. He plucked some of the fur off, then, alighting close to the female, offered the gift to her. This was accepted, and while the male perched close to her, uttering his low call and posturing, she ate the rat. Late in the afternoon, toward 5:30, they were seen to pair. They remained in the vicinity for the next few days and were usually to be seen sailing around or perched on the dead tree. It was not until October 9 that I saw them carrying twigs to the nest. This nest was in fairly good repair, but odd twigs were still being brought throughout the next two days.

On the thirteenth, the female was noted as sitting. She was off the nest at noon but was sitting again in the evening. Throughout the fifteenth the hen sat and did not leave the nest even when I walked below the tree; she had evidently started to incubate. During the ensuing days, the male was usually to be seen perched high on one of the near-by trees, keeping guard. He uttered a warning call whenever anyone approached the nest site. I inspected the nest on the twenty-sixth and found that it held two eggs. The hen left the nest only when I was within six feet of it. She circled round and swooped down close, the while her mate called to her with a low, tremulous "whit whit whitchuuu." As she alighted beside him, he bent down and uttered a low "wich-cher-rooro." She returned to the nest as I was descending the tree.

On November 9, I again inspected the nest. One egg seemed near hatching, but the other appeared infertile; it was still heavy. The hen was restless and had left the nest at the warning call of the male. My next observation was on November 13. The two eggs were cold and had apparently failed to hatch. The kites were flying to and fro with nest material but either dropped the twigs in flight or let them fall after alighting on a tree. They were highly nervous, and were obviously aware of my presence. I

left them alone for that day. Next day, I watched from a distant stance and was delighted to note both birds going into the old tree where a pair of hooded vultures had nested in 1934 and a pair of kites in 1941. In fact, the nest had been in use nearly every year by vultures and kites almost alternately. It was now a bulky structure, some three feet across and nearly three feet from top to bottom. The depression on top was shallow and just a few inches deep and thickly lined with all manner of things: bits of paper, rags, hair, a piece of mosquito netting, coir, bits of skin.

On November 19 I climbed the tree and examined the nest. It held two clean fresh eggs, chalky-white in ground-color, one boldly marked with red-brown. The birds were left undisturbed until December 28. Two eggs were still in the nest, one just chipping. (A third, infertile egg was later found buried in the nest lining.) The parents were very anxious and flew in close while the nest was inspected. The female returned at once to brood, even before I had reached the base of the tree.

On January 7 there were two young in the nest, one just over a week old, the other about five days. The incubation period had been about 38 days. We constructed a treetop hide and next day I climbed to it to watch. The chicks were covered in close ashy-gray down, slightly paler on abdomen and neck. The down on the back of the head was long, straight, and directed slightly forward. They lay in the nest, looking helpless, with their heads on one side, as though they were too heavy for the slender necks. The bills were grayish-brown, greenish at the base; the legs and feet were pinkish. The chicks appeared to have been fed and were now sleeping quietly.

The parents appeared at ease. The male alighted on a dead branch above the nest and stood preening and stretching; then he dozed. The female was on a branch a little higher up. They appeared in no hurry to go hunting. At about 1:30 the male left his perch and was back again in half an hour, carrying part of a small bird in his feet. He alighted on the dead branch and called to the female. She came to the branch in response to his low, enticing call: "siio . . . kee kee kee." She took the food in her bill but in transferring it to her feet she dropped it. She made no attempt to retrieve it. Both birds continued to sit on the branch. Later the female went off, returning with a partly plucked fowl chick. She alighted by her mate, who attempted to take the food. She resisted, so he tried to coax her to drop to the nest. He bent low and called softly, but she sat on, holding the chick firmly in her left foot. At last she turned on her perch, dropped off, circled, and tried to drop the chick into the nest, but it fell short and tumbled to the ground. She made no attempt to recover it. I waited another hour, but both birds just sat on their outlook perches, occasionally



glancing down at the chicks. At last the female flew off and I decided to leave also.

Next morning, when I arrived at 8 o'clock, my boy, who had been at the nest for two hours, reported that one bird had left the nest at his approach and the other had perched on a tree fifty yards off; neither had been to the nest. When I was settled in, the perching male bird came to the nest tree and alighted. At 9 o'clock the female returned with a portion of a shrew. She toyed with it for a while, as she sat beside the male; then she ate it, left almost at once, and didn't return until nearly 1 o'clock. This time she held a fowl chick in her foot. She was still nervous, and though the male called encouragement to her, she expressed her uneasiness by transferring the prey to her bill, then to her feet again, several times. Finally she dropped to the back of the nest, stood for a moment, deposited the chick, and flew off. It was now 2:30, so I decided to give up for the day.

Next day at 8 A.M. I was greeted with the news that one young kite had been found at the base of the tree, stone dead and partly eaten. I took up my position in the hide. The female was absent, but the male was perched near by and soon came to his perch near the nest. The nestling sat up on her haunches and preened, but for the most part just lay sleeping or stretching. A tree-lizard basked on the edge of the nest. When the kiteling saw it she tried to grab it in her bill, but the lizard darted to one side. A white-bellied tit came to the back of the nest and took a beakful of felted fur from the nest lining and flew off, returning for a fresh supply shortly after. The male kite, tired of standing, flew off and circled round but came back almost at once to his favorite stance, drew up one leg, sank his head between his shoulders, and dozed. Presently the female came with food, but she was nervous; some time later, encouraged by the male's calls and by his placing a twig in the nest, she brought her prey, a chicken, to the nest, tore up the chicken, fed it to the young, and stood for a while before leaving. I left for the day.

A week later, adopting the previous tactics, I stationed a boy at the nest tree very early on the morning of January 18, and I was in the hide by 8:15. Unfortunately, on my arrival, both adults were in the offing, but the hen went off foraging at about 9 o'clock and the male came to his guard post.

The chick had grown considerably and was now half as big again; feather tips showed along the back of the neck, on the scapulars, and on the dorsum; the secondary feathers were burst for about one-half inch, but the primary quills, though well over an inch long, were intact; all the feathers still retained the down tips. The "egg-tooth" was wearing off. The feathers were ashy-brown with pale tips. The youngster was more ac-

tive than on previous visits, standing up unsteadily on her feet and waving absurd-looking wings about. Sitting back on her haunches she ran her bill up and down the crop region, then out along the wings. As the sheaths peeled off she ate them. She lay in the sun on her side with wings stretched over a leg, and when this side was fully aired she turned over. Then, sitting well back, she exposed her really fat tummy to the warmth of the sun.

Two hours went by, with no sign of the hen. The male stood guard but was showing signs of restiveness; finally, tired of waiting, he flew off. In a short time he returned, carrying a locust in his right foot. He alighted on his perch and ate the locust. The female arrived with a large piece of red flesh, like butcher's meat, but in spite of its being nearly 11 o'clock, and the chick's calling, apparently hungry, it was some time before she fed the young with little bits and joined her mate on a near-by perch. It was now past noon. I waited until they flew away, then descended.

Next morning, thinking to reduce the time between the birds' visits to the nest, I secured an oxhead, smashed it with an ax, and put it in a grassy place 100 yards from the nest. In the hide I prepared for a five-hour watch. Even twenty-four hours had produced a difference in the feathering of the chick; the primary quills were burst, the secondaries were farther open and the coverts were plainly visible. Feathers were now sprouting on the rump, and the tail was more than an inch long.

The male came to his guard post, then went to the oxhead, fed, and returned to the guard post with a bloodstained bill and feet. Finally the female came to the nest tree and at last to the nest, with a large piece of meat. She fed the young on torn-up pieces, and when it would take no more the remainder was placed on the edge of the nest. Soon the chick went to sleep. The female joined the male on his perch and settled to rest, and I descended after a five-hour period of watching.

On January 20, I climbed to the hide again. Both kites were in the offing. My boy told me the oxhead was much as we had left it. The chick was now covered in feathers on the back, and the wings and tail had sprouted overnight. The nest had been regarnished with sprays of olive; there was also a piece of white flannel about a foot square; remnants of yesterday's late meals were there—a skin of a rat, a bone, and a fowl's foot.

There were no signs of the adult birds by the nest for the first half hour, but it was not yet 8:30, so there was ample time. The male came, perched for more than an hour, then left. He had called a warning to the chick as he left, and in response the youngster lay low in the nest, but not for long. She was soon moving about, preening and sunning herself. At last she lay down by the edge of the nest, with one wing stretched over a leg and the head hanging over the nest edge. I have frequently noted that young raptorial love to lie with their heads downward over the edge of the nest.

She awoke suddenly and rose to an attitude of defense. There was nothing that I could see, but she sat with feathers raised and mouth agape. She grabbed an object with a foot, withdrew it and grabbed again, but still I couldn't see what she was after. Then it dawned on me. Just in front of her was a sharply defined shadow of a branch which moved backward and forward as the wind blew. It was this that had caught her eye and made her assume this combative attitude. A cloud came over and the shadow disappeared. The kiteling lay down.

At 10:15 the female lighted on the outlook stance with a small mouse (*Leggada* sp.). She toyed with it, transferring it from one foot to the other, then sat with it tucked under her abdomen behind the branch. The chick called for food, but the mother took little notice. This trait of keeping the food hidden reminded me of the Baganda name for the kite, which literally means "one who hides what he carries."

The male had not returned, and the female seemed reluctant to come to the nest without the usual encouragement from him. Finally he came to his usual stance. In his right foot was a rat (*Epimys* sp.). He gave a low call to his mate and was answered. The male decapitated the rat and swallowed the head, but while so engaged he called softly to his mate. The female responded and presently circled and alighted at the nest. At that very moment the male swung in, placed his larger offering, perched on a branch at the nest side, and was gone. A noise in the hide sent the female away and I left for the day.

I was paying particular attention to the food supplied to the youngster that day. The food in the nest and that brought by the parents consisted of field rats—no tender chickens, for the supply was apparently temporarily exhausted; and no butcher meat. Had that supply also run out? Actually such *was* the case, for I, too, could get no meat that day—all sold out. We deal at the same shop, I from within, the kites from without!

On January 21 I was in the hide by 8 A.M. Both birds were near the nest, so neither had gone foraging as yet. This meant a long wait, unless one of them visited the butcher's shop, which I knew had received a fresh supply of meat. At 10 o'clock the female kite alighted on the left stance. In her right foot was a large piece of meat; the butcher's yard had been visited. She waited, circling and alighting, until the male arrived, lit on his stance with an object hidden under his tail, and gave the coaxing note, to which the female responded. She then went to the nest and fed the young. The male then took a week-old fowl chick to the nest. He had discovered another brood of chickens.

The kiteling did well; she had the whole of the meat, given bit by bit. Then the mother stretched out, took the chick and pulled its head off, swallowing this herself; little by little the chicken disappeared. The

kiteling's crop was bulging; it had expanded as I watched. Odd scraps were picked up and then the mother turned and dropped quietly off the nest.

I left the kites until November 25. When I entered the hide at 8:30, the kiteling had had a very full meal. The remains of a fat rat (*Tachyoryctes* sp.) lay in the nest. I took up a stand at the forest edge to take observations from the ground. At about 11:30 the sun became overcast by a huge swarm of locusts flying in a northwesterly direction. They came over in waves, followed by storks, marabouts, kites, and hawks.

My pair of kites were perched on top of the nest tree, but as the locusts moved down over the treetops they joined the throng. They cruised leisurely through the swarms, catching up in their feet as many as they wished. Some were eaten in the air, a foot being brought forward and the head bent down. They brought many to the nest, and from my observation post I could see them tearing the insects up and feeding bits to the chick. In about an hour the swarms had passed over and the kites came back to their outlook trees. At 2:40 the hen went foraging and was back at 4 o'clock with a rodent. She was at the nest about 15 minutes. The parents were next observed taking another rat to the nest at 6 P.M. The female remained at the nest and apparently brooded. The male was on his usual outlook perch.

Dawn on January 26 was dull, cloudy and chilly, but I went to the nest tree at 8 A.M. The male was back on his stance. The female went foraging. The kiteling could no longer be called a chick; in the four days which had elapsed since my last visit she had feathered fast and grown in bulk and was now only just smaller than the male. There was little sign of down on the head; mantle, scapulars, coverts, and neck were covered in gray-brown feathers with pale tips; the head was paler, but streaked with rufous, the breast was streaked dark and light brown with pale tips; the tail and wings were growing fast and were almost five inches long. The legs were clearer yellow, the bill blackish, the eyes dark brown. She walked around the uneven edge of the nest; then, standing on a branch by the nest edge, she performed her toilet. She was able to scratch her head with a foot without overbalancing. She cleared the bases of the wing feathers of their dried quills and flapped her wings vigorously. The span was considerable—wider than one would have imagined when the wings were closed. The exercise over, she subsided into the nest and dozed.

As the youngster lay in the nest, a bulbul (*Pycnonotus* sp.) perched on a branch above her, and eying the recumbent figure, suddenly dashed at it, then flew off. I was taken by surprise. The bulbul came again, accompanied by its mate, but they perched higher and scolded. The noise at-

tracted zosterops, white-bellied tits, and later wood-hoopoes. This was the first concerted babble of hate I had heard at this nest. The noise suddenly ceased when a shadow of a kite crossed the nest. The kiteling looked up expectantly. One parent had come with food, and I expected the other to turn up presently. The male came and he carried food. Finally the male came to the nest, tore up the "kill," a rat, and fed the young. The male left as the female came to the nest and fed the rat she brought, then the remains of the male's rat, and the scraps from earlier feedings. If scraps were refused, the female ate them. Finally, the kiteling had had sufficient food. The mother stayed in the nest.

The sun was now bright and the youngster wanted shelter to sleep off her meal. She bent down and snuggled beneath her mother's breast. The mother raised herself and puffed out her feathers and slightly opened her wings. Kiteling lay buried in her breast, and the mother relaxed into a half-standing, half-sitting pose. It was the first time that I had seen her brooding the youngster. A full hour went by. The sun was now behind the nest tree and the nest in shadow. The youngster stirred and the kite awakened. Kiteling commenced to preen herself and the mother looked on for a while; then she turned in the nest and slipped over its edge and away to a tree 30 yards off. The male joined her and then they went off northward. I climbed down the ladder.

January 27 was devoted to a full day's observation from ground level. My boy took up his position at the edge of the forest at 6 A.M. The first visit was made by one bird, which brought a large mole-rat. A considerable period was spent at the nest, approximately half an hour. I took over at 8:30. Both birds reappeared at 10 o'clock, each carrying a rodent (*Arvicanthis* and *Lemniscomys* spp.). They both visited the nest, but, as usual, the male left in a short while, having handed over his catch to the hen. She spent some time at the nest. After this, both birds spent over two hours in a tree near by, sunning and preening. At noon, the female flew to the nest and brooded. She was still at the nest at 1:30. At 2:30 both birds had gone off. At 4 P.M. the hen returned with a rat which looked like an *Arvicanthis*. She was joined by the male on their usual stance, and after both had sat for a while, the hen dropped to the nest from in front of the hide and fed the youngster. This meal was soon over and both birds flew west. At 6:30 the hen, accompanied by the male, brought a mole-rat. Observation ceased. Neither the times of arrival nor the food brought showed much difference from that already noted.

I planned a session in the hide on January 28. When my boy arrived at the nest tree at 7 A.M., one of the parents flew from the nest and seemed to have been feeding the youngster. It was 8 A.M. when I climbed into the hide. I surveyed the nest; there was a partly eaten rat (*Arvicanthis* sp.) at

one edge; the youngster was dull and lethargic and undoubtedly had been fed. Both birds circled round until my assistant was out of sight, then came to the nest tree. The kiteling was now in the strongly speckled plumage of a young kite. Her wings and tail were much grown; the former seemed over-heavy, for she kept them hanging half open. There was just a slight trace of down along the sides of the neck and on the pelvic region below the wings.

The parent birds sat side by side on one of the dead branches. In about half an hour the female flew off in the direction of the butcher's yard; the male stayed a while, then he too departed, but he was soon back with a striped rat (*Lemniscomys* sp.), which appeared to have had its hind quarters crushed. No doubt he had picked it up on the road, hence his rapid return. I wondered if he would venture down; but not he. He sat on his perch as though wired on, almost motionless. Then he started to preen. He worked over the feathers of his breast, then each flank; he ran his bill along each long primary, then stretched the wing over the foot holding the rat. He wanted to do the same with the other wing, but naturally over the other leg, but this held the branch and the other foot held the rat. He seemed to hesitate; then he tried to transfer the rat from one foot to the other, but in doing so he dropped it. It had hardly fallen two yards before the kite swooped, turned, and caught it up in the air. It was all done in a moment. A fine piece of acrobatics!

He returned to the branch and held the rat across its middle behind the branch. I have previously referred to this method of hiding the prey; there seems a good reason for it. Kites are notorious robbers, stealing from each other as well as from other birds, and, as a thief, he knows that it pays to secrete his takings. I remember an occasion at the first nest when a robber kite attempted to grab a large rat which the male was bringing to the nest. Evasive action was taken to the accompaniment of angry calls: "piii . . . pi pi pi pip," as male and female drove the intruder off.

The male sat on and there was no sign of the returning hen. He began to pluck the rat; then he decapitated it and swallowed the head. Finally the female arrived in the tree. The kiteling, gazing up toward the mother, kept opening and shutting her mouth; I'm sure it was watering! (I have often noted that young raptorial salivate at the sight of food.) Her whole attitude was one of anxious anticipation. She commenced to flap her wings. The mother came dropping down to the nest. Now the male came to the nest, deposited a rat, and left. The female seized this rat and began to feed the young. Though hungry, the young was particular; if the bit offered was too large, she closed her mouth; if small, the offering was accepted and acknowledged with a low "piu piu."

The division of food took some time, but eventually the skin was inside out. A few pieces were torn off, offered, and taken; the mother swallowed the remainder. She then picked up the remains of the rat of the first meal, but the youngster seemed satisfied. The mother ate it. She looked at her offspring with her head on one side, gave the kiteling a little peck, stepped into the nest, and raised her breast feathers. Kiteling snuggled within and lay down with a squeak of satisfaction. By one o'clock the nest was in shadow and there was no need to brood the youngster, so the mother picked up a bit of skin and sailed away.

My next visit was arranged for February 1. I was in the hide shortly after 7 A.M. It appeared to be a day of tuition and testing of the young kite, and this is how it was done. The parent kites were on trees not far off. The youngster had made strides in growth and feathering, was steady on her legs and very alert. She was just over a month old. She had had undivided attention, and the parents had been assiduous in supplying and fragmenting food. I think the schooling must have started the day before, if one could judge by the very well stocked larder now at hand; yet the youngster's crop seemed empty! Here is the menu: one three-quarters-grown red-legged francolin (*Francolinus squamatus*), one three-weeks-old chicken, one mole-rat, a striped rat, bits of odd rodents, and a bit of dried feces. These practically untouched offerings must have been dumped in the nest and the youngster told to "get on with it." She hadn't done very well so far; crop empty and obviously hungry!

I was wondering how to explain this generous array of food, when the male kite alighted on his branch to the left. He had a small mole-rat. He made a low call, apparently to the youngster, who looked up expectantly. The father took the rodent in his bill, held it a while, then bent down and placed it between the inner toes of his feet and commenced to tear a hole in the skin. Then he took bits of flesh, swallowing each bit as it came away. Kiteling looked on, opening and shutting her mouth. It was amusing to watch, but I felt sympathy; she was so obviously hungry. The father finished half the rat and flew off with the remainder to a near-by tree. Kiteling protested loudly. The father returned to his perch, still with the remains of the rat, and repeated the exhibition. Kiteling looked around, then started to preen. Bored with this, she flopped into the nest and lay on her side. The father called softly, a mixture of the coaxing call used toward his mate and the food call uttered by the chick.

Kiteling looked up, with her head first on one side, then on the other. The father flew off. The youngster became restless; she walked about the nest, lay down, then got up and toyed with an old rag. Taking a corner in her bill she shook it, let it drop, then lay on top of it. She altered her posi-

tion a dozen times and finally, lying flat, opened her wings and sunned them. With all this food lying about, flies began to gather and buzz around. There was a slight noise on top of the hide, and I made out the form of a lizard. He moved forward, jumped on a branch, and so on to the tree trunk. He circled round this and disappeared, to appear later among the twigs of the nest, then in the nest itself. Food was in abundance all around. The flies buzzed and settled. The lizard took his stance by one of the carcasses and picked off the flies, one after the other. Kiteling awakened and eyed the lizard, but made no attempt to catch it. She watched for a while, then losing interest, flopped back and slept. The lizard took his fill and scuttled off.

At about 11 A.M. the female kite came and alighted on the branch usually occupied by the male. She had a partly eaten mole-rat, the intestines of which were hanging out—a rather gory mess. The kiteling was all attention and uttered her low hungry cry, “pee peep pee-peep,” but the mother sat on and kept looking around as though expecting something. Presently she flew and called; there was an answering call as the male sailed in upwind and alighted on his perch. He had a rat (*Arvicanthis*). The female circled round and perched on a branch above. They stood for quite a time uttering no sound. Kiteling was looking from one to the other and calling.

I waited for the signal from the male. Neither parent seemed in a hurry to come. Kiteling called and toyed with the feet of the francolin; she obviously wanted to be fed. At last the male left his perch and in a wide sweep came gliding up to the nest. He held his rat but made no attempt to feed the kiteling. The youngster was bending down in front of him and soliciting food. The male looked up at his mate and called, and she, too, alighted at the back of the nest. Almost simultaneously each parent put out a foot holding a rat, dumped the rodent in front of the kiteling, and flew off. They returned to their perches.

Kiteling seemed peeved and stood with her head down between her shoulders. The parents called, but the youngster sulked in a huddled position. She looked up at her parents but met with no response. Presently she flapped her wings and almost overbalanced and in recovering made a grab at a bit of rag. In so doing, she brought the mole-rat carcass to her feet. She eyed it for a while, then bent down and pulled on the extruding intestines. She mouthed a bit and managed to get a few inches down; then it stuck. She put a foot up to scratch the obstruction away and put her foot down on the body. When she took another bit of intestine, it came away easily, for the body was held down. This seemed to please her, and she put her other foot on the carcass and found no difficulty in removing portions of flesh. Her appeals to her parents ceased, and she was soon getting down to the job in earnest. Between mouthfuls, she looked up at her mother, who



was eying her and calling encouragement. The mole-rat was soon finished. Kiteling stretched for another carcass but found difficulty in getting the body under her feet. Eventually she succeeded, and bit by bit, this, too, was torn up. Every little while she glanced toward her parents as though seeking their approval. The second rat finished, kiteling flapped her wings and jumped about, then lay down on a full crop to sleep it off. The female kite flew off; the male remained on guard.

I have recorded the incidents as they occurred, and have suggested that the parents showed deliberate intent by their actions—a schooling of their offspring.

Kiteling awakened toward 2 P.M., stretched, flapped around, then tackled another small rat. She was almost through with this when the mother again alighted at the nest. She had brought no food; instead, she picked up the remains of the francolin and flew off with it to a distant tree and had a meal. She dropped the leg bones below her perch. The male was still on his stance.

Ground observation was maintained during the next few days, and one, for a full twelve hours on February 5, supplied the following data: Food was brought on six occasions, five rodents and one fowl chick. The parents dumped the prey and flew off almost at once. No offer of feeding was observed, though one bird stayed some time at the nest. On February 8 I went to the hide by 7 A.M. Kiteling was now 41 days old. She was fully feathered, but the tail and wings had still some length to grow and the bases of the feathers were still in quill. There was hardly any "baby down" visible.

There were few remains of previous meals in the nest—just an empty mole-rat skin, a lower jaw of the same species, and a bare leg of a francolin. But to the lining of the nest had been added a large square of shepherd tartan, its black-and-white check pattern showing up conspicuously. By 9 A.M. neither of the parents had come to the nest. Though the sun was bright and hot, the wind had freshened. Kiteling seemed to enjoy it. As each gust came she faced into it and opening her wings beat them vigorously, until, in spite of having talons fixed to the nest twigs, she was lifted up a few inches. She hurriedly closed her wings and clutched for support. She nearly went over on one occasion.

At 10 A.M. the female arrived with a mole-rat, which she dumped in front of kiteling; then she departed. The youngster was now proficient in the art of holding and feeding; she used feet and bill to some purpose, and the rat had disappeared in a short time. Today was notable in that for the first time, to my knowledge, the parents came singly and the female required no encouragement from her mate.

The tree-lizard came to get his ration of flies; a plantain-eater alighted in the branches above the nest and scolded. This aroused kiteling to action again. She was busy flapping her wings when the male arrived with a striped rat. He glanced around the nest, picked up an old skin and departed. Kiteling made short work of the rat, even to its skin. The tail gave some trouble, but at last this went down as a result of much jerking and neck twisting.

Another short snooze, and kiteling was ready for more exercise. She waved her wings about and circled the nest several times, then discovered the branch by the nest edge. She mounted it and flapped joyously and called as she raised her feet off the branch. She was feeling the power and uplift of her wings, and I thought it time that I had a close look at her. I climbed to the nest. Kiteling was all defiance and threat; she went back on her haunches, fluffed out her feathers, and spread her wings. Feet were ready to strike. She opened and snapped her bill. It was the first time she had shown resentment.

Kiteling was seen in the branches of the tree near the nest during the next two days, but she came to the nest to tear up the food, so I thought it time to take action. In published accounts of the black kite there is no mention of the exact times of moult from nestling to subadult, and from this to adult plumage, and as I was making a particular study of moults and for this purpose had a "Raptorial Nursery," I decided kiteling should be caught up. She was transferred to the nursery on her fiftieth day. She took kindly to her surroundings and her mess-mates, black-winged kites, two goshawks, and a sparrow hawk.

When 55 days old, she could fly around, but she still uttered her baby cry for food as soon as she saw me with fodder, a rat, a bit of meat, or a young chicken. She is now two years old, lusty, and full of mischief. She loves nothing better than tugging at my hair as I sit at my desk, or tearing the paper out of my typewriter! The day is near when she will be free to roam my sanctuary.

One further note: The parents have raised four broods in the sanctuary since kiteling was hatched. They built a new nest in a great *Warburgia* tree and have occupied it twice running; their nest is now in a tall *muhugu* on which a parasitic fig is growing; the nest is in the top of the fig. The old nest was submitted to a close examination for evidence of successional occupation and for insect life. Below the lining of the nest I found an egg, unstained but infertile and not decomposed, and can only suppose that the kites had laid three eggs, one of which, proving infertile, had been pushed to one side and became buried in the relining.

## BLACK-SHOULDERED KITE

*Elanus caeruleus* Desf.

We topped the scarp; to our right was a long shallow valley thick grown with grass; here and there were acacias, festooned with galls, the home of myriads of ants. Against the sky a black-shouldered kite was hovering, wings held up, then flat, then quivering. All at once a stoop; down she went like a stone. A little while, then up she flew, a rat held tight yet struggling. We saw her bending down and tearing at her prey. The head came off, and this she swallowed whole. The skin was ripped; then with the rodent in her feet she flew and alighted in a tree. There was a nest there. Low calls were heard: "pii-uu pii-uu." As we left the car we heard the warning call, "chorlii," from the male, who was on a tree some distance off. There were four youngsters in the nest, varying from a chick in down to one just feathering. In Kenya and Uganda, this kite is widespread and is associated with park-and-orchard country, avoiding forests. It occurs from sea level up to 9000 feet, but its maximum density is around the 3000-5500-foot zone. It requires for its environment fairly open grasslands with scattered trees, especially acacias, where nesting sites are available and food is easily obtainable.

The black-shouldered kite is one of Nature's instruments of control over rodents. So far as my observations go, fully 80 per cent of the prey consists of various species of rats such as are found in grasslands, mole-rats (*Tachyoryctes*), field rats (*Arvicanthis*, *Lemniscomys*, and *Epimys*), and so on. These kites are accountable for the destruction of a certain number of birds, particularly ground species such as larks, pipits, and occasionally quail or "squeaker" francolin, but I am of the opinion that the benefit they do by destroying rats far outweighs the slight destruction of bird life.

They are extremely graceful birds, combining some of the characteristics of the kite family with the facile flight of a gull; indeed, superficial resemblance to a small gull or a large tern is not mere fantasy.

Like most of the accipitres, the young differ markedly in color from the adults; in the nestling plumage (the stage in which we found our brood) the upper breast is strongly washed with orange-tawny to rufous; though the forehead is slightly white, the rest of the crown is dark brown flecked with rufous and on the nape the feathers are streaked with white. The back is a dark ashy-brown with each feather broadly tipped with white and rufous; the flight feathers are dark gray with white tips, while the "shoulders" and coverts are blackish tipped with white. This conspicuous barring on the back might at first sight seem out of place in a nestling reared in a wide open nest, but in fact when the young are lying flat in the saucer of the nest they are very hard to detect, the reason being that the dark twigs



BLACK-SHOULDERED KITE

Alighting on nest

of which the nest is constructed become soiled and streaked with excrement voided by the young, who are unable to evacuate with a degree of force such as we have noted in the case of buzzards, eagles, falcons, and "sparrow hawks." It is definitely a protective pattern.

Before assuming the adult dress, the young assume a subadult plumage which is intermediate between that of the adult and the nestling. The upper side is an ashy-gray with hardly any indication of whitish tips, and the under side becomes pure white except for a gray tinge to the upper breast; the black pre-eye spot is strongly developed. The tail of nestling and subadult is distinctly "forked." The molt from nestling plumage to subadult starts at the third month and is a gradual process that is not completed until the bird is six months old. When adults are viewed in flight from below, it is noticeable that the color pattern of the wings, noted for

the upper side, is almost reversed; thus, the flight feathers are dark, almost blackish, while the base of the wing is white.

The black-shouldered kite is an adept at hovering, surpassing the kestrel in this respect. One will see a bird working a field or valley; he flies along upwind, moving his wings rather more than most accipitres (that is, he does not glide so much, and the flight seems weaker); then presently he hovers, hanging in the air with quick-beating wings. Then he does a side glide, repeating the hovering, then goes forward; he drops a little, hovers again, then with partially closed wings he streaks downward to his victim and seizes it with his forward-flung feet. If the rat is large, the bird goes back on his tail; alternately loosening and tightening the grip of his talons, he holds fast; then his sharp beak grips the neck of the prey for a moment, and releases it. There is no kick left in that rat. To a boulder, if handy, or a tree goes the kite; he rips the skin at the head, eats part of the head skin, then decapitates the rat, and with clever manipulation gradually eats the body, leaving the skin inside out but the tail untouched. If a large bird of prey or another of his own species happens to fly over, he watches over his victim with dropped wings and outspread tail.

Very often he patrols the ground in a wide circle, then across, with a short hover here and there as some possible victim is spied. The hovering is usually into the wind. These kites are not always successful in their "stoop," but they seldom touch the ground if it is not a certain kill; a sudden upward drive just above ground brings them sweeping into the air again to continue the search.

Looking up my records I find that nests with eggs have been examined in the following months: May–August, with a second brood in September, February, March; that is, they build or occasionally recondition an old nest toward the middle of the long or the short rains as the case may be, and as the incubation period is rather prolonged, 25 to 28 days, according to the size of the clutch, the young are timed to hatch toward the end of the rains. Thus, as I write (July), I know of a brood which has been on the wing for a month; a brood of nestlings, here dealt with; and a nest with eggs (due to hatch). Some birds, therefore, nest in connection with the long rains, others with the short, but not, so far as I know, at a time when the rains start or are at their height. Foraging for the young, and the tuition of the young to fend for themselves, take place as a general rule when the grass is dry or burnt off. Food is more easily procurable at this time.

It is not unusual to see these kites following in the wake of a grass fire in association with other birds, but, with the exception of the times when locusts invade the country, I have few records of witnessing the taking of insects nor have I found them to be present in stomachs. Few birds fail to take toll of locusts, and, as already indicated, kites help to reduce the num-



BLACK-SHOULDERED KITE

Four young from nest; note disparity in size

bers of these pests. The birds fly in a swarm and catch the insects in their feet, eating them in mid-air and catching up, with the greatest of ease, as many as they desire. I have not seen them taking locusts off the ground.

This general account now brings me to the recount, briefly, of my experiences with the black-shouldered kite during the last few weeks. As is not unusual with this species, the nest is situated on top of a flat acacia, with little top cover. It is built of twigs, with an inner lining of finer twigs, bits of grass and the wild asparagus (this last a thorny species which one would have thought would cause considerable inconvenience to brooding bird and young). Little fresh green leaves appear to be added to the nest either during the egg stage or when the young hatch. Only two bits of grass have appeared during the two weeks I have had the nest under observation; these may have blown over from my "hide," which is grass-covered.

There are four young; two are large and well feathered, and one is probably two days younger; the fourth is certainly seven days younger. When I first handled them, the smallest was still in the characteristic downy stage which is unchanged for the first two weeks—ashy-gray with a tinge of brownish on the head, paler below, almost whitish; abdomen bare. The mouth is very large, with a wide gape, and pink inside; bill black, yellow at base; eyes brown; feet yellow. These young represent an average clutch of

four eggs. (I have seen one of six, and a minimum of three as the full clutch.)

The eggs are not very large, averaging 40 by 30 mm., dull cream, mat, varying from immaculate to heavily blotched, streaked, or spotted, to almost entirely red-brown. Two eggs of this brood were heavily streaked; the shells were found far from the nest.

When the young first hatch, they are covered with close down, of a warm pink-buff color, with pink legs and yellowish-pink at the base of the blackish bill. The sides of the head bulge, for the eyeballs are very large, though the actual eye opening is very small. The "egg-tooth" is very prominent and is white in color. At one week, the color becomes paler and mottled, for the secondary down is more grayish, but the pink-buff down is retained at the tips of the second down, giving the upper surface a "starred" appearance. Around the eye and to the gape is a dark streak. The wing and tail quills appear first, followed by the scapulars and mantle, at ten days. After this, "quilling" is rapid, and the "egg-tooth" is shed at three weeks.

The bursting of the quills and the feathering develop at a fast rate; each twelve hours shows a marked difference. The nestling period—from the date of hatching to the date of leaving the nest—is five weeks, but for a few days the young hang around the nest and return to it for roosting. Although the first to hatch is capable of flight, it remains with the rest of the brood until the youngest is able to leave the nest. They remain with and are fed by their parents for two or three weeks; then dispersal takes place, particularly if the parents attempt a second brood.

This difference in the size of the young indicates that brooding must have commenced just after the first egg was laid and that the embryo of the first egg must have been developing for a week when the last egg was laid. This is an interesting feature of raptorial eggs (when more than one is laid) but it is not limited to this group. We find it commonly among, for example, African finches and colies, parrots and lark-heeled cuckoos. The significance of this feature is a matter for speculation. We know that brooding by the parents need not be as consistent after one or more chicks are hatched; the warmth of the already hatched young will suffice. The relief from this duty is outbalanced by the fact that the parents have to feed the brood over a longer period, in the nest, than would be the case if all hatched within a day or so. Then again, among the smaller birds, there is the undoubted risk (and I have evidence of it) that a newly emerged chick is killed by the weight of its older relatives, and this has its reflex on the population of the species.

Whatever the explanation, and in spite of the disparity in size of our particular brood, I noted that the parent (singular, for it was only the

female that was seen feeding the young) fed the youngest with as much attention as the rest received. Moreover, the bigger birds did not oust the babe from the front if he happened to be there.

One day about one o'clock I prepared to enter the hide. A swish of wings, a screech, a rush of wind over my hat, a flick on its crown, and the male kite was seen in a steep climb in front of me; again the bird came swooping down before I got up into the hide.

Settled in, I waited for a while. The male stopped his alarm note, and all was quiet. After a time the female returned with a rat but she was nervous about coming to the nest, circling, perching here and there, calling a plaintive whistle, "pii-u, pii-u," and being encouraged by the male with a series of "quaar" 's, loud, moderate, and low. Once when perched on a tree not far off, more as a nervous gesture than a necessity, she pulled beakfuls of fur from the rat in her feet and tossed the fur away, moving her tail up and down with rapid movements. Finally she came to the nest and her mate joined her; then he went back to his favorite lookout tree.

The chicks arranged themselves in a row in front of the hen, each with wide open pink mouth, waiting expectantly and not uttering a sound. The rat had already been decapitated. The female gradually extracted the body from the skin, bit by bit, feeding each youngster in turn. When all the meat was finished, the skin lay inside out. She rose as gracefully and easily as a tern.

Early next morning I climbed into the hide. The skin of a fresh-killed rat lay at the front of the nest and the female was away. The male was on the branch on which he invariably perched, and called encouragingly to his mate. Of course he saw that no harm came to the chicks during her absence. The female had done most of the brooding and now she was doing all the foraging, but he had done most of the hunting when the hen was brooding.

After a time the female arrived, calling the double note "plewit" or "pleu-wit." She lit on a near-by tree and decapitated the rat she carried; then she flew to the nest, alighted, and fed the youngsters. When the rat was distributed she rose and joined her mate. The male had resumed his watching; presently the hen disappeared. Two hours went by and it was past noon. Finally the female came with a female quail, partly plucked and decapitated. She perched on the nest, tore up and distributed the carcass, and left.

I visited the nest again a week later. The young were now well feathered and the three oldest were standing in the nest for long stretches at a time. Real kitelings now, they did not wait for the parent to help in tearing the food to pieces. One bird would take what he wanted; another would seize it and demolish most of it, even to the swallowing of the skin; thus one or



more went without food for that occasion. On the next visit of the parent those who did without saw to it that they got their share. During a five-hour period of observation, three rats were brought, the hen coming from behind the hide, dropping the kill, and going off at once.

I returned a fortnight later. No birds were about, and the nest was empty, disarranged, and bloodstained. Feathers of the young birds were scattered about. Claw marks were on the tree trunk and bits of serval cat fur on some thorns indicated the culprit.

One young, which I called Elanus, I raised in my "nestling nursery." From the very beginning she showed little signs of fear, nor did she exhibit resentfulness at being handled. The usual attitude of defiance—going back on the tail with wings outspread and mouth opened wide and feet ready to strike—that most three-quarters-grown raptorial exhibit, was lacking. She fluffed her feathers out but perched on my fingers without seizing them.

She grew apace, and when her wings were the length of her tail, she commenced to leave the open nest box where she had been placed. She would stand on the edge of the box, keenly interested in another inmate of the nursery, a wild duckling that had been hatched from an egg in a hot-cupboard. The duckling was half grown and was kept in a large shallow wooden box in my "bird-room." Elanus watched it for long spells, and I wondered if she would attack the duck when she became strong on the wing. My fears were ungrounded, for coming back one afternoon, I glanced at the duckling sleeping box, kept warm by hot water bottles; here was Elanus sitting side by side with the duckling. She came to hand without fuss and was put into her nest, but from that time on I knew where to look for her if she were missing from her branch by her nest box!

At feeding time I whistled to her, as had her parents, and she at once stood on the alert. Rats such as she had been accustomed to were plentiful, and her meals, averaging four a day, consisted of a rat each time. She tackled the "prey" in a business-like fashion; holding it firmly between her inner toes, she tore off portions of the head skin and swallowed them; then the rat was decapitated and the head tossed aside. It was short work to tear off the forelimbs and thorax, and then came the abdomen. The stomach was drawn out and tossed aside but the heart and liver were eaten; all the intestines were removed and dropped. The rest of the body was made short work of and then came the hind quarters and tail. The hind legs were separated off and eaten, and most of the skin went with them; at last the base of the tail was seized and stripped from the remnant of the skin and down it went, quickly at first, then more slowly, the end hanging out of the bird's mouth for a while until by twists of the neck the whole disappeared.

Elanus was now seven weeks old, well feathered and able to fly. Her favorite perches were the tops of two tall bookcases. On the top of each of



BLACK-SHOULDERED KITE

Six months old; spotted plumage almost gone

these I put a log. When feeding time came I placed a rat on the writing table and down came *Elanus* with legs dropped to the ready and talons ready to strike. The rat was seized in both feet and the grip tightened once or twice; then it was seized at the back of the neck and carried up to one of the perches. Here it was disposed of in short time.

During this time *Elanus* showed a strange attachment for a red notebook, coming to nestle on it. Notebooks of other colors were ignored. I tried her with other things, including pencils and pens, and all which showed red were drawn in under her and she brooded over them. She is now nearly five months old and is in a flight aviary on a wide balcony of the house with other *Raptores* but she still shows a love for that notebook. If I throw it on the floor of the aviary she comes to it; if I place it on a chair within the enclosure, she flies down to it almost at once.

Before she went into the aviary I introduced other young kites of this species to the nursery—chicks just a day old. I had anticipated difficulty in hand-rearing these tiny chicks and had taken them with some misgiving, but again I had reckoned without *Elanus*. From the day the babes were placed in the specially constructed nest up to the time they could feed for themselves *Elanus* took them over, brooded them, and fed them, though

she herself was little more than a "nestling." This maternal instinct was amazing. If I put a rat before her she took it at once to the nest and fed the chicks before partaking of any of it herself. Nor was this all, for when I introduced a day-old buzzard chick to the nest, she mothered that also. For nearly two months she fed that buzzard, even when the babe was three times her own size. She appreciated companionship, not only that of her own kind or any other feathered creature but that of humans also.

When three months old *Elanus* was full grown, and was, except for color, a full-grown black-shouldered kite. She was strong on the wing and hovered with ease even within the confines of the "bird-room." And she came to hand. At three and a half months she commenced to molt; first the feathers of the forehead were shed and replaced with gray ones; then the mantle feathers were gradually replaced, at the same time the scapulars were renewed in pairs; then presently the breast feathers were shed, the rufous-tinged ones being replaced with delicate gray and white feathers. In a few weeks the wing feathers were dropped, one on either side, then the rectrices, a pair at a time.

At nearly six months of age she had gone through more than half her body molt and was replacing her wing feathers steadily. But her gentle demeanor remained the same, although she was not handled as before and was only one of a dozen raptorials in the flight aviary. The color of her eyes, once a gray-brown, changed to orange with a red glow; in time they became crimson. She was still responsive to call and came to hand without hesitation.

She is one of seven of her species, five of which she has reared and fed. All but one, a male, are docile and respond to call. She assumed full adult plumage in just over twelve months. She was released at two years of age but stayed about, receiving her four meals a day. Finally she mated, came less often, then not at all, and I discovered that she had a nest about a mile from my house.

### TAWNY EAGLE

*Aquila rapax rapax* Temm.

The majority of birds nest during and just after the rainy seasons; that is, twice a year—from March to July and again from November to January. But the "birds of prey" (vultures, eagles, kites, falcons, hawks, and such) commence to breed just as the smaller birds are finishing off with their late broods. Thus, from late June to January, one may count on finding many raptorials with eggs or young. It must be remembered, however,

that most of the *Raptores* mate up and start nest building or reconditioning an old nest about in April. Moreover, the incubation period is very long, almost fifty days, and the nestling period even up to three and a half months.

There is something extremely fascinating about these birds. One admires their wonderful vision, their magnificent powers of flight and so on; but the lesser birds have characteristics equally wonderful, yet the appeal is not the same. Whatever the fascination, the urge in my case was born of a realization that I really knew little about the home life of these creatures, and the opportunity existed to make good this lack of knowledge.

In one small portion of the Southern Game Reserve, which I have studied for many years, no less than a score of species of raptorial birds breed regularly each year, but I had never had the opportunity of following through all the nesting operations from the building of the nest to the time the chick left it. The place was worth a visit. Several tawny eagles (now on my list for study) frequented this area.

At this time of the year (August), the eyries should be occupied, reconditioned, or new ones built. A reconnaissance of the area eventually revealed a nest, situated in the topmost spreading branch of an acacia tree 40 or 50 feet up, open to the sky but protected by the thorns of the nest trees. At this time of the year, the acacias were devoid of foliage for the most part, and the bulky structure was visible from a long distance off. This nest held two fresh eggs, and was thus just right for obtaining full data. The eggs were chalky-white with sparse rusty blotches and marks, the largest spots being at the large end, and measured 68-69 × 53-55 mm. The hen bird had started to incubate and gave every indication of being a "close sitter," for she left the nest only when I approached the base of the tree.

Part of the skeleton of the hide, a framework of light bamboos, was put into position and left for a week, then added to gradually until the whole was completed during the next week. In the meantime, I observed the visits and general behavior of the bird, from a distant stance.

When I arrived at the hide for the first time, on September 27, the hen bird was absent, so I settled in without causing any disturbance. It was 9 A.M. when I got into position. Half an hour passed. In the far distance a small black speck circled high in the sky, then was seen to be traveling straight toward the nest tree. Within two hundred yards of the nest the wings were drawn in, the feet lowered, and the flight inclined downward; a majestic form with outspread wings topped the tree and alighted at the edge of the nest. A momentary glance around and she settled on to the eggs, sinking into the nest so that only her head was visible from the hide. For the next hour she brooded with eyes closed and appeared to doze.

At noon she changed her position but was still invisible except for her head. She brooded with her bill open, gasping with the heat of the direct sun on her open nest.

Another hour went by and I risked a signal whistle to my boy waiting in the car. At last the boy appeared. The bird was on the alert at once; she crouched, but watched the boy. As he came to the tree she raised herself, and, facing the wind, took off and swept away in increasing circles to the top of the valley. I adjusted my position and settled down for another wait. In the meantime I heard the eagle calling "ki-ark, ki-ark," and answered by her mate from the hill beyond. The two birds circled about; finally the female came to the nest and stood on its edge, but soon left. I watched for a half-hour longer and left also.

I returned to the hide early next morning, September 28. The bird was again absent. Shortly after 8:30 I noted a secretary bird trying to outmaneuver an obviously large snake, in the valley below the eagle's nest. He was moving in circles on the ground with wings outspread and would suddenly take a step back, then strike forward with one foot, then retreat. Repeating these tactics several times he eventually struck and held; leaning back slightly, he struck with the other foot, then seized the snake behind its head with his bill and held fast.

Just then a harrier eagle, also a snake-killer, flew over and dropped near the secretary bird, who at once brought his wings forward and crouching over the snake uttered his deep-throated note, "ow-uu-aa, ow-uu-aa." While these two birds were addressing each other in unfriendly terms, two tawny eagles suddenly shot down from the "blue," wings almost closed, legs hanging down, and talons ready to seize. The male dropped on the only exposed portion of the snake, its tail, and then ensued a tug-of-war, accompanied by a great flapping of wings and screechings, "ow-uu-aa" and "ki-ark" intermingled.

The harrier eagle had retired to a small tree near by and shouted encouragement to both sides. At last the secretary bird had to give in; the snake was now in the talons of the tawny and his mate. The secretary bird ran around with outstretched wings, crest erect, and tail expanded, protesting vigorously.

The snake was ripped in two, and each tawny eagle, with a portion dangling from its talons, flew into a near-by dead acacia and proceeded to tear up the prey, swallowing skin, entrails, and the rest. It took only a few minutes to dispose of this four-foot puff-adder, for the tawny is a gross feeder. The perpetrators of this theft were the owners of the nest before me.

The male was the first to approach the nest. Swooping in a curve from his feeding perch, he landed on the far side of the nest tree; his mate was circling overhead, and turning into the wind she planed down with half-

closed wings onto the nest and sidled onto the eggs. Here she brooded for more than two hours; her mate had previously sailed off into the blue. She dozed most of the time and hardly altered her position. Another half hour and she half stood up and turned the eggs beneath her, settling down again almost at once.

She had now brooded the eggs for thirty-three days, and they were soon due to hatch. Toward noon she left the nest and was absent for half an hour. On her return she brought a spray of acacia seed pods which she added to the lining of the nest. The lining already had a layer of these pods, and each day, as the date of hatching approached, a few more were added.

On October 7 the first egg hatched, thirty-eight days from the date of laying. I visited the hide early that morning, thinking that I might witness the removal and disposal of the eggshell, but at 8 A.M. the shell had already been removed, although the chick was still moist about the head and obviously had not long been out. No signs of the shell could be found on the ground for several yards around the nest. I expected that the parent would soon return, but more than two hours elapsed before I heard the now familiar call and saw the hen alight on an acacia some thirty yards off. She was restless and plucked several sprays of acacia pods and let them drop. She had evidently seen me enter the hide and was suspicious. Another hour and she still refused to come, although the chick was now calling feebly.

I signaled to my boy to approach and walk past the tree with the hide, and keep on until well out of sight. This he did, and when the hen next appeared high overhead, she sailed down to the nest without hesitation. She brooded closely for three hours, then left to the call of her mate, who was in an acacia about 100 yards off. He passed a rat to the female. This she proceeded to tear up and swallow. I fully expected that some portion of it would be brought to the young, but apparently all was eaten. She continued to sit in the tree and I took the opportunity to descend from my hide. Making a wide detour I avoided disturbing the bird. Watching from a distance I saw her return to the nest and brood the young.

On October 13 the chick was a week old and twice its original size. It was covered in close white down to just above its feet; these and the base of the bill were yellowish-white, and the distal half of the bill was blackish. The second egg did not hatch. The parent was absent when I went into the hide, so I examined the nest for evidence of food and noted portions of a field rat; thus the young had already been fed by 9 A.M. The female arrived shortly after but brought no food to the young. She stood toward the back edge of the nest and watched the young moving around for a while, then brooded over it.

After 3 P.M. the male arrived, dropped a rat at the nest, and went off immediately. The rat was fed to the young by the female; then she, too, went off. Altogether I spent six hours in the hide that day. I had ascertained many things about these birds, at least about the female, but of the male, who seldom put in an appearance, little could be gleaned at the nest. The female had done all the incubating and the brooding of the chick up to date.

Another tawny eagle's nest farther down the valley contained a month-old chick and an addled egg. (This latter on examination held a three-quarters-developed chick which had died for some reason or other.) The nest also contained a very large rat (*Arvicanthis*), part of the hind quarter of a young Thomson's gazelle, and the remains of two half-grown young black-shouldered kites. This particular young eagle had feasted to repletion; the surplus lay in the nest. It was little wonder that two hours' observation of the nest revealed no evidence of the parents in the vicinity—the chick had been provided for.

I then cruised about the veldt and eventually discerned vultures dropping from the sky to one particular spot. This indicated a recent "kill" or perhaps some sick animal. Making a wide detour to the spot so as not to disturb the birds, I came on a newly dead wildebeeste surrounded by hundreds of vultures, a few marabou storks, and a couple of tawny eagles perched in acacias not far off. The more venturesome vultures had gouged out the wildebeeste's eyes and torn the skin behind the ears and around the anus. The tawnys' share of the banquet was not yet. They would come in for the leavings, and odd bits of meat and portions of entrails. They are classed as scavengers and associated with jackals and other "hangers on," who follow the trail of vultures. Observation had thus supplied evidence of robbery and scavenging; I had yet to learn whether "stale dead meat" was to be offered to the young. The only chance of knowing was to keep observation at the hide.

As the days went by, the young eagle grew apace; his development, size, weight, and feathering were noted twice a week; his portrait was taken on each occasion. After the first week, he was not brooded except by night. The parents came and fed him, sometimes separately, often together, but the male seldom stopped for long. Four consecutive sessions in the hide indicated that the first meal was brought about 10 A.M.

Both birds would come sailing upwind across the valley, incline their flight downward when about fifty yards off by half closing their wings, legs dropped to the ready, then ascend to just above the nest, when the huge pinions would be brought forward. With tail expanded and depressed the impetus would be braked, and either together or within a second of each other, the great birds would alight gently at the nest. The prey (always

large field rats) was carried in their feet. As soon as the female commenced to tear up the carcass, the male left.

One obtained an indication of the near approach of the birds by the antics of the chick. Previously recumbent or sitting on his haunches or preening himself, he would become alert and gaze in the direction of the oncoming birds, moving his wings and uttering his excited double note, "tirit tirit," and as the birds alighted he would bend forward toward them with renewed calling. As each piece of meat was offered and taken he would express appreciation with a low "tu-ru." Bones and most of the fur except the hind portion were swallowed with avidity, to be brought up as a "cast" (mostly fur and teeth) twenty-four hours later. Shortly after mid-day more food was brought, always a rat. If small it was ripped open at the neck and dropped before the youngster, who, still a bit unsteady, and unable to stand and hold the prey in his feet, tossed the carcass around until the head came within his gape; then the rat was devoured by gulps and side movements of the neck. The tail was sometimes awkward to accommodate, and it hung from the corner of the mouth until further vigorous neck movement caused it to disappear slowly.

On occasion, if much of the rat skin remained uneaten, the youngster and his parent would toss it about or each would take a corner of it and indulge in a mild tug-o'-war. When the parent stayed with the chick after feeding it, she made no attempt to brood or shelter it from the rays of the sun. She looked at the youngster occasionally but for the most part stood motionless, occasionally looking to right or left or skyward.

The first portion of the chick to show feathering was along the wing edge; short quills showed through the down. Then, in a day or so, quills appeared on the scapular and tail region, then on the mantle and back of the neck. Two days later the quill tips burst and the white down became mottled with brown. A few short feathers appeared on the head and down the sides of the breast and down the legs; when six weeks old the youngster was clad in light brown feathers on all exposed areas except the crop. Most of the feathers retained their downy tips. In size, the chick was about as big as a three-quarters-grown rooster. At seven weeks his bulk rapidly increased as the feathers grew. He was still fed by the parents and made little attempt to tear up what was brought to him. He was now quite unmistakably a tawny eaglet, with overhanging eyebrows above gray-brown eyes which gave promise of acute vision over far distances.

So far as one could ascertain, four regular meals were supplied to him with a few odd titbits in between. His crop bulged visibly after each meal but very soon subsided. Once a young guinea fowl was dropped in front of him, almost fully plucked but otherwise intact. That meal sufficed him for four hours.





TAWNY EAGLE

Five months old

He was now two months old, able to rend his food for himself, and in stature not far short of his male parent. As a sprouting chick he would often stand up in the nest and after preening himself and loosening the sprouting quill sheaths (portions of the sheaths were swallowed), he would flap his wings about; now, with almost full-grown wings and tail, the flapping often took him off his feet, especially if he faced the strong gusty wind. The day of his first real flight was not far distant.

On December 14, the nest was empty; the young tawny was perched in a tree some fifty yards away from the nest tree. He was alone and allowed me to approach to within a few yards; then he spread his wings and sailed to a tree on the far side of a valley to his left. His flight was still rather uncertain but he kept his balance and alighted safely.

We have followed the sequence of growth and feathering in a youngster in my raptorial nursery. The first molt to the adult does not begin until after the youngster is a year old.

## BROWN HARRIER EAGLE

*Circaetus cinereus* Vieill.

My own experience of this bird is not very extensive but my observations are worth recording. I recalled having seen a pair in the Southern Masai Reserve many years ago, and visiting the area again, I looked especially for this species. I located a pair in almost the same spot where I had seen them previously, and discovered that they were nesting.

I had seen the two birds sitting on a flat-topped acacia bordering a dry stream bed in a valley, and I worked my car slowly over very rough ground toward them. They were magnificent creatures, not with remarkably powerful build or eagle-like appearance, but with really fine heads, the male especially. As I watched them through binoculars at less than fifty feet, the male ruffled up his head feathers until they formed a crest surrounding the upper part of the crown, and when he turned his head toward me the large eyes showed up clearly. These wonderful yellow eyes are deep-set and because of the width of the head appear to be rounded, almost owl-like, and though set well in, they are not overhung by a heavy brow as in the tawny eagle; nevertheless they have a fierce and purposeful expression.

When I tried to obtain a closer view of the birds, they rose and flew off. It was then that one appreciated the great wing span and the curious silvery-white under side of the wings and to a lesser degree of the tail.

I searched all the acacia trees in that valley for the nest. My attention was drawn to a thick-foliaged acacia, covered with a very thick creeper, by seeing a bird leave it. The nest, which could not be seen from the ground, was on a heavily leaved branch on the top of the canopy. While my boy was climbing, the eagle came to the tree but left at once. The nest was a bulky structure of twigs some two feet across and lined with a few bits of coarse grass. It held one egg, which was rounded and almost immaculate dull mat white, with a few brownish marks. It measured  $52 \times 48$  mm. We returned it to the nest, and it hatched within a week, for when we next visited the spot the youngster was two or three days old. It was covered in ashy-gray and brownish down; the bill was blackish, the cere dirty yellowish-green and the bare skin around the eyes greenish. It was missing three weeks later, and the nest was unoccupied the following year.

I was in the same general locality the year after and found the nest occupied by a brown bird. As my climber approached he frightened the bird, a nestling, and it came flapping down to the ground. We returned it to the tree but toward evening found it on the ground again. This youngster still had a quantity of down about her, especially on the head, neck and breast, but she was otherwise well feathered except that the wings and tail were but half grown. The upper plumage was a bold network of feathers with dark brown centers and pale tawny edges, over the head, mantle, and lesser wing coverts; the primaries and secondaries were dark brownish-black. The tail was broadly barred dark brown and ashy and was white-tipped.

I returned to my sanctuary a day later and took the young harrier eagle with me. She was put into a large twig nest inside the large flight aviary on the balcony and took kindly to the other occupants and they to her. She took her quota of rats and mice, lizards, and snakes, but preferred snakes and lizards to all other food. The youngster was extremely tame, did well, and was fully feathered in a month. She retained the strongly marked upper plumage and mottled breast for nine months, then commenced a body molt. The new feathers were darker sepia and less pale-bordered. At two years she had assumed the full adult plumage.

In the Game Reserve a few years back I was on a small tree platform which gave me a clear view of the surrounding country. Just in front was a gently inclined rocky bank almost devoid of grass, a favorite basking place for puff-adders. I noticed a harrier eagle sailing slowly along toward the ridge. When almost opposite my tree, he turned suddenly, flapped his wings, and dropped to the ground. He stood with wings uplifted in great curves on either side of his body. Then he thrust a foot forward and grabbed at something. The forward foot held on tightly but the object squirmed and wriggled and to keep his balance he lowered the wing tips until they touched the ground firmly. His crest was raised like a halo around his head; his yellow eyes blazed, and he hung on. I could see that he had seized a snake. He gripped tightly, bent forward, and gave the reptile a vicious bite. Then he bent low over the capture with wings brought well forward and looked about him with fierce eyes and crest feathers depressed. There was no other bird about so he straightened up, still holding the snake firmly; then he commenced to tear at its head; shifting his hold farther along the body he seized the crushed head in his bill and pulled hard. A piece came away and he swallowed it. He then released his foothold, and taking the head end in his mouth he worked it round and the body gradually went down the very wide gape until only the tail end projected. This too eventually disappeared after the bird had moved his

neck from side to side and depressed it toward the chest. The snake was a puff-adder some three feet long. When the meal was over, the bird flew to a dwarf acacia and perched; for a while he kept on moving his neck and head as though forcing the food downward.

Another instance of bird *vs.* snake came to my notice, with a different species of harrier eagle, the black-breasted. In this instance, the eagle had tackled a five-foot cobra. The snake was held fast in the talons but not close enough to the head. Moreover, the snake had managed to get a few coils of its body around the bird and besides striking the eagle had been able to exert crushing force. Bird and snake were found dead, firmly locked together.

### RED-TAILED BUZZARD

*Buteo rufofuscus augur* Rüpp.

The following account concerns a pair of these fine birds, which nested, fortunately for them, far from the frequented tracks and dwellings of man.

A large fig tree, growing out from the side of a cliff in the wall of the Great Rift Valley and overlooking the numerous terraces and scarps (evidence of tremendous earth movements in the dim past), was this year selected as the nesting site. The previous year the birds had built in a giant euphorbia not far off.

At the end of a horizontal branch some forty feet from the ground, the nest was constructed about the middle of May. On June 1 it contained two fresh eggs, chalky-white with varying degrees of red-brown blotches and marks.

On June 23 the hen bird was sitting tight on the well-incubated eggs, so a hide was constructed near the trunk of the tree, roughly 25 feet from the nest. On the following day the observer took up his position in the hide.

The buzzard soon returned to incubate her eggs. For two consecutive days only the female was noted at the nest—a grand bird, black above and white below, with a rufous tail slightly barred with black, and with a black-and-white-banded patch on the wing. Her approach to the nest was heralded by a chorus of notes of alarm from numerous birds nesting along the cliff face and was signaled, too, by two intrepid species who thought nothing of perching alongside the nest or fluttering over the great bird's back when she had settled down to incubate. These intruders were a paradise flycatcher and a yellow-breasted sunbird. The sunbird, particularly, showed no fear. It often perched on a leaf or twig above the buzzard and not infrequently arrived at the side of the nest a moment or two before the buzzard alighted with a thud at the edge of the nest. I use the expression "thud," for she was never gentle or quiet; her arrival was always accom-

panied by a rustling of the large fig leaves which surrounded the greater part of the nest.

The nest was a platform of large twigs, almost branchlets, on which was constructed a shallow saucer of more slender twigs, roots, and grass. Fresh vegetation in the form of sprays of leaves was added from time to time, especially as incubation advanced, and on practically every occasion when the hen returned to brood she brought a spray of olive and occasionally grass. These she dropped into the nest and arranged after she had sat down. On the first day of observation the eggs were visible from the hide, but the following day a barrier of fresh vegetation had been built up. As the hen sat, the male occasionally soared high over the nesting tree and called. Twice on the second day she left the nest in response to calls but soon returned. It is probable that she was given food, for on the second occasion she came back with blood on her bill.

On July 5 the nest was examined and found to contain only one egg, although the bird was still sitting. Examination of the tree and the surrounding ground showed evidence that humans had robbed the nest, but fortunately had left the hide intact. Whoever took the egg found a nearly fully formed chick inside, for when the nest was next visited the remaining egg had hatched, and the chick was more than four days old; that was on July 23, so the period of incubation had been well over a month.

The nestling was covered with a soft ashy-gray down, set closely, and of the texture of "eider-down"; the back of the head had a diamond-shaped white mark. The breast was whitish and the abdomen bare. The feet, the base of the bill, and the bare skin around and in front of the eye were yellow; the bill was gray. Up to a week old the youngster lay helpless in the nest, but the hen bird was most assiduous in her care.

I spent three days observing the behavior of the parents, and the food brought to the chick. This was commenced on July 24, and I averaged six hours of continuous observation for the three following days, commencing shortly after 8:30 A.M. The chick had already had his first meal before that time—a generous one, judging by the distension of his crop. Toward noon, either the male or the hen brought a small rat or bird as a titbit, tore it up and fed the chick. Again toward 3 P.M. another rat or a rat-mole was brought. On the second day, portions of lizard (*Agama* sp.) were brought, followed in the afternoon by a rat. Neither birds nor rats had been plucked; in the former only the wings and tail had been removed. On the third day three rats were brought. The chick made no attempt to tear up the food, not even when the parent dropped it in the nest and went off for a while. When the youngster was three weeks old I undertook a further period in the hide. On arrival at the nest, it was empty. I searched around the

branches thinking that perhaps the youngster might have crawled into the surrounding thick foliage, but he wasn't there.

Searching the ground below, I discovered him crouching between boulders. I feared the worst, for a 40-foot drop from the eyrie to the boulder-strewn ground below was a serious matter for a heavy chick, still in down. I picked him up gently, turned him over, and felt his limbs. All seemed intact, and there were no signs of bruising anywhere, so I took him aloft and deposited him in the nest.

Then I climbed into the hide and awaited events. The chick had settled down and was even now sitting up on his haunches and preening himself. Evidently he was not much the worse for his descent of 40 feet. At about 9:45 the hen flew up the valley and alighted on an olive tree 50 yards up the cliff face. She called to the chick, who answered immediately, sitting up expectantly and looking about him. The call of the male, "kuak kuak," from the far side heralded his arrival with food. Soon he was seen flying to where the hen sat, and here he gave her his catch, a large rat.

In a moment or two the female circled round and came straight to the nest. The youngster was all excitement, flapping his wings, and as the parent alighted, he crouched low in front of her. The parent tore up the rat and fed the youngster. As each piece of flesh was offered to him, he made a low "twee-u" note. If his mother tore a portion off and swallowed it herself he cocked his head to one side and looked up at her with an expression of surprise. The hind-quarters of the rat remained, but the parent dropped them in front of the chick, stood looking at him for a moment, then dropped off the side of the nest. The chick toyed with the rat for a time and tried to swallow what remained, but failing, left it at the side of the nest. He made no attempt to hold the prey down with his feet or tear it up with his bill.

Shortly after noon the male bird alighted for a moment, looked toward the hide, and moved off. At 3 P.M. the female flew by the nest and glanced at it in passing, but she had nothing in her feet or bill. She alighted on a dead euphorbia and stood preening herself. At 4 P.M. the male called from across the valley and presently I saw him with something in his talons making a wide sweep to the olive tree on the right. The female flew to him and took over the prey. She came to the nest with a bird, which she ripped open, feeding the breast to the chick but leaving the rest. The floor of the nest and the surrounding twigs now held odd remains of several victims which the parents made no attempt to remove. The hen stood by the youngster for a while, then went off down the valley.

I wondered at the apparent over-supply of food brought to the nest. Did it have any connection with the fact the parents had anticipated two



#### RED-TAILED BUZZARD

Adult flying past nest with bird in left foot

youngsters, for there had been two eggs, or was it better for the chick to have fresh-killed food rather than an old kill served up again?

Four days later I visited the nest again. I arrived just after 8:30. Even at that early hour, the youngster had evidently had his first meal. A three-quarters-grown francolin had been brought, and there now remained only the legs and pelvic region of this victim. This was the first evidence of "infringement of the Game Bird Laws" that I had noted, but it could not be considered serious in view of the dozens of rats and other rodents which had been disposed of.

At noon the hen arrived carrying a twig. She dropped it and carried on. A little later she brought another twig; not exactly the feed to offer a growing buzzard! These brief visits were probably in the nature of a reconnaissance, for the hide had been slightly altered, and thickened up. This breaking off and bringing of twigs was undoubtedly evidence of nervousness.

At noon the first "titbit" was brought—a field rat. This was torn up and given to the chick. In the early afternoon the hen arrived with a bird but did not at once alight; she passed the nest and alighted on the euphorbia

to the left. A few moments later she dropped to the nest, placed the bird in front of the youngster and took off, remaining away for more than two hours. The chick toyed with the bird, and failing to dismember it, lay on top of it and dozed. Thus even at more than three weeks, he appeared unable or too lazy to use his feet and beak to tear up his food. This was in striking contrast to young goshawks I had observed, or even kites, who at a comparable age had seized the prey in a business-like manner with well-inserted talons and had rent the body to pieces in a very short time.

At just over the three weeks the young buzzard was still covered in down, light-grayish in color, with a whitish line down the dorsum and a diamond-shaped white patch at the back of the head. The scapular feathers were just showing as a V mark and the wing quills were  $1\frac{1}{2}$  inches long and only just bursting at the tips. The tail feathers were still in blood-quill. The youngster at this stage reminded me of gannet young.

The young chick was a month old when next I visited the hide. He now looked mottled, for the mantle feathers were bursting, the scapulars had grown, the head was mottled with dark feathers, and those on the sides of the breast were showing through the down. The wing feathers had grown considerably and the coverts were sprouting. The youngster had had his first meal, so to while away the time I noted with interest that various visitors approached the nest and peered at and scolded the young buzzard. The paradise flycatchers had their almost fledged young in their lichen nest close by. Both parents visited the chick several times. A red-capped barbet came and scolded it. A lesser honeyguide investigated the hide, then flew to the buzzard's nest and chattered at the young chick. Two red-rumped sparrows hopped about the nest, around it and under it, chirping all the time, but the young buzzard took no notice. A stumpy-tailed warbler paid a call, while an oriole sat on a branch above the nest and called loudly. Cossyphas, too, "looked in" and passed on.

Along the cliff face behind the hide hyrax or rock-rabbits scampered; Schalow's chat flitted from rock to rock, and on the ground violet-eared waxbills twittered and gathered nesting material.

Across the valley the female buzzard sat on the top of a euphorbia, uttering an occasional call. Far down the Rift the male would respond and if he had a "kill" would fly up toward his mate. As he came near she would call with excitement, fly up the valley, and take the "prey" from him.

I noted that the hen bird would call to the chick before flying toward the nest, and the chick would answer; by the pitch and intonation of her call one could judge whether she was coming with food or not. I became expert, I thought, in thus interpreting the calls, but on more than one occasion I was badly "had," for the cossyphas are first-class mimics and one of them had got the buzzard call off "pat."





RED-TAILED BUZZARD  
Adult at nest with spray of green leaves in bill

I turned my attention to the young buzzard in the nest. The rate of growth in bulk had been rapid, but the feathering had been comparatively slow. A young goshawk at this age would be active, and very much feathered, and capable of tearing up its own food. Here was a marked difference in two "birds of prey." Whereas the goshawk tore up food given to it, the buzzard merely mouthed birds the size of a sparrow or a rat until they were flaccid, and then swallowed them whole.

It was now well after noon and the next meal or rather titbit was due to be brought. The young buzzard was moving; tired of dozing he would on occasion nibble at a twig; tossing it up he would seize it in his feet as it fell. While he was thus engaged, the hen called from across the valley; the youngster was all alert and scrambled to the edge of the nest. The parent landed with a lark. The head was ripped off, the youngster took it, and down it went; then followed the rest, bit by bit, feathers and all.

At five weeks, there was considerable advance in the plumage: there was only a narrow line of down between the mantle and the scapular feathers, and the head was well covered except for a patch on the back which corresponded to the diamond-shaped white patch of the down stage; the tail was now three inches long, gray-and-blackish-banded, with just a slight rufous tinge; the breast and flank feathers were growing apace and these were distinctly rufous, with dark streaks at the sides of the lower throat and another series of dark streaks on the lower breast; the feet were now yellowish, but the cere at the base of the bill was greenish-yellow; the eyes were gray-brown. The body size was not much more than at a month, but the bulk seemed bigger, owing to the feathering. The youngster was now spending a considerable part of the day standing up and preening his feathers, stripping off the burst quills and eating the sheaths. At six weeks the whole of the back was blackish with just a few pale or rufous tips to the coverts and scapulars; the tail was markedly banded but showed little rufous except on the upper tail coverts; the secondary wing feathers were slightly banded; the crop area was still in down. He had now begun to move about the branches in the immediate vicinity of the nest.

At eight weeks, he was fully feathered but still in the nest. He now resented any handling and would throw up his wings, lean back on his tail, and strike with his feet if one came near him. His wings were now grown beyond the length of the tail and he would soon be ready to take his first flight. At the end of nine weeks, he had left the nest and taken to the branches of the tree, and the nest was vacated at the end of ten weeks. And so the young buzzard was now under training against the time when he would be left to his own resources.

Weeks of close observation revealed that the food brought to the young consisted of rodents of various species (the main food), lizards, weaver-

finches, a lark, and one immature francolin—nothing to warrant the “shooting at sight” which this bird is subjected to in many places.

Reference has been made to the placing of fresh vegetation in the nest during incubation and during the nestling period. One naturally inquires into the significance of this trait. It is common practice among most raptorial birds, especially during the egg stage and the early chick stage; it is equally common among the colies. Is it done to keep up the moisture content of the nest during the egg stage? for coolness? to keep the nest clean? All these may be contributory factors. It has also been noted that twigs were placed to conceal the eggs from the hide. This appeared deliberate, for the hen took a spray from the right and placed it on the side nearest the hide. But we have also noted in this species, as in the case of the hooded vulture, that under stress of excitement, twigs and sprays are broken off, held for a while, then dropped or even brought to the nest side but *not* placed in position. It is a definite response to a stimulus to protect.

These buzzards appear to have few enemies except man; a few eggs are taken by ravens or crows or baboons, but I have no records of adult birds being molested by larger birds of prey. The species ranges throughout eastern Africa and may be termed common in comparison with other Raptores. Each pair maintains its own territory during breeding and off-season, and the distribution of these territories is such that one seldom sees disputes between rival pairs.

There is usually some vantage point from which these birds scan the country. It may be a solitary tree on the slope of a hill, a particular tree along a watercourse, or, as often happens, a telegraph post.

The food for the most part is confined to rodents, but small birds are also taken, usually those which frequent the ground or feed near ground level. I have not witnessed a buzzard stooping at a flying bird, but they take most of their victims on the ground. They usually hunt from a stance, but on occasion they will circle around and drop on any likely victim. They are experts at flying into the wind; taking advantage of air currents they remain poised, with wings hardly seen to move, until an opportunity offers and they drop with feet drooped and talons ready to seize their prey.

Melanism, both complete and partial, is not uncommon in the species. The characteristic rufous tail of the adult is not usually affected by this increased pigment. Not infrequently one may note a normal bird mated to a black one, or more rarely two black ones paired. In either case, the young may be normally colored, or one or both may be melanistic from the time of hatching. I have no record of one melanistic and one normal chick in the same nest, but such is certainly possible. Melanistic young are usually a sooty brown-black and do not assume the jet black plumage until they are nearly eighteen months old. The characteristic barred area in the second-

aries of the wing is also a stable feature, even in melanistic birds. So-called normal young may have the pale lower surface pure white with black at the sides of the throat and lower breast, or the ground color may be rich rufous; thus both phases are very different from the adult plumage.

The molt from first nest plumage to the subadult commences at nine months. The rectrices are shed in pairs; the corresponding flight feathers on each wing are replaced, and this gradual molt and replacement goes on for some six months. A general body molt starts at twelve months. It is most noticeable on the breast, for the juvenile spotted plumage gives way to an immaculate white except for the black-tipped throat and upper breast feathers. The mantle change is less noticeable. The subadult plumage is complete by eighteen or twenty months. After this the adult plumage is gradually assumed, and it is not complete until the bird is  $2\frac{1}{2}$  to 3 years old. A buzzard takes a whole year longer to assume adult plumage than the kites (*Elanus* or *Milvus*).

## RED-BREASTED SPARROW HAWK

*Accipiter rufiventris* Smith

On January 4 a young hawk of this species was seen in the sanctuary. He was obviously not long from the nest, though all traces of down had gone. He made fruitless attempts to catch up some little chickens that were feeding near a drain by a stand-pipe. Young hawks are very partial to trickling water, and this youngster was no exception. Having observed that he frequented the water at about 2:30 each day, I placed a piece of raw meat on the stand-pipe. He soon detected it and pounced down upon it. The hawks do not drink this water. They stand or even lie down in it, but they do not splash and bathe as do other birds.

The following day we captured the hawk in a baited trap and placed him in a large raptorial nursery where I keep young birds of prey. He had for company a young goshawk, two young black-winged kites, and a gabor goshawk. This nursery is a very large room with wire-netted windows, plenty of perches to rest on, and as much food of various kinds—rats, mice, and raw meat—as the inmates can deal with. They are extremely tame. They take food from one's hand and come and perch on one's shoulder.

Later that evening, the call of another young hawk was heard. I soon located a youngster similar to the one I had caught up and doubtless sister (a female from her size) to the new inmate. The call of this young hawk differs from that of a goshawk. The full call is "chee-luuiii," and an abbreviated call is just "chee-luuuuu," the "uu" fading away.

The next day, this youngster was in the vicinity of my house, calling incessantly, obviously very hungry. I watched her trying to catch two

plantain-eaters who were feeding in a near-by tree. The youngster was inexperienced; her swoops were weak and slow and lacked directive force. She hung about the house all day, except to follow me into the forest when I imitated her call. She spent the next day around the house, too. The baited trap was no attraction, though she must have been without food for twenty hours.

At about 4:30 that afternoon, I entered a large flight aviary on the front balcony of my house. There were large raptorial birds: a young tawny eagle, buzzards, harrier eagles and kites. I had a plate full of raw meat, and the birds came and took their portion from my hand. One red-tailed buzzard eighteen months old took her share and proceeded to tear it up and feed. A portion of her perch projected through the large mesh wire to the outside. The young hawk had come into a large tree overlooking the aviary, and the sight of others eating their meat was too much for her. She came and alighted on the outer portion of the perch on which the buzzard sat. She went on feeding. The hawk came close to the netting, stood, turned her head from one side to the other, and her mouth watered. The buzzard took no notice. Suddenly the hawk shot a leg through the wire and grabbed the meat; almost at the same moment the buzzard shot out her right leg and caught the hawk by the neck. Neither would let go; they remained at grips for several seconds. I went hurriedly toward them, and the buzzard let go. The hawk dropped, picked herself up and glided weakly to a tree. Not a sound had been uttered during the struggle.

About half an hour later my fowls gave a warning cry, so I went out to investigate. The hawk was in the tree above the aviary. The buzzard was on a high perch in a corner. The hawk eyed her, with head down and wings slightly out from the body; then she whistled and dropped straight down onto the buzzard, striking the wire forcibly. She stood on the top rail of the cage infuriated, and made grabs at her enemy beneath. She was hungry as well as revengeful, but hunger was the stronger. She spied the remains of a mongoose on which the tawny eagle had fed that morning, and tried in vain to claw it out through the wire netting. She was so engrossed in her endeavors that she didn't notice that I was standing over her. I whistled, and looking up she saw me and made off. She was round about the house at about 9:00 A.M. for the next two mornings. Then she flew off.

This led me to speculate as to how long it usually takes a young hawk to develop efficiency at taking prey after it has been driven off by its parents. Neither of these youngsters was at all efficient, and both were extremely hungry; almost as soon as I turned the first into the flight room, it had come and taken a double ration of meat from within a foot of me.

On January 19 the young hawk was noted on the east boundary of the forest. She was on the ground eating a large scarabaeid beetle. Poor fodder, but something! Next morning I gave the usual signal after baiting the trap. She appeared. She saw the meat and actually alighted on the trap and tried to claw the meat out, but she would not come to the entrance. She made numerous attempts to get the food, then flew off. I received no response to my calling the next day, but I saw her on the far side of the forest, and her crop seemed full.

On January 28, on my way to the kites' nest, a few scattered feathers attracted my attention. On an inclined trunk of a large tree were more feathers, among them many rufous ones; two wings and some tail feathers lay on the ground. It was obvious that the young hawk had met her fate by the bill and feet of some bird of prey.

### EAST AFRICAN GOSHAWK

*Astur tachiro nyanzae* Neumn.

(Included in *A. t. sparsimfasciatus* by Sclater)

This account concerns the doings of a pair of goshawks, chiefly during the nesting season 1944-45. They first became known to me in the spring of 1938; around my forest sanctuary the pair were often seen hunting through the dim-lit mid-growth, or were heard calling, as one or other circled high, with occasional wing beats, over the forest. Their nest was not located, but by their general behavior I knew that they had their home hereabouts.

In the latter part of 1939, while I was building a small dwelling in the midst of the forest, the goshawks were much in evidence. A small outdoor aviary at the edge of the forest clearing was stocked with small finches and these birds proved a strong attraction for the goshawks. They were not infrequently seen trying to capture the small inmates.

Without my knowledge, the male goshawk was shot, but the female would not desert. She remained in the forest, and later on I discovered that she had a nest with full grown youngsters almost ready to fly. They vacated shortly afterwards and eventually dispersed, but the mother bird remained on. Toward the end of 1940 she was still about with a new mate.

In May of 1941 the pair were seen carrying twigs, and it was not long before their nest was located on the southern boundary of the sanctuary. The nest was a large structure of branchlets and twigs placed toward the canopy of a thick-foliaged tree at the end of a stout horizontal branch. So thick was the foliage that the nest could only be detected from one point. Twigs dropped on the path gave the clue to a possible nest above, so we kept watch and saw a female goshawk rustle into the treetop.



EAST AFRICAN GOSHAWK  
Male and female at nest

A newly completed nest was found in the tree, but as yet it contained no eggs. The first egg was laid on May 7, the second on May 10—small eggs for the size of the female bird, measuring  $43-45 \times 35$  mm., and white in color, with obscure brownish blotches scattered over the general surface, with a slight concentration at the greatest diameter. The hen bird brooded closely and only left the nest occasionally (an average of twice a day) at irregular intervals. She sat tightly even when the tree was ascended every second day after the first fortnight of incubation. She then slipped off with a downward, then upward flight to a tree a short distance away, to return almost immediately.

The first egg hatched on June 3; the second remained a further four days in the nest and was then pushed aside. It was found to be infertile and addled. Thus, the incubation period was approximately 28 days. The

chick was covered in white down except on the abdomen, which was bare. The bill was blackish with the basal area yellowish; the feet were yellow.

A fresh lining of mistletoe and *Maba* leaves had been added to the nest. It had been noted on each inspection of the nest prior to the hatching of the young, that fresh green vegetation was always present in the nest, predominantly *Maba*, with odd sprays of *Olinea*. A hide about twenty feet from the nest was placed in a near-by tree.

Two days went by and the watcher reported that the parents visited the young with food regularly, but at fairly long intervals. The hen bird brought food at 7:00 A.M. and remained at the nest for sufficient time to tear up the meal and feed the youngster. Her next visit was at 9:00, followed by a third at about noon. Toward 2:00 P.M. she came again and stayed at the nest brooding the chick. The male arrived and deposited food near the female, and flew off. The hen left at about 4:00, and came back toward 5:00 and brooded. On the fourth day I entered the hide but the birds were shy and the results unsatisfactory. Two rats had been fed the young.

Once the chick had received his major morning meal, the female was content for long periods to sit within sight of the nest but hardly visible. She came into the tree from one direction and took up her stance. The male provided some of the food but took no part in dividing it up and feeding the chick. The next day I entered the hide at 8:00 A.M. For hours no bird came. Then the male dashed in, dropped a rat on the nest, and was gone. Finally the female came, fed the rat to the young, then stood a long time nearly motionless and left.

Next morning saw me early in the hide. A perfect sunrise in a bright clear sky illuminated the nest with a lateral slant. As before, the male made a swift visit and deposited a rat. The chick called to be fed, but his father slipped away. Within half an hour the hen alighted on the nest. She ripped the rat open at the neck, placed it between her feet, tore the head off and dropped it in front of the youngster, who had stood looking on and uttering a low plaintive whistle.

He sat on his "haunches" as it were, with the rodent between his claws, and began to pull and tug; the skin would not peel off. He then released his foothold, tossed the rat about, and got it side on in his mouth. Frantic jerks and attempts at swallowing ensued; all in vain. Then he got it tail on, but the tail turned outward and got in the way. The mother leaned forward, took the rat, and dropped it at the youngster's feet without uttering a sound. He tried again to tear it up, but without success. He then by accident caught it by the shoulders and jerked it up. That felt more promising, so he jerked it again and gradually it began to disappear. He got it down,



all except the tail; this dropped first on one side of his mouth, then the other. By dint of perseverance and much swaying of the neck, the weight of the body gradually descended, the tail straightened out, and the rat disappeared.

The parent, meanwhile, stood by and looked on, offering no assistance. The rat disposed of, the youngster settled into the hollow of the nest; the parent stood motionless or looked about slowly, never shifting the position of her body or feet. How long she would have "stayed put" I don't know; certainly over an hour passed and she exhibited no signs of activity. It was not until I called to the watcher to move that she became alert and dropped swiftly from the off side of the nest.

She came once again shortly after 1 P.M. and stood huddled and quiet at the nest side. The male paid a further sudden and fleeting visit and disappeared. There was never any great activity except on the part of the chick when food was brought or the sun became too hot; then he restlessly moved from one part of the nest to another, seeking the shade from the foliage above. After 5 P.M. my watcher observed from below. He reported a substantial meal, usually a full-grown rat (*Arvicanthis* sp.) or a rat-mole (*Tachyoryctes* sp.), just before 6 o'clock—something for the youngster to sleep on. The hen sat by the youngster throughout the night, while the male roosted in a thick-foliaged tree near by.

At three weeks the chick took on a definite hawk carriage and appearance. Feathering commenced as a V between the shoulders, mottled black and white. Then the wing quills showed plainly and the tail developed, the tip of each rectrice bearing the down plume. The crown and breast feathering became apparent and the youngster was now able to stand upright on his feet and balance on one leg as he preened himself. It was noticed that he swallowed the feather sheaths and down as he preened the growing quills. At a month old he was well feathered, but he retained a ring of down around his neck, and patches of down still showed on his breast and rump. The breast was buff, more rufous on the flanks, and heavily mottled with black, with circular and drop-shaped marks. It was of the less common rufous phase of nestling plumage; most young have a white ground to the under surface.

During the next two days, the parents visited the young at very long intervals. So the following day the watcher was stationed at the foot of the nest tree shortly after dawn with instructions to make himself conspicuous should the birds turn up with food, and to try to keep them off for an hour or so. I took up my position just before 8 A.M., having received the report that both male and female had perched on a tree not far from the nest, each carrying some sort of prey.

I had not long to wait; the male came silently, and swiftly dropped his offering, a full-grown rat-mole (*Tachyoryctes* sp.) and went off. The youngster set to and demolished the greater part of the rat. An hour later the female flew in and landed on a branch above the nest. She herself had evidently eaten the prey she was reported as carrying.

There then ensued a long period in which the hen stood comfortably above the nest watching her offspring. As the sun rose higher the youngster became restless and wandered about the nest. He preened himself and flapped his wings. Once he was carried off his feet to a branch by the nest. I think he got a fright, although he managed to clamber back to the nest and lie down. Soon reassured, he started moving around again, when suddenly the male glided swiftly to the nest, and the youngster crouched in front of him. He brought nothing, but took away the remnants of the rat—the skin and part of the hind-quarters.

The female eventually left at noon, returning again at 4 P.M. with a skink which the youngster swallowed whole. The mother then stood almost in the same attitude for an hour. She was brought to the alert as a dark shadow crossed the nest; a crested hawk-eagle, who was building farther down in the forest, sailed over and perched on a tree above the hide. The female assumed an attitude of defense; she puffed out her breast and flank feathers until she appeared twice her size and shrieked defiance at the larger bird. The hawk-eagle looked down and uttered his absurd call, like the note from a cheap toy whistle, and carried on to his nest. The mother resumed her slack pose and stood silently on one leg for another hour. During this brief episode, the youngster crouched in the nest.

I repeated the same tactics next morning and witnessed the first meal, a large rat, brought this time by the female. She alighted on the back of the nest and after ripping the rat open placed it in front of the chick. She made no attempt to help the youngster to dismember the prey—merely stood and looked on. The youngster was having difficulties with the rodent and several times over-balanced himself, falling sideways into the nest. He was doing his best when the male flew in, seized the rat in his claws, and ripped the skin off with his beak. It was done in a flash—one foot on the head, one on the flanks, and the rat was stripped from neck to hind-quarters. This done, the male departed as silently as he had come.

The hen had stood back, seemingly ignoring the whole action. The youngster fed, she dropped off the nest, to appear again toward noon with a nestling bulbul. I left but returned the next day and made further records. A quail was the first meal brought in; at noon came a lizard, followed in the late afternoon by a rat. The female repeated her previous day's attitude of silently standing at the nest or on the branch above.

The next two days my watcher reported one large meal early in the morning, a small offering during the day, and another large bird or rat toward 5 P.M., as the rations for that day.

Three days later, I took up my observation once again. The parents behaved as they had done on previous days. On most visits only one parent arrived; it was seldom that the male came to the nest while the female was there.

The youngster was now just over a month old, almost fully feathered and very venturesome. It was not unusual for him to perch on the branches around the nest site, but he received all his food at the nest itself. I noted remains of the morning meal in the nest; fresh green vegetation had been added.

At noon the youngster flapped his wings, then tried their lifting power. A few inches off the nest! Then up to the branch above it! He looked around, saw his mother on the nest side below, and rejoined her. But he grew restless again; up to the branch above he went, then along it to a farther branch and so on to one overlooking the plains beyond the forest. He preened himself, stroking his feathers; ran his bill through his wings and tail; stood on one leg in the sunshine, and surveyed his surroundings. Meanwhile the mother stood at the empty nest, for some time, then went off suddenly. An hour went by; then she returned and put a young bird already plucked at his feet. It was dealt with in a few moments.

The female dropped into the forest mid-growth. Two hours passed and all was quiet. Then the alarm note of the male from a high tree to the right, "whit-whit," short and sharp, brought the youngster to the alert. He drew himself in with feathers closely compressed to the body, and "froze." A shadow passed over. The hawk-eagle had sailed by!

At 4 o'clock the female came to a branch above her offspring. She gave her long-drawn call, "wheet, wheet," and went off. Having again fed the young one at about 6:00, she went into the thick foliage above the nest and was joined there by the youngster, who had flown up from branch to branch. He no longer required his cradle.

Possibly owing to the unusual attention paid to them at this nest, the goshawks went farther afield for their second brood and constructed a new nest just across the northeast boundary of the sanctuary in an adjacent patch of forest; but they continued to hunt in the sanctuary.

The youngster then reared (and again there was only one, one egg being infertile) came into my hands in a strange way. It had not long left the nest and was in the "learner" stage as far as swooping after prey was concerned; in making an attempt it collided with a tree and fell stunned. A friend of mine witnessed the incident and brought the bird to me. It was still dazed

and almost unconscious. It lay practically immobile for twenty-four hours. The following morning it was standing up, rather groggy on its feet, but showing every sign of recovering. It was fed in the evening on a portion of a mouse. Next morning it was brighter, and grabbed eagerly at a piece of raw meat offered to it. I kept it to study its molts. It was eventually turned into a large room where other nestling raptorial were kept, with ample space to fly and take exercise. It took readily to its new surroundings and was quite at home with the other birds.

In the spring of 1942 the parents returned to the sanctuary and built on the eastern boundary, in a tall thin *Maba* tree with a thick canopy. They raised a brood of two successfully.

Before they commenced a second brood, Fate stepped in, and once again the female was widowed. It happened thus: the male was very bold and not infrequently swooped at broods of domestic chicks around the house. More often than not, he secured a victim. A new brood had just been turned out on range; he espied them. He alighted on a tree at about 40 feet off, stood upright, and with a characteristic up and down movement of his head he judged the distance. He swooped straight as an arrow and got his talons into a chick but not quickly enough to avoid the irate mother fowl, who dashed at him. This charge upset his upward take-off and he took a line to the left, to what appeared to him to be an opening. It was a large plate-glass window directly facing the windows on the opposite side of the room. He crashed head on, dropped like a stone, and lay dead. I heard the female calling in the forest for a day or two, but soon the familiar whistle ceased.

The spring of 1943 found her still without a mate. She was often seen and heard flying high above the forest with a slow circular flight interspersed with a few wing beats, as she uttered the far-reaching "which which" call. I could find no evidence of a second bird until late in the autumn, and then at last I found that the pair were busy reconditioning the nest on the eastern boundary. Two eggs were laid and two youngsters raised.

In March of 1944 the pair seemed to desert the sanctuary, but toward June both birds were back again, not as residents but purely for hunting. They had nested in a patch of woodland not far off, where a nest with one egg and one youngster was later found. They raised that youngster, and in due course I took the unhatched egg and found it to hold a fully formed but dead chick.

The goshawks were again in the sanctuary in July as residents; their offspring had been sent about his business. I wondered if they would re-occupy the old nest to the eastern boundary, but inspection showed it in use by hooded vultures.

I have recorded elsewhere that the end of 1944 gave evidence of most unusual breeding activity among the birds of this area; it was during the check up of activity in the sanctuary that I at last located the nest of the goshawks within a stone's throw of the house. They had built a new nest, a rather bulky structure, the body constructed of stout twigs some 18 inches long and  $\frac{1}{2}$ - $\frac{3}{4}$  inches in diameter, the inside lined with finer twiglets and the cup with fresh green leaves. The whole structure was two feet across, and nearly three feet through, for it was built in a triple fork. The goshawks had worked silently and unobtrusively, and had completed this large structure undetected by me. I examined the nest; two eggs had been laid and were partially incubated; from past experience I calculated the probable day of hatching and was actually only one day out in my reckoning.

The elder chick hatched two days before the other. Both were covered in whitish down. The legs and cere were pinkish-yellow, and the bill was blackish, with a strong white "egg-tooth." The larger was three inches long from bill tip to tail end. They had hatched from eggs measuring  $45 \times 37$  mm.

The first spell in the hide was commenced at 9 A.M. on January 12, when the chicks were twelve days old. They had already had a meal, and their little crops were bulging; the remains of a weaver bird lay in the nest. It was obvious that the parents would be some time in returning with more food, but one expected that the mother would come to keep guard or possibly brood. While waiting for the parents to turn up, I made notes on the chicks. Apart from the already noted time lag between dates of emergence, the difference in size of the two youngsters seemed to be more marked. It was probably sexual, the larger being the female. The young were still in spotless white down, but there was a graying along the margins of the wings of the elder, for the blood-quills just showed as the wings were stretched. Neither youngster was able to stand upright, but they squatted on their haunches and in this attitude they preened themselves, running their bills up and down the feather tracts. The cere at the base of the bill was more yellowish; so also were the legs and feet, but the "egg-tooth" was still present. The elder chick was full of life, very much on the alert, with shining bright eyes which noted every movement around, even to the swaying of leaves overhead. She occasionally billed a twig or played with a leaf.

More fresh vegetation had been added to the lining of the nest. The smaller chick, although less active, made attempts to stand with the aid of the wings, held downward. The chicks spent most of their time just lolling in the nest, often lying on their sides with the uppermost leg outstretched and the wing spread over it. They seemed very contented and dozed most of the time.

The female arrived after I had been in the hide about half an hour. She alighted about six feet from the nest, eyed the hide for a moment, then stood almost immobile for half an hour. Satisfied that all was well, she flew off into the forest and was absent a full hour.

The chicks meanwhile awakened and moved about the nest, keeping away from the patches of sunlight which now filtered through the canopy. They preferred the shade, except when they deliberately sunned themselves, as they frequently did from time to time, with wings outstretched, or when they lay on their backs, allowing the sun to warm up their almost bare fat tummies.

The mother returned to the nest with food at about noon, alighting on the nest rim. For over an hour, she hardly altered her pose. At 1:30 she flew off. A moment later the male alighted silently on the nest with a small bird in his right foot. It looked to me extremely well plucked, but it had not been decapitated. In turning round to leave, he dislodged the bird from the edge of the nest and it fell to the ground. He made no attempt to retrieve it. Soon the female returned to a near-by tree from which she could overlook the nest, and here she stood on one leg in a relaxed pose and did sentry duty. When a kite (one of a pair with nest near by) flew over she puffed her feathers out and gave a mewling call. At 2:30 she flew off. At 4:30 the male again alighted for a second on the nest, dropped a rat, and slipped off. There was evidence from the surrounding trees below nest level that the female was somewhere in the vicinity, being mobbed by small birds.

At 5:15, I heard the clear "whit" call of the male and saw him glide across a small opening in the forest. The youngsters were evidently hungry again, and though they moved about the nest neither made any call nor did they attempt to eat the rat recently deposited by the male. At 6 P.M. the mother arrived with a plucked bird, the decapitated body of a Reichenow's weaver. She commenced to tear it up and feed the chicks, but just then a falling branch alarmed her and she flew off. The chicks pecked at the carcass hungrily but failed to separate any of it. Taking advantage of the mother's absence, I recovered the bird the male had knocked off the nest; it was a nestling coly, just starting to sprout quills along the wing edges.

Two days later I entered the hide again. The young had obviously been fed, evidently before 7 A.M. A shrew's head lay on the nest edge. At 9:45 the female glided silently up to the nest. She had no food. The young had not budged from their lolling positions. The mother stretched forward, picked up the shrew's head, and offered it to the chicks; but they were not interested. She swallowed it herself. At 10 o'clock the male alighted on the near

edge of the nest. He dropped whatever he had brought, and turning, sailed away. His offering seemed to interest neither parent nor young.

The mother stood guard in easy poise; the youngsters slept or preened themselves. Their growth in two days had been amazingly rapid; quills, some of them burst at the tips, were clearly visible on the scapulars, mid-dorsum, back of neck, and occiput. The flight feathers showed plainly on the larger chick, and the tail feathers were also sprouting. Both chicks were now able to stand for a short time without the aid of support by drooping wings. When they reclined in the nest, I noticed that they kept shaking their heads as the mother was now doing. I looked more closely and saw mosquitoes buzzing around them. Some had drawn blood. Again the male arrived at the nest. He had both feet full. He handed one bird to his mate, the rest he dropped; then he left. The prey consisted of three nestling serine finches (*Poliospiza* sp.), two of which the female fed to the young. The third bird the female held in her bill. Thus she stood for two hours. At 4 o'clock she stirred, ate the head of the young finch, fed the body to her young and left.

I left the hide at 5:30, and stationed a boy to watch. He reported that the hen had returned at about 6 o'clock with a rat, so the youngsters' diet for that day, January 14, had been: 1 shrew, 3 nestling finches, 1 rat.

On January 15 my "watcher" reported a meal at 7 A.M., a bulbul brought by the male. The hen had arrived at the nest at about 9:15 with no food, but she had fed the chicks with the bulbul. She had stayed until noon. The male had returned again at 11 o'clock with a lizard. No record was kept for the afternoon.

On Wednesday, January 17, observation was maintained from the ground. The food brought, up to 4 o'clock, had been: one rat (*Arvicanthis* sp.), brought by the male at 9 A.M. This was fed to the chicks by the hen, who arrived at the nest at 10. She flew off after an hour and returned at about 2 P.M. with an unidentified bird. At 2:30 she was joined by the male, who brought a pipit (*Anthus r. lacuum*).

Next morning just before 8 A.M. I went into the hide. The boy reported that no parent bird had been to the nest. The chicks had not been fed. Four days had made a vast difference in the youngsters' appearance; the elder of the two now showed sprouting feathers on the crown, the back of the neck, and both sides of the breast. The scapular quills were now burst at the ends for more than an inch, the wing quills were open for 1½ inches, and bursting quills were present on the covert regions; the tail was now almost 2 inches long. She was now able to stand upright and flap her wings without toppling over. The younger bird was not far behind, but he was less steady on his feet.

Soon the male alighted on the nest with a small bird, a fledgling. He brought it in his left foot; he put this forward toward the larger chick, released the victim, and went off. The youngster put the bird under her feet, sat down on her haunches, and commenced to tear portions off and swallow them. The smaller chick tried to secure a morsel, but the other turned her back on the little fellow, who thereupon sank into the nest. This first victim was a nestling weaver finch of some sort (*Spermestes* sp.) and within a few moments the male came to the nest with two more nestlings, one of which he pushed toward the younger chick; the other he placed at the nest edge. Ten minutes later, the male arrived again with two more weaver finches. Obviously he had robbed the nest of its entire contents, five nestling birds just quilling.

The larger of the two chicks "put away" two of the finches. The little brother managed one and was still struggling with a second when the mother turned up. She helped her offspring with the meal, then stood at the edge of the nest. Two kites flew over the nest site and circled around. The mother crouched and puffed out her breast feathers and raised those on her back and screeched. At the first note, the young crouched low in the nest. The kites flew off, and the hen resumed her relaxed pose; then she moved into the nest and squatted down, resting on her haunches.

She hardly moved for two hours. At 11:45 she got up and glided into the forest. The youngsters were moving about the nest and toying with bits of twig. The nest had had a fresh lining of leaves added—leafy sprays of *Ochna* and bits of mistletoe; in fact, the whole floor and the rim were green with this fresh vegetation. I was amused to see the antics of the bigger chick in her attempts to catch a large black cetonid beetle (*Diplognatha* sp.) which was buzzing around. I have frequently seen this cetonid, and other species, around the bulky twig nests of raptorial birds. The explanation is simple. These beetles lay their eggs, and the larvae live, in decaying vegetable matter, and in the body of these nests are found spots suitable to the development of the beetle larvae. Certain cetonids are found almost exclusively in birds' nests.

Just before noon, the male glided up to the nest with another bird, this time a nestling bulbul (*Pycnonotus* sp.). As on previous occasions, the parent stayed just long enough at the nest to deposit his prey. The female came to the nest tree at 1 o'clock but was frightened away by my dropping a lens hood. She remained away for perhaps an hour, but she was in the near vicinity for the small birds were heard chivvying her. When she returned, she came straight to the nest, and standing on its back edge assumed an easy pose and mounted guard. A buzzard flew over; the goshawk crouched and gazed upward in silence, following the flight of the bird until it was out



of sight. At 4 o'clock she became alert, whistled, and sailed off. She was back at the nest within a quarter of an hour, her feet and bill blood-stained. She wiped her bill on the twigs at the edge of the nest and nibbled her feet clean. The chicks were sleeping off their meal.

From time to time, I have referred to the goshawk as "slipping" off the nest and gliding away. As one sits in the hide at a few feet away, this description fits the action, but a close study shows that after the initial turn there is a slight jump and the head and body are inclined downward so that the "dive" is facilitated. As the bird rises it spreads its wings and tail, and one obtains a brief vision of strong barring, not visible when the bird is at rest. This strong under side barring seems to be of some value as camouflage, for it breaks up the "bulk" when viewed from below and simulates the myriad points of light through the canopy of the trees. It is, in fact, an elaborate camouflage for offense.

I remained in the hide up to 6 P.M., but no additional food was brought. My boy reported that at noon on January 19 the female took a six-weeks-old Rhode Island pullet. She unsuccessfully tried to repeat this two nights later.

The next day I went to the nest tree at 8 A.M. The female left the nest as I climbed to the hide. The youngsters seemed to have had no food as yet, for the crops were flat. Both were now steady on their legs and stood upright. The body of the elder was well covered in feathers, and hardly any down was visible; her tail was 4 inches long, and she frequently "wagged" it, a common trick of the adults, just on alighting. The smaller chick was not far behind in feathering but there was still a distinct V of down on the back; the "egg-tooth" had been shed. The wind had sprung up and at each gust the youngsters faced into it and spreading their wings flapped vigorously. The female came to the nest at 9:15 but brought no food. She sat at the edge of the nest until 4 o'clock, when she became uneasy, peering about, but not until 5 o'clock did she leave. She had not returned by 5:30, when I left, and it was not until 6:30 that I saw her fly past my house with a bird, on her way to the nest. The male was not seen all day.

The following day, I spent three hours in the ground-level observation post. The female was on sentry duty as usual. The chicks preened and exercised and flapped around the nest, but no male put in an appearance. On January 23 I went early into the hide; no bird left as I approached. The youngsters were standing up and preening their slightly dew-damped feathers. Some lichen and a leafy spray of *Warburgia* had been placed in the nest. The chicks appeared not to have been fed. The "mewing" call of the female came from the forest and at 8 o'clock she alighted on the nest, but without food. She was followed almost immediately by the male, who dropped what he had brought and was off in a second.

The youngsters crouched over the victim, with outspread wings. Neither would allow the other to pick it up. The mother took a step forward into the nest and bending forward drew the carcass from below the chicks. It was a large Jackson's chameleon, with horny head intact. She put it under one foot, turned, and flew off with it. Shortly she returned to the nest with the chameleon. It was minus its head and partly stripped of its skin. She set to at once and tearing it up offered portions to each chick. The old chameleon was apparently tough, and it took some time to dismember it. Before she was through with it, the male returned, bringing a young Reichenow's weaver—a tender morsel, not long fledged. He placed it in the nest and was away in a twinkling. The weaver was soon disposed of, and every bit of it went to the chicks. Their crops were now bulging and protruded between the feathers.

It was now 10:30; the mother stood on guard and the youngsters settled down for a snooze. They were comfortably settled, when, without warning, the male topped the edge of the nest with a decapitated young bulbul not long from the nest. Though the young were well fed, they were quite prepared to take more, and bit by bit, the bulbul was served up. The younger chick seized a leg, but the joint flexed as he got it into his mouth; his mother tried to assist, but he turned away. The elder chick saw the foot and pulled on it. Then ensued a tug-o'-war. The mother gave a hand and the chick swallowed the leg with violent efforts.

The mother sat almost motionless until 4 P.M. and only flew off to a whistle from her mate deep in the forest. It seemed that today the male was being attentive; indeed, I noted that he visited the nest before 6 P.M. on two occasions, once with a bird and later with a rat. The young chicks had had a mixed diet: a chameleon, birds, and a rat.

The male may have been taking the day off, two days back, or hunting may have proved difficult; anyway, he had made amends today. The timidity of the male was in strong contrast to the tranquillity of the female. He now adopted an even more abrupt procedure of delivering food. At one time he had alighted just for a moment; now he dropped the food as he passed over the nest.

A word about the youngsters: They were now firm on their legs, lively, and possessed of a fine wing span, for the flight and tail feathers were now well advanced. When flapping their wings they raised themselves above the nest; they danced up and down with evident pleasure in the exercise. There remained a patch of down on the fore part of the head and along the sides, like a tonsure. Their eyes had lost the grayish look and were now dark and expressive. The eyes of the mother always varied in expression with the degree of excitement. On the alert, the pupils contracted yet the yellow of the iris deepened. Fear produced a temporary dilatation, followed

by contraction. The "dressing" of the body feathers also varied with the mood—loose when at ease, close held to the body when alert.

Early in the morning of January 25, just as my fowls had been turned out on range, the male killed a small six-weeks-old pullet. It was heavier than he could manage in flight, so he hopped with it to a large protruding root and having decapitated it stripped it of most of its feathers. His first attempt at flight with the plucked bird proved a failure; he could not gain height. By easy stages he got it into the forest, and by short flights from tree to tree he brought it to the nest edge. The female at once seized it. The youngsters sat on their haunches in front of their mother and eagerly swallowed each bit as given. I stood watching from my balcony. This was about 9 o'clock. I imagined that that meal would serve for the day, but at 4 o'clock the male killed a fledgling trogon and took it to the nest.

Early on January 27 I was in the hide, thinking to anticipate the first meal. But carcasses lay in the nest, one a subadult shrike (*Dryoscopus*), one a male cuckoo (didric). Up to 9:30 neither parent came to the nest. The chicks had not yet fed; their crops were flat. Though hungry, they made but half-hearted attempts at tackling the carcasses. It was a cloudless day but gusty. The wind seemed to excite the chicks and stimulate them to exercise. They flapped with vigor, jumped over each other, and often raised themselves well above the nest. Between bouts of play, they preened themselves. The only part which gave them difficulty was having to stand on one leg and use the other to scratch the quills at the back of the head; they had to droop a wing in order to maintain equilibrium. Among their games was one which could be nought else but "precision attack." They would stand upright, staring at a twig or leaf, then suddenly they would dart a foot forward and seize it, first with one, then the other foot. And so time went on, and the carcasses remained untouched.

About 10 o'clock the mother alighted at the nest. At once the youngsters turned toward her. The younger one squeaked, the elder flapped her wings; they pecked at her feet and showed every sign of hunger. But the mother had come empty-footed. Now followed a display, almost human in character. The mother picked up the carcass and put it in front of the elder chick. The youngster expected to be fed, but mother wouldn't play. She picked the body up again, put it before her offspring, and stood and watched. The chick became sulky, turned her back, and walked to the far side of the nest and lay down, putting her head under her scapular feathers. The younger chick snuggled into his mother's breast. Thus an hour went by; mother was content to wait. At last the elder chick turned round and finding the carcass near her took hold of it and started to tear off small portions of flesh. She was really quite efficient at the game, and the body was fast disappearing. Little brother sat begging for a morsel but

was ignored. The mother bent forward, took what remained of the body, and fed the chick.

The meal over, the youngsters jumped and flapped, often beating the mother's head, but she stood patiently by. While they were thus engaged the male streaked past the hide, over the nest, and away. It was indeed a glancing visit, and I was sure he dropped something. The female had already picked it up—a small, yellow-bellied skink—and placed it below her feet. The chicks arranged themselves in front of her and squeaked. The mother was quick in disposing of the offering; the tail portion went to the elder chick, the rest to the younger. Both youngsters, now full fed for the moment, lay down to sleep; the mother also dozed. About 1:40 my dog came yapping below the nest tree. The hen at first “froze,” then slipped off the nest and sailed to the forest. I stayed in the hide for two hours, but neither parent returned.

Two days passed with short periods of observation from the ground. The chicks did their usual exercise but did not leave the nest. On January 28, another chicken was laboriously taken to the nest. No other food was noted.

I was in the hide on January 29 by 8 A.M. On inspecting the nest, it appeared to be without food. The chicks now spent most of the time standing about and playing with the twigs or preening. They were both feathering well. Soon the female arrived with a large rat (*Otomys*). She ripped the skin open at the back of the neck, severed the head, and partly peeled the body. This done, she turned and flew off, leaving the chicks to fend for themselves. They were soon playing a game of tug-o'-war, but eventually the younger one found it better to sit in front of the other and grab bits as they were separated off. The entrails were eaten, except for the stomach and lower gut. It was a very considerable meal, for I had noted almost full-time foetuses in the body. Then I heard the male take a chicken in the forest behind me, and I found him under a tree, plucking another young pullet. I left the body and found it gone later in the afternoon.

The next morning the larger chick was in the boughs of the nest tree. One of the parents came to the nest with a large rat, and the young in the boughs returned to the nest to feed. In the afternoon, the chick sought the boughs again; it was obviously restless.

I arranged to spend the whole of the next day, January 31, in the hide, and I was in it by 7:30. There was only one youngster in the nest; the other could not be located anywhere. After an elaborate toilet, the youngster commenced to flap around, then to jump from one side of the nest to the other. The wind was gusty and he enjoyed the breeze. He rose with outspread wings and was carried higher than usual and landed on a branch above the nest. He was really excited and kept on peering down at the

nest with jerky movements of the head, first to one side then the other. Now and then he peered at something toward the back of the hide.

The mother arrived at the nest about 9:15 to find it empty. She looked about her and over the edge of the nest, then off she went. I watched the chick and saw him very nervously sidle down a branch and eventually reach the nest. The male arrived shortly after, dumped his prey, and was off. The youngster had crouched low on his arrival, and squeaked; then, as the parent flew, he pounced on the carcass and bent low over it, looking around the while. When nothing untoward happened, he stood up, got his toes onto the bird, and commenced to tear it up. The victim was a female yellow serine. He was about halfway through the meal when his mother turned up. She eyed the chick for a while; then, apparently satisfied, she drew up one leg, fluffed her breast feathers out and went to sleep. Mother and chick dozed, until at about 2 o'clock there was a rustle in the trees behind the hide. The female had become alert. Turning round, I was just in time to see the male pass a bird to the elder chick, who was perched in a tree back of the hide.

Toward 3 o'clock the nest chick became hungry; he approached his mother and nuzzled into her and pecked at her feet, but she took no notice. He grew restless and commenced to jump and flap. He tried to reach the branch immediately over the nest but missed his footing and fell into the nest. The mother turned her head on one side and looked at him. He made an attempt at another branch, this time successfully, and perching on one foot he waggled his tail and seemed mightily pleased. He kept eyeing his sister back of the hide and I wondered if he contemplated flying over. Another hour, and the chicks were hungry; both called, and then the little one dropped to the nest and bending in front of his mother made queer noises. At first she took no notice, but later she stretched first one wing then the other, and turning, glided from the nest. I took the chance to leave the hide.

On February 1, there was great commotion among my fowls, newly turned out to forage in the forest. They were standing round a low tree, and I discovered one of the young goshawks in it. The youngster was early astir, for it was just after 7 A.M. I took the youngster up without difficulty and told my boy to take him aloft to the nest. This was done, but as the boy got level with the nest, the other chick flew and alighted in a tree. The second chick soon joined his sister in the near tree and they were left there. Returning through the wood that evening, I found that another chicken had served as a meal for the goshawks.

I visited the nest tree on the morning of February 3. From the ground level I saw one young goshawk in the top branches and the other in a tree some ten yards off. Later that morning, I rescued one of my chickens from

the mother. She had it by one wing and would not let go until I was almost on top of her. The chicken had suffered but a superficial injury and was none the worse that evening. At sunset, the young goshawks were in the canopy of the nest tree. Their crops were very full, and they appeared to have fared well during the day.

On February 4, I heard my chickens screech loudly and found that the male had his talons in the back of a chick which had rushed under a pile of brushwood. He let go. I picked the chick up; it was the same one I had rescued from the female. There was only slight damage to a wing, so I turned it loose. That evening the female did take a chicken and was plucking it below the nest tree while the youngsters looked down expectantly.

The next day, February 5, the male was seen to take a weaver bird and begin to pluck it. The young goshawks no longer used the nest tree for a feeding stance, but they came back to it to roost at night, not in the nest, but in the canopy above. Since then, I have seen the young being fed on a rat and on a young dove (*Streptopelia semitorquata*). Both are capable of strong flight and on February 10 I saw the larger youngster catch a forest bulbul (*Stelgidocichla* sp.).

Only one youngster was seen in the sanctuary on March 12. It was the small male. Since then, both birds have been noted here and in adjoining woods, but they are now "on their own," for the parents have vacated.

#### SUMMARY OF DATA

1. *Astur tachiro* has been in residence in this sanctuary since 1938, one or other of a pair, or both.

2. They have nested in the sanctuary or in the near neighborhood, in the main constructing a new nest annually; the only exception is the year 1939-40, when an old nest was reconditioned.

3. The breeding season at first sight appears to be somewhat irregular, but the autumn nests may be a second brood and not a distinct "season."

The following is a summary of the data:

Eggs followed by young: 1938, May-July; 1939-40, October-January; 1941, May-July, October-December; 1942, May-July, October-January; 1943-44, October-January; 1944-45, March-June, November-January.

The above suggests that the species is double-brooded, if conditions are favorable, or that under certain circumstances a second period of activity may develop. In 1941 the break was just about two months; in 1944-45 it was at least four.

4. Two eggs form the normal clutch, though on occasion three may be laid. One egg is often infertile or fails to hatch.

5. The incubation period is 28-30 days, with as long as four days between emergence of first and second chicks.

6. The nestling period is at least 30 days or more, but vacating of nest tree may be irregular.

7. Only the female has been noted as incubating. Her spells off the nest are irregular in duration and periodicity. She is fed on the nest by her mate.

8. Both birds take part in securing food, but the major share falls to the male. The female keeps guard at or near the nest.

9. Hunting for food commences shortly after daybreak, but the first visit with food may be delayed. The earliest hour of food supply is recorded as 6:30 A.M. and the visits may go on at intervals until dusk. Food brought to the nest during periods of observation included: birds 31, of at least 13 species; mammals, 8; reptiles, 3.

10. The nest is kept lined with fresh leafy twigs and "beard-lichen," but fresh material is brought with no fixed periodicity.

11. The young remain in the nest tree for some days before vacating for the daylight hours, and they return to roost first in the nest then in the canopy of the tree for some few days, before roosting elsewhere. They hang around the environs of the nest site for a long time, up to two months, then disperse.

12. The parents may start another brood within two months of weaning the young.

## GABAR GOSHAWK

*Melierax gabar* Daud.

A slim gray form with a band of white at the base of the tail streaked past me as I sat under a clump of lemon-scented acacias. I was just in time to recognize it as a gabar goshawk in pursuit of a weaver finch. A few yards down the slope was an old nest of the goshawk. I saw a familiar gray form fly upward into a near-by tree, remain there for a moment, then go off. A few moments later it reappeared from the same direction, this time carrying a twig. A nest was being constructed: a mere platform of thorny twigs in a multipronged fork near the center of a tall, thorny acacia. I watched the structure grow visibly with each visit. The female was doing all the hard work; the male was nowhere in sight though I searched the surrounding trees.

Five days later, what had previously been a platform was now a thick structure filling up the fork and was ten inches through. The female was sitting in the nest but she left at my approach. The nest was still empty but fully completed. Fine twiglets had been laid in the hollow of twigs and on top of this was a thick layer of felted and matted cobwebs. The whole of the

outside of the nest had been plastered over with grayish cobwebs and spider cocoons and flaky acacia bark—a cunning bit of camouflage, for there were many clumps of matted spider-web in this tree and in adjoining ones; moreover, there were living spiders among the outer gossamer, and though they had been transported from their original webs they were busy thickening up the overlay, thus adding to its deceptive appearance. There were no spiders in the felted lining.

Next day there was one egg, bluish-white and immaculate. The date was September 25. A second egg was laid two days later; a third on September 30. The hen was sitting close. At this time of year, the acacias are bare of foliage, and I could note the movements of the bird. As she put off, she left the back of the nest like a streak, diving down over the edge of the nest and almost reaching the ground before she sailed upward into a branching tree a little way off. When she returned to the nest, the flight was very similar; dropping out of the tree she glided downward, then sailed upward into the middle of the nest tree, alighting at the nest edge with closed wings. There was no final upward lift of the wings to “brake,” such as one had noted with the black-shouldered kite or the tawny eagle. It was a clean take-off—a downward glide of infinite precision, ending in an upward tilt which brought her exactly to her destination.

I built a hide in the nest tree, just overlooking the nest. It was completed on October 23. The bird showed no resentment to the hide, only 20 feet away, nor did she voice her uneasiness by uttering her not unmusical note, “twee twit twee twee twee twit.”

Early on the morning of October 25 I entered the hide. The female's return to the nest was quick, unexpected, and silent. She settled down comfortably, drew her head down between her shoulders, closed her eyes, and dozed. The nest was somewhat open on all sides, and although there was hardly any depression to the center of the nest except that made in the thick, felted, cobweb lining, she sat so low that her wings blended into the gray of the cobwebs, and she brooded snugly. I roused her by imitating the call of her mate. She was all attention immediately and answered the call, looking in all directions; then she stood up and dived off the edge of the nest. She returned in a very short time and settled down to incubating.

On October 26, the date on which I expected the first egg to hatch, I again visited the hide. As I drove up to the tree the male bird left from the far side in a downward curve and flew up into a thick tree a few yards off. Arrived under the tree, I looked up at the nest; the female was sitting tight and did not slip off as usual. I climbed the hide-tree and it was only as I got level with the nest that the hen dropped off the back, uttering a sharp, whistling note. I sent my watcher up to the nest to report the condition of the eggs. One showed a slight raised spot toward the larger end; it had just



started to hatch. In a few moments the hen returned to the nest and settled down, turning the eggs and working her long legs to either side of them. She had called just as she came to the nest, a sharp "chirip chip chip chip chip," but thereafter she was silent.

She resumed a quiet pose but soon she again became anxious, and I heard a beat of wings as a large bird landed back of my hide-tree. The goshawk was off her nest in a flash, streaking past the hide and away to the rear. A call sounded and I saw the little goshawk in full pursuit of a buzzard, diving at and chivvying it away up the valley for about 500 yards; then she alighted in a tree. Shortly she was back at the nest. This time she looked about her before stepping forward to the eggs and sitting down; she kept on the alert for quite a while. A dark shadow passed over the nest tree and she was up and away. Whatever the bird was, he had no peace, for both male and hen goshawk chivvied it to the accompaniment of shrill whistles, which were finally lost in the distance.

She was back on her eggs in a few moments, but extremely restless, turning around and sitting for a while, then changing her position; half standing up she would bill the egg that was hatching, then draw it under her breast; the other two were rolled to her flanks.

The chick was noted as hatched and fully dry on the morning of October 29, and the eggshell removed, but the youngster had not been fed. It had doubtless emerged on October 28, just over thirty days from the date of laying. It was buffy-white in color, with yellowish-white legs and yellow around the base of the bill. The tip of the bill was black. Even at one day old it was quite active, holding its head up well and crawling around the nest. When it slept it lay on its side with one leg outstretched.

As there had been only some two days between the laying of the first and second eggs I anticipated that the second chick would be hatching about November 2, so I visited the nest on that date.

Chick no. 1 had already grown considerably and was distinctly paler than before; the buffy tinge was almost gone and the beady black eyes were fully open. It resented being picked up and examined. The second egg was light and showed signs that the chick within was attempting to break a point in the shell.

The hen had slipped from the nest when I started to ascend to the nest, but she returned within a few moments of my concealment in the hide. As she alighted she turned the chick over and billed it gently; then, stepping into the center of the shallow saucer depression, she drew the eggs below her and pushed the chick under one wing. She was a fierce-looking creature; her crimson eyes, set deep below a dusky streak, glinted as the sun shone on them, but her actions toward the chick and eggs were gentle.

She had brought no food to the chick, but when I had examined it there was evidence that it had been fed late the previous afternoon.

The hen brooded quietly, except for abortive snaps at a bee which buzzed above the nest. I heard the male call; his note was fuller than that of his mate and had a decided trill toward the end. This was evidently a signal, for the hen left the nest, returning within a moment with a piece of meat in her bill. Inserting the claws of the inner toes into it, she tore off small portions and fed the chick. As each little bit was given it, it made a chirp note. The meal was soon over, and the parent sat down to brood the two eggs, leaving the chick at her side. I remained in the hide until 1 P.M. but the male failed to appear.

My next visit to the nest was on November 9. Chick no. 1, now 12 days old, was mottled or spotty. Her quills were showing through the down but none had actually burst at the tips. No. 2, who probably hatched on November 4, was active and sat up on his haunches while I had a good look at him. There was a difference in the color of the legs and gape and cere of the two chicks; these in the elder had now deepened in shade to a salmon color. The remaining egg showed signs of chipping.

The hen was not at the nest when I arrived. I waited half an hour before she turned up, carrying the plucked carcass of a pipit in her talons. She stood on the prey at the side of the nest and commenced to tear it up. She gave the soft flesh to the chicks with no discrimination but held the portion in her bill as she lowered her head and allowed one or both to take it from her. When a piece of meat with a large bone was separated off she swallowed this herself. Chick no. 2 was soon satisfied, but the elder sat on her haunches and took all that came along. When most of the soft parts had been finished, the parent rapidly dismembered the rest and swallowed it, leaving only the fore part of the skull and beak. She then passed her bill along her talons, wiped it against the twigs of the nest and stepping forward drew the remaining egg below her breast, leaving the chicks to move about.

It was now 9:30; the sun was hot and shone onto the nest. The chicks moved to the shadow of a branch, but as an hour passed and the sun beat down the parent raised her body and half stood; keeping the egg below her she cast her shadow over the chicks, increasing it by partly raising her wings from her body. She put her head down twice and billed the egg, and I thought I heard a faint cheep.

The youngsters were astonishingly rapid in their growth. On my next visit, November 16, the elder showed considerable feathering. There was a triangular patch on the mantle, the scapulars were now half an inch long out of their sheaths, the wing quills had burst for over an inch, and the tail



## GABAR GOSHAWK

Adult at nest containing two young

was now fully an inch long. All these feathers had the down tip still in position. The "egg tooth" was still present but reduced. The remaining egg had not hatched and I found on examining it that the chick was dead inside. The egg had been pushed to a far corner of the nest. The youngsters had had a full meal and were dozing in the nest; the hen was in a tree near by, but during the course of an hour did not visit the young. It was obvious that the chicks required no further brooding and that the hen was content to watch over them from a distance.

On November 20, four days later, they had grown considerably in size and were feathering rapidly. The heavy rain storm that had been blowing up broke as I watched the nest. The young crouched in one corner huddled together, but the parent did not come to shelter them. She was standing upright with feathers drawn close and head down between her shoulders in a tree twenty yards off.

I started off early next morning, November 21, and was in the hide by 8:30. There were no signs of either parent at the nest, and the youngsters had not been fed. Their crops were flat, and they were both standing up, calling impatiently, yawning, and generally filling in the time of waiting by preening the now fast-growing quills of their wings. As a piece of quill sheath was removed it was swallowed.

The chicks presently became very excited and watched intently in one direction. The hen had come into a near-by tree and was plucking an Isabelline wheatear. When the carcass was practically naked she took it to the nest, tore off portions, and fed the chicks. This time, bones and flesh were given to the young, the parent eating none of the meal herself. It took exactly seven minutes to divide the wheatear and serve it out.

Wiping her bill on the nest twigs, the hen turned and dived off the nest. The chicks stood with bulging crops; they occasionally moved their necks from side to side and up and down, adjusting some portion of the meal that was pressing too hard on their windpipes. They had ceased to call. First one, then the other, went to the middle of the nest, and bending their legs at the "knee" sank down and lay quiet. They were going to sleep that meal off their chests.

In about an hour they stirred. The sun was beating down rather strongly, and they moved to a part of the nest where a branch cast a shadow. They kept in that shade, following it from time to time as the sun altered its position. Toward noon the shade had gone and the youngsters sat up, then stood, stretched their wings over one leg, flapped, and began their toilet. They seemed to follow each other's movements, for what one did the other copied. The elder chick, now with decided feathering on wings, back, and sides of chest, flapped around vigorously, holding fast to the twigs of the nest with her now strongly grown talons. She nearly overbalanced but recovered in time. The bulging crops had disappeared and the youngsters were ready for more fodder. At 1 P.M. the female came with a portion of a rat (*Epimys* sp.), the first time I had noted any food other than birds being brought. It was soon apportioned and she left.

The youngsters stood about the nest for a while, adopting an attitude common to many of the Raptores; putting the weight of the body on one leg, the other would be dropped from the hips so that the "knee" rested on the branch and the lower part of the limb projected forward. It appears to be an attitude of relaxation for the leg. After the leg had been rested thus for a short time it would be drawn up and flexed upward until it was covered by the flank feathers. Thus, standing on one leg, they would remain for a while; then, stepping to the body of the nest, they would lie down with heads drooped over the edge. Tiring of this position they would

lie on their sides with one leg outstretched and the wing on that side loosely expanded, a pose of complete relaxation and rest.

There was a clump of lemon acacias not far off and I went to these. Before reaching them I disturbed a small flock of weaver finches and as they flew out from the middle of one of the trees, down swooped the male goshawk. He seized a bird and continued his sweeping flight into another acacia. It was done in a flash. I watched him pluck the bird and eat it. I was glad to have seen this male for even a few moments; previous sight of him had been mere fleeting glimpses as he dived out of one tree into another—a truly elusive creature. I longed to catch him at the nest for I was sure that he took his share in feeding the young at some period during the day.

My bi-weekly visits to the nest were interrupted for a week. During this period the young became covered in finely barred feathers and the type of plumage was noticeable. The young of this species present two different phases of dress; one is pale below, the other rich rufous, and I wondered which of the two these youngsters would present.

On November 30 a co-worker spent a few hours in the hide. His report at the end of the day gave ample proof of the extremely rapid growth which takes place during the last week of the nest period. Nestling no. 1, fully feathered except for a small patch of down at the forehead, had vacated the nest for the surrounding branches; no. 2, not so advanced, was still by the nest; fortunately the nest was still in use as a feeding stance and a resting place. The male had paid a fleeting visit, but the female had come about 11 A.M. and fed the youngsters, who clambered back to the nest on her arrival.

On December 1, just at 9 A.M., I climbed into the hide and studied the sole occupant. His crop was flat, and every now and then he called; obviously he was hungry. Presently the elder chick put in an appearance; she fluttered down from the leafy branches above and joined in the appealing call for food. The change which had taken place in a week was remarkable. Gone were all signs of down on the back and breast, although a few terminal down spikes were still attached to the tail feathers; she (obviously this one was a female judging by size) was rufous, with dark streaks on the head and rich rufous on the chest and flanks and abdomen. The former was streaked and the latter were barred. The back was dark ash-brown and the tail was well grown and broadly barred. The secondary feathers were gray, set in an area which had a bluish tinge. Alert and every bit a "bird of prey," she hopped about the nest, then onto the branches near by, took short flights, and once came into the branches above the hide. Returning to the nest she flapped her wings and toyed with the twigs at the nest edge. She was becoming impatient. The other youngster sat on his

“haunches” repeating his incessant six-note call, “cheep chip chip chip chip cheep.” At last there was an answering call, fuller in tone, from one of the parents. To the nest came the male bird, carrying a small portion of a bird in his talons. He tore it up with rapid pulls of sharp, hooked bill, distributed it to both chicks, and off he went.

In less than ten minutes the hen arrived at the front of the nest with a pipit, decapitated and stripped of all its plumage except one tail feather. She began to tear it up, doling it out to the youngsters who stood in front of her signifying each piece given by a short “twi-u.” Unheralded, the male joined the party. He looked on for a brief few seconds, then departed. The meal took some little time and then the hen took her departure.

As it was still well before noon, I hoped that the male would return with the mid-day meal. At 12:30, he glided up to the front of the nest. Though the elder chick was in the canopy above, he started to dismember and tear up the sparrow (*Passer rufocinctus*) he had brought and feed it to the one occupant of the nest. Youngster no. 1 came hurriedly from aloft to secure her share. She came in for a few bits but not much. Then the parent dived off the side of the nest.

Two days later, at 9:15, I reached the nest tree. The young were in the nest, dozing. They had obviously been fed to repletion. By 1 P.M. they were livening up a bit and becoming hungry. No. 1 went aloft to a tree behind my hide. No. 2 got into the branches of the nest tree. The nest was empty. They both started calling and presently there was a flutter of wings and a bird landed behind the hide. The male was feeding the elder youngster in the tree behind. Two minutes and he was gone.

Chick no. 2 had come down to the nest. The sun had gone and a strong wind was presaging an oncoming storm. Still I waited on. At last a familiar gray object topped the front of the nest—the hen, with a plump pipit. She fed, turned round, and dived from the nest, as raindrops tapped on the top of the hide, and I took a last look at the young goshawk.

## UKAMBA GRAY-WINGED FRANCOLIN

*Francolinus africanus uluensis* Grant

When I first knew the Ngong district, some forty-odd years ago, the gray-winged francolin was common enough, but native settlement has now extended over much of the ground where in the old days one could certainly count on seeing a dozen small coveys. But since the main areas of the birds' range fall within native reservations and uninhabited country, the species can still be considered as safe. In many respects, the gray-wings bear a strong resemblance to the English partridges. Of a somewhat similar



UKAMBA GRAY-WINGED FRANCOLIN

Female leaving nest

size and to be met with in small coveys of seldom more than a dozen, they frequent the somewhat broken ground in the scarp areas of the Rift Valley and the veldt and bush country of the Masai and Ukamba reserves extending north toward Mount Kenya.

Like many another bird of open grass and bush country this francolin depends greatly on its cryptic coloration. When flushed, a covey disperses in various directions after flying but a short distance; then the birds squat after running a little way. It is almost impossible to put them up again unless one has a dog. They sit so tight one may walk over them. Many a time while I have been cruising about slowly in the game reserve a slight movement near the running board of the car has been the first evidence that a francolin was anywhere near. The bird stands perfectly still and when I stop the car I see it crouch and creep into cover. If I get out of the car and hunt where it disappeared, the chances are that it will not be flushed.

It is only by sheer accident that one comes upon their nest: the only evidence that a pair are nesting is when, during the season, one puts up

just a single cock bird. I have done this several times and have hunted up and down a hillside. The first indication of the nest is a whirl, as a bird rises at my very feet.

The nest is a little scrap by a bush or near a rock with herbage near by. From four to six eggs are laid—creamy-buff in color, slightly pitted at the pores, measuring  $40 \times 33$  mm. on an average, though some are rather smaller. The incubation period is about 22 days, but I have not been able to check it to a matter of hours.

Mortality is very high among the cheepers from both ground vermin and raptorial, and though we have game bird laws and closed seasons, unrestricted trapping goes on in the native reserves.

### KENYA SCALY FRANCOLIN

*Fringilla squamatus maranensis* Mearns

There was a time, not many years ago, when the scaly francolin was common in the forests and bush country around Nairobi. Today there are but a few scattered pairs. Fortunately, forest destruction is controlled to an extent, but the application of the game bird law is lax in the extreme. Trapping is all too prevalent.

When I first knew the area where my small holding now is, crested guinea-fowl, helmeted guinea-fowl and francolin were plentiful; the guinea-fowl have gone and there are but two pairs of scaly francolin, which lead a precarious life between the sanctuary, where they are preserved, and the cultivations, around which they are trapped or shot at. In five years, the increase has not been more than 2 per cent. Broods of six and eight are sometimes hatched, but the young barely survive the squeaker stage. Ground vermin such as mongoose and genet take a toll, but the human is the more destructive.

It is a red-letter day when I hear the francolin calling, and an occasion for rejoicing when I find a nest within my sanctuary. Not all francolin calls denote the presence of the birds, for my cossyphas have their notes off "pat." A check is made before an entry is made in my diary. The call varies somewhat with the occasion; just before the nesting season the dawn and evening call is "kaki karek karek," repeated several times; the covey call is a longer drawn "quarek quarek," and the brood call is "chu-ri chu-ri," uttered in a low tone. The alarm note is "kurak kak kak," as they flush.

I have seen no evidence of "scrapping" between rival males such as I have recorded for Hildebrandt's francolin, nor have I any authentic evi-



dence that a male is polygamous. All my pairs have been single and well apart.

The nest is merely a little scrape below a low bush or tuft of grass, lined with a few odd bits of grass and often a few feathers of the parent. The clutches are comparatively small; six is the largest I have noted, but not infrequently only three hard-set eggs may be found in a nest.

The birds are secretive and skulking and they trust to squatting or running to avoid detection; if they are put up they often alight in a tree and stay perfectly still, vacating only if forced to. At the nest they are very shy. I spent two short spells in a hide at one nest that was in a little hollow thickly overgrown with grass and surrounded by bush. I went into the hide on the twentieth day, expecting that the eggs would hatch that day or the next. The hen was flushed as we approached and she flew into the valley thirty yards off. She rose with a flutter but made no call.

Once settled in, I waited. Finally I saw a dark object moving low through the grass and into the bush on the nest side. In a little while I became aware of a low "ku-ru ku-ru" and could just make out a moving object slipping through the grass and working its way to the back of the nest; then the grass parted and the francolin slid gently onto her eggs, facing the hide.

I could see very little of her—just her red bill and dark brown eye. She commenced to pull the grass down in front of the nest, and having obscured the entrance, she turned round and faced away from the hide. She had stopped her low call as she slid onto the eggs. She sat perfectly still for more than two hours, moving only to adjust the eggs under her.

I gave a low whistle for my boy to come up, and as he arrived she slipped off the nest and into the bush. She hadn't flown off. The boy opened the front of the nest and then he placed some twigs to the back of it. Then he retired. Shortly after, I saw the bird stealthily approaching from the high ground. She worked her way through the grass and came to the entrance of her run. Here she stopped for a moment and made her low call, but it sounded more like "chou-ri chou-ri" this time. Then she withdrew. Suddenly she appeared again, slipped into the run, and crept to the nest without pause. She did as she had done before: pulled the grass down over the front and with a low chuckle settled down to brood. I gave her a full hour, then whistled my boy up again. As he came, the francolin turned and slipped off the nest through the grass front. The boy re-exposed the nest front. When all was clear the bird returned, came down her run, stood stock still, a foot off her nest, slipped into the grass and squeezed her way into the nest from behind. I allowed her to sit for two hours, then called my boy up. The bird left as before. I packed up and left.

I returned to the nest early next day. No bird got up, but a bush-buck doe rose from the hollow by the hide and bounded off. She had been lying almost on top of the nest. One egg was out of the scrape; the others were inside but cold. How long they had been exposed I could not tell—probably since the arrival of the buck. I put the egg back into the nest, straightened up the trampled grass where the buck had lain, and entered the hide. Half an hour went by, and I was certain I heard the bird more than once. I waited a while. The “chou-ri chou-ri” call was unmistakable this time, and soon I saw a red bill push out from the grass by the run, then the head, then the neck, as the bird looked toward her nest. She withdrew but appeared again almost at once. She came down the run and without hesitation entered the nest, shuffled the eggs about, sat, got up, billed the eggs again, clucking the while, sat a moment, then left the nest from the back. I heard her low “ku-ru” for a while; then it ceased, and with a swish of wings she went off down the valley.

I sat in the hide for two hours; no bird came. That evening the eggs were still in the nest, stone cold, and no bird about; next morning the same, only the eggs were dew-covered. The nest was deserted. I took up the eggs; one was heavy and addled but the other two were light; when opened they held chicks ready to hatch but dead.

### ORANGE-THROATED SPURFOWL

*Pternistis leucoscepus infuscatus* Cab.

The name “spurfowl” has come into use among sportsmen to distinguish the various bare-throated francolins from those with feathered throats. It is appropriate in most instances and might with advantage be retained. At one time, the orange-throated birds were plentiful around the neighborhood of Nairobi, but with increased settlement and unrestricted shooting and trapping they are now scarce.

However, they abound in the game reserves, where they seem to realize a sense of protection and are remarkably tame, up to a point. One may drive up to them in a car as they feed by a road side or are having a dust bath; they merely slip into the roadside bush or grass and await one's passing. If the intruder is on foot, they run off and hide while he is still far off. They usually appear in small coveys, six to a dozen or so, but there may be many such along an unfrequented road. They may be heard calling in the early morning and again in the evening—“koarrek,” oft repeated. The male takes up a stance on a rock or little mound and here he calls loudly. Of an evening he often perches on top of an anthill sunning himself as he acts as sentinel to a covey feeding in thick bush.

The birds feed largely on grain, grass seeds, roots, bulbs, and greens and take quantities of insect larvae (particularly beetle) and white ants. Any damage they do to growing or newly planted grain is offset by the good they do. If one happens on a feeding covey, they run, preferring this method of escape, but if pressed they fly, and should trees be handy they go up into them. Here they sit close. When the bird is running, the body is carried erect, with feathers flattened to the breast.

The nesting season varies with the locality and the general climatic conditions; most of the birds seem to nest between February and July, and some nest again in the short rains. The nest is a shallow scrape with a few bits of grass, usually alongside a small bush or grass tuft. From five to eight eggs, rarely more, pinky-buff and finely freckled, are laid, averaging  $46 \times 38$  mm. in size. The incubation period is from 18 to 20 days.

The young leave the nest within 24 hours of hatching. They are buffy below, but dark- and ochre-striped on the back in a definite pattern. The hen is very solicitous for the safety of her chicks and will on occasion put up a fight, as I have witnessed when a dog has suddenly come upon a brood. Though the female runs away at first, she returns and shows fight in much the same way as barnyard fowl.

### BLACK-BREASTED or HARLEQUIN QUAIL

*Coturnix delegorguei* Deleg.

There is popular belief among sportsmen and others that the harlequin quail of Kenya is a migrant from the south, coming north after breeding in southern countries. There is indeed a considerable movement, but how much of it is inter-territorial and how much is within the territory has yet to be shown. We know that the birds breed here in very large numbers, especially in the veldt lands of the plateaus of Kenya; that nests are to be found in both the long and the short seasons; that these locally bred birds move about within the territory. What we want are data on the extent to which their numbers are augmented by migrants from without.

Another point on which data are lacking is why in some areas hundreds may nest one year and very few the next. There is little doubt, however, that the great open plains extending south of Nairobi almost to the Kilimanjaro area are a permanent stronghold of the species. One frequently finds dozens of nests in a day's outing on the outskirts of Nairobi itself. Several pairs breed on the land adjoining my plot.

Coveys numbering from 6 to 20 may be put up in the off-season; they get up with a little whir, fly a short distance, then drop and run. One may

flush them once or twice but after that they just disappear unless one uses a dog.

The onset of the season is heralded by the calling of the males: "hu-it whit hu-it whit" or "tiwit tiwit tiwit tiwit." The coveys split up seemingly into pairs, but I have a strong suspicion that the male is polygamous and may be responsible for two or more females. In quite a restricted area, one may find several nests but by systematic patrol one will find fewer cocks than hens. There are occasions when just one pair will be noted in an area.

Having kept large numbers of quails in aviaries, where they bred freely, I have had the opportunity of noting a cock mating with more than one hen; in one run, one cock was responsible for two hens which reared young. What one obtains in semi-domestication may not be true of the wild, but I have more than once had evidence that two hens have laid in one nest, and during spells of observation have noted two hens incubating at different times.

The cocks are pugnacious and fight vigorously, using their bills with good effect; having got a grip, they jump. Feet, too, are used but more for leverage than for giving blows.

The nests are shallow scrapes between tufts of grass, usually well hidden by blades of grass that form a small bower over the hollow. A few bits of grass are laid within the scrape—sometimes quite a thick lining, often hardly any. The eggs vary in number from four to ten or more; six is about an average clutch. They vary in type from those with large blotches of dark brown to black, to those with small black speckling, but a given hen will lay only one type; thus, when a nest of ten or more holds eggs of two extreme types, as sometimes happens, one is justified in presuming that two hens have laid in the nest. (In captivity my hens often laid ten to twelve eggs apiece; one hen laid 122 eggs, with only a few days between clutches.)

The nest is usually in a spot where the grass and vegetation are not too long and where the grass tufts are somewhat spaced, giving runways in several directions, so that if the bird is not suddenly disturbed she has the chance of leaving the nest unseen and when eventually flushed is already well away from the nest site.

Most sitting birds are, however, content to sit close, trusting to their remarkable cryptic coloration to avoid detection. They sit low in the nest, with flank and breast feathers well spread out and head well down. In this position their color blends well with the browns, yellows and grays of the surrounding grass bases, and the whole is enhanced by the broken light which filters through the overhead grass bower. Sometimes the grass blades hang over the front run to the nest.

I once chose a nest and erected a brushwood screen behind which I could place a hide. All went well until the day I decided to put up the hide. Having erected it, I waited a long time for the hen to appear. She was in the vicinity but refused to show herself. That day was more or less of a blank, for the eggs were very fresh.

Visiting the place a day or two later, I found the nest with some of the eggs missing, though the hen had been flushed from near the nest on my approach. Casing around, I found an egg in a little runway, so I went back to my car which was at a little distance and waited inside. Presently the pair of quail flew toward the nest and dropped into the grass.

In a short while, the hen was seen moving up one of the runs. I obtained an occasional view of her as she slipped between the grass tufts. She seemed to be moving something in this runway, and progressing backward; then she disappeared. A little later, she appeared near the tufts where the nest was. She entered the nest bower then moved out backward, keeping something under her breast with her bill. She disappeared down one of the runs, and I saw her just occasionally, by the aid of binoculars. Having watched her movements for some time, I got out of the car and walked towards the nest and runways. The quail rose and dropped to ground a few yards off.

The nest was empty; the egg that had been in the run was gone. I went back to the car, gave the bird an hour, then stepping out I walked rapidly to the left of the nest site and flushed the hen. From where she rose were thick clumps of short tufty grass and between them was a nest with the full complement of eggs. There could be only one explanation: the bird had resented the hide and had removed her eggs to a new site by rolling one at a time to the new nest just a few yards from the disturbed one. This egg-rolling has been witnessed by me in my aviaries; on one occasion, a hen moved her eggs from a rather exposed nest to a more sheltered corner, four yards off.

I located another nest as the clutch was being laid and noted two distinct types of eggs, a boldly marked one and a finely freckled one. Eight eggs were eventually laid, and I gave the hen or hens sufficient time to incubate almost to the point of hatching before I put up the hide alongside a conveniently placed thorn-tree and draped it with thorn branches. While the hide was going up, the male called from a little stony kopje to the right; the female was in the grass some distance off.

I paid the nest a visit in the late afternoon and found the hen sitting close. She didn't move off and I could just see her under the thick canopy of grass above the nest.

She had sat for fifteen days. Early next morning, I went to the hide. The hen was still sitting close so I put her off to examine the eggs and to open

up the grass above the nest. One egg was chipping; the rest were intact. The bird had flown but a few yards and I heard her calling. I entered the hide, and in a very short time I heard a low "towit." The bird walked round the hide twice, then took wing and circled it and landed in the grass behind the nest. In a very short time she worked her way silently and with slow movement through the grass and so to the back of the nest. She stood with head down for a moment then moved suddenly onto the eggs, her head moving rapidly with a short up and down movement.

Toward six that evening I went back to the nest. A hen was sitting but I put her off. There were five eggs and three lots of half shells but no chicks. Next morning there were just empty shells, and though I examined the surrounding ground no young or adults were found or put up. They just sat tight and refused to budge.

The new-hatched chick is a tiny ball of fluff. The close-set down is tawny, with blackish and brown stripes and mottling above, and buffy below. The legs are pinkish flesh-color. The chicks are like large bumble bees on stilts! But small as they are, they can run! Should one happen on a brood suddenly, the mother may rise, but the youngsters disperse in different directions and squat motionless; it takes a sharp eye to locate them.

## AFRICAN KNOB-BILLED COOT

*Fulica cristata* Gmel.

The coot is common on the lakes in the Rift Valley and on many of the artificial waters and dams on private property. It is commonest, perhaps, on Lake Naivasha but varies in numbers from time to time, for the bird is partially migratory between the several waters available to it. It is strangely absent from Lake Victoria, though there are areas along the lake shore which would appear suitable.

Opinions are conflicting as to the utility or destructiveness of the coot. Some hold that coots drive ducks away and that they are responsible for a high rate of mortality among ducklings; that they devour great quantities of food required for ducks; that the two, therefore, cannot be preserved on the same water. I have an open mind on the point and merely suggest that coots and ducks have co-existed on the Kenya lakes for centuries before the white man came here; and, so far as I can see, man has tended to increase the waters available.

Coots are surface as well as deep feeders and are largely vegetarian, though they also eat aquatic insects and small molluscs.

They have a longish breeding season that varies with the locality—usually from April to July but sometimes later, if first clutches are de-

stroyed. They build a floating nest. They lay the foundation by bending over reeds and grass blades, then laying on them vegetation obtained by diving in shallow water; more reeds and blades are placed on the flat mound until it is from two to ten inches above the water level. The nests are usually damp with the sodden rotting vegetation; if the platform settles or the water rises, fresh material is added. There is usually a ramp or stage at one side of the nest where the birds clamber up. There is no attempt at concealment, and many nests are visible from a distance. Most nests are built in fairly shallow water, in areas of mixed reeds and water-lilies. Some are built among rushes, where the nests are less visible, but even there they show up in time, as the reeds become brown, then yellow.

The clutch is from four to six, seldom more—putty-colored or grayish, with fine spotting and freckling in black and dark brown with grayish under-marks. The eggs are rather longish ovals averaging  $55 \times 35$  mm. The incubation seems to be carried out by both sexes over a period of 21 or 22 days. The new-hatched chicks are covered in black down, with longer hair-like down about the body; the face is bare in patches and pink at the gape and base of the bill.

The parents come very readily to the nest if one watches from a slight distance. They paddle through the reeds and water-lilies and as they come to the nest they make a jump in the water and tread on the fringing vegetation, clambering awkwardly onto the nest. They sit close, on the whole, but they make frequent changes. As the new arrival takes over, the eggs are turned by the bill; then bits of nest material are picked up and re-arranged by the sitter. Sometimes the bird off duty will bring a billful of fresh nest material and this will be taken by the sitting bird and placed in position.

As a bird approaches the nest it makes a low note, "kiow kiow," rather different from the feeding note, when a fuller call is made, more like "cauu cauu." They also have a "hinny" note, usually uttered when birds pass each other or are engaged in deep feeding for submerged vegetation.

The death rate among chicks is very high. The youngsters leave the nest within 24 hours of hatching and accompany the parents. I have hardly ever noted a full brood brought to the feathered stage. The downy plumage is retained for a long time, even when the chicks are about the size of a little grebe. The down and long hairs persist and are carried on the tips of the growing feathers, so that a chick at this stage looks as though it were covered by long hairs. In time these hairs bleach, and where they persist longest, such as on the head and neck, the areas have a "grizzled" appearance. As with many aquatic birds, the breast feathers are the first to come in. They are thick and close-set and almost "water-proof." The wings are the last to feather up fully. From this "flapper" stage to the first full

feathering the young are generally duller and paler gray than adults and lack the "cherry-knobs" above the white shield; these are the last to develop and are only fully grown after the subadult age is reached.

### CHESTNUT-BANDED PLOVER

*Charadrius venustus* Fisch. and Reichw.

In eastern Africa this species is restricted to a particular environment, soda lakes, at comparatively low altitudes such as the Lake Magadi and Lake Natron basins. Lake Magadi is a shallow pan several miles long, silted up with soda ash and carrying a supersaturated solution of soda a few feet deep. The lake shelves off at either end and up adjoining valleys into extensive soda mud flats almost as level as a billiard table. Hot springs of soda solution bubble up on the flats and seep out of the valley walls. The greater part of the surface of the lake is encrusted with soda, here white, here pink. It is a dazzling picture under a blazing sun, painful to the eye.

On these soda flats, where one can drive a car, and in the shallows, where the water is only inches deep for miles out, bird life teems: flamingoes in hundreds, pelicans and wood ibis by scores, sacred ibis, marabout storks, herons, egrets, stilts, flocks of avocets, spur-winged plover, saddle-backed plover, Magadi plover, pratincoles, ducks, and white-winged black terns, and in winter scores of migrant waders such as curlew, whimbrel, sandpipers, ring-plover, stints, ruffs, and others. This area is now in the Southern Game Preserve.

In July, 1941, I camped at the south end of Lake Magadi to study the birds, especially the chestnut-banded plover. Early morning brought a babble of calls. As the sun rose the noises ceased but feeding continued. By 9 A.M. the lake was shimmering in the heat, and mirages appeared. The larger birds stood stationary; the smaller birds remained active until noon. Many plover were seen, running over the flats or along the water's edge in pairs or in family parties of four, including apparently early-hatched young.

In all, 23 nests were found. Fifteen were in shallow depressions in a stretch of glistening soda mud, broken by pebbles, the depressions encrusted with soda and many of the eggs also heavily encrusted. Five nests were on open stretches of crystalline soda with few pebbles about, but the depressions were ringed with flaky soda. Three nests were on dark earth and pebbles, superficially free from soda. The eggs varied little in shape, ground-color, or spotting; the ground-color is stone-gray to light putty. Two eggs are apparently a full nest. Apparently this area is so hot that the



birds shelter their eggs by standing over them during the hottest part of the day and leave them for long periods, unattended, morning and evening. The eggs are not chilled during these periods of absence.

Let us now revert to the birds and an account of their behavior on the second evening. I had noted an increase in the numbers at the water's edge and at pools, yet along certain stretches a single pair would be the sole occupants. These limited areas proved to be territories in the vicinity of a nest. Any stray bird which encroached within the zone either while feeding or in slow flight was chivvied off by the male, who flew or ran at the intruder, with head down between the shoulders, the while he uttered a challenging call which I have recorded as "chee wich-ii-you." It was usually effective, and no actual skirmishes were witnessed. From 5 to 6:30 P.M., I noted several young plover accompanying their parents along the water's edge. Some were well feathered and able to fly; on others the feathers were just sprouting; others, not more than a day or two old, were clad in down, finely mottled on the crown and back with black on a light buffy ground, with a dark dorsal line and lateral lines of black dividing the mottled upper side from the white under parts, and with a conspicuous white ring around the back of the neck. The long-legged little creatures maintained a continuous "peep peep peep" call as they trotted after their parents, ceasing only when food was picked up and placed before them. They were being taught to feed on the millions of dipterous larvae and pupae which swarmed among the algae in the shallow water.

So long as I sat quietly these birds were visible, but if I moved to approach the feeding ground only adults and young capable of flight were seen; the rest had, at a signal, squatted and become part of the mottled terrain. As I drew near to a spot where I suspected a youngster to be, one of the parents would flit past and alighting a few feet away would perform the old trick of broken leg or injured wing and go fluttering along the ground away from her chick.

### CROWNED PLOVER

*Stephanibyx coronatus* Bodd.

The African plover and many larks and pipits tend to concentrate in areas inhabited by game and stock—a loose association, but evident. In Kenya the crowned plovers are in greatest numbers throughout the game country of the southern Masai Reserve, Ukamba, and to a lesser degree in the northern areas and the Rift Valley, where the ground is open or there is sparse or short vegetation. They avoid the areas of tall grass and thick bush. They are most noticed when in flocks during the non-breeding sea-

son. These groups may be made up of just a few birds or almost a hundred. Though conspicuous in flight they vanish on alighting until one picks out a white cap here, another there, and so on; then their red legs show up and one appreciates the general contour of each bird.

During the day, these flocks break up into little bands. They seem to spend most of the time just resting or idly picking up an odd insect here and there. They become more active of a late afternoon, when many will be seen picking about the grounds where the game have rested or where cattle have been herded or outspanned; here the dung is plentiful and insects are abundant. Just before sunset, the birds congregate and go through a sort of communal display. They run around each other, making little hops into the air; then, as though at a given signal, they raise the wings straight above the body and fan the tail. The wings are held up for quite a time, then brought to rest. What was previously a display in black and white now becomes merely a hardly detectable group of birds with sandy-gray backs, black-capped and white-tousured. It seems to be a preliminary to the evening feed and flight. I don't know why they fly or where they go. One often hears them calling as they fly, passing over of a late evening or at night. Some birds come up from the lower plains to feed on higher, short-grass pastures where cattle have been grazing throughout the day. They are still present here in the early morning; then they drift back in small bunches to the lower land. But some of the flocks fly high, and maybe they travel a considerable distance.

The nesting season is somewhat erratic; most pairs seem to nest in the short rains, starting on burnt-off pasture land even before the new growth has begun to sprout. In other areas, where the coverage is always sparse, nests may be found from March to July. The large flocks disperse about in September in this area.

The nest is a shallow scrape with hardly any lining, just a few bits of grass or pebbles or game dung around the edge of the slight hollow. Sometimes the scrape is near a stone or a low stunted herb but it may be in a bare spot. The two, occasionally three, typical plover eggs are pyriform, stone-, putty- or just olive-colored, tinged with purple-gray "under-surface" marks and surface blotches in blackish brown and umber brown. They average  $38 \times 28$  mm.

Sitting birds will leave their eggs readily during the first week of incubation, even when one is quite a distance off, and beyond an occasional cry will give little indication of anxiety. Later on they show concern and if with young they fly around and will even swoop at one, and will attack a dog.

To find a nest it is best to retire a short distance and watch. The birds will circle, then will quiet down. Sooner or later, most likely by a circuitous

route, the hen will go to her nest and sit. The mate will be on the lookout. If he sees a movement, he gives the alarm. Note the spot by some land mark and approach it rather to one side, even in an arc. If the eggs are hard set, the hen will remain close, and then as one draws near she may slip off and go through the usual broken-wing-leg stunt common to so many plover. She will adopt this ruse more often if very small chicks are about. I have found it much easier to locate plover nests from a car; they will remain sitting far longer at the approach of a car than they will if one is on foot. Owners of near-hatching eggs are much easier to deal with. The incubation period is about 22 days and both parents appear to take part.

New-hatched young are cryptically colored, covered in soft, close-set down, freckled sandy and gray and blackish on the head, with black on nape, a white necklet, white below but freckled on the dorsum and with a broken black line down the center. One may see them running around with their parents, but at the first alarm they squat. If one has marked the spot, they will be found lying flat and motionless, like a little stone projecting from the soil, or they may be in a little hollow and just as invisible.

### SADDLE-BACKED PLOVER

*Hoplopterus armatus* Burch.

On the soda flats about Lake Magadi (see p. 122) there was also this species. The second day of my stay there was devoted to these plovers, several of whose nests had been found and marked. I had the choice of a nest among mounds of soda, a slight depression outlined with bits of debris and pebbles; one on a pebbly stretch; one in the footprint of a wildebeeste; one on a raised platform of pebbles built up on a small mud bank that projected into a warm soda stream, with a bubbling soda spring alongside; or one high up on a shelving bank among decaying grass. I selected the one by the bubbling spring, for the eggs were about due to hatch and the nest was in close proximity to one of the feeding grounds of plover, terns and finch-larks, all of which could be closely observed between periods of attention to the saddle-backs.

I sat in the car and watched the behavior of the birds. They were still about 60 yards from the spot and calling anxiously "chi-uk chi-uk," ending with "whit-it," repeated four or five times. The male took wing and circled over the nest, then alighted on the far side of the stream; the female did the same but flew lower and circled the nest twice, scanning it as she passed; then she joined her mate. She rose again in a few moments and flew straight over the nest, calling "ki-ko-i, koi koi," and dropped not far from the car. This she contemplated for some time. Then she walked round it



## SADDLE-BACKED PLOVER

Female sitting on eggs

and flew to the far bank, passing over the nest as she went. She bobbed up and down a few times, then began to walk through the shallow and hot soda water toward the nest. A yard from it she stopped, then took a few paces to the right and began to feed, or pretended to do so, as she came step by step in a half circle toward the nest. Reaching it, she turned her back to the car, straddled the eggs and the slight mound, and sat down. It was now just on 8 A.M. and comparatively cool, although the sun's rays were gradually becoming hotter.

Presently both birds flew off again. However, I noted that one of the eggs was chipping and this would undoubtedly cause the female to return. I put the binoculars to my eyes, and watched the birds. The hen approached as she had done before, adopting the make-believe feeding tactics. At about a yard from the nest, she must have noted the chipping egg, for she uttered a succession of low, quick "chuck chucks," and running forward billed the egg and brooded.

Seen at a distance, these plover do not strike one as ungainly or awkward in leg action, but observed close up, especially when they are approaching the nest, their legs appear bent and placed out of balance to the rest of the body. During the spells that the mother sat the young plover hatched, and when the down was dry, I noticed that she straddled young

and eggs instead of sitting. It was now noon, and very warm. The plover panted with the heat. I sat and watched without disturbing her until the sun was well on the slant. Then I ran the car back a little and sat watching the saddle-back to see if she would perhaps remove the eggshells. She didn't do so while I watched.

I had kept a watch on the surrounding country and at 150 yards spotted what I thought was another saddle-back. I directed my boy's attention to certain landmarks and told him to go forward without lifting his eyes off the spot. He went and returned, reporting a nest with two eggs. In the meantime I watched in the opposite direction. Two plover were walking along a slight rise from which a trickle of water was flowing. They were followed by three downy chicks. When my boy went to the other nest, the male plover sounded a warning, at which the mother turned and, running to the chicks, bowed down several times, touching the ground with her breast. Two chicks dropped at once; the third seemed to hesitate and was pushed down by his mother. The chicks stayed put; the adults went a few yards off and sounded warnings.

It was now after 5:30, and the sun was sinking. As it cooled, the birds began to seek the water and food; brooding birds left their eggs; pugnacious plover ran at each other, calling "cheu-whic i-u," which seems to mean "clear off from here." Terns flew along the water, dipping now and then among the myriads of flies that moved on its surface; an egret stood in a pool of bubbling soda, catching up the curious, brilliantly colored little fish evolved to thrive in this hot and super-saturated soda.

### SPOTTED STONE PLOVER or DIKKOP

*Burhinus capensis capensis* Licht.

There was a time when for nearly two years I patrolled a certain portion of the Southern Game Reserve every week-end. I took my car over trackless veldt, went up and down dongas, and explored the thornbush country. Not till then had I realized how many pairs of spotted stone plover there were in this 100-odd square miles, nor how little I knew about them. For the majority of folk, I suppose they just don't exist. Even in their territory one may pass them by without knowing it. They are birds of the dry thornbush and veldt of the Masai and Ukamba country, the Taru desert, and the barren country of the Northern Frontier. When squatting, they are hardly discernible; when standing still, hardly less invisible. Their large, staring, pale eye first attracts one's attention, and making out their form one wonders why it is so hard to "spot" so large a bird. Where storm water has scoured out the shallow valleys to rock and pebble bottom; where the

lava rocks show through the sandy, pebbly soil, and vegetation is sparse; where sandy strips lie stark between the thorns—these are the places to hunt for this bird of the wastes, and if you find a nest you are lucky.

Here is an entry in my records of comparatively recent date. A pair of birds were noted in a shallow stony hollow at the edge of a patch of acacias. They appeared loath to leave the spot and, when flushed, flew just a short distance into the bush, circled round, and came back into the clearing again almost at once. We searched but found neither eggs nor young. We walked off a short distance and kept watch through binoculars. The birds walked among the stony ground, picking up odd things, and presently we noted a quarter-grown chick near them. We marked the spot and went up, but could find no chick. Again we watched, saw the chick yards away, and searched. It was not a large area, not more than fifty paces by twenty, yet we failed utterly to locate the bird. The parents stood at the bush edge, eying us; but for an occasional bob of the head they made no move nor did they utter a sound. Time was short, and we had to give up the search.

Usually I find a nest by putting up a sitting bird when almost on top of it. Some nests are on almost bare ground, others in some rock-strewn stony hollow or on a pebbly stretch in a dry waterway—just two boldly marked eggs lying on the earth or in a slight hollow. The young in down are also cryptically colored—dull sandy gray with dark spots and broken dorsal line, thus resembling the deep-pitted volcanic stones strewn around.

All of my observations on these birds have been made at a little distance. A bird which has been flushed from her eggs will fly back a short distance, stand perfectly still, take a few steps at an angle to the nest, zigzag back, and when a few feet off crouch low and almost creep forward. As she first sits, the neck is held straight up; then it is gradually lowered. Approaching a nest indirectly, watching the bird, one will see that she lowers her head to almost ground level and slips off the nest in a crouching position until well away from the eggs; then she straightens up and stands stock still by a stone or a tree trunk. Should one go straight toward a sitting bird, she will first crouch, then put her head up and fly straight from the nest.

I have one incomplete record for the incubation period: the period was not less than 23 days, and the young were induced to leave the nest within twelve hours of hatching. The data require checking. The adults feed largely on beetles, such as small scarabaeids, tenebrionids, dipterous larvae, small molluscs, and some grass seeds.

Probably more stone plover or curlew are seen by light of a motor car when night-driving than at any other time. The birds are crepuscular. They find roads a good place for capturing night-flying and emerging beetles; they find that scarabaeids are to be found in game and cattle dung on these roads, and so they come out just before dusk from the surrounding

bush to hunt on the roadways until dawn, when they retire to the bush. Nightjars, owls, stone plover and coursers all are observable in numbers by car light.

## STREAKY STONE PLOVER or WATER DIKKOP

*Burhinus vermiculatus vermiculatus* Cab.

As a contrast to its larger spotted relative, whose habitat is the dry barren and thorny wastes and sparse veldt, the streaky stone curlew is closely associated with water, salt and fresh. It appears to have a curious distribution: fairly common along the coast and along the tidal estuaries of the rivers and smaller creeks, it crops up again somewhat sparsely along swamps and rivers in the central Kenya area, and then becomes numerous in the Lake Victoria region and around the central chain of lakes from Albert southward.

The birds are occasionally seen in small parties up to a dozen, but much more often just in pairs. A pair will frequent more or less the same area for years. Protectively colored, they may remain perfectly still and allow one to come quite near. If they happen to be in a fairly open area they prefer to run, then crouch, rather than take flight. When they do fly, it is only for a short distance along the shore, or from islet to islet, or bank to bank; on alighting, they run and stand motionless near a rock or some projecting object. In the early stages of incubation, as one hunts for the nest, they exhibit no great outward sign of anxiety such as flying around; they stand stock still and erect; then they take short runs. One bird may pick up a bit of grass or small stone, hold it a while, and then drop it—a mere nervous reaction, I think.

The nest may be a mere shallow scrape with bits of driftwood around it, and perhaps bits of dry dung, or a few pebbles, seldom arranged with any method; or the eggs may be on bare ground or rock.

The normal clutch is two eggs: sandy to gray-brown in ground-color, boldly marked with shades of dark brown, evenly spaced or showing a confluence of blotches at one end. In shape they are rather rounded, averaging  $45.5 \times 35.5$  mm. They are very cryptically colored. Incubation lasts 22–24 days and both birds take part, though the female does the major share. Slight disturbance will cause a sitting bird to squat low and lay her head flat along the ground, but anxiety causes her to raise it slowly, and she will watch with those large, staring eyes for signs of danger. The eggs are frequently turned and adjusted by bill and feet, when the parent returns to the nest after a short spell off.



STREAKY STONE PLOVER or WATER DIKKOP  
Hen about to sit on eggs



The new-hatched young are also protectively colored: mottled sandy-gray, with dark streaks on the side of the head and on the neck, and a double broken line down the back on each side. The down is close-set and woolly. The youngsters' eyes are large and dark, but as they squat in hiding, at the first sign of danger, the eyes are kept shut.

These birds are crepuscular. They spend much of the day standing or sitting in the shade, but they become active at sunset. They are often heard at night, especially after the breeding season, when two or more families may join up and fly to some favored feeding ground.

The food consists of beetles and their larvae, grasshoppers, crickets, and small molluscs and crustaceans. Much of this food is found among the drift and debris above the water's edge and on the adjoining ground, but I have also seen the birds in shallow water at a pool's edge, or in the shallows left at low tide along estuaries and the seashore, particularly in the mangrove creeks.

One of their most characteristic attitudes is the upright stance adopted at a first sign of possible danger: an almost statuesque rigidity, relaxed only when danger is past. In this respect, the stone plovers resemble the bustards and like these birds they move very slowly from open to cover.

### KENYA DUSKY TURTLE DOVE

*Streptopelia lugens funebrea* van Som.

Of the numerous doves of eastern Africa this is the only one which, in its general scheme of coloring, resembles the turtle dove of Europe. It is perhaps less decorative than the English bird; nevertheless, it has the rufous borders to the wing feathers, the black "collar" represented by dark feathers on the side of the neck only, and the slim general build.

It is the darkest of all the doves of the open country and is not infrequently referred to as the "black dove." One of its most conspicuous features is the bright "burnt sienna" to orange-red eye surrounded by crimson eyelids. The bill is dark purply-brown and the feet plum-colored.

Except at times of "flocking" the bird is not obtrusive, and it is comparatively silent. One hears the male calling in the early morning or late afternoon toward sunset, in the breeding season, with a sitting mate not far off. High up on a branch near the forest margin, or in the tallest tree of a little copse, sitting almost motionless, he occasionally utters a deep slow bisyllable note, "cu-oor, cu-oor." The throat visibly expands as the deep note is uttered, and the rump feathers are raised at the same time.

After the male has sat and occasionally "coo-ed," he will flight out and up, and turning, will come gliding down toward some thick tangled low

tree at the forest edge; almost reaching it he will bank and turn off to his calling stance. Let him repeat this two or three times, and then search the trees toward which he glided. The chances are that you will be able to locate the nest and find the hen sitting.

The turtle dove will sit tight, more so than most doves, but once disturbed, she is wary and loath to return, if one is in the vicinity. The twiglet nest is usually on a foundation of crisscross twigs, or on a level spot among creepers in a tree, at heights varying from six to twenty feet. Two pure white eggs form the full clutch. They may often be seen through the network of twiglets from below, but I have found that many nests are lined with fine rootlets so that the mesh is not so open as in the red-eyed dove's or the laughing dove's nest.

A few nests have been located in my sanctuary, either during the long season from April to July, or in the short nesting period from October to December, but the majority have been unsuitable for photography or they have come to grief before a hide has been erected. This dove is one of the scarcer species in the area, and its appearance is rather erratic. Luck came my way early one October. I heard the familiar "cu-oor" from a patch of tree growth; at the top of a dead olive tree I detected the male calling deeply. I took up a stance and watched. My vigil was short, for not far from where I sat was an area of newly turned land and to this I saw a dusky turtle dove descend. She wandered restlessly to and fro, picking up and dropping various rootlets, and when she had selected some to her liking she flew and slipped into the shrubbery. As she did so, the male dropped from his perch and in a wide arc alighted at a certain spot. A low cooing came from the trees. The female came to the broken ground three times for more rootlets; then just before sunset she joined her mate on the olive tree.

The following day, to my delight, I located the nest in a creeper-grown tree at about ten feet; the hen was sitting, so evidently the eggs had been laid. A day or so later, I viewed the nest by means of a double step-ladder; the eggs appeared fresh. Thereafter, every second day, I walked past the spot and found the hen sitting close; she never once vacated the nest, though I was within ten feet of her. On the twentieth day I took up a stance among the trees from which I could see the nest. The hen was brooding close. After about an hour, I heard the clatter of wings, and the male came to the nest side. He fed his mate by regurgitation and then went off. The hen sat a while, then raised herself and bent low, apparently feeding youngsters; I was too low to be quite sure.

For the next two hours the hen brooded close and hardly moved. That same afternoon I visited the nest again, and though I stood under the nest tree she merely crouched low. With the aid of the ladder I looked into the



KENYA DUSKY TURTLE DOVE

Male standing in front of two young in nest

nest but the mother sat tight; she refused to budge. Her behavior was a good augury for close study, so I selected a site for the erection of a hide.

Three days later, the ladder hide was erected and left in position; the hen had not budged from her nest throughout the proceedings. She had to be put off her nest in order to adjust twigs and creepers which obstructed a clear view.

The chicks were dark flesh-brown, covered in wiry white and pale yellow hairy down; the large, soft, dark purply-brown bills were surmounted by bulging foreheads made up mostly of bulging eyeballs, though the eyes were mere slits. When the chicks were ten days old, I commenced observation from the hide. The mother was absent when I entered the hide and put the camera into position. The chicks now filled the floor of the nest and there was little room at the side for the parents to alight. I had not long to wait before the hen returned. She hesitated momentarily; then she hopped to the nest side and straightway began to regurgitate food.

One youngster put its bill deep within the parent's mouth but the other insisted on having its share too and at the same time; so eventually both chicks engaged, and the mother, with bulging gape, pumped food up with vigor. Two youngsters at once was a bit too much, and she soon disengaged and fed them separately. The meal lasted perhaps three minutes; then the mother picked up seeds that had fallen to the nest, removed a portion of excreta, and commenced to brood the youngsters. She just stood over them and allowed them to nestle their heads within her breast feathers. She hardly altered her position for over two hours; she preened her breast once or twice, then settled down to doze with closed eyes.

The meal I had witnessed was the second for the morning. The mother was asleep, so I quietly slipped down the back of the ladder hide, noting that she merely cocked her head at the movement.

Through the first day, the male bird failed to come to feed the chicks; he perched in a thick-foliaged tree some ten yards off, cooing softly, but left after an hour or so.

The following two days I employed in observation from the ground, to check up on feeding times and their duration. Male and female parents came to the nest one after the other at 8 A.M., providing the first meal of the day. At 11 A.M. the male came again and fed the youngsters during a stay of five minutes. He was followed at noon by the female, who, after disposing of her cropful, brooded over the chicks for nearly an hour.

She was back with more food at 4 P.M. and left after about ten minutes. At 6 P.M. both parents arrived. The male came to the nest first and vigorously regurgitated his offerings; when this was over, the hen flew to the nest. She took her time about this meal, pausing for quite long spells until

eventually the youngsters seemed satisfied and crouched on the floor of the nest. The mother stepped over them and bending forward brooded them closely. I presumed this was the last meal, for the male was now perched high on a croton tree, cooing and preening in the long, slanting rays of the setting sun.

Three days later, taking advantage of rather cloudy weather, I entered the hide at 10 A.M., reckoning that this would be betwixt the first and second meals. Neither parent was near the nest as I climbed into the hide. At about 10:45, I heard the familiar swish and clatter, as a dove alighted in a tree to the right of the hide. In a moment or so he was on a branch in front of the nest. With a hop he alighted on the nest edge and at once engaged the youngsters. The growth of these squabs had been remarkable; their eyes were large and beady-black and they were well feathered, but the dark plumage was broken into a patterned mottling by the presence of the bristly down at the tips of the feathers. As before, the male made short work of regurgitating his offering and for the most part had the bills of both youngsters within his gape at one and the same time. The extent to which this gape can be stretched is astonishing.

There is little difference in the plumage of the sexes; the male is rather brighter and the black neck patch is wider. Wing vibration during the process of regurgitation was more noticeable in the male than in the female, and the while he fed, he kept up a low purring note.

About noon, the female came straight to the front of the nest and set to with a will to bring up food for the clamoring squabs. She seemed less inclined to take on two at once, and disengaged whenever both managed to insert their bills within her mouth. When the feeding had been in progress but a moment or two, the hen suddenly purred and stood upright. The youngsters at once crouched low. The mother was looking over the side of the nest but even as she did so she sank slowly to the nest edge and crouched flat. The "bottom" of my ladder hide was open, and through it I had a view of the ground below. Sneaking through the undergrowth was my little dachshund, who had trailed me to the hide. He lay down under the ladder and dozed. The dove relaxed slowly and commenced to feed the squabs once again, but now and then she looked down to see that the dog was quiet.

When she had emptied her crop, she poked around the nest, pushing the youngsters aside in doing so, in order to pick up any odd bits of food that had fallen. I had noticed that several maize seeds had slipped past the youngsters' mouths when the male had been feeding them; the hen now picked them up and swallowed them. With a final warning "cu-uur," at which the squabs lay low, the mother took wing.

A brief word as to the food of these doves. It has been my experience that when the breeding season is on, a very large proportion of the food is obtained from the forest floor in areas adjacent to the nesting site. It frequently happens that the nesting site is within the fringing trees of forest in open woodland and savannah. The food then consists largely of small seeds from forest trees, dried berries, small insects, and land molluscs. In addition, the birds frequent the native villages and pick up the odd grain.

During the breeding period the birds go in pairs, just a few here and there, but when nesting is over the species congregates and may be noted in large flocks, up to nearly a hundred strong. They then frequent the fields where a crop of grain is being reaped. They hunt the ground for fallen grain, or may even take toll of reaped grain while it is still in sheaves.

An occasion when I observed literally hundreds of these birds was when a field of sunflowers was being reaped; the birds came down from the adjacent forest and blackened the ground in their dozens as they collected the seed fallen from the flower heads. I have only once seen the birds taking toll of standing grain, and that was in the Kavirondo country where *matama* is grown and allowed to ripen fully on the stalk. These doves may be considered as ground feeders almost entirely.

#### GRAY-VENTED RING DOVE or RED-EYED DOVE

##### *Streptopelia semitorquata semitorquata* Rüpp.

Common and widespread, extending from the coast to western Uganda and a bird of cultivated areas and townships, the gray-vented ring dove is a familiar sight. Ubiquitous and bold, yes, but when one seeks to pry into the birds' nest habits, they resent it; some will desert eggs or even small young. Study of individual pairs and careful handling are essential to success with these birds.

There are fortunately several pairs around my small holding, and year after year I have studied them. Some are as different as "chalk from cheese" in their psychological "make up"; those which are hypersensitive, I leave alone. I have taken advantage of two aspects which make for success: (1) The species is multibrooded; that is, it breeds irrespective of fixed seasons. (2) It shows a definite preference for a given nest area, even an individual tree, or a given site in that tree. The screen is placed well away from the nest, then gradually moved up; the birds become accustomed to it. As the time of hatching approaches, the screen is in position and behind it the hide can be placed.

The nests are of twiglets placed crisscross and loosely interlaced on a horizontal fork or branch, from 6 to 50 feet up—just shallow open-net



GRAY-VENTED RING DOVE or RED-EYED DOVE

Female feeding chick

saucers through which the eggs may often be seen from below and from which the eggs are not infrequently knocked if the bird is rudely disturbed from the nest.

Two pure white eggs are laid and both parents incubate over a period of 16 or 17 days. The hen particularly sits close and will leave her eggs for only a very short time in the early morning or late evening when she goes to drink. She is often fed on the nest by the male.

These doves are one of the first to begin cooing, just before dawn, and they keep it up until the sun is just above the horizon. They not infrequently call at night, especially when there is a moon. "Scrapping" between two males may often be witnessed, especially when the breeding season is on. Offense and defense are carried out by use of the wings, the birds usually fighting in a tree. The opponents sidle up to each other with wings raised from the body, and they give each other resounding cracks as they buffet each other with vigor. Feathers fly, and if the battle is really

serious one bird will jump on top of the other and beat him about the head. If one flies off he is chased and buffeted again until he decides to clear out.

There is a definite courting display: cooing and bowing and aerial display which usually takes the form of a steep upward flight, with clapping wings, a sharp turn and a downward glide with tail expanded and wings held steady until just before the perch is reached, when the wings are flapped loudly and the bird rises sharply to the branch. Then follows more cooing and billing. After acceptance of the male, both birds fly upward and turning in an arc they sail back to the branch. The familiar call of six notes, spaced two and two, can be rendered as "this is . . . misses . . . turtur," oft repeated, or it may be abbreviated to "tur tur" or "tuu tu tu," which are notes of contentment or satisfaction.

During selection of the nest site, and after the hen has started to carry twigs, the male often sits in or near the nest and calls a long "turr turr," often accompanied by slight twitching of the wings. This note is made while he squats low with head held down and drawn in, so that when the call is actually made his whole neck seems to swell out. Though the male thus encourages his mate, he takes little or no part in the nest building. Considerable care seems to be exercised in selecting the twigs. Many may be picked up and rejected. A further note made by the male, usually when he tries to induce the hen to return to the nest, is "tuuhoo," made as he makes a little hop toward her. While the hen broods, the male will often be seen perched in a high tree above or not far off, in an exposed position, making a deep almost purring note, "tuurr-tuurr, tuurr, tuurr." This call is most often made in the evening, just at sunset.

There are two main feeding times, early morning and in the latter part of the afternoon. All food is taken off the ground and consists of grass seeds, herb seeds, small berries and fruits, even castor-oil seeds and kernels of the croton. Where grain is available, especially at threshing times, these doves will take advantage of it, but I have no evidence that they will attack standing grain, though one may find them in patches where the grain stalks have been beaten down by rain and wind.

At the few nests with young which have been kept under observation from early morning, the first meal was brought between 7 and 7:30, and from thence on at about two-hour intervals if both birds came at the same time, or at shorter intervals if they came separately. If I elected to spend a day in the hide, I usually stationed a boy somewhere in the nest area shortly after 6 A.M. and his presence kept the first meal waiting until I was ready to enter the hide at 8 A.M. Once the boys had departed, the male bird, sitting on a high stance commanding a wide view of the area, would start his "cooing" note, the "all clear" signal. Very soon the female would



fly to a near-by tree. From this, by short flights and by walking from branch to branch, she would come to the nest tree and then to the nest. Her arrival near the nest was always signified by a low "siihuuo," followed by a soft "turr turr," which caused the chicks to turn and face her.

Very young chicks are pinkish-brown, with longish white wiry down on the head, scapulars, and dorsum. Their eyes are closed for the first few days; then they gradually open as mere slits, then ovals, to become fully wide about the tenth day. As with all other young doves, these youngsters seem all soft, long bill set in front of two bulging eyeballs, supported on a skinny neck.

As the parent comes to the side of the nest she begins to contort her neck with a wriggling and up-and-down movement until the food is regurgitated into the mouth. She then bends her head vertically and engages the bill of a youngster, who inserts his soft beak within his mother's mouth; then the pumping action begins. When that lot of food has been finished, the mother disengages and regurgitates more into the throat and feeds the next chick. Even at an early stage the youngsters suck in the food to the accompaniment of wing-flapping. A full crop takes about three minutes to empty. The crops of the chicks swell visibly as they feed, and by the time they have absorbed the contents of two crops they are ready to flop in the nest and sleep the meal off.

There is this disadvantage about hide work at the nests of doves and seed-eaters: the periods between feeds are considerable. When the young are small, the parent will brood for some time, sleeping. Except during the first week, the period of brooding is short, though it may be prolonged during the lull period of mid-day. Growth is remarkably quick but feathering rather slow, and the "squab" stage is soon reached. The parents have a hard time to keep the chicks satisfied. It is now that the youngster seems to badger his parents and clamor to be fed. While one is being fed, the other squeaks and flaps his wings and worries the parent until he is attended to. Both try to get to the parent's bill first; they push and heave and not infrequently force the parent off the nest in their excitement. After the first fortnight one notes a shrinking in the base of the bill; the wing feathers begin to grow more rapidly, and the body feathers up. The youngsters are less inclined to sleep and they spend a deal of their time in preening. In first feather, the young are unlike the adults; the head, mantle and coverts are ashy-brown with buffy tips and fringes; the wings are tipped with rusty brown; the under side is more brownish, with buffy to rusty tips. They are ready to leave the nest on the twentieth day after hatching, but very often they stay around in the nest tree for a few days before venturing farther afield. Once they have left the nest tree they roost

with the parents in some sheltered spot. Like most doves, these young are slow to fend for themselves and are fed by their parents long after they are able to fly quite strongly. I have noted that even when the hen has started a second nest the young will continue to importune the father until he drives them off.

As already indicated, one cannot lay down any hard and fast nesting period for these doves in this area. Though many nests may coincide with the nesting times of smaller birds, yet in this plot I have one pair which nested five times in twelve months and two which built four nests each. The birds are resident on the plots and there seems to be no evidence of flocking or even increase in numbers. The youngsters which survive, disperse. The mortality rate, however, is high—about 60 per cent—due to the action of predators such as mongooses and hawks.

### WHITE-VENTED RING DOVE

*Streptopelia capicola tropica* Reichw.

These doves associate in pairs, but at times numbers may flock at some particular feeding ground and often associate with the speckle-neck and larger gray-vented species. The threshing ground near native huts always proves an attraction and where grain is handled in quantity near railway sidings numbers will congregate in the late afternoon when all is quiet. Away from human habitations the birds become less prone to congregate.

They usually nest in low trees, building the scanty twig platform with the slightest of depressions in a site where twigs lie horizontal or where a horizontal branch has twigs growing out from it. The structure of the nest is so open that the eggs can be seen from below. If a sitting bird is suddenly disturbed from the nest an egg is often knocked out. Two pure white, smooth, semi-glossy eggs are laid. They average  $28 \times 20.5$  mm. The incubation period is about 17 days, the hen doing the major share.

There is nothing very distinctive about the nestlings except that they are covered in a more whitish wiry down than other species. Both parents feed the squabs during the nestling period of 20-odd days and continue to do so for about two weeks. Then the young are forced to fend for themselves. Youngsters are duller in color than the parents; the face is less whitish, the feathers of the upper side have rusty to tawny tips, the neck collar is less well developed, and the grayish breast feathers have slight tawny tips.

Pairs become fairly tame when they frequent a dwelling, but they never allow familiarity; they don't lose the natural sense of wariness, and though they may feed at one's doorstep, so to speak, they resent too close an approach.

The call note is distinctive: "ku ku rok," modified at times to "ka kuro." The principal times of calling are early morning and evening. Taken as a whole, this species is really a bird of the drier thornbush country and is less addicted to forest and heavy tree growth than is the gray-vented ring dove.

### SPECKLE-NECKED LAUGHING DOVE

*Stigmatopelia senegalensis aequatorialis* Erl.

The habitat of the speckle-necked dove is really the dry thornbush of the lower altitudes, below 5,000 feet; it is very common all through the country south of Voi, Masai-land, Ukambani, the Northern Frontier, Kavirondo, Suk and into Uganda. But like many another species we now find it congregating in considerable numbers around settlements, townships, and homesteads. The increase in cereal cultivation and the handling of this produce at certain centers have brought about an influx to these areas, and being adaptable, the bird has penetrated into our larger towns and suburbs.

It is entirely a ground feeder and may be seen along roads and tracks, taking little notice of pedestrians—merely side-stepping or rising with a zigzag flight, to alight just a little farther on. In some of our settlements, the birds are as common as the sparrow is in England, ignoring the native passer-by and fluttering a foot or two to avoid being trodden on.

The laughing dove's call is a series of six notes: "hoo hoo hoo hoo hu hu"; this call is usually preceded by a high-pitched "kuro kuro." There is the usual calling at dawn but the evening calling is of longer duration. It is then that the birds perch in the higher trees, sunning themselves in the rays of a setting sun, and it is then, too, that mating often takes place. Some display accompanies this.

Very large flocks gather around native kraals when the harvesting and threshing of *mwimbi* and *mwele* is going on, and when the grain is put out to dry on areas of hard, swept earth, children are posted to keep the birds off. In the back country one often sees large flocks around, drinking at temporary water pans or feeding under acacia trees when the seed pods have dried and split, scattering the seeds below.

Away from habitations these birds are not so tame and confiding. There we find the nesting seasons to be more regular, through dependence on climatic and food conditions. One can usually find their nests between March and August and again from November to January, and a few nests at other months. It is different near settlements; though the majority still have a season, many nest the year through.

The nest is the usual shallow twig structure built in a low tree or bush and seldom more than ten feet up. Two eggs are a usual clutch; very occasionally three may be laid. Both parents incubate for a period of 16 or 17 days.

The nestlings are sparsely covered with a yellowish hairy down, especially about the head and back and the base of the wings; the skin color is a light brown. They are brooded close for the first few days and at intervals, especially after a feed, until they are well feathered. Food is given by the usual mode, regurgitation, and the inset of the youngster's soft bill into the parent's mouth; then follows the usual pumping action. Both squabs are fed at one visit. They feather up fast and begin to seek the surrounding branches of the nest tree after the twentieth day from hatching. They still retain some of the hairy down on the head and tips of the feathers. The upper feathering is somewhat barred, for most of the feathers have buffy to rusty tips and the wing feathers are edged with rusty-brown; the lower breast and abdomen are whitish tinged with ochraceous.

#### LONG-TAILED GROUND DOVE or NAMAQUA DOVE

*Oena capensis capensis* Linn.

The environs of my sanctuary are hardly suitable for this bird of the dry thorny waste and desert country, yet on more than one occasion a few have come this way, although they have not remained to breed.

I have located their nests five miles off toward the plains, but the greatest number of breeding pairs are to be found in that almost waterless country southwest of the Masai Reserve, especially in the area of the Kajiado-Longido flats. Owing to the rather limited number of watering places, it is not surprising to find that large flocks congregate around these selected spots, both morning and evening. They come in flying low, though swiftly, and pitch on the low trees or on the ground, biding their time until larger birds, such as sand grouse, have had their fill and dispersed to their feeding grounds.

The casual observer will notice these birds mostly as they feed on or along a road side; they get up with a zigzag flight; then, traveling swiftly, they alight again on the road or on a bush well ahead of a pedestrian or an on-coming vehicle.

When the breeding season approaches, the birds split up into pairs. This little dove is most catholic in its choice of a nest site. I have found the tiny nests on the top of a small anthill around which a few herbs were growing; on top of a bare rock; on a little mound of earth; on crossing horizontal grass stems; on top of a fallen tree-trunk; on a creeper-clad

rock; in a small bush—all either on the ground or not more than four feet up. The nest is very small—a mere shallow saucer made of fine rootlets and fine tendrils, remarkably open in meshing yet neatly interlaced and finished off at the edges. Most of the nests are fully exposed in some open position. The two small cream-colored eggs are very conspicuous when seen from above. When the hen is sitting, the nest is almost completely obliterated and her plumage fits into the general setting to a remarkable degree, especially when the nest is situated among bleached dry grass or on a gray rock or tree trunk.

I have seen both sexes helping in nest construction, but until recently had seen only the female incubating; then at a nest near hatching I put off the hen, erected a small portable hide and entered it to watch. In a very short time the male pitched on the front of the nest, hesitated a moment or two, turned, and sat on the eggs. He sat very close, with hardly a movement, and I signaled my boy to walk past. This he did, and the bird flew off. In ten minutes a bird returned—again the male. This time he alighted to the side of the nest and without hesitation commenced to incubate. He sat for well over half an hour. The female flew over, and as she passed, the male looked up, then left the nest. In a short time the female dropped to the ground behind the nest. The male flew down to her and billed her gently, as though encouraging her to go to the nest, but she was reluctant to move. The male eventually flew to a tree and preened himself. After the eggs had been uncovered for about twenty minutes, the male alighted at the nest and sat snugly on the eggs. The female roused herself and flew off. The male dozed on the nest. It was fully an hour before he stirred, stretched his wings over his head as he stood up, and then flew off. I took this chance to creep out of the hide, dismantle it, and go away. Later in the afternoon I walked past the nest site and saw that the hen was sitting.

It is a strange fact that throughout the period at the nest neither of the birds made any call, not even when the male was by his mate; nor for that matter, have I ever recorded the note of the species. It has seemed silent on all occasions.

The long-tailed dove is entirely a ground feeder, seeking small grass seeds and those of some labiates. As indicated, they favor the margins of the roads, for here wind-borne seeds collect in drifts and are washed to the edges by showers of rain. Their feeding grounds appear bare of any vegetation, yet they find plenty. I have noted them in areas where there were patches of stonecrop (*portulaca*), and I suspect that the small seeds of this plant were the attraction.

When the nesting season is over, pairs and small coveys move from place to place, but it is only at watering places that I have seen them in scores.

## WHITE-BREASTED FOREST DOVE or TAMBOURINE DOVE

*Tympanistria tympanistria fraseri* Bp.

In the case of the white-breasted dove, nature has evolved a pattern which, combined with color, is admirably protective in the two environments in which the bird moves. When in search of food it is terrestrial, and the upper surface coloration blends admirably with the leaf debris of the forest floor, for when the bird stands still the white under side is not seen but the white forepart of the head cuts the contour completely. When the bird flies up and alights in a tree, the very contrast between its dark upper and white lower surface breaks its outline and the two fit in with the dark silhouette of foliage against a light sky. The bird is immobile when it suspects danger, and this helps it to evade detection, but when it is forced to fly it rises suddenly and zigzags through the undergrowth and between the tree trunks with remarkable speed and precision, and perches in some tree of the mid-growth. It is essentially a bird of the forest and has a wide distribution from the Kenya coast through Uganda and beyond.

The courting call is very distinctive: "toot toot, toot . . . too too . . . too too too, toot too too to to to oooooooooo," the last seven notes descending and diminishing in tone. With each note the head is bowed but the whole throat is expanded. The wings move slightly at the side, with a twitching movement.

I have witnessed no elaborate courtship display or posturing. After a male calls several times he flies toward the hen, at which she usually makes off to a near-by tree; he follows and sits on a branch opposite, and commences to call again. He then goes through the act of regurgitating, and if the hen is ready she accepts the food when offered.

The nesting site is usually fairly low, from 6 to 15 feet up, in a small tree or sapling. A rather frail-looking platform of fine crisscross and interlaced twiglets and rootlets is built toward the end of a horizontal branch, or where creepers interlace and form a slight platform. The whole is so lightly built that the eggs are often visible from below. Both birds take part in the building, though the female does most of it; as the twiglets are laid, one or both birds may sit in the site and call softly.

Two eggs form the normal clutch. I have frequently put a male off a nest, but the female does most of the incubating over a period of eighteen days and almost from the first will sit close and immobile. She will not vacate unless frightened by too close an approach. (Pigeons and doves should be given time to vacate, for if suddenly disturbed they leave with such suddenness that they often dislodge an egg from the shallow platform nest.)

The white-breasted dove is not uncommon in my sanctuary. Doves are notoriously timid, but they will respond to quiet treatment; at one nest

twelve feet up, I gradually moved my hide to within six feet and was able to check on the nest construction and the youngsters up to the time they left the nest.

The birds took a week to build the nest, bringing twiglets and rootlets in the morning up to about 11 A.M., and adding more in the late afternoon. They were in no apparent hurry to complete the nest. Both birds, but more frequently the male, spent a great deal of time sitting by the unfinished platform, cooing softly. The eggs were eventually laid and the female commenced to sit close. She allowed me to climb the ladder until I was level with the nest, and then she vacated, but she only went a few feet off into a near-by tree. On the evening of the seventeenth day, when I thought the eggs might have started to hatch, she sat tight and refused to budge, so I presumed hatching must have started. When I returned next morning I found her still sitting tight. I tried to induce her to move by touching her with a thin twig but she merely twitched her wings and cooed low. I raised her gently and noted that the chicks had hatched but the shells were still in the nest. After about an hour, the male arrived on the edge of the nest, and standing to one side fed his mate by regurgitation, the hen taking the food in the manner of a youngster. Presently she bent her head down and commenced to move the eggshells; she pushed them about and, lifting them slightly, "nested" the portions one within the other. The male took them in his bill and flew off. The hen resumed her brooding.

I could just see the chicks; they were dark brownish-flesh color with pale creamy-whitish wiry down on head, scapulars, and dorsum; the eyeballs were large and protruding but the eyes were shut. I visited them twice during the first week and it was not until the end of that time that the eyes were open as mere slits.

When the youngsters started to feather up, I commenced a series of sessions in the hide from 8 A.M. to near 6 P.M. The young were dark brownish, strongly barred with cinnamon and tawny on the back, and this color harmonized so well with the rufous and black of the nest material and the dark interspaces of the platform that when they were lying quiescent they were hard to see from even a few feet off. This camouflage was apparent right up to the time the young were ready to leave.

During these early morning to evening sessions, I noted a certain periodicity in the feeding. The first meal was given between 7:30 and 8:30; then there was a break, followed by a second feed between 11 o'clock and noon, another at 4:30, and a last one at about 6 P.M. The intervals depended somewhat on whether or not both birds arrived at more or less the same time. On four occasions the birds arrived in the near-by trees together; the female came to the nest first, and after feeding the chicks she



WHITE-BREADED FOREST DOVE or TAMBOURINE DOVE

Male beginning to regurgitate food for young; note swelling of neck

brooded for a while; when she vacated, the male came. There was sometimes a space of five minutes to over half an hour between the feeds by the two parents.

The feeding process itself varied in duration and was largely dependent on whether both young were fed at the same time. I was somewhat surprised to see that on occasion both chicks had their bills within that of the parent at the same time! Feeding would then be rapid, taking perhaps three minutes, whereas ten would be taken in feeding each chick separately.

A very pleasing feature of the feeding was that on arrival at the nest the parents would utter an oft-repeated low call, the two long first notes of their usual call, but with a low and coaxing intonation; sometimes this low call, especially when made by the hen, was hardly audible. When the



youngsters were very small, it took some time for them to get their large bills inserted within their parent's mouth, but once they were adjusted, regurgitation was done vigorously, often accompanied by wing movement. The regurgitation was not continuous, for there were short spells when the parent would stop and disengage; then, calling softly, she would force more food up and engage the chicks' bills once more.

When the youngsters were temporarily satisfied, they crouched down in the nest and snuggled below the parent, who fluffed out the breast feathers and covered them. This warming up was often of short duration if the male was in the offing. If it was his intention to feed the chicks, he made his full call, followed by the first two long notes, and at this the hen would vacate and the male would fly to the nest. His behavior there was very similar to that of the hen. His coaxing call was deeper and stronger; not infrequently he made the full call and then the skin around the whole neck became inflated and gradually subsided as the notes were sounded. His act of regurgitation was rather more vigorous than had been the hen's; in addition to wing quivering, his whole body would move with the pumping action of head and neck. When a rather large berry or seed was brought up, he disengaged and either dropped the seed on the side of the nest or re-swallowed it, before commencing to feed the chicks again. If the food was dropped, one of the parents would pick it up later and swallow it—so also any food which had slipped past the mouths of the youngsters.

During the longer spells of brooding, the mother would edge to the back of the nest and preen the chicks. She ran her bill up and down the quills with a gentle movement and as the sheaths came away she ate them. Sometimes she would stand and watch her offspring preening the rest of their feathers. When two weeks old, the chicks were well feathered on the backs and wings and able to move about the nest. All excretion was voided over the edge of the nest, and this had been the case even when the youngsters were hardly able to move about. With the increase in feathering there was a decrease in the thickness of the soft base of the bill; this was particularly noticeable during the last days in the nest. It is an actual thinning but is at the same time emphasized by increase in head size and feathering of the head; moreover, the eyes are now large instead of being mere slits, and these features tend to dwarf the bill thickness.

By the third week the young became clamorous when feeding and surged toward the parents as soon as one arrived at the nest edge. They vied with each other to get in first, flapped their wings, and made low squeaky noises. They were now fed one at a time, and while one was being fed the other butted in and not infrequently dislodged his mate. At this time, male and female came in rapid succession; the female always left

just as the male alighted on a branch a foot or two from the nest. The chicks fed rapidly, standing up with flapping wings, the better to work the food down.

The female obtained most of the food from the ground under the trees of the nest area: fallen berries, termites, and small molluscs. The male foraged farther afield in an adjacent forest patch or along the floodline of the stream bed. The youngsters vacated the nest for the surrounding trees on the twentieth day but did not leave the vicinity of the nest tree for another three days. In body size they were about equal to the female, but their tails were still short. At a second nest kept under observation, the youngsters vacated the nest on the twenty-second day. They were able to fly for short distances, but it was a week or more before they learned to pick up food for themselves.

The first subadult plumage is very similar to that of the female. The distinctive male plumage is not assumed until the end of the first nine months.

Like most doves, these birds are capable of remarkable speed, but since their environment is forest, long flights are seldom indulged in. This species possesses a very curious first primary which tapers rapidly toward the tip; the terminal inch, which is very narrow, is almost sickle-like. Its significance is obscure.

#### EMERALD-SPOTTED GROUND DOVE or EMERALD-SPOTTED WOOD DOVE

*Turtur chalcophilos chalcophilos* Wagl.

The great acacia thornscrub zones are the main strongholds of these doves, but in many of the older established areas around Nairobi they have become familiar garden birds. They are usually noted in pairs or singly, and almost invariably on the ground, where they move about with restless zigzag walk and heads moving from side to side. Scanning the ground as they move they pick up small berries and grass seeds. They are seldom still nor do they remain in any one spot for long.

These little birds have the same type of rather mournful call as the white-breasted forest dove, but it is higher pitched and has far less volume and a different spacing. It commences with a very low, long note: "toooo, teu teu teu, teu teu, to to to totototoooooo." It is usually uttered as the male sits on some exposed branch of a low tree in the early morning or late afternoon. Sometimes the call is so low as to be hardly audible, as when the male calls from a tree near where his mate is sitting.



EMERALD-SPOTTED GROUND DOVE or EMERALD-SPOTTED  
WOOD DOVE  
Male brooding young

One may locate the nest by noting the male, who often calls within a few yards of it. Most nests are fairly low, from four to fifteen feet up. One of my pairs has nested in a creeper at ten feet for three consecutive years, utilizing the same spot each time; another selects a low tree with spreading horizontal branches at six feet; another chooses the stump of a pollarded tree with growing shoots around; yet another an obliquely cut branch from which twiggy shoots have grown. The nest is a small, frail-looking platform of fine rootlets and a few twiglets, with a few finer rootlets as a

lining. Though seemingly frail, the rootlets are wavy and twisted, and though openly meshed they have strength and resilience and are not easily pulled apart. Two small pale creamy eggs are laid, averaging  $23 \times 17$  mm. The female does most of the incubating; the period is seventeen days. I have occasionally seen the male sitting, more especially in the late afternoon when the hen has been off feeding or has gone to water.

Once incubation has started, the eggs are kept covered most consistently, if the bird is not disturbed. The majority vacate easily, but the female of one pair was unusually tame. When this bird had hatched her young, I put up a hide near the nest. Both birds were reasonably tame, and during the first few days the female brooded the chicks closely, even though I stood near. Both parents adopted the same method of feeding. When they approached the nest tree, they perched on a branch for a few moments. Working the head and neck jerkily from side to side, then up and down, they brought the food up into the throat before actually alighting at the nest. On alighting they raised and lowered the tail once or twice, then going forward straddled the chicks so that the youngsters faced the same way as the parent. The parent then bent down and one of the chicks put its bill transverse to that of the parent and swallowed the food as it was dribbled down by jerky pumping movements. Though both parents might arrive together, one waited at the back of the tree until the other had emptied its crop.

There were five main feeding times: 6 to 8 A.M., 10 to 11, noon, then a break, followed by meals at about 3 to 4, and 6 to 6:30 P.M. There was of course some variation on different days and in respect to visits of one or both parents. It was not possible to see what food was being given, but from scraps which fell to the foliage below the nest, I was able to identify small seeds (herbs and grass), a small weevil, bits of a small mollusc, and chitin from termites. All the food was collected from the ground under the trees and bush near the nest, or on an open area near by and along a pathway. Neither parent ranged far from the nest site, and one at least was always within a radius of twenty paces of the nest.

The new-hatched chick was pale brownish-flesh in color, with longish, rather wiry, yellowish hair-like down on head, scapulars and dorsal tracts. The eyes started to open on the fifth day, and the wing quills already showed. The bill appeared very long and out of proportion to the size of the head, but this disappeared with general body growth and feathering, though the head feathering was much slower than that of the rest of the body. This is no doubt a provision of nature against soiling of the face during feeding times.

The little squabs spent most of their time between meals in sleep; they lay with their heads to one side in rather a helpless-looking fashion, as though the skinny neck was not strong enough to support the head.

The parents gave warning of approach to the nest, by just a few notes, though, after feeding, the male often sat on a tree not far off and called softly.

When the young were nearly full grown the mother could hardly cover them with her body, but by partly opening her wings and drooping them over the chicks, she provided cover for the night. Youngsters in first feather are brownish, with sandy and tawny barring to the upper feathers and a slight barring on the breast. They are ready to vacate the nest on the eighteenth day from hatching, but often stay a day or two longer and remain in the vicinity of the nest site for the next day or so, under cover. Here they are fed by the parents; then, later on, they take to the ground and accompany their parents in the open, but they are still fed up to two weeks after leaving the nest.

The mortality rate is very high in this area; my figures give it as 80 per cent. Shrikes and mongooses are the chief predators of eggs and young.

### BRONZE-NECKED FOREST DOVE or LEMON DOVE

*Aplopelia larvata larvata* Temm. and Knip

An old Wandarobo hunter of the Kenya forests once told me that this bird was "*mbaya sana*" (very bad). Asked why, he explained that when one was creeping through the forest undergrowth, intent on the spoor of some beast, this bird would suddenly clatter up from some dark patch of undergrowth, scaring the hunter and giving warning to the would-be quarry.

It frequents the deep shade of thick undergrowth in evergreen forest, seeking all its food among the decaying leaf debris, moving with restless walk first in this direction then in that, the while it picks up small berries, seeds, insects, and molluscs. I once saw two birds pulling up small bulbous roots, the tubers of a small ground orchid, which they seem to relish.

The bird's plumage blends extraordinarily well with the foliage; its white face and throat break the line of contour of the head. The light gray tips to the full tail serve to draw attention to this extremity rather than to the rest of the bird as it flushes. Its flight is of short duration, for it keeps low and drops to thick cover at a few yards' distance. Flushed once or twice, it may go up into a small tree of the mid-growth, yet even thus perched it is difficult to "spot" in the forest gloom.

At times, my little forest is full of these doves, relatively speaking; there may be a dozen to twenty birds searching about the forest floor, singly or in small groups. But so far as I have noted, not more than two pairs have nested in the area. Food is plentiful at times, and this and the presence of water have been the chief attractions. Many of these birds have been young of the previous season, July, for they seem to nest between April and July, raising perhaps two broods. In another area, where I sometimes work, eggs and small young have been noted in March. In my forest patch there are two areas which are low-lying, normally rather damp, full of leaf debris but with little herbage, and these seem to be favorite feeding grounds.

Most nests, of the usual light, twig-platform type, are built toward the middle of a horizontal branch, at 6 to 20 feet from the ground, in rather low trees, but some are built on a mass of creepers, and one nest was in the decayed end of a broken-off branch. Nests here have been mostly in deep shade. One was kept under close observation for seventeen days. The hen sat close, and so far as I observed, the male took no part in incubation. The chicks, which hatch on or about the eighteenth day, are brownish, with coarse hairy yellowish down on the head and back. A hide was erected by degrees at this nest but a mongoose took the chicks. At another nest, the chicks vacated at the twentieth day and remained with their parents for nearly two months before dispersing.

I have heard but one low note made by this species, a double "curu," repeated at intervals; for the most part it seems silent. When two males have been feeding in one spot and one has approached too near the other, one has driven the other off by coming close and then rushing at him with raised wing and dealing a sharp blow, to the accompaniment of a hissing "sissu" sound.

Two years later I located another nest in a thorny *Chaetacme* tree at twenty feet, when I saw both parents collecting fine rootlets and twigs and flying into the tree. The nest was completed in just over a week, and then the first egg was laid, with a full day between this and the second. Either one or other of the birds was always on the nest every time I walked past and inspected the site. The young hatched on the eighteenth day from the laying of the second egg.

I allowed them a full week before erecting a tall tripod which reached just to nest level; on top of this tripod we placed the canvas hide. The female was the first to come to the nest and she did so with little hesitation, because the hide had been up for two days before I did my first spell in it. She alighted toward the front of the nest; then, stepping into it straightway, she commenced to regurgitate and to feed the chicks one at a time. While one fed, the other clamored for food, and it was with some difficulty

that the mother disengaged the first youngster to attend to the second. Each chick was fed twice; then the mother brooded them for a while, until the male came into a tree near by and made a low "kuu ruu" note indicating readiness to take his turn. The bird always left the nest when the male was ready to come to it. The only note heard at the nest was made by the female, who uttered a low "coo-uu" note on alighting. The chicks made a wheezy note just before getting their bills into the parent's mouth. One or other of the parents mounted guard over the chicks between feedings until they were well feathered.

The nestling plumage of the young differs markedly from that of the adults. It is mottled and barred with rusty brown, there is no indication of the bronzy-purple-green on the neck, and the wiry whitish hairs are retained for some time on the tips of the feathers.

The young were ready to leave the nest on the twenty-first day, and even at this stage some head and neck down remained at the feather tips.

These birds are frequent visitors to the bird-bath. They take a full drink in the early morning and another in the late afternoon. This latter is often accompanied by a bath.

## RED-BREASTED CUCKOO

*Cuculus solitarius* Steph.

The red-breasted cuckoo is resident in this district. Its call may be heard and its eggs discovered in both the long and the short nesting seasons. I have seen it in every month of the year. Its calling (checked by tracking the bird) has been heard in every month except August and September.

The number of birds present on the plots has never exceeded four, so far as I have observed in any one day: two males, one female, and one whose sex is not known. One male works the forest strip from east to west and the bush on the western boundary; the other male hangs around the bush and *Euclea* strip along the stream bed and the area to the northeast. The female comes and goes.

In the early morning, the male perches high on a tall dead tree and gives his familiar "whip poor will" call. The notes may go on for half an hour or more. Then he comes down to the bush, flying here and there, slipping into the bush in this spot and that, occasionally perching in a low tree and calling. It seems to me that during this time he is searching for nests—keeping watch for birds which are building—for at such times there has been little evidence of his taking food.

Later on, he again seeks a high tree and calls vigorously; he holds his wings slightly down, his tail just above the horizontal, his head slightly up. His throat swells and vibrates as he calls. He turns his body to right and

left, sending his call in all directions; the notes seem to have a ventriloquial quality.

Sometimes a second bird with less red on the breast, apparently the female, appears, and the male, calling loudly, displays: he droops his wings farther, fans his tail, and hops along the branch, calling the while. The hen bird calls, but the note is of a higher pitch, more rapid and not so full. The two birds take short flights, the male leading and alighting in areas where he and I had previously found nests; the hen flies to the nests and investigates them.

One morning I saw them investigating the nest of a bulbul (*Pycnonotus*); two nests of streaky serines (*Polioptila*), both in one tree, one old, the other new; the nest of an oriole, and one of a cossypha. Later on, I saw one of the birds drop down to a patch of bush where I knew an *Erythropygia* nest to be. Both birds called at intervals. I lost track of the birds and then went the round of the nests at which I had seen them visiting. None had been disturbed or interfered with. Toward 4 o'clock both birds were back in the locality, and they hung around until dusk. The only nests which they approached on this occasion were those of the orioles, from which the owners kept driving them off vigorously, and that of a cossypha in the bush strip. I knew the orioles had well-incubated eggs, while the cossypha had laid its full clutch at least three days before.

During that night and early next morning the male called loudly, starting off just before dawn. At about 11 A.M. I visited the cossypha's nest; there was one cossypha's egg and one undoubted cuckoo's. The cuckoo egg was more rounded at both ends, rather browner, and didn't show the slight speckling of the cossypha egg, but there was a marked similarity between the two. The hen cuckoo was not present again in this area until four days later, and then she remained just one day. I did the round of all the nests I knew of but found none victimized; indeed, all held well-incubated eggs. Although in the western corner only the one cossypha had been victimized, two cossyphas' nests in the stream-bed zone held cuckoos' eggs.

In May, 1942, a male cuckoo was very noisy in the northeast corner of the plot, and a female was seen occasionally. A *Cossypha semirufa* had been victimized earlier in the month and its nest held only one cuckoo egg. On May 10 the cuckoos were present in the trees by a vegetable garden. I knew that a *Cossypha caffra* was just completing a nest near by. I went to the nest and found that it held the first cossypha egg. The cuckoos hung around all the morning. Twice I saw the hen fly toward the nest and on one occasion enter the recess where it was, but she vacated in a moment. I had to return to my house at noon and stationed one of my watchers to note events. Returning at 2:30, I was told that the cuckoo had gone to the nest,





#### RED-BREASTED CUCKOO

A young bird from a *Cossypha* nest

remained a while and left. He said the bird was not more than three to five minutes at the nest. I watched until 4:30 and saw no cuckoo near the nest nor did I see the cossyphas. I examined the nest and found it empty, but on the ground, about a yard off, was a sucked cossypha egg. The following morning, toward noon, the nest held one cossypha egg. It seemed that the cossypha had this second egg ready to lay, and in spite of the loss of the first egg she laid this second one in the robbed nest. The cuckoos were around all that day, but not near this nest. Next morning, the cuckoos were busy at a distant corner so I examined the cossypha nest and found it tilted, torn and empty!

On April 10, 1945, a *Cossypha semirufa* nest held two typical eggs of this species, quite fresh. The cuckoos were about the area, and I knew the male cuckoo had located the nest, but neither he nor the female went to it during the periods of watching on the tenth and eleventh. On the morning of the twelfth the nest held only one cuckoo egg, of the olive-brown type. On the twentieth the nest was empty.

A dozen nests located in this area have contained a solitary cuckoo's egg. All the eggs have been of the olive-brown type, and all but one have been in the nests of *Cossypha semirufa* or *C. heuglini*; the exception was a nest

of *Chlorocichla flaviventris*, whose eggs are grayish and heavily freckled with brownish and ochre.

Blue eggs have been recorded elsewhere and attributed to *Cuculus solitarius*, but I rather suspect wrong identification, though the eggs are of the same shape and texture. They may be the eggs of *Clamator jacobinus*, another parasitic species, which lays blue or white eggs.

## YELLOW-BREADED EMERALD CUCKOO

*Chrysococcyx cupreus* Shaw

The emerald cuckoo is not uncommon. I have definitely located three males within this area of 40 acres in one day and have noted an even greater number of females, although these latter have been mostly birds of passage. The bird is more often heard than seen.

It is usually assumed that the species is migratory—an idea based on data on the labels of specimens and on aural evidence, or the lack of it, for calling birds are usually heard during the so-called long-rains nesting season (March to July). However, I have long recognized that the species is, in part anyway, resident in this area throughout the year. I have sight records for every month in the twelve and have observed both male and female birds. During the non-breeding season the species is quiet and unobtrusive, rather shy, and difficult to approach and observe. For the most part it frequents the thick vegetation of the forest, showing a decided preference for the canopy.

Jackson's account (*Birds of Kenya . . .*, vol. 1, p. 499) is based on the bird's more obtrusive behavior during the breeding season, the period from March to July, and the inference to be drawn is that this is the only breeding season in the areas dealt with. Nevertheless, he *does* record a young bird with its foster parents in February.

I have already drawn attention to the fact that under certain circumstances certain pairs of birds will become sexually active during both long and short rains, whereas nesting will usually take place during the former period only. I use the expressions "long" and "short" rains in a general sense, but as I have clearly stressed, the sexual urge antedates the actual onset of the rains.

In common with many other species, the emerald cuckoo has, during the past short season (1944-45, October-January), shown marked sexual activity. The usual call note of the male has been heard continuously day after day, and at least two males have been located as in residence, together with at least four females. The familiar call has sounded from the treetops all around, but the makers of these calls have been localized to



YELLOW-BREASTED EMERALD CUCKOO

A male perched on branch near nest

very definite territories. When one has encroached on the territory of the other, and contact has been made, scrapping has taken place, mostly intimidation by voice and display, not blows.

From January 15 to 25 I had the good fortune to observe these birds at very close quarters. The display is accompanied by call notes totally different in type and character from those notes usually associated with the species, which latter I now assume to be mainly a localizing or directional call.

I recount my observation of January 15. It has been repeated thrice since. A male bird took his stance on a high *muhugu* tree at about 7:30 A.M. and commenced his familiar call. He was within view of my bedroom window. He remained on the one branch but altered the direction of his call by turning from one side to the other or by reversing his stance on the

branch. A female arrived on a fig tree below his stance. Her arrival was silent. The male flew down to her, first of all with a silent glide, then with vibrating wings that produced an audible "prupp prupp." He alighted on a branch in front of the female. Then followed a series of call notes, loud and of marked intensity, which I wrote down as "tuar, twar—char, ree-choo choo," whistling notes of a penetrating quality. This call was repeated some four times. The wings were held depressed below the partly expanded tail; the throat was expanded and vibrated visibly; the thigh feathers were lowered and displayed.

The female sat immobile, with head drawn in between her shoulders and beak pointing upward. The male then took short flights from one branch to another of the fig tree, each flight accentuated by the "prupp prupp" noise, and short calls: "chier chi choo, chier chi choo." He then took a longer flight of some twenty yards, called the full series of notes, and returned to the fig. Lighting on a branch just in front of the hen, he threw his head back, gave the full call—"tuar tuar, chari, chi choo"—and commenced to display. Bending forward, he raised and expanded his tail, drooped his wings, and fluffed out the thigh feathers. In this attitude, he moved sideways along the branch; as he moved he repeated the short "chui chee choo," then, turning, moved back along the branch. He turned round opposite the hen, drew himself upright, then depressed his body low to the branch and slowly expanded his tail and opened his wings. He next flew toward the hen, who, avoiding him, went to another branch. The male followed her. He displayed again, and just at this moment another female came into the tree. The male called excitedly, but the first hen darted at the intruder and with a hissing note drove her out of sight. The male meanwhile gave voice to the full call; the female returned (presumably the original bird), and the male re-commenced his "dance" along the branch. The female drooped her wings and moved them with a slight quiver, and at this the male alighted by her and copulation took place. Immediately after this, the male flew with exaggerated wing beats to a near-by tree; alighting, he called loudly, and darting into a *Trema* tree alongside, he picked off two beetle larvae, flew to the hen, and fed her. She fluttered her wings, opened her mouth and took the gift. Then he made a wide circular flight, calling as he flew, "chui choo choo choo choo choo," starting loudly and descending in scale and volume. His call was very reminiscent of the display call of *Tchagra australis*. Soon he returned to the hen, and both birds moved into the *Trema* tree and commenced to feed on the beetle larvae and pupae infesting it.

This whole episode took place within a few yards of me, as I stood by my window. In the *Trema* tree was a nest of the violet-throated sunbird

(*Chalcomitra a. doggetti*). The nest held one egg, but a week incubated. The female cuckoo was at the nest two days later; she clung to its front and looked in, then flew off. There was also a just completed nest of the yellow-vented bulbul in a tree close by; the cuckoo went to that one, and then flew off.

I examined the nests two days later; the sunbird's egg was still present, and the bulbul had laid her first egg. On January 24 both cuckoos were back in the *Trema* tree, busily feeding on the beetle larvae (a species which feeds exposed, whose pupae also hang exposed to the under sides of the leaves; neither is touched by other species of birds). As they fed, another male arrived, but he was driven off at once. During the morning another female appeared, and though she was tolerated for a while, the first hen drove her off. At 4 P.M. I heard the male calling the courting call, and going out toward the fig tree I saw him again displaying. Pairing took place after a while and both birds flew toward the forest. The bulbul's nest was kept under close watch but was not interfered with; however, another pair of yellow-vented bulbuls who had a nest on the west boundary were noted to be feeding a young emerald cuckoo a month later.

In previous seasons, I have found at least five yellow-vented bulbuls' nests with young emerald cuckoos in them. We have several records of this cuckoo's egg in the nest of Reichenow's weaver.

The cuckoos' eggs are white to pinkish in ground-color, spotted with red-brown and with gray sub-marks; they are very similar to the eggs of *Pycnonotus*, though slightly smaller. The incubation period for the cuckoo's egg is at least one day less than for that of the fosterer, probably two. In nests where a young has been found, it has been the sole occupant. I have no evidence that the young cuckoo ejects the young bulbul, but I have taken pictures of a nest with one cuckoo egg and one bulbul's egg, both well incubated. Unfortunately, this nest was robbed before the young hatched!

## WHITE-BREASTED EMERALD CUCKOO

*Lampromorpha klaasi* Steph.

This third species of cuckoo is also common in the sanctuary. As usual, it is the male who is much in evidence, as a result of his distinctive call and conspicuous plumage. Like most cuckoos this species perches high on some exposed branch and calls. This calling seems to be directional and localizing—not strictly part of a courting call. I am also satisfied that it is the male who does the round of his territory, localizing any possible nests for future use, and that his distinctive call is made to attract the females to the

area. Two males appear to be permanent residents in this area, each with his own territory, but there are certainly more than two females who "visit" the area. The species takes advantage of a double nesting period of the birds it victimizes, for I have located eggs and young during both long and short periods when such have occurred in one year, as in 1944-45.

I have twice observed the courting, once for the full period, the second only after copulation had taken place. As in the case of *Chrysococcyx cupreus*, there is a very marked difference between the call used during courtship and the call which one so often hears and which I term "directional." The courting note is much lower, softer, more enticing; it starts off with "swii . . . hiii," accompanied by body and wing movement, then changes to "whit whit," ending in a long "sweeeeeeee." Flight and posturing take place; the wings are drooped, the tail is held up and fanned, the head is held low, almost straight out, and the bill is agape, as the body is swayed from side to side. The female appears indifferent at first and flies from branch to branch, but eventually she signifies assent by bending low and quivering her wings. The giving or offering of food seems to be an important part of the courtship, for on two occasions I have witnessed it. The female sits still on a branch while the male hunts around until he finds a larva or an insect; then he flies to the hen and she accepts the offering with fluttering wings, in the manner of a young bird. This feeding is not to be confused with the feeding of a young of the species by a male cuckoo. As the female sits with open mouth at the approach of the male, she makes a low "sii sii sii" note, not unlike the call of a youngster.

I have not had the good fortune to see this cuckoo at the nest of a fosterer, but I have not infrequently found its egg in a nest of the little yellow-bellied sunbird (*Cinnyris venustus*), in that of the yellow-breasted warbler (*Apalis flavocincta*), and in that of another sunbird (*Chalcomitra*), in this area. I have found a youngster in the nest of a *Prinia*, but it would seem that here *Cinnyris* and *Apalis* are most often victimized.

The giving of food by this male cuckoo to a youngster of its own species seems to me to indicate a latent sense of paternal instinct, for I have observed it not only in the young out of a nest but with one still in the nest of the fosterer. It would almost appear that the male keeps track of the nests in which eggs have been laid and I suspect the same of the parasitic lesser honeyguide.

Other species of cuckoos noted on the plots are *Clamator jacobinus*, the pied crested cuckoo; *Cuculus jacksoni*, a black cuckoo; and *Lampromorpha caprius*, the bronze cuckoo, but their eggs have not yet been found in any nest in this area.



HACKLE-NECKED COUCAL or WHITE-BROWED COUCAL  
Female leaving the nest

### HACKLE-NECKED COUCAL or WHITE-BROWED COUCAL

*Centropus superciliosus intermedius* van Som.

This is perhaps the commonest of the local *Centropus* species; it is certainly the most widespread, since it is found in suitable localities from the coast to Abyssinia and Uganda. Its habitat is the bush and scrub, at low as well as high elevations, even up to 9,000 feet, and though it occurs at the margins of open savannah it is not found in heavy evergreen forest.

These birds are retiring and skulking in habits. For the greater part of the day they remain hidden in the bush, but in the early morning they perch on the tops of bushes, sunning themselves and calling. In the late evening, toward sunset, they again appear on the bush-tops and become more active. They may be noted on the ground even after the sun is down, for this is the time when they take toll of grasshoppers at rest and chaffer beetles which emerge for their evening flight. One might almost apply the term "crepuscular" to this late evening hunting, for it is a marked feature of their habits. It is at this time as well as in the morning that one most often hears the curious bubbling call that has been aptly likened to the pouring of water into an earthenware jar from a height. It has a quavering

quality both in the descending and the ascending notes, which gradually trail off in tone. One may sometimes hear the call late on a moonlit night, especially as the nesting season approaches. At this time calling also takes place during the day, though less markedly toward noon.

One not infrequently sees these birds perched on the bush-fringe along country roads—one here, another there—and if they are approached in a car, they remain still. But should one approach them on foot, they immediately drop to cover and creep into hiding. Their flight is weak, floppy and labored, and not long sustained; the feet are carried hanging down and the tail is partly spread, and as the bird drops into the bush at a short distance, it creeps or runs to cover. When it is perched its whole attitude is one of melancholy, for the head is drawn in between the hunched-up shoulders, although the fierce red eyes belie the impression of boredom.

These coucals are usually solitary, although they may be seen occasionally in pairs; however, at the end of a season when a brood is on the wing, one may note a family party sunning at the edge of a reed-bed or on top of bushes, although a note of warning usually sends the youngsters to cover at once. On the other hand, a single fledged youngster may just sit in a bush until one has walked right up to it before it flops into cover.

The rather weak flight of these birds is emphasized during wet weather. After a night of heavy rain they become wet and bedraggled as they creep through bush and grass; then they can be run down and captured by hand. After a shower, the birds sun and dry off, perched on a bush-top with wings and tail outspread.

There is some local movement of the species, but a pair will remain resident in a suitable locality. There are two pairs in my immediate neighborhood. They remain unobtrusive until the nesting season comes on, when their bubbling calls attract attention.

The calling stance of the male is near the nest. The birds select a rather thickish bush, or one overgrown with creepers, a tangle of brushwood, or a dwarfed tree with thick foliage, in which to build. The nest is a large, rather untidy, domed structure built of grass stems and blades, leaves and roots, and lined, mostly at the bottom and sides, with grass. The entrance is toward one side and rather high, so that the "bowl" is well below the lip of the entrance; there is frequently a ramp leading up to the opening. I have watched both birds bringing material to the nest deep in a small clump of isolated bush, where the birds had to fly low or run across a small clear area of a dozen yards to reach it.

After a week the nest held one egg, and five days later there were four. The eggs are uniform dull white and immaculate, but they soon became nest-stained. The average size is  $34 \times 24$  mm. Incubation started from the laying of the first egg; thus the development of the embryos was uneven,



and in this nest there were four days between the hatching of the first and last eggs. The eggs were never found uncovered, and I am satisfied that at this nest both parents incubated. It was interesting to see how they adjusted themselves to the relatively small chamber of the nest. As the bird entered, its whole tail extended beyond the entrance, but having gone in, it turned round and faced the exit, so that the tail was now drawn in and cocked over its back, to one side.

The first egg hatched on the fourteenth day, the last on the eighteenth, so that the incubation period is estimated as being fourteen days. One parent sat close for the first three days, and food was brought to the nest by only one bird, so far as I observed, twice during the morning and three times in the afternoon. From the fourth day both birds went foraging. It was now that I put up the hide close to the nest; I was in the hide early next day. The birds were shy of it and forced their way into the nest from the back and from the right side until I barred their entries. Finally the male did enter from the front. He slipped into the nest, his tail still visible. I heard the chick greet him as he entered. In a little while he turned in the nest and sat deep, with just the tip of his bill above the front edge. He brooded for more than an hour, and during this time there was no sign of the other bird. It was about noon.

At 1:30 or thereabouts, the second bird was heard to alight in the bush, and at this the male slipped out and flew past the hide. The female tried to find the back door first, and failing, worked her way round to the left, and with her back toward me, fed the chicks. Then she slipped down into the bush and off for more food. Now that both birds had found easy entry to the left, they came with fair regularity. By far the greater proportion of the food consisted of long- and short-horned grasshoppers, a few crickets, moth larvae, a small lizard, and a tree-frog. The feeding rate increased in the late afternoon, reaching its maximum between 5 and 6 P.M., when food was brought every ten minutes or so.

Newly hatched coucals are interesting creatures, almost black, with long, rather stiff, wiry, white hair-like down on head and back. In a day or two quills show, and they grow to some considerable length before bursting at the tips; thus the nestling looks like a young, spiny hedgehog. Combined with this unusual appearance, they make a curious hissing noise when handled, or even when one places a hand over the nest entrance; it sounds like the hissing of a snake. In addition, they have a rather disagreeable odor, and I feel sure that all three characters combine to warn and keep off predators. Moreover, if one handles a chick, it evacuates a most unpleasant liquid excreta, black and nauseating.

Subsequent sessions at this nest provided some interesting food data. Besides the mixed diet already mentioned, a young mouse, two nestling

zebra finches, a small grass snake, and more tree-frogs were brought, in addition to numerous acridids. I have frequently seen adults taking small lizards, frogs, and small birds, but until now I had not noted that such were given to fledglings. Coucals are chivvied by small birds, which doubtless detect a cuckoo-like appearance and probably realize the thieving propensities of the species.

Although the young coucals are often of different ages and sizes, the older ones stay on in the nest or its near vicinity until all are ready to leave. This duration in the nest varies from eighteen to twenty days in the case of broods of four and five young. The first plumage is rather unlike that of the adults; it is more tawny-brown, with dark streaks on head and neck, the mantle is barred with blackish, and the rufous wings are heavily barred; the under side is buffy, with indistinct barring. The young are hardly able to fly at first, and so they keep to the thick bush where they creep about or sit hunched up until the parents arrive with food. The body plumage is molted at six months and the flight feathers are gradually shed at nine months.

The chief breeding season in the Ngong area is from April to July and August, but nests may be found at other times in other districts.

#### BLUE-CRESTED PLANTAIN-EATER or HARTLAUB'S LOURIE

*Turacus hartlaubi* Fisch. and Reichw.

Among the larger birds of the Kenya Highlands, the plantain-eaters are probably the most conspicuous. There are two species: the blue-crested and the purple-crested. The former inhabits the evergreen forests, the latter frequents the drier savannah and the gallery forests of rivers. Only one, the former, which occurs in my sanctuary, is described here.

The blue-crested plantain-eater makes itself conspicuous by its loud raucous calls, and its splendid plumage is enhanced when in flight by the display of a large crimson patch in each wing. But its coloration is actually cryptic; it harmonizes with the dark green foliage of the trees. The bird has the habit of "freezing" (remaining perfectly still) until it sees an opportunity to noiselessly hop, run and leap from branch to branch higher and higher until it is near the top of the tree; then, if it knows it has been detected, it utters a curious purring note, "purr" or "churrrr," followed by a louder "quarck" as it takes wing; flapping a few strokes it sails up into the next thick-foliaged tree.

The call of one bird to another is a feature of the Highland forests from dawn for an hour or two, then again in the late evening. The morning and



BLUE-CRESTED PLANTAIN-EATER or HARTLAUB'S LOURIE

Adult and squirrel at bird-bath

evening calling may be likened to the challenging call of francolins; a bird calls loudly and its challenge is taken up by one to the right, then one to the left. The call is a loud throaty "kwa, kak, kwak-kwak kwak" or "quar quar, quarck quarck," or "kwau kwau kwau chikkwau chikkwau"; the note of anxiety or awareness is an abrupt "puert puert" or "chuert." There are different intonations to these various calls, indicating degrees of excitement, under varying circumstances.

These birds have a sense of curiosity and will come to a spot where there is some unusual noise. They have sometimes come around when I have been putting up a hide in a treetop. They approach, but remain at some distance, craning their necks and peering first with one eye then the other, and uttering a low "puit puit" note of enquiry. One not infrequently finds them among a pack of birds gathered around a tree snake, an owl, or other large raptorial bird taking shelter in a tree. They add their notes to the excited cries of the chivvying birds, but they stay on the outer ring of the company.

Though more often seen in pairs, one may sometimes find them in numbers, perhaps six or more, associating with other fruit-eating birds in some heavily laden fig tree. They are wasteful in their method of taking fruit, and drop more than they actually swallow. Several kinds of berries and fruits are eaten, including the large fruits of *Acokanthera longiflora*, avoided by most birds. They exhibit a definite preference for certain fruits and when the more edible are exhausted others are taken in rotation, the least palatable being left to the last. When certain crops fail, the birds are forced to feed on fruits they would otherwise ignore.

I have referred to their habit of jumping and running along branches. It is common to all the forest plantain-eaters and is facilitated by a curious modification in the basal joint of the outer toe which enables it to be directed backward as well as forward, so that the holding power is more equalized. This fore-and-aft grip enables these large birds to work their way along toward the end of slender branches, where fruits are most abundant.

The few pairs inhabiting my sanctuary and the adjoining woods have given me opportunity to study their nesting habits. Three pairs have been resident for the past five years, and another pair has occasionally nested in the area. Altogether six nests have been located, four between the months of April and July, and two between September and January. This double nesting period is confusing. I feel certain that a given pair will not habitually nest twice a year. I think that when a pair has nested in May and has successfully raised a couple of young, such young remain with the parents until subadult. When a pair is found nesting late in the year, it has prob-

ably been unsuccessful in the long-season attempt. The mortality rate is definitely high.

The nest sites are comparatively low in position. All have possessed a common characteristic—thick foliage and fine twiggy branches in the immediate vicinity of the nest. The nest itself is constructed of twigs loosely interlaced to form a shallow platform; it is like the nest of a pigeon. The mesh is often so wide that the eggs can be seen from below; sometimes finer twigs are laid in as a lining. The main support of the nest is the branching horizontal on which it is built.

Two eggs (sometimes only one) form the clutch. They are rather round ovate in shape, dull white in color, smooth. An average egg measures  $38 \times 31.5$  mm.

The incubation period, so far as I have been able to estimate, is 16 to 18 days. As the sexes are so alike, it is difficult to say if both birds share in the incubating. The bird will sit close if not approached too hurriedly; careless investigation has led to an egg being knocked out of the shallow nest as the bird has hurriedly left.

I watched a sitting bird for a while; she had her head forward as I climbed an adjoining tree, but when I was just level with the nest she slowly turned her head away and put her beak down into her breast until I could see only the back of her head and the dark crest. She remained thus all the time I watched. The eggs were on the point of hatching. It is of interest to note that I have seen a dove doing the same thing.

The newly hatched youngster is a curious looking creature. It is dark brownish, almost black, covered all over with woolly black down except on either side of the mid-line on the breast; there is also a pink area of bare skin down the center of the crown, over the ear regions, over the bases of the wings, and around the vent; a bare area around the eye is grayish-blue; the bill is flesh-pink except at the tip, where it is brownish. The tail is indicated by a "brush" of long hair-like down. The feet are gray-brown. At about ten days the beak darkens and the egg-tooth is shed, but the base of the bill remains pink. The pinkish bare areas of the body become more brownish and short quills appear in the wings. At 14 to 16 days the wing quills are nearly two inches long and open at the tips; tail quills are present, and on either side of the breast short quills may be felt under the down. The head, neck, and body feathering is very slow in appearing, so that even at three weeks the youngsters present a scraggy appearance. A very noticeable feature about the head is the very wide gape and pink palate.

With some considerable difficulty, I erected a hide at one of the nests. The youngsters were just three days old and required brooding for long spells, so I gave the birds three days to become accustomed to the hide. I watched the parents on the first day, from a ground hide. They came to



BLUE-CRESTED PLANTAIN-EATER or HARTLAUB'S LOURIE

Female during a pause in feeding chick

the nest shortly after we had completed the hide. They hopped and ran about the large branches of the surrounding trees, uttering their staccato "chut chut" and "chek chek"—the latter note made by the female—but in a short time the hen was on the nest and brooding.

The day I entered the hide, I selected a time when I noted from a distance that both parents were absent. I was settled in when both birds came into the nest tree. They noticed at once that the branches between the hide and the nest had been separated and were nervous and hesitant about coming to the nest. Finally the female hopped up to it, through the twigs.

The youngsters had turned to face their parent as she squeezed between the twigs. They now stretched their necks and opened their mouths wide. The mother put her bill crosswise to the gape of one chick and regurgitated, directing a flow of slimy pulped fruit into the gaping mouth. The youngster swallowed all the time. The first fed, the mother turned to the other chick and fed it in the same manner. When a whole berry was brought up, the mother disengaged and re-swallowed the fruit.

Having now fed both chicks through the foliage and twigs, she remained standing and anxiously viewed the youngsters. She pushed herself a little farther through the twigs, then withdrew. Presently she climbed up to the nest at one side but she made no attempt to feed the chicks. Gently pushing one with the side of her bill, she raised its tail up and then commenced to massage the bare pink anus with her bill. The youngster responded, and as the excreta was being voided, the mother swallowed it. She repeated the process with the second chick. Then, satisfied, she flew off. Much of the food given to the young of many frugivorous birds passes rapidly through the alimentary tract. It is only partly digested and still contains nourishment. Many parents swallow the excreta, for it supplies them with food and at the same time assures sanitation of the nest. The excreta of insectivorous birds is contained in a gelatinous sac, but that of fruit-eaters is not, and this is probably the reason for taking it while it is being voided.

The plantain-eaters now came and went calmly. True their visits were not very frequent, perhaps not more than once in every half hour for an individual bird, but both came to the nest precincts together on several occasions, although they fed the chicks independently. If the male did not actually come into the nest tree, he accompanied his mate to and fro on her foraging trips.

Even though much of the food given during the first few days was very pulped and partly digested, I could recognize much of it. The wild fig formed a considerable part, but other fruits were also noted. After two weeks, small but whole fruits were regurgitated and swallowed by the young. Some of the harder fruits were passed through the whole of the digestive tract and voided intact. Few of the large seeds of *Teclea* berries were noted in the regurgitated food, and it would seem that the pulp was separated from the seed by the parents before they swallowed it, if the food was for the young, for I have frequently seen the adults taking and swallowing these berries whole.

Next day I was in the hide at about 10 A.M. The mother had left the nest as I walked toward it. There was only one youngster; the other had disappeared. The parents came often and behaved normally.

On my third visit an incident occurred which involved the plantain-eater and the goshawk. There was a sudden change from the encouraging "quark" of the male, to the wild, defiant "kak kak kwak kwak" of fear. The female had just come to the nest and was getting into position to regurgitate; she stopped, on the alert, crest raised and tail dipping, then fanning. Suddenly the goshawk swooped at the male, missed him, and flew onto a tall croton tree. From here, he overlooked the nest tree; he eyed it intently, then flew off. I left the hide about 5 P.M. The next day, I paid a visit to the goshawk's nest and while I was in that hide, the plantain-eaters

came around and called loudly—calls of defiance and acute excitement. It was strange, for the birds were well off their usual “beat.”

That afternoon I found the plantain-eaters’ nest empty and blood-stained. Did the goshawk return and take that remaining chick? Observation at that nest came to an end.

Early in May, 1944, I watched a pair of plantain-eaters courting. It was a noisy performance, accompanied by great activity. The male was perched on a branch displaying; raising and lowering his crest he fanned his tail with jerky movements and repeatedly half opened his wings so that the crimson patch showed plainly. He kept up a continuous “quark quark.” He then made a jump toward the female, who avoided him, and the two went leaping from branch to branch in the great fig tree. The female rested and the male displayed again. He walked along the branch with half-raised wings, and tail outspread, and as he reached the hen she flew off and both disappeared into the forest. The following day they were in the fig tree again. I saw them billing, and presently the female lowered herself and raising her head opened her mouth and the male regurgitated food into it. They later paired. I was busy with an oriole’s nest in this same fig tree, and often saw the plantain-eaters. One day I noticed one with a twig. I hunted for the nest in every likely tree around but it was not until many days later that I saw the nest. In my neighbor’s yard a young plantain-eater was found on the ground. Not far off we found another youngster, dead. It lay below a solitary *Chaetacme* tree growing almost alongside the road—the last place I should have expected the birds to build, but the nest was there, some 25 feet up, among the thorny twigs. After much difficulty we returned the living chick to the nest. We were gratified to note one of the parents in the tree within half an hour.

I estimated that the chicks were between twelve and fourteen days old. This particular nest had not been disturbed in any way by humans, and it was difficult to account for the fall of the young. The branches where the nest was situated had shed all their leaves, and there was insufficient cover to shelter the chicks from the blazing sun. In attempting to crawl to a more shady spot, they may have fallen. I drew a leafy branch down over the nest and the second chick was well sheltered.

The nestling period is difficult to ascertain accurately. I have a record of 28 days, but young plantain-eaters, like colies, crawl about the nest tree long before they are ready to fly.

Another pair of birds, which were under observation for weeks, had built a rather frail twig nest toward the outer rim of a tree (*Rhus* sp.), among the slender leafy branches. Although this tree was not more than twenty feet high it was well domed and spreading, with drooping branches



that reached the ground. A common feature of these trees is that the foliage is thick around the outer surface, but the "interior" is a mass of bare branches and twigs. Thus one is able to stand below and note any nests concealed among the outer foliage and yet invisible from outside. When the plantain-eaters selected this tree as their nesting site it already held a nest of a black-tailed cossypha (*Cossypha semirufa*), that of a white-throated olive bulbul (*Phyllastrephus fischeri placidus*), a nest of a yellow-breasted bunting (*Emberiza flaviventris*), and that of a zosterops (*Zosterops senegalensis fricki*).

This assortment of species in one comparatively small tree gave rise to no friction, although it may be recorded that both the bulbul and the cossypha resented the intrusion of another of their own species within the nesting site! Standing on my double stepladder I was just level with the plantain-eaters' nest. It contained two obviously hard-set eggs.

I gave the birds a fortnight without disturbing them and then revisited the nest. It now held two chicks, one very much larger than the other, seemingly hatched at different times. I judged the larger chick to be about a week old. At odd occasions I sat on the ground below the tree and watched. The hen plantain-eater brooded her chicks and at intervals went off at the approach of her mate with food. I watched the parents return and saw a chick stretch its neck toward the parent's bill. The parent regurgitated, and fruits began to dribble into the gullet of the youngster.

After three days of ground observation, a hide was rigged up on the ladder and the whole carted to the nest tree. I entered the ladder hide at 8:30 one morning and parted the leafy branches. By now the elder chick was well feathered on the scapulars and breast; his wings were over four inches long and his tail over an inch; the rest of the body was covered in blackish down but where the down was thin the pink skin showed through; the base of the bill was pink and the bare skin around the eyes was dark bluish. The lesser chick was without feathering but the blue and pink of his "face" was brighter than that of his mates and the pink skin down the center of the crown showed clearly; his body down was less blackish, more dark-brownish, especially on the back. While I had been studying the youngsters the parent bird had crept through the twigs and was now sitting behind the nest.

The chicks were restless, moving and calling. There was a difference in their calls; that of the larger was deeper—not unlike that of the parents but of less volume and limited to two or three notes; that of the "babe" was high pitched and just two notes repeated two or three times: "chu chu." In response to these appeals the parent came to the edge of the nest. She was at once besieged by the bigger chick. He pushed the little one aside,

opened his gape, and raised it to his mother's bill. She regurgitated, and first one fruit, then another, trickled into the youngster's maw. Twice the parent made as though to disengage and feed the little chick but the bigger one pushed upward. A fruit that was too big or not sufficiently softened was drawn out of the youngster's gape, squeezed and re-swallowed, to be regurgitated again with more saliva. While the hen was thus engaged, the male bird alighted in a bare tree not far off. He expressed surprise by guttural "churrs" at the unwonted sight of an exposed nest. The female left the nest and joined him. She took a fruit offered to her and went back to the nest. Once again the larger chick received the food first. Then followed the massage of the anus by the mother and as the feces were voided the mother ate them and flew from the nest.

Meanwhile the male had watched proceedings from his stance. It was some little time before he approached the nest with sharp "chuch" notes. He was still on the outskirts of the nest site, hesitant, when the larger chick, impatient at the delay, hopped to the edge of the nest, then to a near-by branch, and edged his way to his timid parent. He billed his parent's breast and then his bill until at last the male regurgitated and fed his "forward" offspring. The male left the nest tree; the "bully" (as I now called him) sat on the branch away from the nest. In due course the mother came straight to the nest. Little chick was the sole occupant and received all the food, and attention to his toilet. "Bully" croaked and protested, but by the time he had edged his way back to the nest the feast was over. He sat on a branch to the side of the nest, and when one of the parents next visited the tree, he moved in and intercepted his parent, achieving at least three full feeds while the little one moved restlessly in the nest, vainly endeavoring to stand up and crawl about. For the next three hours "bully" continued to waylay his parents each time they came.

Here was a contributory factor which seemed to foster, even accentuate, the disparity in size between the two chicks. During the following week I took up position in the hide for spells of six hours. On each occasion, "bully" pushed himself forward after the first hour or so, more especially when it was the male that brought food, for he was less tolerant of the opening in the foliage in front of the nest than his mate. While he hesitated within the tree his more enterprising offspring, now very active on his legs, would meet his parent halfway, to the detriment of his less forward brother. So I had "bully" put in a box and fed him, returning him to the nest at the end of the period of watching each day. Both parents then fed the younger chick.

One day the female gave practical evidence of her objection to the exposure of her nest. She had fed the chick and brooded him for awhile, but

she was uncomfortable. She began to push the twigs about, re-arranging some of them on the margin of the nest; but she wasn't satisfied. She stood up, gave the youngster a little caress and slipped off the nest and into the body of the tree. I heard her fly off to a dead tree close by. Here she snapped off a twig, returned to the nest and manoeuvred the twig into position at the front edge. She brooded the chick for a few moments, then slipped off the nest once again. Soon she was back with another twig. She repeated this six times and eventually the front rim of the nest was so raised that the little chick reclining in the shallow saucer could not be seen. I interpreted her action as evidence of anxiety for the chick rather than concern for herself. It may have been merely a nervous reaction such as I have described in the case of other species.

The approach to the nest by both parents was always the same—never direct to the front of the nest but always by way of the body of the tree, then through its twiggy interior to the back of the nest. Here the birds would push through the foliage and feed the young while standing on the edge of the nest. Smaller fruits and berries were taken by the young without effort; in fact, as I have described, the food trickled into the youngster's wide-open mouth. At times the fruits were too big for the chick's gape, wide as it is. If a fruit could not be accommodated at once it was removed, squeezed, swallowed and regurgitated. This process was often repeated several times before the youngster at last managed to get the fruit into his gape. It then went slowly down the gullet by much twisting and depressing of the neck; it might make the neck skin bulge to one side but eventually it reached the crop.

The parent stood and looked on and then followed the almost invariable attention to "toilet"; the bird bent forward and gently pushed the youngster until the tail-end was raised; then the anus was gently billed and "massaged," and the excreta was taken as voided, and was swallowed; odd bits of food were picked up from the nest and everything was clean. The feeding and toilet over, the youngster sought warmth; it snuggled against the parent's breast, put its head between the feathers, and made a low squeaking sound. If prepared to stay awhile the parent puffed her feathers out and shuffled into the body of the nest; then the youngster crawled beneath her. The parent lowered her body and with head sunk between the shoulders she might doze; her eyelids closed. Though seemingly at repose she was ever on the alert; the slightest unusual noise caused her to open her eyes, perhaps cock her head to one side; a bird passing overhead caused her to look upward.

The length of time spent in brooding depends largely on the weather; when cold and dull the duration is prolonged, but on a sunny day a few moments suffice to warm the chicks; food must be secured. As with most

frugivorous birds, passage of food through the system is rapid, and feeding of the chicks goes on hour after hour with a noticeable break only at mid-day. The quantity given at each meal depends largely on the availability of supply and the variety procurable. It is a noticeable fact that variety is sought, and there is probably a good reason for this. From the close proximity of my hide I was able to identify the following: small figs, *Chaetacme*, *Elaeodendron*, *Trema*, *Duranta*, *Rawsonia*, olive, *Teclea*, *Vitis* and *Olinea*. Some of these fruits were available in the immediate vicinity of this nest—*Duranta*, *Olinea*, and *Rawsonia*—yet a meal seldom consisted of one species only; figs were usually present and I was aware that this and *Teclea* were procurable only at a distance. Not infrequently I heard the raucous call of the male from where I knew a fig to be in fruit. The female invariably answered and this not infrequently when she was at the nest! A double note, "whii caraw," repeated up to four times! The male seemed to forage farther afield than his mate, and his visits with food were less frequent.

A further break in supplying food to the youngsters occurred toward late afternoon; at this time both parents in company sought food for themselves. On two occasions when the hen was brooding her youngsters, she was called off by her mate to join in the evening meal. After uttering her answering call, she would stretch, give her body feathers a shake, and take wing, exposing the crimson wing patch.

At two and a half weeks "bully" was all over the interior of the nest tree and seldom in the nest; his little brother stayed in or near the nest but he was growing fast, his wings were sprouting, and he had control over his legs. I like to think that human aid in the more impartial or equitable distribution of food had contributed to his well-being.

## LILAC-BREASTED ROLLER

*Coracias caudatus caudatus* Linn.

This bird is commonly referred to as the "blue-jay," a name not infrequently applied to the Masai starling (*Lamprocolius chalybeus*) with less justification. It is a familiar bird, often seen perched on telegraph wires or on the tops of bushes out on the plains. Bold and confiding, it sits still, scanning the ground below; as it sees an insect move, it flies down, seizes the victim in its bill, and returns to its perch. Here the prey is beaten; if it happens to be a grasshopper the jumping legs are pulled off, the insect tossed until it faces head toward mouth, and down it goes.

One sees a single bird here and there, sitting on some favorite perch day after day, for weeks on end.

Toward the end of February, the males begin to show signs of rivalry; two birds may be seen perched on top of a bush "swearing" at each other, with crests raised at times, and tail uplifted and spread. One may attack; then the two, facing each other, fly upward with beating wings, as the one tries to claw the other. Should one obtain a hold, both birds drop to the ground and struggle for a while; then one lets go and flies up 30 or 40 feet. As he flies he does his "roll," once, twice, then sails downward to his perch, where he calls his harsh cry. I have often noted that the twist and roll are performed during the "after-pairing" flight. They are also used when a pair is endeavoring to draw one's attention from a nest hole or from young just on the wing.

The few nests that I have located have been in old dead trees where a branch has broken off by the trunk and has decayed away, producing more or less a natural recess with a slight downward incline, modified but not excavated by the birds. Other nests have been in holes in the side of "white-ant" hills. Little attempt is made to line the cavities in either situation, and the eggs lie on the bare wood or earth as the case may be. Two or three eggs are a usual clutch, pure white, smooth and slightly glossy, rather rounded, measuring on an average  $33.5 \times 25.50$  mm.

The incubation period checked at one nest in the Tsavo River area was seventeen days and at another beyond Kajiado it was eighteen. Both parents seem to take part in this duty. I have no full data relative to the nestling period, but up to twenty days the young were not ready to leave.

As with many other "hole" nesters, these birds have a strong odor which probably acts as a repellent. The parents are very excitable at the nest and will perch on a near-by tree, calling loudly and anxiously. At one nest, the male actually flew at the boy who was climbing up to investigate it.

The food consists of insects, mostly grasshoppers, locusts, crickets, beetles, moths and their larvae, and a few butterflies on rare occasions. Other prey taken on occasion includes small lizards, frogs, and, I suspect, an occasional small bird, for I have seen a roller drop toward a flock of small waxbills as they fed on the ground. A roller which I once had in captivity had to be removed from a cage adjacent to one containing finches, for he killed two through the wire mesh. The rollers will take raw meat readily in captivity, but it may be that confinement induces this depraved taste.

There is some local movement among the roller population of this area, but when several have appeared, most have been subadult.

## PIED KINGFISHER

*Ceryle rudis rudis* Linn.

Visitors to Kenya will see this bird in some of the creeks of both Kilindini and Mombasa harbors, but they will lose touch with the bird away from the coast, unless they travel up one of the larger rivers. We meet it in numbers around the shores of Lake Victoria. There *are* a few pairs which frequent our larger lakes, such as Naivasha, and there is always the odd pair to be seen on our rivers, even the Mbagnathi, and also on the Athi and the Tana and so on. Many an artificial lake caused by damming will have its pair or two. The little dam in the valley below my sanctuary is frequently visited by two or more birds.

Note then, that this species is associated with water, an expanse which is fairly quiescent, be it lake, dam, or a large pool of a river. The birds live on prey captured in the water: fish, tadpole or frog. They take their prey by hovering above the water, then darting down onto the victim. The hover is characteristic; the body is held just off the vertical, the head and bill are directed downward, and the wings beat rapidly. The bird hovers over an area where it has detected movement; the object may have moved, so the bird drops slightly, then rises and hovers again and as soon as the prey is sighted the body is brought right over, the wings are closed, and the bird descends with a little splash. If the dive has been successful, the bird flies to a stance where the fish or tadpole is manipulated in the bill until it faces head toward the gullet; then it is swallowed whole.

There are certain spots on Lake Victoria where earth banks are literally riddled with the nesting tunnels of these birds. One low bank had more than twenty such holes, the work of many seasons, but only one or two were occupied. The tunnels run in with a slight upward incline for many inches. The softer the earth the deeper the tunnel and many are from four to six feet long. Tunneling is done with the bill, and the feet are used as scoops to shovel the earth out. Two birds may work in a tunnel together, and the sand will pour out of the entrance. The favorite nesting sites are in the sandy banks up river from the lake, and in one long stretch my brother counted as many as twenty nesting pairs. The tunnels end in a brood chamber in which the five or six almost spherical white eggs are laid.

When the youngsters have hatched and feathered, they are packed like sardines in the comparatively small chamber, even one on top of another. The large clutch size is evidence of a plentiful food supply, and one will find that where a bank has many nests, the waters of the river will be teeming with small fish.

## MALACHITE-CRESTED KINGFISHER

*Corythornis cristata cristata* Pall.

Stroll along the banks of a Kenya river, saunter along a stream, pause by a long-established dam; here, sooner or later, you will hear a high-pitched piping call and perchance see a streak of red, blue and rufous skimming across the water. As the bird sits he moves his head up and down and from side to side. A dart, a little splash, and back to his perch!

He hunts in the still waters, the pools with gently rippling surface, and the backwaters. He finds food in water-logged overgrown murrum pits and in the borrow pits along a railway embankment where water stands; though no fish are present there, he takes his fill of damselflies and their larvae, water beetles, and tadpoles, too. Fish are not essential to him. He takes them when he can, but water-insects, small amphibians, lizards, grasshoppers, and mantids form his staple diet. On lakes and swamps with open water he is equally at home.

These birds avoid the high cold mountain streams, but they are plentiful along the coast, in swamps and on lagoons, and even on the tidal estuaries of the rivers and in the mangrove swamps. Thus the species is widely distributed, but it is most plentiful along the papyrus-fringed lakes where suitable banks exist for nesting. Birds in residence on temporary waters move off as the waters dry up, but otherwise the population is steady.

Years ago I found a nest of the malachite kingfisher in a bank on the Ngong River. It was in one of the higher banks of a pool fringed with reeds, with blue water-lilies floating on the surface. Water hens and black crakes lived in this pool, and game came down in the evening to drink. It was a quiet spot unfrequented by humans except when the snipe were in. I put up a hide in the reed bed near the nest. The birds came along, popped in and out, and behaved as though no human was near them. Each gave a shrill call as it approached the nest, possibly to let the youngsters in the hole know it was coming, perhaps to tell its mate that it had gone to the nest.

The kingfishers brought an assortment of food: small frogs, tadpoles, small fish (*Barbus*), mantids, dragonfly larvae and pupae, long-horned grasshoppers, and a water-bug. I noticed that when they did not come straight to the nest hole and disappear within in a flash, they selected certain reeds to perch on, for a moment or so. When they alighted they had the prey crosswise to the bill, but by slight manipulation, sometimes by tossing, they adjusted the victim until its head pointed toward the tip of the beak. Then they came to the nest and darted in. The reason for this adjustment was presumably to get the prey in such a position that it could be put into the chick's mouth and swallowed with the least difficulty.

I spent several days in the hide, up to the time when the young were so active that they came to the entrance to meet their parents. I noticed, however, that the youngster just visible within was not the first to be fed. The parent pushed past and went into the nest chamber. When the youngsters were very small they made no noise, but very soon one could hear their wheezy voices as soon as one of the parents alighted at the entrance, or even when one alighted on a stick near the nest. Their hearing must be acute. It is probable also that the slight darkening of the entrance gave them an indication that the parent had come, for when I inspected the hole and put a mirror before it to reflect light, the youngsters wheezed lustily until the ray of light shone in; then they "froze," huddled together at the back of the chamber.

It isn't always possible to see into a chamber, for it is often to one side or it may be just below the level of the tunnel, which may have an upward incline. Some of the tunnels go in as much as three feet before they widen into the nest chamber; some are only eighteen inches long; some may take a bend after a few inches, and so measurement is difficult without opening them up. The tunnels are usually excavated by the birds, both parents taking part in the work. Sometimes an old hole, if small, will be adapted and lengthened. Trial holes may be made, and if an obstacle is met, another hole is started.

Nests with eggs are usually found from April to July, but in some localities the birds will lay in the last months of the year. However, it has not been shown that these late nesters are the same birds which laid in the early months. Both parents brood. The incubation period is not known with certainty, but from observation I think it must be from 14 to 16 days. Four or five eggs form a normal full clutch. The nest chamber is unlined.

The nestling period at one nest was certainly 25 days from the date I knew the young had hatched to the time they emerged, but the date of hatching may have been a day or two earlier than I had noted. The young are hatched naked, pinkish in color, with blue-gray gapes and gray-brown bills. As the quills grow, and before they burst, the youngsters have a spiny appearance. Though there is no lining to the nest to begin with, the chamber floor is littered with fragments of bone and other hard substances regurgitated by the young when they bring up pellets of undigested food. These pellets disintegrate and litter the floor. Some excreta is also present, but at an early age the young learn to direct this toward the entrance tunnel. Thus the approach to the chamber becomes coated with the chalky excrement. It seems surprising that the parents manage to keep their feathers clean and free from contamination, but the breast and abdomen feathers are held close and the legs are well extended as they run in and out.





MALACHITE-CRESTED KINGFISHER  
Male perched in front of nest entrance

When I commenced the survey of the birds in and around my sanctuary in 1940, numerous murrum pits were full of water and overgrown with water-loving grasses. A black crane nested here, as also did a pair of white-rumped ducks. One day I saw a malachite kingfisher perched on a dead twig projecting from a bank. It was joined by another, and they "duetted"—a curious little singsong but uttered together, so that it was difficult to hear which bird uttered certain notes. I put the song down as best I could: "ii-tiii-cha-cha-, chui chui tiichui chui," ending in a long "chuckle." I noted later that this chuckling note was made when one bird arrived at a stance just at the moment the other left it to go to the nest tunnel. As the two birds sat together, I noticed that one had some red earth on its bill, a sure sign that it had been tunneling.

Sitting quietly in the bush, I noticed first one then the other bird go to a near-by bank. One alighted on a stone projecting from the wall; the other disappeared into a hole. In a little while earth began to trickle out of this tunnel, whereon the second bird entered it and the earth began to come out faster. They were in the hole about five minutes; then one after the other emerged. They hunted insects on the water for a while, then returned to the tunnel. And so it went on for most of that afternoon. Next day I had a look at the excavation. It was already fourteen inches deep, with a slight upward incline; then it turned right. There were two other newly excavated tunnels near by, one about a foot lower than the hole I had seen the birds entering. I thought perhaps they had struck some snag in the first hole and had started a fresh one. I went into hiding and along came the birds. One entered the original hole, the other took the lower one, and both worked. The bird in the lower tunnel soon gave up and went into the upper one. They remained inside a long time, then only one came out.

For over an hour only this one bird was seen. I wanted to make certain that the other one hadn't come out without my knowledge so I went to the bank and tapped the earth above; at the second tap a bird flew out. Walking away, I stopped at a little distance and saw the bird return to its hole. I suspected that it had started to lay.

At intervals of a few days, I watched at the bank. Only one bird was seen, but if I tapped above the bank, the second came out. On the twentieth day from the time I suspected the hen to be laying, I went to the spot early. Both birds were perched on the reeds, but in a very short time one flew to the hole and disappeared. The second bird sat on some sedge; presently he dived and secured a small tadpole. He jerked it round until it lay lengthwise in his bill, head to tip. Then he flew to the nest. He emerged in a short time and sat on his favorite stance, which commanded a channel of water and a pool. He bobbed his head in characteristic fashion. He

plopped, dived, and came up with another tadpole. He tossed this and got it lengthwise, then came to the nest. Both birds came out and sat apart. Each captured a small victim and held it and worked it in the bill for a while; then one after the other flew to the tunnel. I could assume that the young had hatched and were being fed.

This pair of birds were not nearly so tame as those of the Ngong River. I put up a hide and returned to it next morning. One bird entered the nest just as I walked toward it. She remained inside, so I entered the hide. She had not emerged when her mate came along, momentarily touched the entrance, and ran inside. It was definitely a run. The female "stayed put" all the morning.

A week later, I visited the kingfishers again. I noticed that a certain amount of excrement now stained the entrance to the tunnel; the young must now be active and must move backward to the tunnel entrance to evacuate.

I was able to pay one more visit to the nest before going off on a long safari. The youngsters had reached the stage when they required almost constant feeding. The little parents were kept hard at it hour after hour. Fortunately, food was available in abundance.

## VIOLET-CHEEKED KINGFISHER

*Ispidina picta picta* Bodd.

These birds are never plentiful. There is just the odd pair here and there in the dry thornbush country during the rainy season, when insect life is plentiful around the temporary water pans and swampy ground. This little kingfisher feeds almost entirely on grasshoppers and other insects. One sees him perched on an outer twig of a thorn tree, head bobbing up and down or turned to one side or the other, intently looking toward the ground. He makes a sudden downward dart, picks up an insect, and returns to his perch, where he beats the prey with rapid side strokes of the bill; then he adjusts it and down it goes.

When the nesting season approaches, we find these birds moving to places where suitable earth banks exist. These banks may be found in the erosion gullies and dongas, but many pairs move toward the river, for those sandy banks are more easily tunnelled than the hard-packed banks of the dongas. I have located a number of nests, the most unusual of which was a tunnel in a termites' nest. The tunnels run inward with a slight upward slope for several inches; then they turn left or right and end in a small chamber. The last two nests observed were miles apart—one in a stream bank in the Bwamba Valley of western Ruwenzori, and the other in a bank

of the Tana River at Bura. This will indicate how widespread the species is and to what degree it can adapt itself to varying climatic conditions.

Four or five small rounded glossy white eggs are laid.

### WHITE-BELLIED KINGFISHER

*Halcyon albiventris orientalis* Peters

This bird is sometimes referred to as the red-billed kingfisher, but this name is confusing, since there is another red-billed species which also occurs along the Kenya coast, viz., *Halcyon senegaloides ranivora* Meinertz. Even the name "white-bellied" is not very appropriate, for the under surface is washed with tawny-buff, especially on the flanks. It is sometimes called "brown-hooded kingfisher" and this is perhaps the most suitable name.

The species occurs all along the Kenya coast and along the larger rivers inland for a considerable way; thus we find it in Ukambani and the Meru district of Mount Kenya.

Although associated to some extent with water, these birds eat few fish. The diet consists of locusts, grasshoppers, mantids, crickets, cockroaches, beetles, and caterpillars; to this insect diet they add frogs and tadpoles, small tree-lizards, skinks, and even small grass snakes.

The above menu was supplied to a nest full of young which I had under observation for several days. This particular nest was in a tunnel in a bank by the Tana River. It was within a yard of a steep path down which natives went to draw water. The birds were thus accustomed to humans, and beyond a sharp "chee rit" or "chit chee rit" when anyone went toward the nest site, they showed little fear. In fact, they often darted down toward my feet as I walked, snapping up a grasshopper which I had disturbed. The bank was steep and overshadowed by a large *Deinbollia* tree which hung over the water. From the tree hung creepers in loops about ten feet from the nest entrance. The birds were in the habit of alighting on one particular loop, then turning round and darting into the nest tunnel. The nest was within ten yards of our camp and we watched the birds come and go for several days.

Feeding commenced almost before dawn and went on all day, with a lull toward noon, up to seven o'clock. The birds took most of their prey from within the camp surroundings, and they had several favorite stances from which they darted down to make a capture; they seldom failed. Lizards and skinks were taken off tree trunks with surprising accuracy. A captive would be taken to a branch, battered a bit, then adjusted in the



WHITE-BELLIED KINGFISHER

Female alighting near nest with food for young

bill so that the head of the prey was foremost; then the captor flew to the creeper and so to the nest hole. The female parent was the most attentive: her visits were twice as frequent as her mate's and she was usually silent. The male, however, usually announced his arrival by a clear "chit-chee-rit," repeated three or four times. When I was making observations from beside the camera I sometimes heard the female make a low chuckle call as she came to the stump in front of the hole, then a purring note, which was at once responded to by a wheezy chorus from the young within. The time in the nest hole was hardly more than a moment, but the parents must have gone in and turned round for they came out head first. Reflected light



WHITE-BELLIED KINGFISHER

Male coming to nest with a gecko lizard in his bill

failed to locate the brood chamber; the tunnel went slightly upward for 18 inches, then turned right. The young must have been fairly well advanced, for excrement was voided through the entrance hole onto a slight ledge below. Though both parents sometimes arrived on the creeper together, one waited for the first to vacate before darting to the hole. Just above the

tent was a dead branch and on this the parents used to sun themselves; lying sideways on the branch they would spread out the wings, expand the tail, and putting the head to one side raise the feathers and puff out the mantle.

In the vicinity of the nest site there were three intruders which the parent birds could not tolerate: lilac-breasted rollers were chivvied off; green tree-snakes were hustled on their way by a sudden dart; a monitor lizard which had its hide up on the bank was not allowed within ten yards of the nest. On the other hand, red-headed and blue agama lizards basked on the ground or on tree trunks close by and were ignored.

One parent, the female, entered the nest hole on the occasion of the last feed and slept in the chamber; the male roosted on a branch under thick foliage high up in the *Deinbollia*. We did not see these kingfishers out in the dry thornbush; they were always in the fringing forest along the river or among the *doum* and *borassus* palms. Along the Kenya coast, too, one sees them singly or in pairs among the taller shady trees and tall bush. Their presence is often first appreciated by their rather shrill penetrating "chit-chee-rit," oft repeated. When the male calls he stands upright, with wings slightly down and vibrating. The courtship display is interesting. Calling takes a great part in this. The head is held high and almost upright; the wings are spasmodically opened to show the white and are vibrated; the tail is fanned and occasionally uplifted.

The nesting season varies with locality; we have found nests from May to July along the coast, and on the Tana River in November and December. The three or four eggs are pure white, smooth to glossy and almost spherical; they measure  $27 \times 20$  mm. on an average. The incubation period is about two weeks and the nestling time a little bit longer. A newly vacated nest is somewhat smelly; when there is a full complement of young the entrance becomes very soiled with excrement and the sparse lining of the nest chamber is full of quill sheaths trodden into the floor, for the feathers are sheathed for quite a time before they burst and expand. Yet in spite of this, the plumage of both parents and young is kept spotless.

## BROWN-BELLIED or GRAY-HEADED KINGFISHER

*Halcyon leucocephala centralis* Neumn.(Included in *Halcyon leucocephala leucocephala* of Sclater)

Known severally as the "white-headed," "gray-headed" and "brown-bellied," all names equally applicable, this species ranges throughout East Africa. It is found in a diversity of spots but not in the high moorlands or the evergreen forests. The presence of water is not essential to it, since it lives almost entirely on terrestrial insects such as locusts, grasshoppers, mantids, beetles, crickets, moths and their larvae, and small lizards. It is common along the coast hinterland, through the thornbush and in the park and savannah forests of an open nature in acacia country. It is very common in the Kisumu-Kavirondo country and most parts of Uganda. It occasionally appears in township gardens during the non-breeding season, when it may wander and be met with in most unlikely places. At odd times one of these birds visited my garden at Nairobi, staying two or three weeks, then disappearing; I often saw them at Nakuru, but only once at Ngong.

Where there are acres of grassland without a tree or bush, though teeming with insect life, this kingfisher will not be found, but if by human agency a road with telegraph runs through it, the chances are that the bird will be seen. A stance of moderate height, usually ten feet or so, is essential in its environment—a place from which it can dive down and take its prey. It avoids long grass, for this obscures its vision and hinders a take-off; open areas, sparse grass and stunted herbs, bare stretches of earth, even roadways, are places where it hunts, but there must be suitable perches.

I have never encountered these kingfishers in any numbers together—never more than a family party of five or six—but several may be seen at intervals along a suitable stretch of country. The bird sits almost upright on its vantage point, head turning to left and right; then with a little jerky up and down movement it will dive down, momentarily touch the ground, snap up an insect in its bill and return to its perch. If the prey is small it goes down at once; if large, it is given a few taps with a sharp lateral movement of the bill against the stance, and then is adjusted head backward and swallowed whole.

I have located a few nests, most of them in earth banks, natural banks in a wash-out, dry watercourses, river banks, and borrow pits. Occasionally I have found one in the face of a tall "white-ant" hill.

I have only once had a brief opportunity of taking photographs and making close observations. It was many years ago at Kisumu at a point where the railway line had been strongly embanked. Deep borrow pits



stretched for a quarter of a mile, and these in time became over-grown. Many held a certain amount of water so that the grass around the pits was always green, and insect life abounded. This ideal stretch was tenanted by two pairs of these kingfishers. One pair already had eggs, the other was just burrowing a tunnel.

The birds were very timid. The female incubated, the male perched near by. After the eggs hatched, both male and female carried food into the nest burrow. Upon occasion the male followed the female into the burrow. The food included grasshoppers and a small skink. The young vacated the nest just over three weeks after I knew they were hatched.

### CINNAMON-BREASTED BEE-EATER

*Melittophagus lafresnayii oreobates* Sharpe

This bee-eater appears in its greatest numbers in the Kenya Highlands between 6,000 and 8,000 feet. It occurs again in western Uganda. In some areas, particularly near large stands of forest, the bird is resident; in other places it is locally migratory; that is, it arrives for nesting purposes, stays about three months or so, then disappears.

A road or railway cutting, a borrow pit, a quarry face, or the high earth banks of a stream in or near forest—all giving access to open spaces and exposed at some period of the day to the rays of the sun—are the favored nesting places of the cinnamon-breasted bee-eater. The presence of forest appears to be an essential in this bird's environment. Why? I don't quite know. It probably has something to do with food requirement or humidity, but I hope to show that an analysis of food devoured does not show the inclusion of insects procurable only in or near a forest environment.

In spite of their brilliant plumage these birds may be overlooked, for when not nesting they go in pairs, hawking for insects over the canopy of forest, or they perch high up on some dead branch at the forest edge, or in a clearing in the forest itself. When they flock before a local movement or seek lower elevations for nesting one sees them in numbers, from three to ten pairs together. This number will of course be increased when broods are on the wing with their parents.

In my garden in Nairobi, I once counted twenty birds together. I had a number of sisal plants in flower at the time, and bees were attracted to them in thousands. The bee-eaters came for the bees. They had a royal time, but when temporarily satiated they perched in a row on the telephone wire or, at about 2 P.M., when the sun was very hot, they came down to the loose sandy patch in front of the house and had a dust bath or



CINNAMON-BREASTED BEE-EATERS

stretched themselves full out on the hot sand and sunned themselves. They remained for just a week, then moved on.

The nesting colonies of this species are never very big, nor are the tunnels in very close association. The largest colony I have seen was in a bank of a road cutting near Lake Narasha. There were ten occupied tunnels in a stretch of fifty yards and many more unoccupied ones—trial tunnels and old ones of previous seasons.

In my sanctuary at Ngong, there is a quarry, roughly 70 feet wide and averaging 30 feet high. There is a good deep stratum of soil above the rock face, and to this the bee-eaters have come for several years in succession. A few bee-eaters used to be noted flying around the forest edge, but none utilized the quarry until a pair of black saw-winged martins and two dusky sand-martins had burrowed their holes in the earth the previous season.

First, one pair of bee-eaters came and settled in; the next season there were two, then three, and this season (1944-45) there are still three. They

are on friendly terms with the martins, and I have seen no evidence of their trying to usurp a tunnel occupied by these little birds. Tunnels are numerous in the earth bank from just above the rock strata to a foot below the grass coverage. There were twenty-five in 1943, and now there are almost fifty. Many are trial holes varying from a few inches to a foot. Some are completed tunnels and chambers occupied in past years, for today only three tunnels are occupied by bee-eaters, two by black martins, and three by dusky martins.

When bee-eaters come on the scene, each of a pair may start an independent hole. Then the pair finally selects one or else starts an entirely new one, and this accounts for the numerous burrowings now extant. Unlike the majority of small birds in this area, the bee-eaters are "end of the year" nesters, carrying on into the two months of the next year; i.e., October-December-February, with slight variation according to climatic conditions, and whether or not more than one brood is attempted.

I usually became aware of the presence of these birds by hearing the sharp "clicking" or snapping of their bills as they seized some prey in mid-air. Searching for them, I would see them perched on some exposed high branch. They sit with their heads drawn in between the shoulders, bodies almost upright and tails wagging slowly up and down, pendulum fashion. Suddenly one will dart out—a swift glide, a rapid bank, a click, a turn, and so back to the outlook stance.

It often happens that there are more birds in the vicinity than actually take up residence. The earliest date, so far, that birds have been seen near the quarry is October 10. Ten birds have appeared on that date but only three pairs remained to nest. They arrive, apparently already paired up, for they associate in couples from the start. They appear to be in no hurry to commence operations; they may inspect a few holes, but they spend most of the time hunting—flitting from certain favored stances which give them a commanding view of a wide area. The preliminary inspection eventually leads to serious endeavor. I watched a selected pair for hours. Each bird worked at a different hole; then one would fly to the excavation of the other, inspect it, then go back. On occasion the second bird might stay on and change places for a while. Then work would cease abruptly and both birds would go to a tall *muhugu* tree to hunt. After half an hour they would resume work. They eventually decided on a particular hole (the criteria for which I could not make out), and both birds worked assiduously, in shifts, until the tunnel was deep enough to hide them. Sometimes both birds entered the tunnel one after the other; one must have dug with its bill, for the other pushed the loosened earth backward by shuffling its feet. Then, unexpectedly, the birds would knock off. Thus, they took a

long time to complete the tunnel. A check on it showed that eggs were not laid until two weeks after the hole was first started.

On arrival and up to the time the young are on the wing, one hears the intermittent sharp call notes of these birds, either the single long "tzee-ip" or a treble "tee-si sip," usually uttered as one bird is about to alight near its mate. The notes may be sharp, or with a distinct sibilant quality. The birds are most noisy just after a thunder shower, when insect life begins to take wing from the damp foliage; when the bees start to swarm again around some favored flowering trees; and when of an evening, especially after rain, the winged forms of tree ants begin to flight.

I have not opened up any occupied nests in this area, but by taking a tally of offspring after nests have been vacated, the full clutch would appear to be two. Elsewhere, I have often found three eggs in a nest, rarely four. I have taken the eggs of two species of honeyguide, *Indicator indicator* and *I. minor*, from nests of this species.

The eggs of the bee-eater are pure white when first laid, smooth, slightly glossed, and elliptical in shape, averaging  $23 \times 19$  mm. They soon become earth-stained from the feet of the parents, especially during wet weather. The incubation period has not been checked; I can only estimate its duration from a date when I knew the hen to be sitting, to a time when I have noted food being taken in; it works out at 12 or 13 days. Incubation appears to be carried out chiefly by the female. Quite frequently I have put out two birds but have assumed that the male was feeding his mate as she sat; I know this does occur.

The nestling period is equally difficult to ascertain, for the young do not leave the nest hole until fully feathered and able to fly. I estimate it at twenty-five days at least. I have been reluctant to interfere with the nest in my quarry, for fear of causing the birds to desert the spot. In a favorable season, two broods may be raised, but more often only one is attempted.

The name "bee-eater" is no misnomer in this case. I have made several close counts of food captured by adults for their own consumption, and food taken for the young. I was particularly interested in this matter because of the statement made by some observers, that bee-eaters feed very largely on Lepidoptera (Rhopalocera) and are thus an important factor in the evolution and maintenance of mimicry in butterflies.

This particular nest site in the sanctuary offered an excellent opportunity to check up on the food. The general terrain was particularly good. The quarry faces north. On the east is a row of high trees, on the north a wide valley with species of *Euclea*, and on the west a high bank with bush. When butterflies and other insects are on the move, they appear to take a

line diagonally across the quarry from northwest to southeast. The bee-eaters have several favorite stances on the dead branches of large trees, on several sapling species of *Trema*, and on dead brushwood at the south aspect on the bank.

The first series of observations was carried out when I knew there were still no young to feed. The results showed: Hymenoptera (mostly *Apis mellifica* L.), 95 per cent; Diptera, recognizable as such, 2 per cent; Lepidoptera (*Terias* and *Belenois*), 3 per cent.

When I knew that the young had hatched and were not more than a few days old, I undertook a further period of close observation. Food taken to the nest holes was small, and mostly honeybees. When a butterfly was captured (*Pieris* or *Papilio* spp., or a nymphalid) it was devoured by the adult bird. When the young were at least ten days old, a more detailed count and analysis were made. While the bulk of insects still showed Hymenoptera to predominate, the Lepidoptera catches rose to 5 per cent, mostly *Terias* and *Belenois*, one *Precis*, and one *Papilio phorcas* (captured and dropped). Noctuid moths were also recorded. When Lepidoptera were caught, they were squeezed, tapped, and rubbed, but they were taken to the nests with wings *not* clipped off. The adults ate Lepidoptera with wings still *in situ*.

The increase in butterflies captured was not resultant on a need for more food; it coincided with an increase in the species flying across the quarry. There was a small migration of *Catopsilia* at the time, but few were taken.

A checkup on two nests not far apart, i.e., four birds, during a 5-hour period, divided up into half-hour periods gave the following number of visits: 15, 18, 12, 15, 10, 18, 16, 13, 15, 16, per half hour; one *Terias* was caught and eaten by an adult and 148 bees were captured and taken to the nests. The day was dull and few butterflies were on the wing.

A week later, a further count was made, based on the number of visits to each nest. The results were as follows: Nest 1, 31 visits; Nest 2, 28 visits; Nest 3, 24 visits. The period of check was two hours. The six birds paid a total of 83 visits. The food taken in to the young consisted of 28 *Belenois* spp., 1 *Mylothris* sp., 1 *Papilio* sp., 1 *Pyrameis* sp., 2 *Precis* spp. (total number of butterflies 33), and some Hymenoptera.

It is of interest to record that one parent of Nest 3 was twice noted to visit Nest 1 while both rightful owners were inside.

Some readers may think that collecting data of this sort is a boring process; in reality it is not. The birds are intensely interesting to watch. As mentioned, they have favorite stances and they swoop to and fro between them or they return to the original point of take-off. The accuracy with which they make these sallies is a treat to watch. Many of the insects are not discernible to the human eye, but the birds spot them; then swoop, bank,

snap! There is a short "fruu fruu" of wings as they turn and dive sharply, then sail upward to their stance. It is now that one is able to recognize the prey in almost all cases, for the insects are not swallowed in flight but are taken to the stance for killing and adjustment.

Because of the interesting data obtained by watching, I decided that at the end of the season when the birds had left I would open up one of the tunnels which I knew had been occupied for one season only. The tunnel ran in with a slight upward incline for  $23\frac{1}{2}$  inches to the back of the chamber; the chamber was slightly to the right of the line of the tunnel. The floor of the nest chamber was  $1\frac{3}{4}$  inches below the level of the tunnel; the chamber itself measured  $8\frac{1}{2} \times 6 \times 2\frac{1}{2}$  inches high; there was no nest material, but the floor held a quantity of insect debris from regurgitated casts and excreta. This debris was carefully collected. It weighed  $\frac{1}{4}$  pound and consisted of the hard chitinous parts of Hymenoptera, Diptera (syrphids: *Phytomyia*), Coleoptera (scarabaeids: *Onthophagus*), buprestids, *Silphus*, and wings of Lepidoptera, in the following numbers (head, right and left wings, or elytra constituting an individual insect): Honeybees (*Apis mellifera*), 4380; other Hymenoptera, 10; Diptera (*Phytomyia*), 12; Coleoptera, 6; Lepidoptera (pierines, 6; moths, 3)—a total of 4417 recognizable individual insects from among a pile of fragments too small to determine.

For a period of two or three hours during the middle part of the day and early afternoon, the bee-eaters left the quarry and flew over the forest. They took up stances on the high trees and skimmed to and fro over the canopy. Bees were particularly numerous here, especially when the crotons were in flower.

I have often tried to ascertain the periods of actual sitting or incubation during the hours of daylight. It is not continuous; at one nest, watched very carefully, I noted that the hen sat for 15 minutes, then came off, returned after 5 minutes and sat for 28 minutes, then was off again for 8 minutes. Her next spell on the nest lasted 37 minutes and when she went off, her mate entered and sat. He was on the nest 20 minutes and was relieved by the hen.

I have mentioned the accuracy with which these birds take prey; it is equally interesting to note the precision of their flight or swoop to the nest hole; the pause at the entrance is hardly perceptible—a mere fraction of a second. I know this to my cost, for I have often attempted to photograph this entry, using speeds up to  $1/800$ th of a second, and this is too slow on most occasions. They seem almost to fly straight into the hole, which is only slightly larger than the circumference of their bodies. If one bird is already in the tunnel when the other arrives the entry is slower; they may even pause, and this gives one a chance of a picture.

When I was checking up on length of spells on the nest, I noted that the hen would occasionally employ her free time by perching on a rock face with an easy incline, or even on the ground, and would spread wings and tail out, lie on her side and sun-bathe. She often lay almost on her back so that the tummy was exposed and its feathers fluffed out to air. She was sometimes joined by her mate or other birds. Sun-bathing is a common predilection of bee-eaters; one notes it with many species.

Although young bee-eaters emerge from the nest fully winged and capable of flight, there is no rapid exodus from the nesting ground; indeed, the nest holes are used as sleeping quarters for a week or two. The young remain with their parents up to the time when the whole party moves off to the forest areas. These youngsters can be recognized at once by the less yellow throats, the green feathering on the under side instead of the cinnamon, the lack of a decided black collar, and the much shorter bills. They soon learn to swoop after passing insects but are fed by the parents for quite a long time unless the adults start a second brood.

When the rains of March begin to fall, the bee-eaters quit the quarry; they may stay around the forest for a while, but eventually move to areas where the forest stands are larger.

One would imagine that these bee-eaters, nesting as they do in holes, would be free from the attention of marauding mongooses and such like. But one of my pairs elected to tunnel in an inclined bank above the rock face. A mongoose found the nest when the chicks were just two weeks old; there was just sufficient foothold for the beast to dig the youngsters out of their 18-inch tunnel. He also emptied a cossypha's nest in a hollow on the same bank!

### RED-THROATED BEE-EATER or WHITE-FRONTED BEE-EATER

*Melittophagus bullockoides* Smith

The observant individual who has the opportunity of traveling around the country will not infrequently note how a certain species of bird seems common in one locality and is not met with elsewhere, though conditions appear similar and favorable. This is particularly marked in the case of the red-throated bee-eater, which is so plentiful in the Rift Valley from just north of Magadi to Rongai and then on to south Rudolf, all to the east of the Mau and the western escarpment.

It seems to have its headquarters in the central portion of its range, that is, from Njoro to Kijabe, in which areas it nests in great numbers. The tunnels may be seen in borrow pits along roads and railway, and in the banks

of rivers, especially the Morendat. The birds take advantage of even more artificial earth banks, such as the rifle-butts now constructed near all the military camps within this area.

Although a bank may be freely tunnelled, not all the holes are occupied, for the birds often make trial holes and many may be of previous seasons. Perhaps a dozen pairs may be found in occupation of tunnels along a stretch of river bank, or two to three pairs may be in a borrow pit. They usually perch low, on the dead branches of bush around the nest site. As they perch with upright pose of the body and head drawn down to the wings, they move the tail like a pendulum, a slow to-and-fro motion. They are noisy and keep up a twitter, especially when one bird alights near its mate. They make a sharp call just as they flight out after some passing insect, and a series of notes as they alight.

As they sit, one may often approach within a few feet of them, for they exhibit greater tameness and boldness than do most other species of the family. They are perhaps more excitable at the nest bank, but even here one may sit and watch them going in and out from just a few feet off. As they sail up to the tunnel entrance they close the wings at the moment of alighting and run into the hole without pause; when they emerge, they take off in a downward plane, then rise to a near-by perch.

Some of these nest tunnels run in as much as two feet in friable earth, ending in a chamber wide enough for the bird to turn in but of no great height. One chamber opened up by me was  $8 \times 7 \times 3$  inches high. There is no nest lining, and the two to three pure white eggs are laid on the bare earth. The eggs are rather rounded, smooth, and slightly glossed and measure  $23.5 \times 20$  mm. Incubation seems to be about thirteen days, but I have not checked this accurately.

When the young are hatched, the nest chamber becomes filled with the hard chitinous parts of insects regurgitated as pellets, or voided in the excreta. The nestling period seems to be over three weeks, but no detailed records are available.

I have often watched these birds at their nest holes, but have never had the opportunity to stay and take photographs; the pictures I have made were of birds feeding by the shore of Lake Naivasha.

Sand- and sun-bathing are frequently indulged in. For sun-bathing they select a warm rock face; spreading wings and tail, they ruffle up the head and breast feathers and look quite different from the sleek trim birds seen in flight.

They have two main nesting seasons that correspond more or less with the two rainy seasons, but there is naturally some variation throughout their range. One may find a few pairs still with eggs in late July and Au-



gust, probably second attempts at rearing a brood for the long season. There seems to be but slight movement in the Rift during the off-season, and so far as I have noted it is limited to a concentration of birds along the shores of Lake Naivasha.

Full-plumaged birds are rather beautiful, but it is seldom that one sees them in full clean dress. The head feathers are usually worn and the green becomes bleached to a mottled bluish.

They feed entirely on insects taken in flight, mostly bees and wasps, but a few moths and butterflies may be caught up, as well as other winged insects such as chafers, damsel flies, and flying ants.

### RED-AND-WHITE-BILLED HORNBILL or VON DER DECKEN'S HORNBILL

*Lophoceros deckeni* Cab.

Of the bird life in the thornbush country, the land of thorny acacias and weird-shaped, twisted species of *Commiphora*, stunted herbage, and sparse grass, perhaps the most conspicuous birds are the hornbills, conspicuous because of their size, black and white coloring, unusual shape, ungainly actions, and characteristic flight. There are several species, the red-billed, the yellow-billed, the black-billed, and the parti-billed (red-and-white).

One sees the birds in pairs or small flocks, perched on top of dead trees, in flight, or on the ground hunting insects. The flight appears awkward and labored: flap, flap, flap, which takes them up an incline, then a glide followed by more flapping and more gliding until the final glide carries them to the tree they wish to perch on. As they alight they seem to over-balance. The size of the bill seems to bring them forward and the tail has to be spread and moved up and down to give balance. They sit with wings brought well up and neck depressed between—not compact and sleek but grotesque.

When on the ground they hop about, and even here their curious build makes them look awkward. Sometimes, particularly after the breeding season is over, one may see numbers of these birds (usually mixed as to species) congregating around a limited area of ground, digging into the earth with their heavy bills and securing whatever insect has attracted them to the spot. Very often the attraction is the emergence of hundreds of chafer beetles, which all seem to come out at one time; the birds have a great feast. At other times it may be white ants, winged or otherwise. Another occasion on which one sees them on the ground is when they "sand-bathe." Though the species is largely insectivorous, fruits and berries are taken also.

Hornbills have an interesting nesting story that varies according to the group; as the pairing time arrives, the flocks break up and pairs go off on their own. During the courtship one may often see a male feeding a hen—sidling up to her with juicy larvae and such like. She opens her bill and quivers her wings. A nesting hole is chosen, usually a hole in a tree trunk. It may be a rot hole or an unoccupied old nest of a barbet or a woodpecker. The entrance is enlarged just sufficiently to allow the female ingress; the cavity within may have to be enlarged. This is done with the bill. The nest hole may be within two to four feet of the ground or it may be high up. When the time arrives for the eggs to be laid the female enters the hole, and the female from within and the male from without proceed to mud up the entrance, leaving a mid-slit just sufficient to accommodate the bill of the bird. The female is thus imprisoned.

She is fed continuously by the male. Two eggs are laid, rarely three, chalky-white and elongate. They rapidly become nest-soiled and stained. The female incubates for a long period, estimated at thirty days. During this period she undergoes a partial molt. She sheds her tail and wing feathers—the former abruptly, the latter gradually—and so fits better within the restricted space of the nest chamber.

The eggs hatch, and the female broods and feeds the young with food brought by her mate to the narrow slit. His work has trebled: he provides for his mate and young, and he has to feed himself. Visits to the nest go on every few minutes from dawn to long after sunset. Awkward-looking at most times, he now assumes quite extraordinary positions: he clings to the tree trunk by his feet and supports his weight on his long tail, seldom horizontally, usually obliquely. Thus his tail becomes disordered and frayed. He stays at the entrance just long enough to pass the food to his mate within—only a few seconds. The food is carried in the tip of the bill. Having disposed of an offering he flies to a branch and wipes his bill—then off to search for more food.

Most of the food is taken off the ground: beetle and lepidopterous larvae, grasshoppers, crickets, beetles, and such like. To vary the diet he occasionally brings a lizard, a small mouse, or a nestling bird. During a trip to the Tana River we found a nest rather high up in one branch of a dead fork of a *doum* palm. The nest hole was obviously an adapted woodpecker hole. The entrance, apart from the mud-sealing, was very small and must have been only just large enough to allow the female bird to enter. There was an identical hole in the other branch at about the same level, occupied by a pair of woodpeckers. I had both under observation for several days.

The male brought the usual assortment of food, but I was rather surprised when he turned up with a long-tailed skink. The head of the lizard



RED-AND-WHITE-BILLED HORNBILL or VON DER DECKEN'S HORNBILL  
Male at nest hole, about to pass food through narrow slit to female

was at his bill-tip but the long tail dangled downward along his neck. He flew to the entrance to present his gift and I watched the long tail gradually disappear through the slit. Another time he brought a tree-frog, its hind legs splayed out on either side of the bill. Then I watched him fly to the dead (but still-attached) fronds of a *doum* palm. He hopped among these, rattling them as he moved; then he came back to the nest with a large tenebrionid beetle. He returned to the palm and found a large cicada. The insect vibrated and buzzed, but a little pressure of the bill quieted it. It was tossed and manipulated until it was held head down; then it was brought to the nest. The actual flight to the nest hole was made invariably from a near-by branch of the palm. One could hear the bird's feet and nails scrape as he clutched the almost smooth trunk.

To continue the story of the nesting habits: when the young are about two weeks old, the hen chips her way out of the nest, assisted by the male from outside. She has been in the nest about eight weeks. Her tail is sprouting again and grows rapidly. Both parents then feed the young through the enlarged opening, which is partially resealed by the youngsters inside. The youngsters grow apace and feather fast. To accommodate themselves to the small nest chamber the growing tail is bent forward over the back and remains in this position until the young are ready to leave the nest. They are fully feathered but hardly able to fly; they hop about the branches and spend most of the time squatting. Their tails come down to a normal position in a short while. I have been unable to check up on the actual nestling period, but it is probably a few days longer than the incubation period. There is often a disparity in size of the young, due in the first place to intervals of days, in some cases, between the laying of the eggs and, possibly, the amount of food received. It may thus happen that the nestling period is prolonged to suit the growth of the smaller youngster. It is often as long as 45 or 48 days.

### SOMALI CRESTED HOOPOE

#### *Upupa epops somaliensis* Salvin

The crested hoopoe is a bird with an onomatopoeic name, and very fitting too, as you will agree when you have heard the clear call-note, "hoopoe hoopoe," ringing out in savannah woodland, orchard country, thornbush or homely garden. Unfortunately these birds are usually silent except when the nesting season approaches; then you may hear two rival males vying with one another to attract the attention of some hen bird, who with seeming indifference continues to walk about the ground, prodding here and there with her long, slender, curved bill into the loose earth in search of insects.

It is fortunate that when a pair of these birds have located congenial surroundings they "stay put" and may frequent a garden for several years on end. But that garden must have a convenient nesting site. They are ground feeders, living almost entirely on terrestrial insects, which they secure by probing about with their long bills. Though conspicuous against a green grass background, the general plumage harmonizes well with a reddish soil or the reddish sandy waste of thornbush, and even when the bird is perched in a tree its barred back and wings break up the general contour. It is not so visible as one might expect. In flight the barring is conspicuous. Wherever the bird is encountered, whether in garden or thorn-

bush, it struts about fearlessly and allows a near approach if not suddenly disturbed.

In uninhabited areas the nest site is usually a hole in some suitable tree or a cleft in a rock face; in a garden, one may locate the nest hole in a tree, in a wall, or in some recess under the eaves of the house. Wherever the nest may be, there is usually a curious musky odor, said by some to be a deterrent to would-be marauders. The birds are so conspicuous and confiding at nesting time that perhaps some protection from enemies is needed; personally, I don't object to the odor. The type and depth of the nest vary with the site. In a wall, the nest chamber may be just a short way in; in a rock crevice it may be quite deep in; in a tree the depth will be governed by the extent of previous excavation (for sometimes an old woodpecker's nest is used) or by the extent of rot. A nest of the Somali race I observed closely, quite recently, was in an old rot hole in a fig tree—a cleft between two living branches which had partially closed over a central trunk long since cut and decayed. There was a horizontal floor to the cleft; then a hole went downward for more than eighteen inches. I had no chance to examine the nest chamber, but other nests have been lined with bits of dry grass and dead leaves or just rotted chips. Three, four or even five eggs have been recorded, greenish-blue in color and smooth of texture to mat, but they become nest-soiled.

It was just by chance that we discovered the nest in the old fig tree. We spent an hour or two in studying the actions of the birds, for both parents were now in attendance, and in noting the outward differences of the sexes and the mode of approach to the nest. Next morning I was on the spot by 8 A.M. and the birds were busy carrying food. Sometimes they sought for caterpillars and other insects on the muddy ground in the vicinity of the nest tree; sometimes the male would fly across the Tana River to the opposite mud bank, but both were fearless. Placing the camera in a good position I sat below it in a little sand-pit. There was no need to conceal myself, for after a slight hesitancy the birds flew to the nest hole, pausing just a moment before entering. The male raised and lowered his crest—a beautiful sight.

The bulk of the food brought (carried in the bill) was a species of green moth larva secured from among the short grass and herbage on the mud banks; sometimes a chafer grub was carried. Beyond a short "huip," the birds were silent.

There is not the slightest doubt that many of the birds one sees about are migrants, for there is a local movement and possibly some visitation from more southern areas. Nevertheless, I have seen pairs frequenting the same general area throughout the year and occupying the same nest site as the breeding season came round.

Young of the year are less rufescent than adults. They are somewhat grayish and streaked on the under parts, and the crest is less developed. They remain with their parents for quite a time after learning to fend for themselves. Sometimes two family parties will link up and small companies will be formed on some suitable hunting ground, but often as not a single bird may be encountered.

### PEARL-SPOTTED OWLET

*Glaucidium perlatum* Vieill.

Most owls are nocturnal, but this species is diurnal and crepuscular. One comes across it in the thornbush and acacia country, in the fringing of rivers and dongas, and almost everywhere in the dry country, but not in high evergreen forest. One occasionally sees these owls on the outskirts of Nairobi, especially toward the Mbagnathi and Ngong hills areas, but they are perhaps commonest in the Magadi and Suk country. In the Tsavo area they were common, and I often heard their penetrating whistle just after 4 P.M. They sit perched in some dwarf acacia or a gnarled *Commiphora*, and can be very cryptic. They look like one of the gnarled excrescences on the rugged stunted tree.

When a bird is flushed from a tree in broad daylight, it seems to find bright sun no inconvenience, and though it is reported to feed during the day, I have only once, as recounted above, seen it hunting before evening. There seems no doubt that it does hunt by day, for birds are recorded from stomach contents.

I don't think a nest has ever been recorded in Kenya; I have noted young, just from the nest, in August.

### NOTES ON NIGHTJARS of the NGONG AREA

I hope that the following brief notes may stimulate others to collect reliable data for future use.

By virtue of their crepuscular and nocturnal habits, nightjars are difficult to study. Most of them are difficult to tell on the wing, and some are equally so when roosting on the ground. Their calls are varied and difficult to transcribe or even to associate with a given species.

If one resorts to the use of a gun to collect a bird that may be calling, the bird secured may not always be the one responsible for the call; it may have been another lying up in the same ground. Such was the case a year

or so ago. Nightjars were heard calling just one type of note. Birds were seen hawking around; others were flushed. Not being able to identify them with certainty, my companion walked toward the spot where a bird called, flushed one, and shot it. At the report the others rose from the immediate area and another was secured. When examined in the hand, the two proved to be distinct species. Which bird had made that distinctive call? To add to the difficulty the call in flight may be quite different from that made when the bird is at rest on the ground.

There are three species of nightjars commonly resident and breeding in the Nairobi area.

### RUFOUS-NECKED NIGHTJAR

*Caprimulgus rufigena frenatus* Salvad.

A large bird with strongly marked pattern on the back, a large white throat patch, and a square tail with the two outer feathers white for the distal third or more. In flight the wings are dark, the primaries crossed by white spots on the four outermost in the male and by slightly buffy spots in the female. Its call note from the ground or, rarely, from a tree is "P-A-U, piri-U," uttered shortly after dusk for an hour or two. In flight it makes a "chiuk" note.

It is usually an early nester, nests being found in January and February for the most part, but also again in July and August after the rains are over. Two eggs are laid on the ground in a small clear patch in grass or bush, or they may be on a pebbly patch. Pale pinkish with diffuse gray and gray-brown smear marks, the eggs measure on an average  $26.5 \times 19.5$  mm. Incubation lasts sixteen days, and is done by the hen only. She sits close with almost closed eyes. The male lies up not far off. If flushed, he flies for a short distance and when about to alight he gives a half turn. In the off-season, the birds have regular roosting places where they lie up during the day and from which they may be flushed day after day. It may be under a small tree or bush, on a ledge under a bank, or in an abandoned quarry.

The other two species are more difficult to identify, especially the females.

### SQUARE-TAILED NIGHTJAR

*Caprimulgus fossii* Hartl.

Not unlike *C. frenatus* in general appearance, but smaller and less boldly marked above; the tail is square, with the outer pair of feathers white-tipped and white also along the whole of the outer web. I have found the

birds most frequently in the small clearings and grass patches by forest, in the dry beds of streams, and in bush by ravines. Their nests have usually been among leaf debris under the shelter of small trees, not on bare open ground. The eggs are small,  $24.5 \times 18$  mm., pale dirty pink, with subdued marks in gray and gray-brown and lilac, rather blotchy. The hen sits for 15 or 16 days before the chicks hatch. She sits very close and one may walk close up to her as she crouches with mere slit eyes. The female is very like the male, but the outer web of the outer tail feather is gray or off-white.

### SLENDER-TAILED NIGHTJAR

*Caprimulgus clarus* Reichw.  
(*Caprimulgus fossii clarus* of Sclater)

This species is often confused with the previous one, especially in the female, but it is less strongly marked and is much more grayish in general tone. The tail is longer in proportion to the body and it is *graduated*, so that the central feathers are more than an inch longer than the next and so on. Although occurring around Nairobi and Ngong, it is more a bird of the dry country, the bush and thorn of the Rift from the Kedong to Magadi southward. It occurs in the Ukamba country and on to the Northern Frontier, where it changes to the race *apatelius* Neum. It lies up in the long grass and thornbush, and comes out in the evenings when it skims just above the grass and rocky slopes or open ground, alighting on a bare patch, a rock, a fallen tree, or a roadway. Its call is very reminiscent of that of a tree-frog. It is monotonous and may go on for minutes on end.

Numbers were heard calling on the Magadi flats in May, and nests were located with eggs and young. The eggs, two in number, are laid on the bare ground under or near a small bush or by a rock. They are creamy to pink with just faint marks in gray and lilac and brownish surface blotches. They measure  $25 \times 18$  mm. and are very cryptically colored but not so well camouflaged as the hen, as she sits incubating. From a yard away, one can hardly make her out.

At least two other species of nightjars are known to breed in this area but they are less plentiful and are erratic in occurrence. Others are recorded from time to time but not as breeding.

Impeccable data are required regarding calls, breeding times, and eggs. Identity must be established beyond doubt, and this is not easy unless the birds are shot.





KENYA WHITE-CHEEKED COLY or KENYA SPECKLED MOUSEBIRD  
 Female alighting above nest

KENYA WHITE-CHEEKED COLY or KENYA SPECKLED  
 MOUSEBIRD

*Colius striatus kikuyensis* van Som.

These birds are detested by fruit growers, nursery gardeners, and vegetable growers, professional and amateur alike. I suppose they really do deserve this opprobrium, at least those which live within the sphere of man's activities. Nevertheless, destructive as they are, they do a lot of good.

At one time, I knew of organized "drives"; several householders banded together and, armed with shot guns, they patrolled several valleys or had the birds driven toward them at fixed stances. Hundreds of birds were slain. Not long ago the Agricultural Department issued a note on how to get rid of these birds. It advocated putting out poisoned water and poi-

soned bait, netting the birds at their sleeping quarters, and destroying the eggs. It also suggested that rewards be given for so many head and/or eggs—all rather diabolical, to my way of thinking.

The birds do a lot of good, for they consume quantities of insects injurious to crops. Of course they eat fruit. They must have fruit, and if man wishes to grow it, let him protect his crops without destroying the birds; it can be done. Biased? Perhaps I am, but I have grown fruit and vegetables without recourse to killing the birds. But this is not an essay on the ethics of bird control.

The name "mousebird" has come into use as a result of the curious way in which these birds creep or run on branches or even on the ground. The rodent-like appearance is enhanced by the long tail, which looks thin and tapering in profile. However, one more often sees these birds clinging tail down, to a branch, singly or bunched together, two or as many as six, tummy to tummy. In this position the flexible toes come into play, all four being hooked over the branch. One often sees the birds clinging to the outer foliage of a tree, using their long tails as additional support.

They have rather short, rounded wings, so that wing beats are rather rapid until the birds gain sufficient momentum. Then the flight is continued as a glide; but they never fly far. If one tries to follow up a flock, they fly and glide into a bush, then creep to the top twigs to look around; if again approached, they go off to the next bush but creep to its far side, ready to take wing should the intruder move in their direction.

They are not found in heavy forest but live almost entirely in the bush and scrub country, in light-wooded areas inhabited by man, where trees and shrubs have been planted. They are gregarious in the off-season, flocks of twenty being often met with. It is then that they can do great damage to fruit and vegetables and young nursery plants.

They are voracious feeders, and they have an uncanny way of finding out just when crops are ripening. Small fruits are taken whole; large fruits are eaten *in situ*. They make a hole in the skin and eat away the pulp, often leaving skin and stone in position. They are fond of young leaf and flower buds, so they not unnaturally seek for such along the rows of growing peas and around tender young plants in seed boxes; thus they are cursed by man. But they take quantities of noxious moth larvae and are very partial to aphids.

During the heat of the day, one often sees them dust-bathing in a loose patch of earth along a roadside or on a pathway. They spend long moments in throwing the earth over themselves; then they lie and bask for a while. It is usually of an evening that they gather in groups. Just as the sun sinks low and shines almost horizontally onto the bush tops, one may see



KENYA WHITE-CHEEKED COLY or KENYA SPECKLED MOUSEBIRD  
Three birds feeding on cactus fruit

bunches of six or more clinging onto the topmost shoots of the tree or bush which is their communal roost. They sleep bunched in this fashion; and thus, too, they huddle together during cold and wet weather. They dislike cold and not infrequently become numbed, almost comatose, after an abnormal frost. They are then easily taken by hand.

Though gregarious, pairs nest separately. A flock will disperse over a rather wide area. They almost invariably select a thick bush or small tree, often a clump of parasitic mistletoe growing on a small or even high tree. Sometimes the nests are as low as three feet, often as high as twenty, but each of them has a distinctive character. They are rather bulky and almost invariably have a thick foundation of dried composite flower heads, mixed with the rough dead flower stems of labiates. Grass fiber, bark fiber, and rootlets form the body of the nest into which composite heads are mixed. The inside is lined with finer fiber and sprays of wild asparagus; if this is lacking, green leaves of fine-leaved herbs are used. This green lining is renewed from time to time, especially when incubation is well advanced or the young have hatched. Proximity to human habitation often results in the use of all sorts of odd material in the nest construction; one may find bits of string, cloth, mosquito net, hessian, coir, bits of paper and other rubbish.

The clutch varies in size from two to six—usually it is four or five—dull white or creamy, mat and immaculate eggs. Some eggs may occasionally show bloodstains, but not true shell marks. Incubation starts with the laying of the first egg, and a full clutch may not be laid on successive days; thus the young hatch at different times. As much as four or five days may elapse between first and last, and the young are then unequal in size and feathering. From data relative to dozens of nests, I find that the incubation lasts from 12 to 14 days, and both parents take part in it. The young are at first naked and pink in color; during the next day or two, short, woolly down appears over the greater part of the body; the large conical bill turns greenish-yellow above and bluish-gray below; the large eyeballs show bluish through the thin pink skin; the "tail" (from which the feathers sprout) is elongate and pointed. There is no mistaking a coly chick. In a few days the quills begin to show as bluish tracts; the wing and tail quills grow rapidly for a few days but don't open for some time, so the wings present a spiky appearance; the "thumb" or bastard primary is large and has stiff quills. The feet are pinkish. The feathering progresses, but it is slow compared to that of many nestlings of comparable age of other species. The feathers of the under side come in last of all and though the dorsum may be feathered the tummy is bare and pink and looks excessively large; the elongate tail-stump adds to the curious appearance of these chicks.

Partly due to the non-simultaneous hatching of the young, colies brood for a very long period, as much as a week after all the young have hatched or even when they are feathering. The brooding bird is fed on the nest by her mate. She in turn passes the food on to the young.

The coly is a curious mixture of boldness and suspicion. One may see colies clinging to the top of a bush, and they will allow one to come quite close and pass by; they may chatter and raise their crests in suspicion, but they won't fly off unless one stops to watch them too long. They may remain quiet in a fruit tree, motionless, until one drives them off. They may continue to dust-bathe when one is close by; they appear bold. During nesting time, it is quite a different matter. They secrete the nest in thick foliage; they camouflage it to a certain degree, and when the hen is sitting she will remain tight unless deliberately put off. She sits low so that the green foliage lining hides her, and though the tail is long it usually lies up at an angle among the surrounding twigs and is inconspicuous.

I once inadvertently caused the death of a brood. The nest was in thick mistletoe growing on a small tree at seven feet and just on a level with my hide. I went into the hide. There were two young, two days and one day old, and two eggs on the point of hatching. The coly quickly returned to the nest tree; she climbed about the branches on the far side, and then she hung on a branch behind the nest. An hour went by and still she clung to the branch. I became anxious about the two eggs and the young. Finally the female changed her position. Her head appeared above the far rim of the nest; she bent down and took one of the chicks and withdrew. I saw the chick fall to the ground. Then she moved back to the nest, took up the other chick, and it too was dropped. The coly flew off. I came out of the hide, and picked up the two chicks; they were both dead, and one had been decapitated. I visited the nest next day; the two remaining eggs were cold and deserted.

A fellow-worker had a similar experience. He had put up a hide at a convenient nest which held one egg and four chicks of different ages. He spent two hours in the hide, and the nearest approach the coly had made was to sit behind the nest. He had a luncheon appointment and left, returning to the hide at 3 P.M. Everything was as he had left it, except that the nest was now empty but for the one egg. He hunted the herbage below the nest tree and found four dead youngsters, three decapitated.

Since these episodes, I have learnt greater caution in dealing with colies. The hide has been more gradually moved up and adjustments to the foliage have been made gradually over several days, always leaving sufficient to shelter young from sun or rain during the absence of the parents. In this way I have had no more untoward incidents.

The feeding of young colies is almost the counterpart of that of plantain-eaters. As the parent arrives at the nest, she moves her head and neck up and down vigorously, then depresses her head. The food is regurgitated into the throat and mouth. She then bends over and places her bill transverse to the gape of the youngster and the food gradually trickles into the open maw. The food is well macerated and partly digested and rather liquid in form. Two or three young may be fed at a visit. Then follows another interesting performance, again almost identical with that of plantain-eaters. The parent coly tilts a youngster up, massages its anus gently with the bill, and as the excrement is being voided she takes it and swallows it. The massage and taking of excrement *during* the process of extrusion is just the same in the two species.

Both parents take part in the feeding of the young and their visits are frequent; it is a continuous coming and going. Two days' observation of five-hour spells each day gave an average of five visits per hour for the two birds. The fruity matter passes through the digestive tract very rapidly, and to obtain a sufficient quantity of nourishment a greater bulk of food is fed to frugivorous birds than to insectivorous ones or seed-eaters. The colies are thus hard-worked to supply the food and at the same time remove the partially digested excrement to keep the nest clean.

To estimate the nestling period presents difficulties. The young hatch at different times in a full brood; some vacate the nest for the surrounding branches before others. I mentioned the strong development of the wing "thumb" or bastard primary, and the strong sheathed quills; these processes on the wing, together with the strong leg development and the strong bill, enable the young colies to move about not only in the nest but in the surrounding branches also, though they are by no means fledged. This is noted frequently; it is exaggerated under certain circumstances, such as undue disturbance by inspection.

I well remember an occasion when I was photographing at a nest which at a certain time of the day received over-much sun. The young colies, which had previously lain quiet, began to move about restlessly; one, two, then the lot, crawled out of the nest and hid in the thick foliage around. Here the parents fed them. The youngsters came back to the nest when the sun was no longer shining on it.

On accumulated data, I estimate the average nestling period to be 17+ days.

Colies have no song that I have ever heard. The note of anxiety is a single "cheep" merely repeated several times or a longer "g-g-g-g-g," if the bird is alarmed. The flock call is a shorter "chirp," uttered just as they fly.

## PIED BARBET

*Lybius albicauda senex* Reichw.*(L. senex* of Sclater)

When *Ficus hochstetteri* has shed its leaves, and the young branches become clustered with ripening figs, green, yellow, or tinged with red, you may be sure that if there is a pied barbet within a mile of the spot he will find his way to the tree. A noisy bird, he will announce his arrival at the banquet with harsh, repeated calls of "tjek-tjek-tjek-tjek," shortly after dawn. The call will be taken up by another bird, with slightly different intonation: "chiuck chiuck chiuck." Violet starlings, green pigeons, bulbuls, more barbets, zosterops, garden warblers, blackcaps, plantain-eaters—all assemble to the feast. Suddenly a slim gray bird with longish tail, a sparrow hawk, dashes into the tree. The little birds and starlings scatter, the green pigeons "freeze," the bulbuls fly off in alarm, and the plantain-eaters slip into cover; the barbets chatter the more but hold their ground. The sparrow hawk has failed to take his victim. He looks around, ignores the barbets, and slips into the forest. With giant hops the plantain-eaters regain the fruiting branches and croak loudly, the pigeons relax, and the lesser birds return.

The barbets hop from branch to branch picking off fruit and dropping more than they eat; they bully the little birds and drive them off. By 10 o'clock most of the birds have disappeared; the plantain-eaters have gone into shade to digest the meal; the barbets, though gorged, vie with one another in vocal challenge; then they too disappear. In the later afternoon there is a repeat performance.

For many years a dead fig tree stood tall and gaunt along the eastern side of my forest patch. Its upper stem was tunneled round and round by barbets and woodpeckers. How long the barbets had used this tree I can't say. More than one pair resided here, and not content with the holes already bored, they worked away at new ones. The tapping went on for hours on end, interspersed with harsh "tjek tjek" calls and curious hissing sounds. The nest holes were too high for inspection and the branches too rotten to bear one's weight. One stormy night in May the tree collapsed, and a nest hole with two broken eggs was found. The birds hung around for a few days; then one pair disappeared.

The second pair found a dead tree and commenced a hole. They worked for ten days intermittently and at last seemed satisfied with the job. A bird was put out of the hole by my tapping on the trunk at odd times during the next fortnight. The mate was always to be seen perched on top of a high *mugumu* tree about fifty yards off. On the fifteenth day from the time the hen was noted as sitting, the male was seen to visit the nest frequently;

then, later, both birds were noticed going in and out, so one assumed the young had hatched. However, this tree was just outside my property and was now cut for firewood. It was very bad luck for those birds; they had made two attempts in one season, and both had met with disaster.

There were two other nests, a few miles off, in my garden at Nairobi. At one of these nests, in an old dead *Trema*, there were just two birds, an undoubted pair; at the other, not two hundred yards away, in a very old but living cape lilac tree, with a stout dead branch in which the nest was situated, there were four birds.

I put up my hide at this second nest. It was ten feet up on the under side of the dead branch; the entrance was about a foot from the broken end, and by tapping, I found that the hollow went down for eighteen inches and obviously ended in a chamber. The nest hole was still under construction when I first noted it. There were usually four birds about, but only one working at any one time. When this bird flew out, its place would be taken by another of the four. It was impossible to keep a tally on who was who, for they were all very alike.

The nest was completed in about ten days, and thereafter one bird could be put out of the nest during the day, but two of an evening. The other two were not to be seen after sunset. I could find no other hole in adjacent trees which might be their sleeping quarters. On the fourteenth day, a bit of eggshell was found not far from the nest tree. It was white and slightly glossy, and the membrane on the inside was dry but blood-veined; the egg had obviously produced a chick. My suspicion that the young had hatched was confirmed next day when I saw the parents taking in food. I say "parents," but there were still four birds about. I was in the hide most of the day. At first the birds were timid, particularly one which I took to be the hen. One bird brooded the young for long spells and there was little activity at the nest that day.

The following day, I entered the hide at 8 A.M., and remained in it until almost sunset. The young were being fed at very short intervals, fifteen times each hour, with a break toward noon. There was nothing unusual in this, for with fruit-eating birds digestion is very rapid. Excrement was taken out each time after the chicks had been fed.

I noted that the hen was the more frequent visitor. I watched her movements away from the nest and saw that the male often handed over food to her; this accounted for her more frequent visits.

Most of the food consisted of ripe figs, or the pulp of the fruits of the cape lilac. Some of the food was carried in the bill but later on I noted that after the visible food had been given more food was regurgitated and fed. At this stage, when a bird alighted at the nest entrance it entered the hole and went down; occasionally, having entered, it turned round and looked





PIED BARBET

Male at nest hole

out, then went down. It was really remarkable how they managed to turn in the narrow tunnel. In gathering food the male went directly to some fig trees, but the female merely went into the crown of the lilac. It was while I watched her that I noticed at least two other barbets pecking at the lilac fruits. One of them, not the female I had watched, came down, entered the nest and left it shortly after. Two birds then came to the nest hole almost together: the male whom I had seen coming from the fig, and another, but still not the hen. She was still in the treetop. It all seemed rather a mix-up. I vacated the hide and hid in a clump of bush, where I had a clear view of the nest hole, the canopy of the tree, and surrounding trees. It was soon obvious that no less than four birds were feeding the youngsters. How many youngsters were there, and to whom did they belong? Were there actually two pairs using the one hole? Was this barbet polygamous? Or were the second two merely assisting, and were they possibly the young of the pre-

vious brood? All the birds looked alike, except the one I had assumed to be the female, which had slightly less white on the shoulders.

Next day two birds came regularly and two occasionally, one of which stopped bringing food fairly early.

I had almost daily sessions of watching, until the young were well fledged. Whereas the parents had previously entered the nest hole, they now merely stopped at the entrance and a chick was sitting there to receive the food. Sometimes two heads would appear. These youngsters were using their special climbing toes early, for they had ascended the eighteen inches of tunnel.

On occasions, when the chicks had been fed, the parent would push his way down into the chamber and come out with excrement. Most of this was dropped away from the nest, but when the chicks were younger much of it was swallowed.

When the chicks were just over two weeks old and were feathering well, one of the odd birds failed to put in an appearance. On the sixteenth day, only two adults were in attendance. This strengthened my view that the two extras were merely amusing themselves by giving a little help. I think this explanation I suggest is correct, for during the non-breeding season the species is semigregarious, and several birds may roost in a large sleeping hole in a tree. I have caught up six out of one hole.

The parents now fed the chicks entirely at the entrance. Their arrival, announced by harsh cries, was greeted with squawks from the young. I had hopes that in a day or so, I should be able to see the youngsters out of the nest.

On the morning of the seventeenth day a huge swarm of ants (*Dorylus*) in open, foraging formation was everywhere. Ants were streaming up and down the nest tree and pouring out of the nest hole. Need one say more? A little skeleton picked bare was found at the base of the tree; another was located under a moving mass of ants.

### RED-FRONTED SPOTTED BARBET

*Tricholaema diadematum massaicum* Reichw.

This barbet lives in the acacia-park country and is particularly common in the Masai Reserve on the wooded kopjes and in the acacia fringing rivers and dongas, along the timbered scarps in the Rift Valley, and in the Ukamba country.

One will usually locate it where figs and other fruiting trees abound, but it is not entirely dependent on a fruit diet, for it feeds freely on insects and

is very partial to termites. The birds open the earth tunnels on trees, taking the white ants as they are exposed. These white ants are usually plentiful in the thorn *bomas* of the native kraals, so the birds often hop among these branches.

When birds are assembling in the fig trees of an early morning or late afternoon for a final feed, these barbets come along. They make considerable noise. The note is a harsh "ki-eah" or "kei-ayre" oft repeated, sometimes followed by a long-drawn "twaaar," then a higher pitched "kier kier" and a rapid "quek quek quek." The variation in these calls is indicative of degrees of excitement and emotion; thus, the last-mentioned note is made when two birds are squabbling on some particular cluster of figs. They face each other and open their bills wide, but I have not seen any "sparring." The call one hears most often is the louder "ki-eah" and "kei-ayre."

When the breeding season is about to begin, two birds along a stretch of acacia trees or along a scarp will sometimes keep up a duet for many minutes without any attempt at further contact. It seems to be merely notification of residence in a given area, and although "territories" are not maintained, two or more pairs nesting along a scarp will keep to their own immediate areas without squabbling, except at a feeding ground.

Many different species of dead trees may be drilled for nest holes, but one particularly favored, especially in the Rift Valley area, is the "candelabra" euphorbia. The rectangular hollow dead branches of euphorbias lend themselves admirably to the nest requirements. The hollow can be reached with little excavation in the hard outer casing, and the hollow spaces between the nodes require little modification. Old euphorbias may have several holes drilled in the dead branches but only one hole will be occupied as a brood nest. Another may be used as a roost by the male. Acacia trees are not so often used, for the wood remains very hard for years after the tree dies.

Sometimes the nest is made in a broken-off branch which hangs caught up in a creeper and oscillating in the wind. I have often found them in the old dead poles of sisal; once the hard outer cutex has been drilled, the inside pith lends itself to easy working. The entrance hole is about  $1\frac{3}{4}$  inches in diameter and the length of the downward tunnel varies from a minimum of 8 inches in hard wood to 18 inches in softer types. The chamber is comparatively small:  $3 \times 3\frac{1}{2}$  inches.

Both birds take part in excavating the nest hole, and often two birds may be working at the same time. The work is not continuous; very often there may be a break of hours, during which the birds may be some distance off. Not infrequently the first egg is laid before the inside of the chamber is finished.



RED-FRONTED SPOTTED BARBET

Female visits nest hole in euphorbia

The incubation period has been difficult to determine with accuracy, but at one nest in a euphorbia I was able to cut out a small square above the chamber and inspect the nest, replacing the square afterwards and sealing it with euphorbia latex. There was one egg present at the first inspection; two days later there were two. Twelve days later I opened the nest again, and there was one newly hatched youngster. The other egg was missing.

After the first inspection, I sat under a thick bush near the nest tree. The female came back and entered without pause. She had been sitting for some time when I heard a dull tapping within. It sounded as though she was smoothing off the inner walls of the chamber. She sat for three hours. The male came to the entrance, the female vacated, and the male entered the nest. The female came back in the course of half an hour and the two changed places. She sat from 12 noon to 3 P.M. without a break. Then she left. She returned in ten minutes and soon the male arrived with a berry visible in his mouth and entered the hole. He was in the hole not more than three minutes. Then he flew off.

The nest hole was 20 feet up, and as the euphorbia was growing among bush, I had to erect a hide on a tall double ladder. The hide was rather conspicuous, but that couldn't be helped. The female had vacated the nest while the hide was being put up, and she and her mate hung around the

bushes uttering a low "ku-a" note of anxiety. When the work of erection was complete, I entered the hide and put the camera in position.

Previous observation of the birds suggested that they would be comparatively tame, and in this I was not mistaken. Soon the hen alighted on top of a euphorbia branch about two yards from the nest. The male came to the far side of the nest hole and called "hu-hieu-hu," to which the female at once responded by alighting at the nest entrance. She looked into the entrance, then at the hide, and popped into the hole. The male then flew off. The female sat brooding. While she was sitting, a honeyguide alighted at the entrance. It remained for a few seconds, then altered its position, leaned over the entrance hole, and had a good look inside. Then it flew off. It was a lesser honeyguide, a species which victimizes this barbet.

The hen had remained brooding for a full two hours. It was now 1 P.M. The male came to the entrance and went in. The female made her exit but was back again by 2:15 with food in her bill. She left in about five minutes. Both birds were seen in the bush at a distance from one another but they maintained vocal contact by uttering a low "hu hu" and "hieu-u" to each other. The female was the first to return and she sat close for another hour. The male came to the nest tree and as he alighted, the female left the nest and both went off. I gave up observation.

I returned to the nest two days later and saw that the birds had adopted new tactics in approaching the nest. They alighted on a branch directly in front of the nest entrance but behind the main trunk of the tree, and from this they flew straight to the nest hole and disappeared within in a second. Each time they came each carried visible food, but I was unable to see what it was. On one occasion, the male came to a stance clear of the trunk and regurgitated some white pulpy food into his bill before flying to the nest hole. He entered and stayed down just a moment or two. The birds had come, on an average, every ten minutes, but now there was a longish break of over half an hour. During this spell, the honeyguide re-appeared. His visit was very short; he popped his head into the hole, then flew off.

I left the nest at 3 P.M. Friday and went back on Monday morning. A large hole had been cut above the chamber, but the nest was empty. An "egg-collector" had cut it open, without taking the trouble to note that the birds were carrying food.

The parasitic birds, honeyguides and cuckoos, have an uncanny way of detecting which nests are suitable in respect to egg incubation and the placing of their eggs. It is usually presumed that the victim's eggs are tested by breaking one open; this may be so. It is also presumed that once the parasites have laid their egg, they take no further interest in it. I have some data to show otherwise, in the case of certain African cuckoos; for

instance, the white-breasted emerald cuckoo (*Lampromorpha klaasi*) will feed a young of its species, though that chick may have been reared by a sunbird; the same occurs with a yellow-breasted species (*C. cupreus*) which often parasitizes a *Pycnonotus* bulbul.

This pair of barbets went to nest again and cut a hole in an inaccessible euphorbia high up on a steep crag; here they raised two chicks. These young barbets in first plumage are very like the adults in color; the red fronts are less wide and duller, the back is a duller black and less spotted, and the bill is brownish and smooth along the cutting edge, whereas in the adult there is a tooth on the edge of the maxilla.

The chief nesting season is from March to July in an average year, but nests have also been recorded in February and November. I once found an old tree almost honeycombed with tunnels, standing gaunt and shattered in the bush country. There were two species of barbets nesting there, one at six feet, another at twenty; and there were the nest holes of an oxpecker, two species of starlings, a rock-sparrow, a woodpecker, and in a hollow in the main trunk an owl's nest.

#### GRAY-BREASTED TINKER BARBET or KENYA GOLDEN-RUMPED TINKER-BIRD

*Pogoniulus bilineatus jacksoni* Sharpe

The "group" name "tinker-bird" appears to be derived from an idea of similarity of the call notes to the tapping of metal associated with the trade of a tinker. The calls of the majority consist of the repetition of one note for minutes on end. This little bird is no exception. When not calling, it is easily overlooked, for it feeds silently among the foliage of the forest trees, often in the canopy, seeking the more open parts of the forest and woodlands when the fruit-bearing trees are in heavy crop.

Though essentially forest birds, many have taken to frequenting well-wooded gardens near forest lands. They are bold, independent little creatures, taking full advantage of a bird bath and a bird tray stocked with fruits. Their general pose and demeanor place them as something apart from the other birds.

The call is heard most frequently at nesting time. The male sits in some cool secluded spot, often in thick cover; his stance is upright, with wings slightly drooped, so that the golden rump is exposed. The tail moves with each note and as he calls the throat feathers are raised and vibrate. The note is often described as "popping," but to me it is "thwou whou whou whou whou," which may go on uninterruptedly for three or four minutes, then stop abruptly. But there is also a softer note, which sounds like



GRAY-BREASTED TINKER BARBET or KENYA  
GOLDEN-RUMPED TINKER-BIRD

Female perched in tree

“pwerp-pwerp-pwerp.” uttered when the birds have already started to excavate a nest hole; it is made by the male as he sits in a tree not far from the dead branch where the hole is being excavated. This same note is also made when the hen sits incubating or brooding very small young.

This little barbet favors a mixed diet, though fruits predominate. Chief among these are the wild fig, the small black fruits of *muhesu*, and hard-seeded fruits with a good layer of pulp; hard berries are not favored until the supply of softer fruit gives out. The red and orange fruits of *Loranthus*

and *Viscum* are freely taken, and in this area this bird, together with the little moustached barbet (*Viridibucco leucomystax*), is the chief distributor of the sticky seeds of these parasitic plants. Insect food consists largely of lepidopterous larvae (noctuid mostly), some larvae of boring beetles, and termites. These barbets may sometimes be seen fighting after winged ants but they are not adepts at this game.

Their flight is weak, and wing beats are rapid. They have the curious habit on alighting of standing upright and moving the body jerkily to right and left, at the same time bobbing the head up and down, as though they were looking for something.

There are several pairs of these barbets in my woodland, and though I know of many nesting trees used season after season, yet the number of trail holes in odd dead branches is excessive for their nest and sleeping requirements. Apparently chipping at a tree is a pastime. I have seen birds excavating in every month of the year, amusing themselves, with no intention of carrying a hole to completion. I have checked up on the possibility that these "trail holes" are located where there may be beetles or ants working but inspection shows this is not the case, though a beetle larva found in a hole would not be despised as food.

Usually a boring to be used as a brood nest or sleeping quarters is on the under side of a slightly inclined branch or even an almost horizontal branch, broken off and caught up in a tree. The position of the opening prevents rain water from trickling into the cavity. There may be several fully completed borings in the one branch, but only one will be in use. A hole of the previous season is seldom re-occupied as a nest chamber, though it may be used as a roost. One dead branch used for four successive seasons has four fully completed borings in it.

I have often watched a bird chipping for long periods; suddenly it will stop and fly off. It or its mate may return to do a half hour spell; then off it goes again. A whole day may pass before a little more excavating is done. A hole may be excavated over a period of a week and then completely deserted.

The shortest time taken to complete a nest hole and chamber and lay the first egg I have recorded as 10 days. The entrance hole is very small—just large enough to allow the bird to pass in easily. It passes inward for about an inch, then downward from 8 to 14 inches and ends in a chamber of  $1\frac{1}{2} \times 2$  inches. No lining is added. The eggs are deposited on the wood chips. Two small immaculate white eggs form a normal clutch, very occasionally three. They are rather blunt ovoids measuring  $15 \times 12$  mm.

According to my records incubation lasts twelve days and is carried out by both sexes, I think, but the two are so alike that it is difficult to tell them apart.



A young bird in first plumage has the same general scheme of pattern as the adult, but the bill is pinkish brown; the black is duller on the mantle and tipped with greenish; the under side is grayer and washed with greenish and yellow on flanks and belly.

Birds kept under close observation from a hide, near a nest, have been very tame and have shown no anxiety except for the first half hour, even though I have had to use reflected light. Although the immediate surroundings of a nest branch may be clear of vegetation it is usually well sheltered by overhead vegetation and thick creepers.

I usually commenced observation just after the young had hatched, for I anticipated a noticeable change in the diet as the chick grew. For the first two days, all recognizable food consisted of small noctuid larvae, carried in the bill. Two days later, insect food was alternated with pulp of fruit, and whereas the insects were carried in the bill, the fruit matter was regurgitated just prior to entry into the nest hole. The parents alighted on a branch a yard or so from the nest, announced their arrival by a low "tok" note, worked the food up into the bill and flew to the entrance. When actually at the nest, they were completely silent. For the first week, the parents entered the nest hole, but later the youngsters climbed up and awaited them at the "door step." As soon as a parent gave warning of its arrival, a small pink-billed head would pop out in expectation. At this stage, small berries were brought whole, and quite a bit of the regurgitated food was not pulped. Small fruits (*Trema*, *Clausena*, *Loranthus* and *Allophylus* spp.) were being given.

During the first week, the parents removed the excreta from within the nest; later they waited by the entrance until one of the chicks turned within the tunnel and presented its anus; then the parent took the excreta as voided. There was no evidence of "massaging" the anus, as I record in the case of the coly and the plantain-eater. Much of the excreta was swallowed on the spot; some was dropped at a distance.

I witnessed an amusing episode at this particular nest. In the thick creeper above the dead tree was a squirrel's drey, the owner of which fed in the fig tree not far off or sought for croton nuts on the ground. There were two youngsters in this nest of bark fiber and fine grass. If the squirrel wished to get to her nest from the ground, the quickest way was via the dead tree with the barbet nest. She had used this approach several times while the barbets were absent, but on the next journey the male barbet appeared with food. As the squirrel was half way up, she got the full impact of the sharp beak of the infuriated barbet. She dropped from the branch double quick, and scampered off. The barbet came to the nest and fed the chicks. The barbets came and went several times; then, during their tem-

porary absence, the squirrel ventured to take this short cut again; but she was not quick enough, for both birds attacked her, one from either side, so she dropped to the ground and raced off, the birds chivvying her as she went.

I was not present when the youngsters vacated the nest hole. They were still in the nest on the seventeenth day after hatching, but they were absent on the twentieth day.

At another nest I knew to hold young, I noted fresh chipping on the ground and thought perhaps another hole was being started, but there was no such cavity. Sitting down in cover, I heard dull tapping coming from the nest hole, then noticed chippings coming out. With the help of a double ladder I reached the nest hole and by percussion ascertained the position of the chamber. With a sharp knife, I cut a circular opening in the thin cuticle and exposed the nest. The chamber and tunnel had been considerably enlarged and within was a three-quarters-grown variegated honeyguide. It was remarkable that the hen honeyguide had been able to force her way in and lay her egg in the original small chamber, and moreover, how did the barbets come to appreciate that the chamber was too small to accommodate the chick? Yet here they were, enlarging the chamber to ensure the comfort of their foster child! I replaced the circle of wood and sealed it in. The young honeyguide was seen in the forest two weeks later, attended by the foster parents, but they were not actually seen to feed it.

### LESSER HONEYGUIDE

*Indicator minor teitensis* Neumn.

And Notes on Other Species

There are numerous legends concerning honeyguides, bees, and man. All, I think, are connected with the two larger species, the black-throated (*Indicator indicator* Spm.) and the variegated (*Indicator variegatus* Less.). The chief story is that the honeyguide calls and thus draws attention to himself. When he sees that he has been noticed, he calls the louder and flies away a short distance. If you then follow him, by calls and flight he will lead you to a bee-hive. Here he flutters around and expects you to open the hive so that he can get at the bee larvae in the comb. If you fail to oblige him, he will lead you on to a lion or to a snake.

Another story is that when a man goes to his hives to remove the honey, the bird will accompany him and will expect the owner of the hive to place a bit of comb with young bees and larvae so that the bird can get it. Should the man fail to do so, the bird flies off and calls up a wild beast to intercept

the man on his way home and kill him. There are other versions, all of which are firmly believed by the natives.

The birds are interesting enough in this regard, but they are more so in regard to their nesting habits, for they lay their eggs in other birds' nests and leave their care to foster parents.

We do not know if the male is polygamous, or the female polyandrous, or whether the male and female will pair for a season and disregard others of the species. It is a strange fact that one more often sees but a single bird, of either sex, and seldom a pair together; this is my experience, and I have seen dozens of all the species known to occur in eastern Africa, during my forty years of residence in the country. It is true that I have seen both male and female of the greater honeyguide together at a bee-hive, but that does not mean that they are a breeding pair.

Attention is usually drawn to the variegated and lesser honeyguides when one hears them calling from some high forest tree in which they are perched right up at the top; or one may see them singly, at a bee-hive. Again one may see but a single bird investigating the nest hole of a barbet or a woodpecker or the nest of a bee-eater. Of the two groups including the slender-billed (*Prodotiscus*) and the cone-billed (*I. conirostris*), the only species which I have found not to be noisy are the pigmy honeyguides.

The call of the greater honeyguide is an oft repeated "ree-chee," which changes to "chuta chuta chuta" as he flies round a bees' nest. That of the variegated is a longer drawn-out "chee-tii chee-tii," though uttered in much the same way. The lesser honeyguide utters but one note, oft repeated, which may be likened to "pieu pieu pieu" and a sharp click, when at a hive. He usually calls from a high perch.

Barbets' and woodpeckers' nests are used and occasionally that of a bee-eater; once I found a honeyguide's egg in a kingfisher's (*Halcyon chelicuti*) nest in a tree hole in a dead branch. The lesser honeyguide often selects the smaller barbets' nests, and I have seen a variegated honeyguide struggling into a hole scarcely large enough for her to enter. More than once, I have seen a lesser flying around a vulture's nest, but I think the bird was merely attracted by the presence of insects buzzing around and mistook the flies for bees around a nest.

One bird is frequently seen by a bees' nest in the roof of my house, but I have not seen him taking adult bees. I have, however, seen this bird taking the young larvae and pupae from the "paper" nest of an aculeate wasp.

So far as I can ascertain, the incubation of the honeyguide's egg is equal to or less than that of the foster parent, but this is very difficult to check, as very frequently the honeyguide will injure or destroy the eggs of the fosterer. In a bee-eater's nest I opened up, the honeyguide egg was intact but

the eggs of the bee-eater had all been punctured, although they had been left in the nest.

The lesser honeyguide is a regular visitor on one of my bird-baths. He comes for water, but I have seen him catch adult bees which also come for a drink.

Nothing was known of the nesting of the slender-billed honeyguides (*Prodotiscus*) in Kenya until recently. I was fortunate in securing some data regarding the nesting habits of this honeyguide in June of 1948. I found a fledgling just out of the nest on the ground near my house. As I was scrutinizing the branches, I saw a yellow-fronted zosterops fly to a leafy branch with food and saw that she was feeding a chick in a nest directly above the spot from where we had picked up the fledgling. It was twenty-five feet up on a branch, which almost touched the roof of the house. My son climbed to the nest, and the single young fluttered to the ground. It was a second honeyguide nestling! I knew by experience that it was nigh impossible to return fledglings of this age to the nest, for they just won't "stay put." So I secured a glass-sided butterfly breeding cage, about  $6 \times 6 \times 9$  inches, placed an old bulbul's nest inside, and put the two youngsters into it. My son placed the whole in an upright triple fork in the croton tree about six feet below the zosterops nest, and we watched for the return of the zosterops. Both parents came with food. They went to their nest and finding it empty, the hen fussed around and called, making a curious quavering note. The young honeyguides replied and the zosterops heard them. She became all excited and hopped about the tree, calling the while; finally she traced the two youngsters to the cage in the fork. She came to the outside and tried to reach them through the glass sides; then she hopped to the top and so into the cage, and fed the chicks! We watched her come and go half a dozen times, and the male followed her example; then we saw her brooding them. All went well for two days. The foster parents could not have been more attentive.

During the third night it rained heavily until almost dawn. In the morning we found one rather bedraggled youngster on the nest edge. The rain had flooded the bottom of the cage and the nest bottom, and one chick (the one that had fallen) was almost dead. We drained off the water, changed the nest, and dried the youngsters by the kitchen fire. The lively one soon dried; the other died. We returned the sole survivor to the dry nest cage and awaited the return of the mother. She came along with a beak full of green caterpillars and fed the chick. She continued to do this all the morning, assisted by her mate, and in the afternoon we noticed the youngster at the edge of the nest and standing up. He was fed until dark. The following morning, he was on the twig above the cage and was here fed. In the late

afternoon he had gone to the canopy of the tree and the foster parents attended him there. That night he slept between the two parents in the tree-top under the shelter of a spray of big leaves. He was in an adjoining tree next day, and he fluttered toward the hen when she came to feed him. All was well with that youngster.

Here was proof that the pigmy honeyguide used the zosterops as fosterer; that the original zosterops' eggs had been disposed of; that the honeyguide laid more than one egg in the zosterops' nest. The zosterops' eggs are pale blue or white and immaculate. What color are the honeyguide's eggs? We don't know.

I have frequently noticed this little pigmy honeyguide in my forest and usually around the house area. I now examine all the zosterops' nests—and there are several—for a stranger egg or young, but have found none. However, in a wattle-eyed flycatcher's nest we found a single young pigmy honeyguide. So we now had proof that the honeyguide also uses the open nest of a small flycatcher, *Platysteira peltata*, as fosterer. The flycatcher's eggs were doubtless destroyed by the honeyguide. The flycatcher's eggs are spotted. And the honeyguide's? Here is something yet to be discovered.

## UGANDA GRAY-BREASTED WOODPECKER

*Mesopicos goertae centralis* Reichw.

The loud, almost aggressive call of the woodpecker is associated in my mind with freedom and abandon. Listen to his thrilling, challenging call, which bursts upon the quietude of woodland; hear his decisive tapping as he forces the ants to vacate the hidden recesses of a dead bough; there's nothing half-hearted about either.

This more northern representative of our Kenya bird is limited to the open park country, the savannah forest and the long-deserted habitations of man. In this last setting, particularly in Uganda, the planting of certain species of fig, whose bark is or was stripped off for the making of "bark-cloth," was a feature of native settlement. Many of these soft-wood trees die as the result of de-barking and form admirable nesting trees for this bird. Other species of trees are also used for nest holes, but the figs furnish a straight bole without branches for many feet, offering little foothold for would-be predators.

The actual nest holes vary in height from four or five feet to over twenty. The entrance hole is round. It goes in direct a short way, then descends from 12 to 24 inches and ends in a chamber, the floor of which is lined with chippings. Two or three pearly-white eggs are laid, ovoid in shape, measur-

ing  $22.5 \times 17$  mm. The female does most if not all the incubating, over a period of fourteen days. She sits close and when incubation is advanced she is loath to leave, though one may tap on the tree.

The parents are very attentive to the youngsters, coming and going with food and removing excreta at almost every visit. There is no marked periodicity in the visits, but a check at one nest gave a visit every 10 minutes, with a very long break at noon. The birds are quick in their movements at the nest hole, scarcely giving time for a photograph, so at one nest we were forced to resort to partial closure of the entrance to delay the rapid entry. When a bird arrived at the hole there was just a momentary pause before the obstructing leaf was whisked out of the way or pushed to one side. The ruse answered well for a short time, but they soon discovered that they could push past without effort.

The young are recorded as fledged and vacating the nest at twenty-one days. They are somewhat like the female but generally duller in color.

#### KENYA GRAY or GOLDEN-BACKED WOODPECKER

*Mesopicos goertae rhodeogaster* Fisch. and Reichw.

This is a typical inhabitant of the semi-dry areas: acacia-park; acacias fringing rivers and lakes; savannah woodland; and dry forests in the Highlands of Kenya up to 7,500 feet. One hears their intermittent tap-tap-tapping as they beat the hard outer casing of some dead tree; or their shrill metallic call as they fly and alight on another tree.

They are most difficult to view satisfactorily at first, because if they suspect they are being watched they slip around to the back of the trunk or far side of the branch and keep out of sight. But a little patience is soon rewarded, for the sense of curiosity is highly developed in them. They will gradually work round to the top or under side of the branch, just to have a look, and if satisfied will resume tapping as though no one was present.

Although they are birds of the drier type of woodland, they show a distinct partiality to areas with some water, though I have never known them to come down to water to drink. I have not infrequently seen them at the margins of papyrus swamps, where they seek the larvae and pupae of the boring beetles which infest the crowns and stems of the reeds. Ants also have nests in the crowns of the old papyrus and they are relished by the woodpeckers. The tapping one so often hears is mostly to disturb ants out of cracks and crannies; it is not the drilling of a nest hole. As the ants swarm out, they are lapped up on the tongue and swallowed. Tapping and chipping also occur when beetle larvae are sought in decaying timber; the

roughened tongue comes into play when a larva or pupa is exposed—the point is pushed in and the insect hooked out.

One usually finds these birds in pairs, not necessarily close together, but when one takes wing and moves on to another tree, the other follows almost immediately.

The nest holes, either in a dead branch or a tree trunk, are often quite exposed. There may be several holes in one tree but only one will be in use by this species of woodpecker, for they nest singly, though in the same tree as other birds. The entrance is about  $1\frac{3}{4}$  inches wide. It goes in straight for a couple of inches, then downward for a varying depth, and ends in a chamber roughly  $3 \times 3\frac{3}{4}$  inches. Two eggs form a full clutch, rarely three. They are pure white, smooth, slightly glossy, rather pointed ovals, measuring  $22.5 \times 17$  mm. I have no exact data for incubation periods, but by inference, I doubt if it is less than fourteen days.

Though many nests have been located, at only one did I have an opportunity of making observations from a hide. Throughout a week at this nest, the parents remained nervous. The first day was completely blank; the following day was little better.

The birds hunted in the flat-topped acacias around the nest tree area and called to each other as they moved about. When one was about to come to the nest, it uttered two or three sharp notes, alighted on an acacia overhanging water, flew upward to the nest tree and alighted on the far side. It was quite impossible to see what food was brought unless it happened to be a fair-sized beetle larva, and it was equally impossible to view the method of feeding.

The next day when the bird arrived, instead of coming to the right of the nest hole he went left and popped into an old hole well above the nest entrance. I expected him to come out again but he didn't and in a few moments he slipped out of the correct entrance. Quite obviously, there was some connecting tunnel between the two borings! The female came next, and she played the same trick on me. The visits for the day, from 8 A.M. to 5 P.M. were on an average of six every half hour by two birds at irregular intervals.

## ATHI RED-WINGED LARK or RUFOUS-NAPED LARK

*Mirafra africana athi* Hart.

Most larks are highly cryptic, their plumage matching the color of the environment in which they live. A very good example of this is the red-wing, a species which in various racial forms extends from the dry thorn-bush through to the high veldt, thence on to the lake areas of Uganda and

beyond. The palest race is that found on the Athi-Kapiti plains and in the Rift Valley south of Naivasha, and it is this form that I propose to write about.

The protective coloration of these birds is enhanced when they squat, as they invariably do, with bill held up, "freezing," at the least sign of danger or human approach. They take wing only when compelled to do so. If they see an opportunity of running and squatting, they take it. When flushed, they rise with a fluttering flight, not long sustained, and drop with a half turn as they are about to land; on alighting they run a little distance and lie doggo. I have not infrequently mistaken a running bird for some small ground animal, for they run with heads and tails held low.

Birds of the grasslands, they prefer areas where grass is not too long and where there are open patches of earth or sand and a few scattered bushes. They are very fond of sand- or dust-bathing.

Although essentially ground birds, they may perch on the topmost twig of a bush and call, especially of an evening or morning. The song is not very melodious. It consists of two long notes, two short, and one short and high: "theu theu twe-dle lit," or perhaps a longer call: "chee, chep, pui-chee pui-chee." This song indicates nesting. If one approaches a calling bird with near-by nest, its note will change to the warning call, "tlew-it," or the call of anxiety, "twee ki-ree." Unless the hen is sitting close on well-incubated eggs, she may slip off her nest. One may flush her yards away from the nest site. To find the nest move off a little way and watch. After a while the female will drop off her perch. She will zigzag through the grass to near the nest but will not enter it until an all-clear signal has been given by the male. There is no doubt in my mind as to co-operation between the birds; this signal call is usually made as the male flies almost vertically, with four or five rapid wing beats, then drops to the ground. When the eggs are very fresh or the full clutch has not yet been laid, it may be an hour or more before the birds indicate the position of the nest. When all is quiet, walk quickly toward the spot where the female was last seen, so as not to give her time to run off before taking wing. The flight from the nest is deliberate and consists of regular wing beats, then a glide, not very high off the ground. The flight will not be far. After a while she will fly to a bush and both birds will call "tlew-it" or "two-ut," oft repeated.

The nest is a little scrape beside a tuft of grass or a small woody herb, or sometimes near a stone. The scrape is 1 or 2 inches deep and is lined with grass fiber and rootlets, somewhat loosely laid in. Two or three eggs are laid, varying in ground-color from white to buff, spotted and freckled with dark and gray-brown, and with grayish sub-marks. The spotting may be evenly distributed or may show a tendency to concentration toward the larger end. Some eggs are boldly marked, others finely spotted. The shape





ATHI RED-WINGED LARK or RUFOUS-NAPED LARK

Female approaching nest

is rather variable: long oval, ovate, and sometimes almost pyriform. An average measurement is  $24 \times 15.5$  mm.

I have usually found the female to be the less timid, but at one nest, I found the hen most reluctant to approach until the male took it upon himself to lead the way. He approached the nest site very boldly, calling softly as he came. When about to reach the nest, he thought better of it and went to the back of the grass tuft instead of the front, and stood calling. As the female hesitatingly approached, he ran forward to meet her and both came along. Just as they were about level with it but to one side, the male stepped to the back, leaving the hen to make the final entry alone. Once having taken the plunge, as it were, this hen came and went without hesitation. Eventually she dispensed with the long walking approach, and flew toward the nest and dropped within a yard of it.

Most of the food of this pair was collected from ground where game herded at mid-day. They turned up beetle and fly larvae from the dung

and took moth larvae from the surrounding vegetation. Mantids and grasshoppers were also captured, and sometimes a billful of termites from dry cattle dung. Another spot for food was a shallow pan in which silt and debris collected after rain; earthworms and fly larvae were taken here.

The female was certainly the more assiduous in her attention. The male often perched on a low bush calling, but when he did come it was with a big mouthful or something really large such as a grasshopper, which required much bashing before it was sufficiently pulped to offer the chicks. The note or call of encouragement made by the male is an oft-repeated "peeti-loui."

Feeding of the young starts shortly after dawn and is more or less steady throughout the morning. Then the visits become longer spaced; they are more frequent again in the late afternoon, especially after 4 P.M. up to dusk.

I have occasionally seen these birds standing over the top of a low termite hill taking up the "ants" as fast as they emerged, and though they made attempts to capture the winged forms in flight their own flight was too heavy and slow to overtake the prey.

When one first sees these birds very close up they appear to be extremely "leggy" and out of proportion, but it is a leg length suited to the mode of life, and as one sees them negotiating the tufty grass with rather an upright carriage, one appreciates that short legs would be an inconvenience; moreover, their legs are adapted for a quick jump, should they be forced to rise.

### KAVIRONDO FLAPPET LARK

*Mirafra fischeri kavirondensis* van Som.

In the more open thornbush country and on the stony hillsides where grass coverage is scant, you may suddenly become aware of a curious, almost rattling noise. It comes from above and if you look up you will eventually see a small dark bird performing in a curious manner. It flies upward, then down steeply, climbs again, then circles, dives again, climbs, and circling farther away sails down to some low tree and perches. The sound has ceased. When it rises to perform again, note when the clapping or flapping noise occurs; you will find that it synchronizes with the upward flight and to a limited extent with the circling.

I have not been able to satisfy myself as to how the noise is made; it may be produced by the rapid contact of the flight feathers below the bird's body as it climbs. The sound is very distinctive and can be heard even if the bird is just a speck in the sky. This little bird derives its English name from this curious habit and noise. This flight is part of the courting display.

Nevertheless, an exaggeration of the flight as described is often the reaction when the bird is disturbed from its nesting ground.

In various racial forms, the species occurs from the coast to the lake area, but it is not found in the Highlands. A grayish phase occurs at the coast and as far inland as Voi; a reddish phase through Ukamba to the Northern Frontier; a very dark one from the Kavirondo country to Ruwenzori.

The bird is of rather robust build, and has somewhat rounded wings that are particularly noticeable during flight. It is terrestrial and rather than fly will seek to avoid detection by short runs and squatting. It will perch if disturbed. As the birds sit perfectly still one can hardly detect them. Though still, they are alert, with legs set for an upward spring and flight. When first flushed, they fly with a slight jerky movement for a short way; then, vibrating the wings more rapidly, they drop straight down. If you expect to put them up again in that spot you will be disappointed, for by the time you reach it they will have zigzagged yards off through cover.

The nest is a shallow scrape sparsely lined with grass and rootlets, alongside a tuft of grass or a rock. Sometimes the nests are very exposed, but most of them have some little cover from the sun. They are not easy to find, because the birds approach on the ground from some distance off, and as the nest area is usually very broken by rocks and grass tufts, one cannot easily follow the line of approach. Most nests are detected by flushing the hen off, but the eggs are usually well set, if she is found on the nest.

The clutch consists of two or three, very rarely four eggs—pointed ovoids, the ground-color white to buff, profusely speckled with dark brown and gray-brown marks that almost obscure the base color, although they may be more concentrated toward the large end. The surface is smooth and slightly glossy; size 21–23 × 13–14 mm.

I had one brief opportunity of watching a pair from a hide. The eggs were on the point of hatching, as I put up the hide and entered it. The male bird was anxiously clapping his wings in aerial display while the hide went up, but as soon as my boy left the clapping ceased. At last I saw the hen "creeping" (I cannot describe it otherwise, for she kept low to the ground with head and tail down) between scanty tufts of grass. She zigzagged from cover to cover and at last came to the nest side. I secured a picture, but at the noise of the shutter she flew a yard or two away and remained crouched. Soon she crept back again, entered the nest, and sat on her eggs.

The diet of this species includes small grass seed as well as insects such as small grasshoppers, mantids, moth larvae, small beetles and termites.

Like many other larks, these birds are fond of a dust bath, and I have often come upon them in the loose sand surrounding the clear area around

the nest of the "harvester ant." Certain favored scrapes are used almost daily.

### RUFOUS-CROWNED FINCH-LARK

*Eremopterix leucopareia* Fisch. and Reichw.

The finch-larks are a small compact group associated with country that is almost desert: the vast stony and sandy areas of the Northern Frontier, where bush and grass are scarce; the hot, almost waterless tracts of the north Ukamba country; and the dry thornbush of the Southern Masai Reserve.

The rufous-crowned finch-lark appears to have its headquarters in the Athi-Kapiti-Magadi areas of Kenya, where, in the non-breeding season, hundreds may be seen in the parched and dusty areas. Flock after flock may be put up along the Magadi road, dust-bathing in the warm volcanic ash or feeding along the roadside edges and the shallow drains where wind-blown seed has accumulated in the depressions.

The great bulk of this lark's food appears to be grass seeds, though insects are taken. (The birds do extremely well on a seed diet in captivity.) This species seems much more numerous and far more gregarious than the several other species inhabiting the same general areas.

The general plumage of these larks harmonizes extremely well with the gray and brown soil, and since they have the habit of squatting when first approached, they are hardly visible. If flushed, they get up with a low piping call, and flying low, they soon alight on the ground a little farther on. They seldom alight on bush, though often on rocks.

With the advent of the breeding season, March-April to June, the flocks split up, but it is quite usual to locate dozens of nests in quite a small area of suitable ground, perhaps twenty in an acre. The nest is a shallow scrape alongside a small tuft of grass, against a stone, a mound of earth, a pillar or a small tree, all with hardly any overhead cover. The scrape is lined with a few bits of grass, rootlets, and fiber. One may find many types of nests in the Magadi area, and on the hard soda-mud flats some very ingenious ones may be seen. Where the ground is so hard that a scrape cannot be hollowed out, the birds go to the trouble of making an artificial hollow by gathering small pebbles and soda flakes and placing them up against a soda-mud mound. Then they make the scrape on top of the little pile and ring it around neatly to prevent the edge from slipping.

Three eggs form a normal clutch, although two or four occasionally are found. They are white to grayish in ground-color, freckled with umber and red-brown, with grayish or ochre sub-marks. Some are evenly marked, others more heavily toward the large end. An average size is  $18.5 \times 13.5$



## NEST OF RUFOUS-CROWNED FINCH-LARK

Nest of unusual type; note pebbles around nest placed against soda-mud mound

mm. Both sexes take part in the incubation to an almost equal degree. The nests are so exposed to the hot sun and the earth becomes so warm that the birds change places quite frequently, and very often when the sun is high the eggs are merely kept shaded by the bird's straddling over the nest. The eggs are very frequently turned. As I have watched these birds from a close distance from a hide, the heat has been so intense and the ground so hot that it surprises me that more eggs are not found addled with the heat. The birds exhibit remarkable tameness at the nest—a disregard for humans that is largely engendered by their anxiety to keep eggs or young well sheltered. As they sit or straddle, they pant with the heat.

Quite a number of nesting species in this area (Magadi) take appreciably long spells off the nest in the early part of the day and again of a late afternoon; the heat of the earth seems sufficient to maintain incubation and there is no need at these times to shade the eggs from the sun's rays. The approach to the nest is quite open; they come almost directly to it in flight, then run the last few feet without any hesitation. The incubation period is about 12 days, and the nestling period so far as I can estimate is 14 or 15 days.

There is some communal flocking of the nesting birds of an area in the late afternoon when they go to feed on the flats and hunt for grass seed, but



RUFOUS-CROWNED FINCH-LARK

Male, panting from heat and with body slightly raised, sitting on eggs

the Magadi birds are frequently noted at the margins of the soda streams and pools, apparently feeding on the millions of fly larvae and adult flies which group themselves in masses in the little back-waters.

## RED-CAPPED LARK

*Tephrocorys cinerea anderssoni* Trist.

Of the several species of larks frequenting the Athi-Kapiti Plains, none is so conspicuously colored as the red-capped male. Whether on the ground or in flight, its rufous crown, offset by the white around and above the eye, and the rufous on the sides of the chest and base of the tail at once attract attention. The white on the throat, the center of the breast and the belly is also in contrast to the ashy-brown of the back, which is streaked with blackish-brown and rufous. The otherwise dark tail has white edgings on the two outer feathers and these show up well in flight. The females are not so easily recognized for they are grayer and lack the rufous on the head, and the young are even more difficult to place, but there is a general ensemble which sets them apart from the majority. The bill is comparatively long, yet conical, and the wings are pointed.

These birds are in greatest numbers, often in flocks, during the non-breeding season; from about July to October, hundreds may be seen on the plains, more particularly where cattle are grazing and the game wander about in large herds. There is a definite association between pipits and larks and game. Wherever the ground has been pounded up and the dung is plentiful, the birds congregate. There they obtain quantities of fly and beetle larvae, and one may frequently see them breaking up the droppings with their bills, for this food. One may also notice numbers after a grass fire. For several days, the burnt-off area will attract birds of many kinds, these larks among them, and when they are working such ground they become grayed and soiled with the ash. A dip in the nearest puddle and a good sand-bath soon puts the plumage to rights again.

The species is often seen along roads, tracks and trails, especially after heavy rain, for along the margins drowned insects and grass seeds are washed in quantity. The bird's major diet is insects, but seeds are also taken.

This is one of the few larks that have a definite courting display. The male will sit on a rock or bush and sing; then he will flutter up to a height of 40 or 50 feet, then glide down; when just about ground level he will sail upward almost vertically and as the impetus of the upward glide is lost, he will flutter higher and higher, then sail down with quivering wings and outspread tail until he alights by the hen. As he flutters upward, he sings. This performance closely resembles the soaring of the English lark.

All the nests I have located have been in absurdly open spots, sheltered only by a small tuft of grass, a low herb, or a stone. They are often placed on a road side, by a path, or in an open area with just a few rocks. The nest is a shallow scrape lined with grass fiber and rootlets, loosely placed

around. The eggs are variable in color, with a white or slightly bluish-tinged ground strongly blotched with purply-brown and dark brown, or sparsely marked with brown and grays, in spots and streaks. The average size is  $16 \times 21$  mm.

Incubation lasts 13 or 14 days and is undertaken by the hen only, so far as I have observed. The nestling period is 16 or 17 days as a rule. The young are very cryptically colored and even in the nest are not at all conspicuous, for they are strongly barred and mottled above.

I have usually found the birds to be tame at the nest. In many ways they resemble pipits more than larks, for they are fond of perching on a low stone or bush so as to obtain a better view, and also, I think, to draw one's attention away from the nest.

The bulk of the food brought to the young consists of small grasshoppers, usually of the long-horned group, nymphal mantids, moths and their larvae, beetle and fly larvae, certain flying ants, and termites. Very often the food is brought *en masse* and it is difficult to distinguish individual species. It is usually the male who brings the greatest quantity, though his visits are fewer than those of the hen.

The chief nesting season is between the end of March and July in an average year, but a few nests have been located in November-January also. There are small local migrations governed by food supply, but in areas where food is fairly constant the birds are resident at all times.

### AFRICAN PIED WAGTAIL

*Motacilla aguimp vidua* Sund.

Of the dozens of entries about this species in my records, all refer to the birds as occurring alongside human habitations, or associated with some form of human activity. They are perhaps one of the most "remarked on" and "noticed" birds in Kenya and Uganda, not only on account of their conspicuous black and white plumage, but also and mainly because of their sociable habits and charming song. Even in out of the way places, one finds them around a hut or dwelling or in a *banda*, and in native villages they are common. Streams, swamps or lakes are not essential to their environment, yet where these are present the birds are more plentiful.

They are most often noted in pairs, but many may congregate in a village market or around a township slaughterhouse, and of a late afternoon or evening dozens may be seen perched on the ridging of the houses. Couples appear to pair for life and remain attached to a particular spot for years. I had a pair, which to my certain knowledge were the same birds, resident around my house for five years, nesting under a lantern-light in



the roof, and producing at least two, sometimes three broods in the year. The male was semi-albinistic and the female had a clubbed left foot. It was only when the hen was accidentally killed that the male sought another mate.

Although many may be seen around a particular feeding ground, many of them are youngsters of the season. Though these birds are tame and sociable, yet among themselves they are of a very jealous disposition, more particularly in regard to their immediate nesting site. If a pair takes up residence in a garden or near a human habitation, they keep all intruders off, defending their territory with considerable vigor.

Accounts are not infrequently published of birds attacking their own reflection in windows, etc.; this is of common occurrence with these wag-tails, especially the male. On seeing his reflection in the glass he fights his image furiously, even to the degree of complete exhaustion. Such a contest is not mere show; it is a serious combat, where bill and feet are brought into play. I have known a male, who, being unable to reach his rival, has flown to a tree a little way off, then dashed at the window with such force as to stun himself temporarily. The fighting is usually accompanied by vigorous song. I have known a male who used to visit a certain window every day for weeks just to see if the other fellow was hanging around. The pair had a nest in the roof of an outhouse, and the sitting hen was sadly neglected. Even when the young were hatched the male still wasted much time fighting an imaginary enemy instead of attending to his duties, until I covered the window.

The food of these birds is insects in various stages (larvae and imagoes of moths, flies, small beetles, larval grasshoppers, and worms) but around habitations they will take odd scraps of meal, bread crumbs and cake, etc. Because of this semi-domesticity and abundance of food, this species, like many another, has departed from the normal breeding seasons, and many nests with eggs or young are to be found in most months of the year. The chief breeding season is, however, from April to July, with a lesser one from November to January.

The nest is rather a bulky and untidy structure, with all sorts of odd materials in the foundation: grass stalks, leaves, rootlets, bits of rag, wool, and string. The bowl is made of rootlets and damp grass fiber, lined with fine rootlets and hair, when available. Its situation depends on the environment. In the vicinity of human habitations the nest may be built in the thatch, on the struts of a roof, on the top of a pillar, on the angle of a rain-water pipe, in a pile of wire netting, on the shelf in an outhouse, and so on. I have known the birds to build in boats moored offshore, even in the cabin of a motor boat that was frequently in commission. In more natural surroundings, I have found a nest on a rock shelf in a small cave, in the

hollow end of a decayed branch, in a clump of reeds, and among creepers over a rock fence.

Three or four eggs form a normal clutch, rarely five. They are whitish or grayish in ground-color, spotted all over with brown, and may be streaked, with underlying marks in grays. Sometimes the eggs are so closely spotted as to leave little of the ground-color showing, thus having a general brownish tone. Average size  $20 \times 15$  mm.

The species is often victimized by the solitary cuckoo (*C. solitarius*), the pied cuckoo, and to a lesser extent by the bronze cuckoo. The frequent use of this wagtail's nest by *C. solitarius* has given rise to the Baganda and Ukamba legend that the wagtail is the father of a hawk. The incubation period is 13 days; the hen does the greater share. The nestling period averages 15 or 16 days.

In general habits, these birds resemble the European pied wagtail; they have the same trick of moving the tail up and down, especially on alighting, or after a run for an insect, or when they become excited. I have yet to hear a satisfactory explanation as to why they seek out human habitations, even temporary ones. I have often camped well away from the nearest native settlement, yet in a day or so a wagtail has always put in an appearance. In most rest-camps one will find a pair in possession. They will come into and wander about the rooms and perch on tables and furniture.

On one of my collecting trips I found a young owl and had it loose in my *banda*. The local wagtails discovered it and came in daily to chivvy the youngster. The male would stand on the back of a chair and sing lustily, then dive at the frightened owlet. On another occasion I saw two wagtails umpiring a tussle on the ground between two Streubel's swifts. The swifts were engaged in fierce combat and refused to loosen the grip they had of each other. The wagtails looked on and ever so often the male would go forward and give the nearest swift a peck, then jump back quickly to avoid the long wings of the combatants. Occasionally he ran around the fighting pair, then flew to a perch and sang loudly.

### KENYA TAWNY PIPIT

*Anthus richardi lacuum* Meinertz.

Kenya is blessed with a multiplicity of pipits—a joy to the systematist but a source of confusion to the field worker. Fortunately, most of the species can be grouped in respect to their environment and general distribution, so that if one gets to know the “points” of the species to be expected in a certain area, there should be no great difficulty in placing them when seen in the field.



## KENYA TAWNY PIPIT

Female carrying moth and beetle to nest

In Kenya the tawny is the one with the widest distribution. It is common in the coast belt and less so in the thornbush country, but it becomes very common again in the Kenya Highlands (except the high moorland) and extends into Uganda. These pipits show a preference for the "short grass" veldt lands where the pasture is heavily grazed by game and stock, but they also occur in the richer pastures of the higher plateaus. The Masai and Ukamba plains are their chief center. There is indeed a definite association between these birds and game, and this is very noticeable during the off-season for then the birds are in flocks. Birds from the higher plateau come to the plains, and during this period they are definitely gregarious. Flocks up to a hundred strong are often seen. The association with game is not with the animals themselves but those particular areas where the herds lie up and rest, for large areas are trampled and denuded of grass cover and, littered with droppings. Again, many species of game are in the habit of selecting one spot as a communal "latrine" and such spots attract thousands of dung beetles and flies, the larvae of which form a large proportion of the food of these pipits.

After a veldt fire, when the ground has cooled, scattered groups of these pipits will be there to feed on the half-scorched and maimed insects. Immature and young birds can be recognized in the flocks by their rather barred and mottled darker upper plumage, their paler under side, and more strongly streaked breasts.

With the onset of the breeding season the pairs separate and there is little evidence of communal life except where birds still resort to a common feeding ground, or where progeny of a first brood or non-breeding subadults are found together. As the species is so abundant in some areas, one may find several nests in a small stretch of suitable ground. In one season I located 25 nests in 400 square yards.

Most of the nesting birds sit close, even when the eggs are quite fresh. One often locates a nest by almost walking over it, when the parent will rise at one's feet. One year, nests were found on the grassy central ridge of a motor track; cars passed up and down and the parents sat on. One not infrequently finds a nest just off the side of a game trail or a native path, in the fairway of a golf course, or at the edge of a clearing made by harvester ants. Open spaces and pathways are used as approaches to and means of egress from nests, for the birds prefer to run and squat rather than take immediate flight.

It is usually quite easy to locate the nest; one has only to watch. The male will take up a position on top of a bush or rock and call, while the female, after a while, will take wing and hover over the nest, sometimes dipping toward it; then she will circle off. On her next flight, she will hover again and drop just a few feet from the nest and then run toward it.

The nest is usually rather a deep scrape at the base of a small rock, a stunted herb, or a grass tuft, with some grass coverage to give shelter and seclusion. The hollow is lined first with grass, then with fine rootlets and fiber and hair. The completed nest is about 2 inches across and  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches deep, sufficient to allow the sitting bird to sink low with just her bill and tail above the rim. She usually sits facing outward, well-screened by the overhanging grass.

Three eggs form the usual clutch, but four or only two may be laid. The ground-color may be buffy to whitish. The spotting may be bold and discrete or it may be fine or freckled, in gray brown and umber brown with grayish and ochre sub-marks. The shape is rather variable: bluntly ovoid, elongate or rounded, with average measurements of  $20 \times 15$  mm. The incubation lasts 12 or 13 days, and is done by both sexes, though mostly by the hen.

Rats and other ground vermin destroy many clutches and many nests are trampled by game and stock. Siafu ants (*Dorylus* sp.) take toll of nestlings.

There is little difficulty in making close observation of these birds once they have overcome the initial period of anxiety—seldom more than a few moments. The male will probably flight from bush to bush uttering a sharp “see-a sear” or a more abrupt “peet peet peet” as he perches, while the hen will flutter around with spasmodic quivering wings, then drop by the nest. Most pairs that I have watched from a hide have been completely indifferent to the structure. The female has usually been the bolder. The approach to the nest is first by flight to within a few feet, then by quick walk to the nest. Some of the birds used the top of the hide to alight on and then dropped straight to the nest from in front. Not all pairs have been so tame. One hen always alighted well away from the nest, then took short runs and pretended to pick up food as she came zigzagging between the grass tufts with a mouth full of insects.

These pipits forage for food within a comparatively small radius of the nest. I could watch them breaking up cattle and game dung to secure larvae, or digging at the roots of grass clumps for “cutworms.” Silt and debris around water-logged depressions provided an abundance of syrphid larvae. Among the insects brought to the young were several nymphal grasshoppers, young mantids, and tipulids. Both parents were most assiduous in their attention, and visits were almost as regular as clock-work until toward noon. On one occasion, the female spent part of her rest-time in dust-bathing; then, coming to the side of the nest tuft, she lay down on one side and stretched her wings and tail full out, with the upper wing stretched out on a leg.

Except when very cold or during rain, well-feathered nestlings are seldom brooded; in fact they so fill up a nest that the parent could only sit on the nest edge or on top of the chicks to give them shelter.

If undisturbed, the nestling period is up to 17 days. The upper plumage of the young is highly cryptic even when they are in the nest, and when they leave and squat on the ground among stones and vegetation they are still more difficult to detect.

In the Ngong-Nairobi area, breeding takes place from March to July, when two broods may be reared. If conditions are favorable, a few pairs will nest again between November and January; the young are on the wing by February.

## YELLOW-THROATED LONGCLAW

*Macronyx croceus croceus* Vieill.

Of the various species of longclaws, the yellow-throated is the commonest, the most adaptable, and thus the most widespread. It occurs at the coast and extends to the mid-plateau and the high grasslands, then on to Uganda and beyond. Though adaptable to varying climates, and pastures of different types, it does show a decided preference for low-lying meadowland where the ground is damp, or vleis which becomes waterlogged in patches, with good though not necessarily rank grass coverage and scattered bushes.

It exhibits a remarkable leg and foot development that has been evolved for easy passage over tufty grass. It has a hind-toe claw measurement of nearly 2 inches, which with the long mid-toe gives a fore-aft claw span of nearly  $3\frac{1}{2}$  inches.

One usually sees these birds in pairs, for they remain together when the young have dispersed after the breeding season. They give a first impression of being fairly tame and approachable, but they possess that lark-pipit characteristic of standing still or squatting until forced to take wing. Their flight appears weak and jerky; the wing beats are spaced and are made from the level of the body downwards, until, just on the point of alighting, the wings are fluttered. They seldom fly far and may alight on the ground or a small bush; if on the latter, the bird experiences a little difficulty in accommodating its long toes to a slender twig. Though essentially a ground bird, it will perch readily if at all anxious or excited.

When the nesting season approaches, one may see a male perched on a small bush whistling his song: "twit-twit twitit, twit-lui-liiii chewit twit twit teeee." The full song is best heard in the early morning or late afternoon when the sun is setting.

I have seen no courting display except a fluttering flight in a circle, quite low, with tail outspread so that the white pattern is clearly visible, and then a drop toward the hen, who is squatting on the ground. If she goes off, the flight is repeated and the hen chased about. A male will resent the too near approach of another of his sex and with jerky flight and much calling will drive the intruder off.

Pairs are remarkably sedentary; where one has located a nest in one season, the chances are that somewhere in that vicinity a new nest will be found. The birds' behavior shows at once whether or not they are nesting. The male will be much more on the *qui vive*; rising from the ground he will take a short circular flight and alight on a bush or small tree, treading the twig and fluttering his wings to keep his balance. He has probably called in flight and will continue to utter a low "chew chew lui," oft repeated; if he



YELLOW-THROATED LONGCLAW

Female taking food to young

is very anxious the note is changed to “chee weet cheewet” or “chee wit chit, chee-weet”—rather a plaintive call. If the female has appeared from apparently nowhere and has joined her mate or is perched on another bush, the best thing is to wait quietly. Both birds will probably take a short flight, the female dropping to ground and the male taking up a stance on another bush. The female will probably make her way on foot, walking over the grass tufts, then into hollows, then along runs; by a circuitous route she will arrive at her nest. The male will soon fly forward, call, turn in his flight, and alight again on some bush.

That point of turning is important; somewhere below it will be found the nest; the flight was to make certain that the hen had reached the spot. Give her a little time, then get up and go toward the spot. The male will have given a warning, and the hen will probably have vacated, and the two birds will now be flying around. Somewhere within a 10-foot radius of where she got up, one should locate the nest. If the grass is short look for a tuft with longish grass, with a small clear area in front of it. The nest will be hidden by drooping grass blades. It may be within one tuft or between two, at almost ground level. If it is a few inches up, there will be a

little ramp leading up to it. The hollow within the bower will be lined with grass blades, stems, and rootlets. The foundation material may be decayed vegetation—sodden decomposing grass from the edge of a pool. On top of this foundation the cup is made. In damp situations the foundations may be thick and the walls of the nest built well up into the tuft. The nest is then somewhat bulky. In drier situations the nest may be shallower, but it will still be well hidden by overhanging grass. I once found a nest in an unusual site, two feet up in a "rhino-acacia," a flat-growing, closely matted species.

The eggs are fairly large and rather variable. Three eggs is a normal clutch, occasionally four, often only two. The eggs are whitish, and the ground-color is buffy or pale bluish-gray, spotted and freckled with gray-brown and dark brown, with sub-marks in ochre or lilac-gray. The spotting may be evenly distributed or zoned toward the larger end. An average measurement is  $25\text{--}28 \times 13\text{--}15$  mm.

The female does most, if not all, of the incubating over a period of 13 or 14 days. I have sometimes flushed the male from a nest, but it is unusual.

These birds soon become accustomed to a hide, and it is most fascinating to watch the long-legged, big-footed, handsome creatures at close quarters. After obtaining food, they fly toward the nest, then drop with a slight turn a few yards off and come striding over the grass to the little clear space, where they stand bolt upright for a moment before bending their long legs and stooping forward to reach the nest. The youngsters are remarkably quiet in the nest until they reach a well-feathered stage.

I recently watched at a nest which was among very thick tangled grass. There was one runway to the left of the nest and just a small flattened area in front of it. The hen bird approached up the track in proper fashion, but the male preferred to stride over the grass and slide down over the front of the nest.

The food brought to the young consisted almost entirely of nymphal grasshoppers, mantids, moths, and larvae. I saw one lycaenid, one skipper, and a few small millipeds and glow-worms. One day a large swarm of locusts came over and a few settled in the grassland. Numerous birds were after them, including shrikes, kites and coucals. To my astonishment, the male longclaw came to the nest with a locust. It had been beaten and its wings and jumping legs removed, but it was far too large for the chicks, or even for a parent for that matter. Nevertheless, he turned it in his bill and tried to shove it (I can use no other expression) down a chick's mouth. Of course it wouldn't go, so he bashed the locust against the grass many times until it was more flaccid. One chick tried to close his mouth over the locust head. The father turned his head on one side, then seized the locust, pulled it out, stood for a moment, and then flew off with it. He returned in about five minutes, still with the locust, which was now well pulped and minus its



head and most of its thorax. The chicks greeted his arrival with wide maws. He tried it on one, but the chick brought it up; nos. 2 and 3 were not more successful, and the father was about to try again when the female alighted at the nest. She fed her offerings, and seeing her mate with the locust still in his mouth, she took its tail end and the two pulled hard. The locust came apart; two youngsters got a share, the third did without.

The young are usually ready to leave the nest on the sixteenth or seventeenth day after hatching. Though hardly able to fly, they can run, and they spend the next week hidden up in the grass. They are even more cryptically colored on the back than their parents: tawny-colored with dark streakings. The breast is tawny buff with streaks on the flanks and just a wash of yellow on the abdomen. They remain with their parents for a long time though able to fend for themselves, or until a second brood is contemplated, which is often the case, for the birds are double-breeding in the long season.

### ORANGE-THROATED LONGCLAW

*Macronyx aurantiigula* Reichw.

The orange-throated longclaw is found in the grasslands of the lower, drier parts of Kenya and throughout the coast hinterland to Ukamba and Masai-land, but it is nowhere plentiful. Because of this drier habitat, the toes and claws are shorter than in *M. croceus*. The grass in the habitat of the orange-throat is sparse, tufty, and rather short, and is mixed with stunted herbs and thornbush, so the bird's legs are still long and the toes wide-spread. These birds move about the wiry grass with agility, and I have seen them jumping up to pick an insect off a grass stem. Their long stride enables them to walk on the grass instead of having to make use of runs and pathways. During the non-breeding season, an odd pair may be flushed here and there in the shorter grass areas, but for nesting purposes they move into places where the grass is longer.

I have found a few nests in the Ukamba-Masai reserves. Most of them have been well hidden in tufts of grass or between two large clumps, from two to four inches off the ground and approached by a slight ramp. The nests are built in a rather deep scrape in the old crown of the grass and are lined with dry grass blades and stems, many of the stems being bent around within the nest, with one end projecting forward as part of the ramp. The inner lining is usually fine rootlets or grass fiber.

The eggs, from two to three in number, are whitish in ground-color, spotted in gray and gray-brown with bolder darker brown marks. Some eggs have ochreous sub-marks mixed with gray. The average size is 24.5 X

17 mm. Incubation is by the hen only, so far as I have observed, and lasts thirteen days.

I have found these birds rather more timid than the other *Macronyx*. Their flight is rather weak—a series of intermittent wing beats of short duration; then they drop to the ground or perch in a small tree or bush. They are as cunning as the rest of the group in trying to lead one away from the nest by short flights and plaintive calling and dropping to the ground. Merely as a matter of interest, I followed a male bird very slowly, and by a series of short flights and false landings he led me quite 400 yards in a curve away from the nest.

I was able to spend a very brief time at a nest with half-grown young, and noted the food brought. It was a mixed diet of moths and moth larvae, spiders, nymphal and small adult grasshoppers, mantids, small beetles (chafers) and a large species of termite common in the dry grasslands. These last had had their heads and powerful jaws rubbed off.

I can give no exact data for the nestling period, but it must be about sixteen days. Youngsters in first plumage are more sandy-colored on the back, though more decidedly striped than adults; the under side is sandy-buff with little traces of yellow and is finely striped on the breast and flanks. So far as I can judge, the breeding season starts about February, and second clutches may be found in May. A nest with eggs was found in the coast strip in July.

## RED-THROATED LONGCLAW

### *Macronyx ameliae wintoni* Sharpe

The open grasslands of Kenya, particularly those of the high plateaus, are rich in bird life and well worth studying as an entity. Although there may be some merging into bush, scrub, and savannah woodland, the grasslands are sufficiently defined to harbor a peculiar fauna of their own. Dominant among the bird fauna are various species of larks and pipits, finch-larks, grass warblers, and so on.

These grasslands vary a good deal according to the depth, porosity, and composition of the soil and the degree to which they are grazed (mostly by game). Thus we note a certain segregation among the grassland birds into particular areas most suited to them. Pipits, particularly, exhibit marked preferences. This species, though widespread, has a rather interrupted distribution and is nowhere common. One comes upon the odd pair only here and there. Its habitat includes areas of rather tall, thick grass on damp soil that is subject to water-logging and even swampiness. In such areas the grass is lush but tends to bend over by its weight and the wind action,

forming hummocks with the flowering stems standing erect. The birds may be absent in a dry year from an area previously frequented.

When flushed, they fly off with curious, jerky, well-spaced wing beats; then at a little distance they drop. If they are not followed too quickly, one bird will presently mount a hummock of grass to look around. The pose is almost upright, and the reddish-pink under side is conspicuous.

During the nesting season, these birds become very wary. The male is always on the outlook, perched on some low bush or grass hummock. He gives the warning call, "chuit chuit," oft repeated, as soon as danger threatens. If you approach he flies off low, calling as he flies; then, alighting, he continues to call. If you continue to follow, he will repeat the low flight, and in the end he will have succeeded in taking you well away from the nest ground. His calls will cease, and, having worked his way in and out among the tall grass, he will circle back to the spot from which he started.

To find a nest it is best to sit down quietly where you put the male up. The female may be perched on a hummock of grass and she will add her calls of anxiety to those of the male. Presently she will drop from her tussock and disappear. Now watch the male; occasionally he will fly and circle or hover over a particular spot. Walk there. The female will flush, but perhaps some feet from the nest. With the aid of a stick, gently lift or part grass that is overhanging hummocky tufts. Look out for traces of a run—just a slight flattening of the surface grass leading to a tuft. There may be two runs, one leading to the top of the tuft, one away from its front and really a continuation of an inclined ramp leading to the nest.

The nest will be in a scrape within the old friable crown of the grass tuft, enlarged to a hollow, with new growth hanging over it. It will be lined with grass rootlets and fiber, and the base will be raised above the surrounding ground, to prevent flooding when the area becomes water-logged. Most nests are so protected, and all are well hidden. The eggs may be two or three in number, white or creamy in ground-color, spotted or irregularly marked with brown and grayish to ochre sub-marks. They are elongate or blunt ovoid, measuring  $25 \times 16$  mm.

In the early stages of incubation, most hens will leave the nest readily and slipping through the grass will get up some way from the nest, but as incubation advances they sit close and may even be found on the nest. The hen appears to do all the sitting, over a period of thirteen or fourteen days. New-hatched chicks are light flesh-brown in color and naked, except for tufts of down on the head, the base of the wings, and the dorsal tracts. The gape is yellow and the mouth pale salmon-yellow.

Some years ago, I located a nest back of my sanctuary. It held young when found, and was well situated for observation. The nest was in an old

crown of grass, with two new tufts on either side and dense red-oat grass behind. It was in rather a deep scrape, and was well lined with grass stalks and finished off with rootlets. There was a slight ramp up to the edge of the cup. There were three young about a week old and one addled egg, which I discovered after the young had vacated.

When I entered my grass hide for the first time, the parents were perched on hummocks of grass, calling anxiously, but as soon as I was settled in and my boy had gone off, the calling ceased. Presently the female hovered above the nest and alighted on a tuft of grass about ten feet away. Her bill was full of insects. Then she walked on top of the grass until she was near the nest, when she dropped to a runway and came forward, body erect and legs full stretch.

The youngsters were all attention. She held several insects in her bill, and she apportioned a few to each chick. Collecting up the feces, she turned down one of the runs and flew off. For a long while only the female came, and her visits were remarkably rapid—so much so that I wondered how she was able to collect so much food in such short time.

The matter was solved a little later, for while the hen was still at the nest, the male flew over, dropped to a tuft of grass a few yards off, and called. The female, who had just finished feeding the chicks, ran along one of the paths and appeared beside her mate; from him she took a mouthful of fodder and was back at the nest immediately.

Eventually the male made up his mind to come. He alighted well away from the nest, walked a few steps over the grass tufts, stopped, and dropped between the hummocks; then he rose again, still uncertain. Dropping into a runway, he walked the whole way round the hide, keeping about six feet off, then sneaked to the nest through the grass at one side. He had brought a generous supply of food, but it soon disappeared. He picked up two sacks of excreta and flew off. Thereafter, his visits became quite frequent, but he was never quite at his ease. In contrast, the female now dropped in flight to within a foot of the nest, after a short hover above it.

A few days later, on my next visit, the young were well feathered and filled the nest to near overflowing. They sat facing the ramp, and as soon as one of the parents approached, necks would be outstretched and gapes wide open. They had already learned to scramble out of the nest and meet the parents in the little flattened area in front of the nest.

The favorite hunting ground of the birds was a long low-lying water-logged hollow, to which cattle had access. Beetle and fly larvae were plentiful. Glow-worms and carabid larvae were found in the silt, two small lycanids were taken near the water, and cutworms and wireworms were dug out from the edges of decaying grass tufts. Grasshoppers and moth larvae were plentiful.



RED-THROATED LONGCLAW

Male at nest with young

The young had left the nest on my next visit, and I estimated that they had gone sixteen days after hatching. They are smoky-buff above, strongly marked with black; the throat is buffy, with just a few dark specklings on the breast and flanks, and the abdomen is just tinged with rosy-buff. The legs are very long, but the tails are short, so they look quite out of proportion. The young lie up close at a word of warning from their parents; to search for them is like looking for the proverbial needle in a haystack. I was able to locate two of them by watching the parents' movements.

## YELLOW-VENTED BULBUL or BROWN-CAPPED GEELGAT

*Pycnonotus tricolor* Hartl.

Ubiquitous, verging on the commonplace! Hated by fruit growers! A victim of ignorance and misrepresentation! Such is the yellow-vented bulbul. Commonplace? Yes, but not to be despised and ruthlessly destroyed, and certainly worthy of study.

As a species this bulbul ranges from the coast of Kenya to Uganda and beyond. Though absent from the high alpine regions and dense evergreen forest, it is at home in the thornbush, the scrub and park country, or the edges of forest, and it is established as a "garden bird" in residential areas, both urban and rural. These birds are usually seen in pairs, and undoubtedly they mate for life. Sometimes numbers of them come to some fruit-bearing tree which has attracted many species of birds, and they often congregate in small numbers, usually of an evening or early morning, around some pool in a watercourse or at a temporary water pan, for they are very fond of bathing. Such birds are probably non-breeding.

Though *Pycnonotus* has become associated with human habitations and displays a certain boldness, it retains a distrust of man and seldom allows a very close approach, except at the nesting season. Then anxiety overcomes fear. Distrust is indicated by an oft-repeated "tit-twit, ti-twat-twit" that ends with "tii-too, to-wit" and becomes louder as anxiety increases. The birds make no attempt to conceal themselves. They sit exposed on some bush or small tree, protesting loudly, at the same time raising their crests, twitching their wings, and spreading their tails.

Bulbuls are among the first to give voice of an early morning, just before and after dawn. They maintain their calls for perhaps two hours, then cease calling and seek food. They are the last birds to retire at night, and they do so with much twitter and fuss. At sunset, they may often be seen sitting on top of a bush or a high, exposed branch, calling and preening themselves, in the last rays of the sun. On moonlit nights, their call intermingles with that of the gray-vented dove, and they often give voice when the solitary cuckoo calls at night.

The spacing, sequence, and intonation of the call notes vary with subspecies and locality. The Kenya Highland bird has a call which can be rendered as "tee, twit, tit tit," whereas that of the Uganda bird is "tweet, ti ti, twit." Another call of the Kenya bird is "pee, ter-oh." These calls may be combined, even jumbled together, if the birds are very excited, especially if two birds are calling at the same time. Thus, when a pair, associated with other birds, are chivvying a tree-snake, the jumble is "whit whit whit-jor" . . . "whit per-r-r-r-o," "whit cho ki, which-o which-ii, whit-to to-wit."

*Pycnonotus* takes cultivated fruits, but his depredations are small compared with the good he does, especially during the nesting season. The main breeding season in this area is from March to July, in an average year, when two broods may be raised. A few may nest from October to January if conditions are favorable.



NEST OF YELLOW-VENTED BULBUL or BROWN-CAPPED GEELGAT  
A typical nest

The nests are usually built quite low—three or four feet up if in scrub, from six to twelve feet up if in small trees. I once found a nest a foot off the ground, in bracken. A triple upright fork, a simple fork with twigs around it, or an inclined or horizontal fork with lateral supports is selected as the nest site. The nest is characteristic: a comparatively shallow cup made of very slender twigs of herbs, rootlets, and perhaps a few grass stems, attached to the arms of the fork with a few cobwebs. The inner lining is made of fine rootlets. The nests are sometimes so open in structure that one may see the eggs from below, but this is usually before the full lining has been laid in.

The eggs are characteristic but variable. The ground-color varies from white to rich pink, even dark pink, the spotting from fine spots to freckling, blotching, and streaking in liver-color and maroon; the under marks range from grayish to mauve. The marks may be bold or subdued; nevertheless, they all bear the stamp of *Pycnonotus*. There is some variation in shape: some are oval and some are bluntly rounded, but most are long ovoid, slightly more pointed at one end. A clutch of two is common, three are quite frequent, and four are exceptional.



YELLOW-VENTED BULBUL or BROWN-CAPPED GEELGAT  
Female at nest containing young cuckoo

Incubation lasts twelve or thirteen days and is done almost solely by the female. The male is always somewhere in the vicinity, may occasionally incubate, and certainly will brood the chicks. Although the nest is comparatively shallow, the hen sits low, with just bill and tail above the rim and pointing upward.

The new-hatched nestling is dark, quite naked, flesh-brown on the back and slightly paler below, with a yellow gape and a yellowish-pink mouth. The chicks are brooded constantly for the first few days and the hen is often fed on the nest by her mate. She swallows berries that are brought, but much of the insect food is passed on to the chicks. Observation at close quarters at several nests shows that only insect food is given to the youngsters during the first few days, even up to a week; thereafter they receive a mixed diet of insects and fruits.

The attachment of these birds for each other is displayed to a marked degree when tending the young. They maintain close association when hunting for food, and they return to the nest together. Between feeds one bird may fly up into a tree and it is at once joined by the mate, who is greeted with a low "cheedle cheedle cheedlelit," accompanied by half-raised wings; then the two sit side by side.



The young are fed on insects such as larval and imago noctuids, nymphal grasshoppers (long-horns), mantids, winged termites, flying forms of *Phydole* ants, and dipterous larvae; they also eat the fruits and berries of *Lantana*, *Trema*, *Ficus*, *Cissus*, and *Clausena*. Feeding is fairly regular, from eight to twelve visits every half hour by the two birds, but there are frequent breaks when the female broods. The longest break is about noon, when the parents sit on the edge of the nest and shade the chicks. At one nest, the hen preened herself, and, lying down on her side, spread a wing and tail and sunned herself, raising the crest to its full extent and fluffing up the rump feathers to allow the sun to penetrate.

The young feather up quickly after the first week and are ready to vacate the nest at the sixteenth day. They are able to fly only a short distance and remain hidden among bushes for a few days, before they are able to follow their parents about.

The nests are not well concealed and many are very exposed. The species is much subjected to the attentions of parasite cuckoos, especially the pied cuckoo and the yellow-breasted emerald cuckoo. The egg of the pied cuckoo is blue, in strong contrast to that of the bulbuls, but the yellow-breasted emerald cuckoo's egg is very similar to a small, pale, bulbul egg. It seems very strange that the bulbuls will adopt an egg so different from their own in color.

As in the case of many low-nesting species, bulbuls suffer severely from predators such as shrikes and mongooses. The birds advertise the locus of their nests to such an extent that it is a wonder any of them escape. So, too, when the young are in the cover of bushes; the actions of the excitable parents are indicative of where the chicks are hidden.

I have seen no evidence of territorial defense, but a nesting pair will resent the too close approach of another of their species to the nest. The birds are quarrelsome among themselves and to others when feeding or at water, but they are not aggressive.

## WHITE-THROATED FOREST BULBUL

*Phyllastrephus fischeri placidus* Shelley

One bird which is common in the Highland forests east of the Great Rift Valley is the white-throated bulbul, with another subspecies common in the forests of the Coast Belt. The white-throated bulbul is a bird of the undergrowth and mid-part of the forest, and is easily overlooked when it is quiet. Its quiet colors hardly advertise its presence, but its notes and calls, fussy, abrupt, and even explosive, often give it away. As you enter a forest patch you may hear a sharp explosive note, "prip prip prup prup," and

perhaps see one or more of the olive-colored birds slip into the undergrowth. These birds have a strong streak of curiosity. If you sit quietly a short time, the birds you disturbed will creep back through the tangle to within a few yards, just to have a look. They will utter their characteristic explosive notes most of the time, "pru-it, pru-it, prip prip prup prup," and will flick their wings and dip their tails. Their movements are rather deliberate and "smooth," even to the wing flick. Having satisfied their curiosity, they will move off.

They are insect eaters. One may occasionally see them in the canopy of the lesser trees of the forest, but the undergrowth is their chief hunting ground. There they seek their food by creeping through the thick vegetation, around the trunks of trees, or on the ground among decaying leaves and moss; they will also work their way up and through creepers and lianas. They hold the head level with or slightly lower than the body and the tails are depressed and slightly moving. Moth larvae, spiders, small weevils and other beetles, small molluscs, mantids, and long-horn nymphal grasshoppers are their chief diet.

Though one may see a small company of these birds it will probably be a family party, for they are usually not gregarious. However, one can attract numbers of them by making a low squeaking noise. When a party of birds starts to chivvy an owl, a tree-snake or even a chameleon, these bulbuls contribute to the general noise, and they may associate with others of their species at some particularly productive food supply, such as an exposed "white-ant" trail on a tree trunk.

There are several pairs of this bulbul in my little patch of forest, and from observation I feel certain that a couple once mated will remain together season after season. Even when several birds are associated, they co-operate two and two in their hunting.

The male displays before the female prior to copulation. He hops about the undergrowth, intermittently flicking his wings and fanning his tail, raising his head crest, puffing out his throat feathers and making the rump feathers "stand on end." As he moves in a circle he utters a low "pruit pruit pri pri pri, pru-pri-cho," without the usual forceful, explosive character.

The majority of pairs in this area start nesting in April and go on to July. The late nests are usually second broods. As a rule, forest birds start nesting later than bush or veldt species. Very few pairs (only one out of twelve) nest during the short season (November-January).

Nests are usually in the woody undergrowth or in small saplings of the mid-growth and are seldom higher than fifteen feet. The site is a horizontal fork, the angle formed by two stems crossing, or the space between two



WHITE-THROATED FOREST BULBUL

Male bringing long-horn grasshopper to nest

loops of a creeper. Nests are usually well in the shade of overhead trees but may be quite exposed otherwise. A slight framework of strands of bark fiber and thin tendrils is slung across the fork and attached firmly at both ends. Decayed leaves and bits of bark are worked in; more fiber and tendrils are laid around; and more leaves, many skeletonized, are pushed in and tucked around the outside, as the cup is gradually built. Bits of moss

and spider web are used as filling and binding material. Sometimes long streamers of bark are left dangling from the outside, and a few dead leaves may hang from the nest, merely attached by strands of cobweb. The inner lining is fine bark fiber. The builder frequently gets into the nest as it progresses, and she shapes it and stretches it with her bill, breast, and feet. The cup is 40–45 mm. deep and about 50 mm. wide across the fork, but it may be 70 mm. from the free edge to the crotch. The inside of the cup is neatly finished off, but the rest is deliberately left untidy and looks like a mass of leaf debris caught in a fork.

When nest building, the birds show little regard for intruders. I have watched them from two yards away. Both birds take an active part in nest construction. The first nest of the season is built leisurely, and completed in a week or ten days.

The normal clutch is two eggs, but I have one record of three. They are creamy-pink or pink with a slight gray tinge, with surface spots, blotches and scroll marks in umber-brown to almost black, and underlying marks in gray or mauve-gray. The spots are usually sparse, but they may be concentrated toward the larger end. The eggs are longish, measuring  $24 \times 16$  mm. on an average.

Both parents incubate, but chiefly the hen. The incubation period is eleven or twelve days, but hatching may be delayed by very cold weather. The new-hatched chick is pinkish-orange above, and paler below, a rather curious color; the gape is yellow, the palate deep yellow without any marks. The nestling period lasts from sixteen to eighteen days, varying with weather conditions and amount of disturbance.

I have found dozens of nests in my sanctuary and made hides at several. Most pairs have been very tame, especially the females. Typically the hen sits deep and close on her eggs and on occasion I have lifted her up with my finger to examine the eggs. To stroke her as she sits is often possible, but if taken by surprise she slips off, drops to the ground and flutters, then lies on her side or back, with wings half open and head lying limply to one side, simulating death. Presently she turns over and “staggers” a few feet with trailing wings and outspread tail; then she topples over and lies panting; then on another few feet with “broken-wing”; then a flutter and collapse, and she lies on her side as if dead! This “injury stunt” is frequently seen with several other species of bulbuls.

After one of these birds had hatched her young and sat brooding them, she would take a moth larva from my fingers. If she were off the nest, on her return she would perch on my cigarette case as I held it by the nest, and feed the young from this perch. Such tameness is the exception rather than the rule, but I have had *Zosterops* and *Sylvietta* equally tame. This female seldom made any note of anxiety—only an occasional high-pitched

"squi squi," as I commenced a period of observation. The much larger male was much more fussy and excitable, flicking his wings and calling, and raising his crest in excitement. But he, too, eventually "tamed up," and was often at the nest with his mate.

During my period of observation at many nests almost all food offered the young has been insects: noctuid moth larvae, a few geometers (these mostly eaten by the adults), a few glow-worms, carabid larvae, and nymphal long-horn grasshoppers; spiders are also eaten. Not far from one nest I cut up and split open an old dead tree to obtain longicorn and buprestid beetles. Many immature larvae and pupae were lying among the debris, and I was surprised to see that the parent bulbuls brought these larvae and pupae to the young. Although such food would be inaccessible to them in the ordinary way, it appeared to be greatly relished. Food was usually collected within a radius of some twenty yards from the nest. The female hunted in the leaf debris and around the tree trunks while the male sought for insects in the thick tangle of vines and undergrowth farther afield.

The young fledged *Phyllastrephus* are very similar to the adult in color but are slightly more brownish above and more yellowish-olive below. They remain with the parents for a long time, even should the parents begin a new nest. I have sometimes noted four birds by a nest under construction, two obviously young of the first brood. They remain around until the new clutch has been laid, then move off.

Owing to the low, exposed situation of most nests, many broods fall victim to the depredations of mongooses and genets. Shrikes and snakes, too, take the eggs, and the goshawks take toll of the fledglings. Thus the *Phyllastrephus* population of my sanctuary has hardly increased at all during the five years that I have kept a census.

## YELLOW-BREASTED FOREST BULBUL

*Chlorocichla flaviventris meruensis* Mearns

A native whom I sometimes employ to assist in my bird work refers to this species as "the talking bird." The name has merit; all the syllables of the calls are deliberate and well spaced: "Quar—tooa, quar—toar," "cher—keri, keki—kerek," "kch-kak-a-wak, kak-a-wak," "quaroo—cheir, cheir," are some of the calls. The first is the one most often heard; it is the "directional" call, uttered by both of a pair to keep in touch while hunting apart. It is modified to "kerr quar" when one bird has located food and calls to its mate. The longer calls are those of excitement or of courtship.

The yellow-breasted bulbuls live in the undergrowth and the mid-strata of the forest. If one approaches a calling bird it slips into the thicker

vegetation, keeping out of sight. Its skulking, retiring habits have given rise to the false idea that it is comparatively scarce. To my certain knowledge, there are four pairs in my little sanctuary, and they are regular visitors to the bird-baths. Fortunately, in my sanctuary the birds are relatively tame.

Several nests have been located in the sanctuary, but at only two have I been able to make continuous observation from the commencement of the nest to the leaving of the young. In the other nests, the eggs or young have fallen victims to predators. The nests have been fairly low, at heights varying from six to twelve feet, usually in rather thorny or twiggy trees, moderately well protected by foliage and always toward the end of a rather slender branch. The nests are quite unlike those of other forest bulbuls; that is, they are not slung in a fork, but are like a large edition of a *Pycnonotus* nest—a rather shallow cup with a foundation of tendrils placed on a horizontal twiggy branch, the body of the nest built of finer tendrils and bits of vine, mostly of *Momordica*, a wild cucurbit. The inside is lined with fine rootlets, but the whole is so loosely meshed that one can see the outline of the eggs from below.

The eggs are elongate, off-white to pale ochreous in ground-color, some with a slight greenish tinge, spotted and freckled with umber-brown and grayish sub-marks, many showing a concentration of marks toward the larger end. Two eggs are the usual clutch. They measure, on an average,  $25 \times 17$  mm.

One pair near my house commenced to build a nest on April 21 and completed the structure in seven days, both birds taking part in the building. The female was sitting that evening and one egg was laid; there were two by the twenty-ninth of April. The hen bird did all the incubating, over a period of fourteen days. She sat very close, and the periods off the nest were very brief, the longest being about ten minutes. When I inspected the nest the female hopped off, but she remained in the nest tree protesting loudly, flirting her tail, opening and shutting her wings, and raising and lowering her crest. When I left she returned to the nest at once. Though I passed below the tree on my daily patrols of the forest, the female never left her nest on my approach and she continued to brood very closely for the first two days after the chicks hatched. She was often fed by her mate during incubation and while brooding the chicks.

On the third day after the chicks had emerged, I put up my hide. It was erected within five feet of the nest tree but the female continued to brood while the pylon was being put up and a platform nailed on top. The next day I entered the hide to make observations. It was fully half an hour before the hen left the nest. As she left, the male came and fed the chicks;

then he hopped into the nest and brooded the young. It was the first time I had seen him on the nest. He remained brooding until the hen came back with food; as she approached, he stood on the side of the nest, and he watched while feeding was in progress; then both parents went off together.

The newly hatched chick was naked, dark grayish-brown on the back, more yellowish on the belly. The gape was yellow, the mouth cadmium, the bill brown, the feet gray-brown. For the first three days of observation, five-hour spells each day, only larvae were fed to the chicks, but after that larvae and berries were given indiscriminately. It was noted, however, that the female continued to supply larvae almost exclusively, while the male produced nothing but berries up to the time the chicks were ready to leave. The fruit varied: the soft fruits included *Cissus* and *Allophylus*; the hard seed fruits, *Clausena* and *Teclea* (both species). These latter had had the seed removed before being offered, until the young were over a week old. Excreta voided was taken up, removed, and dropped; I saw no evidence that the adults swallowed it.

The young feathered rapidly, and by the fourteenth day more than filled the nest. The hen had to droop her wings to cover them as she brooded for the night. On the sixteenth day I climbed into the hide at about 9:30. The parents seemed unduly fussy, but I put this down to the fact that I had not been in the hide for two days. They quieted down and disappeared as soon as my boy had left. The young were now in the stage when they would stand up and stretch and preen themselves, one doing his toilet while standing on the edge of the nest.

The parents soon returned, each with berries. Instead of coming to the nest, they sat within the tree and called to the chicks. They came quite close, then flew to a branch a foot or so away. The chicks remained in the nest and answered their parents with calls for food, making a low double note, "cherup cherup." This went on for over five minutes, and then the hen came and fed the chicks. The male meanwhile continued to induce the chicks to vacate. The bolder of the two sat on the edge of the nest, and the parent came within a foot. The youngster stretched out for the food, but the father stood his ground and called encouragingly. At last the chick ventured and hopped and flapped to the branch. He was fed, and the male went off. When the hen returned, she fed this chick and ignored the one still in the nest. When the male returned, he too fed the chick in the tree, despite the fact that the other called the louder. While the parents were still away, the second youngster hopped to the edge of the nest; then, with a flutter, he managed to get to the branch within the tree, so that when the parents next arrived, each chick received a share of the food. On subsequent visits, the parents induced the youngsters to move farther into and



YELLOW-BREASTED FOREST BULBUL

Male at nest

higher up on the tree. I wondered whether the youngsters would have quitted the nest that day had I not gone into the hide, for at a previous nest the young had not vacated until the eighteenth day.

At another nest built in an *Acokanthera* at the edge of the bush fringing a stream, the parent birds were much more timid. This may have been due to their having had less contact with humans. When the female was incubating, she slipped off the nest at my approach. Only when the eggs were about to hatch did she sit close and begin to perform her "injury stunt" in the same way that I have described for *Phyllastrephus*. The hen had been sitting for thirteen days to my certain knowledge, and to check on the eggs I went to the nest, found the bird sitting, and pulled the branch down gently to eye level. Not until then did she tumble off the edge of the nest. She lay fluttering on the ground, and then, one wing drooping, crept off along a trail. The eggs were on the point of hatching. The hen was back on the nest as soon as I released the branch. I put up a hide at this nest. As before, only insects were brought to the young for the first few days; then they went onto a mixed diet. Additional fruits given were *Lantana* and *Carissa*, both plentiful along the stream bed.



The curious lack of feathering on the back of the neck of the adult is more marked in the fledgling; in fact, there is an entire bare ring around the neck. The young bear a superficial resemblance to the adults, but are duller and more downy in plumage. The eyes are gray-brown, turning red at six months of age.

## YELLOW-MOUSTACHED OLIVE BULBUL

*Stelgidocichla latirostris eugenia* Reichw.

This species is rather different in appearance and build from the other species already described; it is more compact, has a shorter broader bill that is serrated along the cutting edge, and shorter legs. However, it has that same lack of feathering at the back of the neck and the same somber type of plumage that is so well adapted to the deep shade of the forest. Its nesting habits are very similar to those of *Phyllastrephus*.

It is common enough in the evergreen forests of the Highlands up to 10,000 feet and ranges into Uganda. Though very retiring and seldom seen, its monotonous voice can be heard throughout all hours of the day. When not feeding, the birds resort to heavy-foliaged saplings, small trees, and heavy creeper growth. Hidden in this cover, a male will commence his incessant, rather monotonous calling. I have often tried to put down on paper the succession of notes which make up his song. Here is such an attempt: A continuous chirping, then a break for a moment as though getting his breath, then on again: "chirup chirup chip," "chit thrip trip, pipip pipip teo . . . pipip pipip prip, twea trip thrip tee, chip cheeee . . . pree prii siiii, chirup chirup chirup . . . chirup chirup chii cii, twee twee trip, pre plee pleo . . . prip prip chirup pree . . . swi ti ti ti, chur ti plue, chiri tei, plurti plue . . . pler plei plur swiii," and so on and on. The first note or two after a pause is louder than those that follow. The calling is heard throughout the year but is most constant at nesting time. While his mate is sitting, the male has one particular thick tree, not infrequently only twenty or thirty yards from the nest site, in which he sits and "chirups" nearly all day long.

These birds are not in the least sociable, and other than when the young are just from the nest, one sees but a pair here and another some distance off. Even when birds are flocking to a heavily laden fig tree, few of these bulbuls will be noted. The only time I have seen them in numbers together was around a bird-bath in very hot, dry weather. They are extremely fond of bathing and soak themselves repeatedly.

I once had to take care of a bird that had broken a wing. I put the wing in splints and turned her loose in my laboratory. She took readily to fruit

and drank milk from a saucer. She also had a bath of water, and despite her broken wing she was continually in it. Even of an evening, she would have a dip; then she would perch by an electric light bulb, preen and dry off. The fracture set within ten days, and she flew freely about the room. In a very short time she came flying toward me and took food from my fingers. I left the window open and she went in and out during the day, returning to roost in the room for over a week. She eventually found a "pal" and stayed outside. She nested in a tree not far from the laboratory this last season. Such confidence seems unusual, for this bird, as one meets with it in the forest, is very retiring.

There are some twelve pairs of moustached bulbuls in this small area, and most of their nests have been located season by season. Not infrequently, pairs build in much the same place year after year. In a normal year, the undergrowth of the forest is thick. The floor is covered with a close growth of woody-stemmed composites and labiates that grow to about five feet and tend to lean over, forming thick cover which the moustached bulbul prefers as a nest site. It usually selects a horizontal or slightly inclined fork or an angle made by two stems crossing each other. Thin, flexible vine tendrils are attached in a loop to either arm of the fork; bark fiber from composite creepers is used, and then some dead leaves, much decayed and almost skeletonized, are worked in; then more tendrils and fiber are added to the loop, and presently a cup takes shape, slung within the fork. More dead leaves are placed around and on the outside, and the fine bark fiber lining is added. The nest is very similar in construction to that of *Phyllastrephus*; though it is less untidy and thus looks smaller, it has the same general appearance of an accidental collection of debris, caught up in the fork.

The quickest time noted to build a nest was five days (for a second brood), the longest a fortnight (for the initial clutch of the season). The birds are double-brooded during the long season, and if pairs nest during the short rains, which is unusual in this area, only one brood seems to be raised.

Two eggs form the clutch. They are quite different in appearance from those of other forest bulbuls—more like the pale, lightly marked eggs of *Pycnonotus* but more glossy. They are pale pinkish in ground-color, with bold maroon spots, some light-brown marks and underlying streaky marks in lilac-gray. Some eggs have very few sub-marks. The average size is  $25 \times 17$  mm. The hen sits very close throughout the twelve or thirteen days of incubation—so close indeed that one often has to touch her to make her get up. During incubation and when the young are very small, this bird when disturbed behaves at the nest in much the same way as *Phyllastrephus*. She will drop off the side of the nest onto the ground, lie and

flutter for a while, then trail off with drooping wings and outspread tail. I once tried to ascertain how far such a bird would lead me from the nest. When she dropped and started to move, I followed; she took me through the undergrowth for about six feet and out onto a game trail, along which she fluttered for quite twenty paces; then, flying into the fringing trees, she moved from tree to tree, always away from the nest, for another ten yards; then she disappeared. Having lost her, I returned to the nest, and there she was, sitting in it.

At another nest, on the twelfth day of incubation, I went up to see if the eggs were hatched. The female remained sitting until I put my hand forward to lift her, whereupon she dropped and lay on the ground on her back; then, turning over, she ran, wings and tail trailing, for about twenty yards, then stopped. Seeing that I had not followed, she flew back to the nest and settled on the eggs, while I stood on the ladder beside it. The young hatched the following day, for I saw the mother removing the eggshells. That same afternoon, just about 5:30, I heard the male bulbul calling anxiously and I went to the nest tree. The mother was sitting tight, but two puff-back shrikes (*Dryoscopus*) were worrying her, one even flying at her as she sat. I drove the shrikes off, following them up for at least thirty yards and speeding them on their way with a stone or two. Late that evening the hen was sitting. Next morning the nest was empty. The edge was torn and the nest tilted. I feel sure that those shrikes had returned early that morning and taken the chicks.

When first hatched, the young are naked, pinkish-brown above and pink below. The soles of the feet are bright yellow, the gape is yellow, and the mouth is orange. The mother broods them very closely for the first week and thereafter at intervals until they are almost feathered. She is frequently fed by the male. At one nest which held newly hatched chicks, the male was most attentive. When he brought berries the hen swallowed these, but when he brought an insect (moth larva) the hen fed it to the chicks or stood aside and allowed the male to do the feeding. The young were fed entirely on insects during the first four days; after that, I noticed that pulped, regurgitated fruit such as *Cissus*, *Clausena*, *Ficus* and *Allophylus* were given, as well as insects. During the last week in the nest, the young were fed almost entirely on fruit, given whole.

Each time the female came to the nest she chirruped low, until the chicks stretched up with mouths held open. If she happened to be brooding and the male arrived with food, he would announce his return with two or three notes from the trees above the nest; the female would answer and hop onto the side of the nest to let him feed. Occasionally she took the food from him and fed the chicks.

To illustrate the adaptability of these birds, I give the following: After severe drought, the undergrowth of the forest wilts; the woody stems remain, but there is no foliage. It takes some time for the vegetation to recover, and thus leafy shade for otherwise suitable sites is wanting. These conditions obtained in the early part of 1944, when the forest birds began nesting. The moustached bulbuls sought sites under the canopy of the small saplings and in bushy trees; some ventured out of the forest and built under the thick canopy of *Rhus* trees; one bird even elected to nest in a leafy begonia plant in an outdoor orchid house. All these nests, instead of being the usual two or four feet off the ground, were over six feet up; some were even twenty feet. The majority of the pairs failed to bring off their young that season for the shrikes took a heavy toll, and one nearly full-feathered brood was taken by a mongoose.

### KENYA DUSKY FLYCATCHER

*Alseonax minimus interpositus* van Som.

(Included in *A. m. murinus* of Sclater)

"Small, silent, unobtrusive, soberly clad and fearless," about sums up this flycatcher. Avoiding the thornbush country, it lives in the more open forests, in woodlands, along the tree fringing of rivers, and by the margins and clearings of forest up to 8,000 feet. I doubt if many people notice it, and yet it is common enough.

If these birds have a song, I haven't heard it. Beyond a low twitter, I know of no note. They perch on some low twig at a few feet from the ground, and they dart from stance to stance in pursuit of some small insect, frequently invisible to a human; then you hear a sharp snap of the bill. This flight may often take them within a few inches of you, as you sit or walk in the forest.

Perhaps I am fortunate, for in my little forest and on its boundaries there are at least nine pairs. Each has its favorite hunting ground, and when they nest it is invariably somewhere in that area. There is only one pair which diverges from the rest; they frequent a strip of forest that is traversed by a road, and their favorite stance is high up on the electric light cables that run along the forest edge. Their nest, too, is some fifty feet up in a lichen-clad *Schrebera* tree. They are usually in pairs until after a brood is on the wing. Then a family party of four or five may be seen, but the young are readily recognizable by the slight pale spotting above and the mottling below.

The situation of the nest varies, but the material is the same. One pair uses the natural collection of leaf debris caught up in some twiggy branches.



#### KENYA DUSKY FLYCATCHER

Male at lichen nest, which is thickly lined with feathers that cover young

If it has become cobwebby so much the better. A little depression is made in the mass, and bits of bark fiber and lichen are formed into a little cup and bound together with cobweb, the whole blending into the mass. Fine bark fiber is laid around as a first lining, and then feathers are added.

The nest of another pair resembles a chance mass of caught-up debris; the two have nested in the same olive tree for five years, always selecting a semi-pendent spray with a quantity of lichen growing on it. The nest is toward the end of the spray and looks like a small bunch of lichen and cob-

web and a few decayed leaves. Within the cup is a thick lining of feathers, and around and curling over the cup are longish feathers (neck feathers from crowned cranes) so placed that they entirely hide the sitting bird and the eggs or young.

Another pair, which has nested in the same tree year after year, uses a crevice formed behind a strip of peeling bark. There is less camouflage here, and bark fiber with lichen and cobweb are mainly used.

Yet another pair has a liking for natural clumps of "fern-lichen." These growths stand upright on the branches, often thick ones, and the nest is built partly within and against the growth, so that the mass becomes merely increased in size. Some of this lichen is golden or brownish, and the birds select the feathers of Rhode Island fowls for the feathery lining and canopy. They do not need to go far for the feathers, for my fowls and cranes provide them on the spot!

The birds will also build in a thick clump of mistletoe or *Loranthus*, or in the crotch of a lichen-clad fork of a thick branch. Quite recently, a pair was modifying an old nest of a Reichenow's weaver by lining it with feathers and reducing the entrance a little. This was on the Gura River. I have a similar record for a pair on the Ndarugu River. Notwithstanding the situations, the nests are of a distinctive type in construction and materials, except in the case of adoption of an old nest of another species.

Two eggs, often three, are laid. They are pale greenish in ground-color with spots and freckles in umber-brown, and grayish sub-marks. The average size,  $16 \times 12$  mm., is rather large for so small a bird. As the sexes are so alike, I have been unable to prove that the male takes any appreciable part in incubating, but he does occasionally take over and certainly does a great deal of the nest construction. The incubation period is comparatively short, eleven or twelve days, and the bird sits very close.

Most of the nests have been situated fairly high, between twenty and forty feet, and the erection of a hide has not always been possible; so observation on food and periodicity of visits has been done mostly from ground level. One nest gave an opportunity for photography when the young were starting to feather. Although most of the food taken was very small, much of that brought to the chicks was recognizable. Noctuid moths figured largely, and there were also noctuid larvae, mostly taken from tree trunks, lacewing flies, and an occasional syrphid. Many of the moths were taken in flight; some on being disturbed went among leaf debris, but by a short flutter over the spot the insect was made to rise and was snapped up at once.

The average number of visits by both birds per hour during five sessions of five hours each was fifteen, to feed three youngsters. The parents were

very tame and showed not the slightest fear. After each feed the parent would stand on the edge of the nest with its head on one side, and as soon as a chick voided, the excreta was picked up and dropped in flight. At this nest with three chicks, the nestling period was seventeen days; at another nest with two, the young vacated on the fifteenth day.

The fledglings stay with and are attended by their parents for over a month, and though able to fend for themselves they still associate until the parents start another brood. This flycatcher is one of the few species which, since I came to reside here five years ago, has bred regularly each January and February and again in the long season from May to July. The problem of the breeding seasons is not so easy to elucidate. There is no apparent rhythm or periodicity such as we find in Palaearctic birds. We read that such and such a bird breeds in the long rains or the short rains or both; that is, March–July, November–January. But what is one to say of an entry relative to *Alseonax* which reads: Birds seen pairing end of December; commenced to build on February 2; first eggs laid March 9; young vacated in April. Was this a short-rain nester or a long-rain one?

I have paid particular attention to flycatchers and their food in an effort to obtain some data relative to the supposed active part these birds play in the evolution and maintenance of mimetic patterns in Lepidoptera. I have found no evidence at the nests to show that butterflies are given to the young of this species. In one corner of a clearing in my forest a pair of *Alseonax* and two fledged young were to be seen daily over a long period. In five days' watching, from 2:30 to 5:30 P.M., only four butterflies were taken, out of dozens which were about, and all these were *Acraea*, supposedly distasteful! The adults caught the butterflies and ate them; none were given to the young, though other insects were passed on freely.

## WHITE-THROATED SWAMP FLYCATCHER

*Alseonax aquaticus infulatus* Hartl.

On many occasions at Kisumu, as I walked along the inner margin of the papyrus swamp or canoed slowly along its water-side edge, I noted this bird. My first nest was found by seeing a bird go into an old weaver bird's nest in a swamp. It was inaccessible and I had to content myself with watching. The birds perched on the papyrus stems and darted out after passing insects, and they took small green grasshoppers' nymphs from the tops of the lush grass, snapping them up in flight over the grass tops. Judging by the frequency of visits to the weaver bird's nest (that of *Ploceus dimidiatus*), I reckoned the young to be well feathered; and so it proved, for on my next visit, a few days later, two young in speckled plumage were



WHITE-THROATED SWAMP FLYCATCHER

Male on lookout stance

seen in the papyrus. They look very different from the adults, mottled below and spotted with buff above.

It was not very difficult to locate other nests in other parts of the swamp where there were abandoned weaver birds' nests. The flycatchers adapt the old nests to the extent of adding a few feathers as a fresh lining.

The usual clutch of eggs is two, though three are often found. They are bluish to bluish-green in ground-color, freckled with dark-brown mostly toward the larger end, and measure  $16 \times 12$  mm. Incubation is carried out by both sexes, though mostly by the female, over a period of twelve days. The young are flesh-brown, with tufts of longish down on the head and shorter down on the base of the wings, on the back and on the pelvic tract. The gape is yellow, the mouth rather darker yellow. The nestling period is about fifteen days, but I have not been able to check this accurately.

The only area in Kenya where I have met the species is along the Kavirondo shores of Lake Victoria, but in Uganda it is common along the



lake shore and occurs in the Ankole-Kigezi country and around Lake Kyoga. The west Uganda bird is a distinct race, though similar in all its habits.

### UKAMBA GRAY FLYCATCHER

*Bradornis microrhynchus ukamba* van Som.

(*B. g. griseus* of Sclater)

In some areas there will be two species of flycatchers of very similar build and habits, the one large and rather brownish above and isabelline below, the other smaller and grayer, almost whitish below. It is this latter bird about which I now write.

One will see a single bird or perhaps a pair here and there, perched on the outer branch of a small tree. The bird's pose is upright, with the head down between the shoulders. It flicks its wings occasionally and perhaps moves its tail up and down a little. It turns its head from side to side as it scans the ground. It suddenly darts down, picks up an insect, returns to its perch and deals with its capture. If an insect flies past, the bird may dart after it but most of its captures are taken off the ground. As it alights on its twig the wings are flicked once or twice from the shoulder without actually opening the flight feathers; the tail is moved jerkily.

In early March or November, when they have paired up, the male will fly to where the female is perched and offer his capture, which is accepted by her with quivering wings. We may see them carrying nesting material—very fine twiglets or rootlets—to some horizontal branch of an acacia, where long thorns and branchlets form a wide angle with the main stem. They make a little shallow cup of rather loosely interlaced rootlets and line it with finer grass and bark fiber, and then add feathers if available.

Two or three eggs are laid over a space of four or five days, and the hen sits close. The eggs are pale greenish or bluish-green in ground-color, obscurely freckled in light brownish, the spotting often hardly visible. The incubation period is about twelve days.

The youngsters are naked, dark brown above and pinkish on the tummy. The hen broods close for the first few days and she and the young are fed by the male; that is, he brings food, and the hen passes some to the chicks and eats the rest. The male is a good forager and is in constant attendance. Then comes the time when the chicks can be left in the nest and both parents become busy with providing food. The chicks have now begun to quill; the wing quills and those on the crown and on the back show bluish, and in a day or so the tips of the sheaths burst and the feathers expand. The youngsters then take on a grayish plumage spotted with whitish and buff on crown and back, and as the breast feathers come in they are off-



## UKAMBA GRAY FLYCATCHER

Female standing before two young in nest protected by thorns

white with dark mottling and streaking. Thus the first or nestling plumage is strongly spotted, quite different from the adult dress.

I put up a hide at a nest about twelve feet from the ground. The youngsters were about a week old and were just becoming well feathered. The parents took kindly to the hide and made frequent visits. They brought an assortment of insect food: moth larvae and small moths, long-horn and other grasshoppers, a few soft melolonthid beetles, nymphal mantids and an occasional winged ant. Two spells in the hide gave the same diet. The female was at the nest most often, but I noted that she obtained some of her food from the male. Both birds were remarkably silent, both at the nest and away from it.

Of the many nests I have located, most have been between six and fourteen feet from the ground, occasionally as high up as twenty feet, and most frequently in a thorn tree. The young are ready to leave the nest about the

fifteenth day, but they may vacate earlier if disturbed. Once out of the nest and as yet hardly able to fly, they hide up in some leafy thorny tree; then in a day or two they begin to follow their parents around and eventually fend for themselves. I have watched this process. One of the parents has flown down and captured an insect, the chick has followed, and the parent has placed the still struggling insect in front of the youngster. He is made to pick it up and beat it if need be; if he refuses the parent flies off, ignoring the capture on the ground. A wise chick picks it up; otherwise he does without.

These flycatchers are early nesters, for they usually attempt two broods in the long season and one in the short season. Their habitat then is the thornbush and orchard country of the north and central Ukamba country and the Masai Reserve.

### WHITE-EYED SLATY FLYCATCHER

*Dioptrornis fischeri* Reichw.

The various activities of man have been largely responsible for the total or partial disappearance of bird life from certain areas; conversely, man has brought about certain changes which not only facilitate the feeding but increase the food potential of an area. In the case of this white-eyed flycatcher, man has not interfered with its natural habitat to any degree but has unwittingly brought about a concentration of the species in certain districts by increasing the feeding grounds. The population of the species in the Nairobi suburban area has increased enormously.

Its natural habitat is open woodland, fringing forest, dry forest, and forest margins, but since it takes the bulk of its food from off the ground, in the manner of certain shrikes, it requires open areas and short grass where the capture of food is facilitated. One has only to pass through the residential areas, say from Muthaiga to Ngong, to appreciate the numbers of these birds sitting on telephone and electric light wires along the road, for all the world like shrikes!

The foregoing gives some indication as to how they seek their prey; they take up a stance on the top of some bush or low tree or other vantage point and scan the ground below. When it sights an insect the bird flies down, takes the prey in its bill and returns to the original stance or other convenient point. The bird kills its victim by tapping it sharply against a branch. The food consists very largely of grasshoppers, scarabaeid beetles, mantids, and so on. Noctuid moths are often taken off the ground or from low vegetation and from leaf debris. If a moth is seen to take refuge under leaves, the bird flies down to the spot and may flick the leaves or more often



WHITE-EYED SLATY FLYCATCHER

Female at nest built in thick mistletoe

flutter over them, causing the insect to take wing; then it is caught up at once. The stance on the ground is almost thrush-like; well up on the legs, tail slightly up, and wings depressed. The head is held slightly over on one side as the spot is carefully scrutinized for the hidden insect. Though hunting food for the most part in the manner described, these birds are also experts in taking prey on the wing; a passing insect is taken up with ease, and it is not an uncommon sight to see them taking the flying forms of tree ants. They are about at once when the "white ants" are in flight of an evening after rain, and they will remain active until almost dark; indeed, this species is one of the last to retire of an evening.

They are wary, but bold, and are prepared to take risk; they ignore a human and will remain perched when one is close; they will dash at an insect one has put up from under one's feet, but they shy off at once if one

pays them too much attention. At the nest they are fearless, and will even fly at a person examining a nest, or they will come into the nest tree within a yard or so of one, and "swear." The note of anxiety is a single or double "tchuiskere cheewet." They have no song that I know of.

The requisites of a nesting site appear to be a reasonable height and a sufficiency of cover in the immediate surroundings of the nest. The birds show a distinct partiality toward olive trees, *muhugu*, the tops of *Maba*, old *Schrebera* and other plants on which grow clumps of parasitic mistletoe and *Loranthus*. They not infrequently nest in trees which are heavily coated with lichen, utilizing this material in the nest construction, but the usual type of nest is very largely made of moss from trees, with a goodly admixture of coral lichen and spider web. The foundation is thick, varying with the degree of "filling in" of the interspaces between the multiple twigs on which the nest is built. The outside of the structure is irregular and rough, purposely so, for the complete mass looks like a collection of debris caught up in the twigs. The cup within the mass is finely finished off with fine rootlets, little bits of lichen, and a few very fine tendrils, and then it is profusely lined with hairs and feathers.

Both birds take part in the nest construction. Quite a bit of the feather lining, especially that which curves over the top of the cup, is added during the later days of incubation, even after the young have hatched. Inside measurements of the cup: 50 mm. in width and 30 mm. in depth. Most nests kept under observation during construction have taken nearly two weeks to complete; one took more than a month.

These flycatchers exhibit a degree of conservatism, not only in regard to the general nest area, but also in the matter of selecting one particular tree. More than one nest may be in, say, an olive, or a new nest may be built on top of an old one. Less frequently, a nest of the first brood may be reconditioned and used straight off for the second clutch.

In this area, clutches have been, with about equal frequency, two or three eggs; very rarely there are four. The eggs are fairly large, 22 × 15 mm., pale-greenish in ground-color, with umber-brown and finer red-brown spotting and freckling, often showing a zoning or concentration of marks just beyond the greatest diameter or a distinct capping at the large end. Incubation is carried out by both birds, the female doing the major part, over a period of twelve or thirteen days. On many occasions I have noted the male taking food to the sitting hen during the day, but the hen vacates the nest for an appreciable time, up to ten minutes, in the late evening, when I have noted her at water, together with the male.

New-hatched young are dark flesh-brown, with rich yellow mouths and swollen yellow gapes. They are brooded closely for the first day or two and are fed but infrequently, but in a day or two both parents are extremely

active in providing food. There is a full morning session with a slackening off at mid-day, during which time the hen broods for a long spell. Then feeding is renewed and becomes very rapid just before dusk.

Each season I have located several nests in my immediate area, but few have been suitable for observation. Most have been at heights varying from fifty to sixty feet, in single trees, and toward the end of thin, though thick-foliaged branches; many have been in mistletoe. One recent nest was built in a thick clump of mistletoe on a double stemmed *muhugu* tree at thirty feet, and offered possibilities for hide construction. Even while the hide was being built, the parent birds came within a yard of me, scolding vociferously, and the hen not infrequently took food to the chicks in the thick clump. When the hide was ready, the mistletoe on the near side was thinned slightly and the structure was left for a day or two to allow the birds to become accustomed to it. I watched from a ground stance next day, and the birds showed little anxiety.

I spent four full afternoons in the hide. The parents came freely, but approached the nest most often from behind and between the thick nest twigs. Visits between 2 and 3 o'clock were slow; in fact, the hen brooded most of the time, and only vacated when her mate came into the clump with food. Between 3 and 6 o'clock the visits increased. Few moth larvae were brought. Most of the food consisted of nymphal grasshoppers, crickets, mantids, small chafer beetles, a few wireworms obtained from newly dug ground, a very small skink, two small portions of a pink tree-frog, and a small milliped.

My last visit to the hide was when the young were well feathered. There was little change in the diet except that occasionally small berries were brought. I was aware that adults occasionally eat the small fruits of *Erythrococca*, *muhesu* and even *Rhus*, but I did not expect such to be given to the young in the nest, though I have record of berries being given to a fledgling emerald cuckoo by *Dioptornis* foster parents! The young flycatchers brought up pellets by regurgitation and these consisted largely of hard, chitinous material. After each feed, the parents waited at the nest side to remove excreta as voided; none was eaten so far as I observed.

The youngsters from this nest vacated on the sixteenth day. At other nests, the fledglings have sat in the nest clump or in the thick foliage of the nest tree for a day or so before leaving, but these vacated in response to the calls of the parents and fluttered into thick bush well away from the tall nest tree.

The reader may have noted my not infrequent comparison of this bird with a shrike in regard to behavior; such similarity may be purely fortuitous, but let me say that I view the species with grave suspicion as taking

part in the depredations on young birds in this area. I have yet to obtain impeccable proof, but the evidence is strong against them.

Each pair of flycatchers has its own territory during the nesting season, and the male resents trespass by another of his species. During the off-season, however, two families may associate at a common feeding ground—where termites are in flight, or at a particular bathing pool. One may note a dozen birds around a bird-bath, for they are fond of water and frequently take a last dip long after sunset.

Like most young flycatchers, the young of this species differ from the adults in being heavily buff-spotted on the upper side and mottled below; the “eye-ring” barely shows. They remain with their parents for more than a month, unless the adults start another nest.

The main breeding season is between March and July in an average year. A few will nest in the short season from November to January, but of the several pairs hereabouts only two have occasionally nested in the short period. They are usually double-brooded in the long season.

### GOLDEN-BREADED FLYCATCHER

*Chloropeta natalensis massaica* Fisch. and Reichw.

This bird is an ornithological puzzle. It has a broad flycatcher-like bill, strongly developed rictal bristles, and other less obvious points which suggest its affinity to flycatchers; yet it has longer legs, holding feet, slim build, and many general habits and nesting peculiarities which link it with the swamp warblers. It is a betwixt and between.

There are two species in Kenya, both occurring in the Highlands, but one is restricted to the margins of the higher forest, the other to lower altitudes. The latter ranges into Uganda. It is this bird which I shall write about. It lives in the bush country never far away from water, be it swamp, lake, or river; indeed it is often to be seen on the edge of reed beds.

These birds are not very numerous anywhere and are usually seen in pairs or in small family parties when young are on the wing and still with their parents. I have been fortunate, for two pairs have nested within my sanctuary for the past few years, one to the north of the forest along the river land, the other to the south near swampy land. They perch on top of the scrub or reeds and trill out their not unpleasant warbling song, a series of running notes, rather throaty, which I record as “pila pila, wichu wichu” and “chui chui, chuisit.” It is something like the song of *Tchitrea* and unlike most flycatcher songs. The birds perch on exposed stances, not to catch insects, except under certain circumstances, but to sing, for they take most of their insect food, which consists largely of moth larvae, by creeping and hopping among thick herbage.

These birds have another very un-flycatcher-like habit: if one sees a bird perched on top of a bush and goes toward it, it immediately drops down into the vegetation and creeps through it, appearing again some distance off. Most flycatchers would take wing and perch again.

One hears the call more often in the early morning. As the male warbles on his stance, another male in the next "territory" will take up the call, and the two will try to outdo each other. They will maintain a "beat" or "range," with force if necessary. One year, a second pair took up residence along the adjoining stretch of river bed below my property. If one of the males intruded on the other he was driven off, to the accompaniment of much warbling and display and crest-raising.

I have witnessed part of the courting display. The male sits on a prominent twig and warbles loudly. The throat vibrates visibly, the wings are vibrated, and the crest rises and falls. Then he throws himself into the air, ascends six to ten feet, and drops down in a series of jerky glides to where the hen is sitting. She flies off and zigzags between the bushes, the male after her. He stops his pursuit, perches again, and postures with raised and outspread tail. Then he repeats his flight and alights near the hen, trilling softly.

As this is a bird of bush and scrub, its nest is usually in a low bush, even a clump of reeds or sedge-like *Carex*. The site and nest are unlike those of most flycatchers. The site may be an upright triple fork, or a simple fork, two upright stems growing close and almost parallel to each other, or two or three reed stems crossing each other, perhaps just a foot or two above water. The nests are deep "cups" made of broad grass blades and rootlets and grass fiber. The grass blades are wound around the supports, so that the nest is slung and possibly rests within the crotch of a fork. If the nest is in a fork, the foundation material is carried well down into the cleft, but even so the wall material is worked around the uprights. Fine grass fiber is used as a lining material. One rather remarkable nest was lined inside, around the rim, and around the supports with "beard" from maize cobs! The average inside diameter is 60 mm. and the depth about 50 mm. In general appearance it is reminiscent of a sedge warbler's nest. Most nests are but a foot or two above the ground.

The eggs are rather curious round ovals with a smooth mat surface and are pale creamy pink in ground-color with sparse red-brown spots and streaks, mostly toward the slightly bigger end. They measure  $16 \times 12.8$  mm. Two are a frequent clutch, often three; four are unusual. I have twice found nests with only one hard set egg but I suspect the others had been stolen. In 1944, two nests held two and three apiece, yet when the young should have hatched and the nests were inspected there were one and two





GOLDEN-BREASTED FLYCATCHER

Female at nest in low bush

young only. The incubation period recorded at several nests is twelve days. The hen does most of the sitting, but I have seen a male taking over for a short spell, and he certainly does some of the brooding when the chicks are very small. The hen sits close and shows great anxiety when put off. She will disappear into the bush, then, perching on top of a branch near by, will utter her anxiety call. The male will soon appear and by his antics and calling and short flights away from the nest will try to distract one's attention from it. If one moves from the nest, the hen will come creeping back through the herbage and will soon be on the nest.

The young are dark brownish in color, slightly yellowish on the tummy; the gape is yellow, the mouth deeper yellow. The parents are very attentive and fearless at the nest. Most of the food consists of small lepidopterous larvae, very small larval mantids and locustids, and very occasionally a moth. Small winged termites may be fed if these appear just before dusk, after a shower of rain. I have never experienced any difficulty in close

watching from a hide, and one cannot but note the strong warbler-like deportment and behavior of the birds. Their whole attitude when perched on twigs on or near the nest is that of a warbler more than a flycatcher.

Between periods of feeding the young, the male will often work his way up to the topmost twig of a bush and warble two or three bars of his song, then resume hunting. Of the two, the female seems to do most of the feeding. At one nest, her visits were once every ten minutes. The young feather fast after the first few days and are ready to vacate by the fourteenth day; I have one record of a full sixteen days in the nest. They are duller in color than the adults, less dark on the head, and have a rusty-yellow wash on the flanks. They stay with their parents for almost a month unless a second nest is started, for the birds are double-brooded during the long season. I have no records of any end of the year nesting in this area.

The young suffer very heavily from ground vermin such as mongooses, and shrikes take toll of eggs and new-hatched young. It is seldom that a full brood reaches maturity.

### KENYA PUFF-BACKED FLYCATCHER

▪ *Batis molitor puella* Reichw.

I wonder if you have ever sat below those great flat-topped acacia trees—fever trees, they are sometimes called—which grow along and are so characteristic of Kenya rivers and dry watercourses in the low country. If so, you must surely have heard a curious clipping of wings and sharp snapping of bill coming from the canopy above you, and a little piping call, “hii her,” so oft-repeated as to be monotonous. The maker of those sounds is a small bird with rather rounded form, black and white, yet hard to see against the network of fine foliage and twigs, until he moves. There are probably two, for they go in pairs and are seldom far apart.

These flycatchers flit about under the canopy catching the small insects. They dart upward, hover with quivering wings, and pick off an insect from below a leaf or branch. One hears the snap of the bill as they catch their prey; then, if they fly a little distance, one hears the clipping of their wings. The male may call “hee-herhoo” several times. From Uganda south to about the Naivasha area, the call has this triple note; from Nairobi southward, the call is two notes only.

When the nesting season approaches the birds are most often heard. They start from just after dawn and continue intermittently to nearly noon; then they start again about four and continue to nearly dusk. It is during the posturing and display of courtship that the puff from which the bird derives its name becomes evident. The puff is produced by the raising

and spreading out of the long rump feathers, which are dark gray at the base and broadly white-tipped. The male sits on an exposed stance and calls; he flicks his tail up and down, then, bending forward, throws the puff out like a soft powder-puff. He flies from branch to branch, clicking his wings and calling. The female sits and watches his movements and when he comes near she snaps her bill rapidly. The male alights on a branch above and in front of her and stands upright, quivering his wings. The note changes to a very curious "querk querk querk," which, heard at a distance, is like the quack of a mallard. He throws his puff out again, and with it still expanded he flutters in front of and around the hen. As he flutters around, she turns on her perch and clicks her bill. He flies away to another tree and calls "hii-her hii-her" several times; then back he comes with loudly clipping wings. The hen then submits to the male and coition takes place, after which both fly off with calls and clipping wings.

In a day or two they start looking for a likely nest site. They appear to require branches thickly covered with lichen. I have never noted a species so fussy about the site. They fly to a lichen-covered fork. The male gets into the crotch and turns around and twists his head about, scanning the surroundings. He flies out, and the female takes his place. They decide it won't do, and off they go to another tree—this time a slanting, lichen-covered branch with a small, upright twig. This is thoroughly inspected, and they take the "feel" of it. After much calling, they go to a near-by tree where there are several clumps of leaf debris and spider web. They collect some of the web and come back to the branch; the web is laid on and fixed; the hen goes off for more web while the male collects some lichen. Although the tree of the approved site is heavily laden with lichen, they go to one some distance off. Then the two birds work for a while, the hen doing the binding of the lichen chips with the cobweb. The male looks on. They may make six or more visits; then they knock off. Having watched them thus far, one naturally presumes that they have found a suitable site. But not a bit of it! Next day one may see them gathering lichen and cobweb, but taking them to another tree in quite a different spot. I have seen as many as four sites tried out, then abandoned. Having found one suitable in all respects, they set to and work with great diligence, gradually building up a neat, compact, lichen-cobweb cup nest which blends in so completely with the surroundings as to be hardly discernible. Sometimes a rather thick, horizontal branch is selected, dead and lichen-clad and free from surrounding foliage, but sheltered by the canopy above. Such a nest is even more difficult to detect.

The cup is deep for its size, so that when the little hen is sitting, her back is lower than the rim, and one sees only her bill and tail pointing upward. From above, her mottled gray and black plumage, sometimes with the puff

spread, but lying down, blends into the tone of the nest. The whole structure is a wonderful example of camouflage architecture. It is completed, about the end of March, by having a layer of fine bark fiber laid within as a lining. The nest takes about ten days or a fortnight to build.

These little birds, together with many others of like size, especially zosterops, are remarkably fearless of man. They sit on a dead twig a foot or two away; they dart past or in front of one; they hunt the foliage above one's head; but one must not make any sudden movement or else they disappear. At the nest they are equally tame. I have frequently touched a brooding hen or even eased her up to view the state of eggs or young.

On an average, the nests are about ten to twelve feet up, depending largely, of course, on the general environment. This last season, one of my pairs nested on a branch quite sixty feet up in a great *Ekebergia* tree; on the other hand, I located a nest in thornbush country at four feet.

Two eggs usually form a clutch, but occasionally three are laid. They are grayish-green in ground-color, with rather large spots and freckling in umber-brown and with sub-marks of grayish-ochre. They are large for such a small bird, averaging  $18 \times 12$  mm. Incubation is carried out by both parents, the male acting as temporary relief, morning and late afternoon. It lasts at least eleven days.

I once found a delightful nest quite low in a silver croton. The tree was, as usual, lichen-clad, and in addition there was an orchid growing just by the nest. I watched the nest being built, then with eggs, and I feared for its safety. It was in such an open area—a rocky open space in a more or less dry watercourse. At last the chicks hatched, and though I could stand within two feet of the nest without causing the mother to leave, and could even touch her gently, I decided to work from a hide.

As I erected the hide the mother bird sat, and she continued to do so after I had settled in. The male came with food and wanted to feed the young. The hen tried to take the food, but he stood a few inches off the nest and held the insects. At last the hen got up and stood aside, allowing the chicks to be fed; then both flew off.

I watched them hunting among the foliage of near-by trees; sometimes they fluttered in front of a leafy spray and took a larva or a moth, or they darted at a passing insect. The female was the first to return, with a small noctuid larva. She fed the chicks, then perched on one of the prongs of the fork. The male announced his return by a low "hee-her," and with clipping wings, he alighted by the nest. He brought a small moth; before offering it to the chicks he rubbed it against the branch, removing most of its scales.

Both birds went off together. They came and went with great regularity, sometimes singly, sometimes together. Their joint visits gave an average of



**KENYA PUFF-BACKED FLYCATCHER**

Male, at nest, has just fed young; female looking on

once in every ten minutes. The female was silent, but the male nearly always called before he flew to the nest. Most of the food was small caterpillars.

My next visit was five days later. The male soon announced his return. He quickly disposed of his insects, and as he flew off the female arrived. Moths, larvae, spiders, and once a syrphid fly, were brought in rapid succession.

One could not have wished for better "actors" than these little flycatchers; they came and went often and posed well, showing not the slightest fear. A very noticeable feature about them was the pale yellow eyes with a slight greenish tinge, almost a lemon yellow, which contrasted strongly with the blue-black feathering around the eyes. The chicks were seldom brooded at this stage; the longest period was during a short shower of rain, when they were covered more for protection than warmth.

I was interested to see that the greater proportion of the food brought to the young consisted of larvae—food which was taken from stationary points—whereas, if one watched the adults hunting, much of the prey seemed to be taken in flight.

The youngsters grew apace and in a short time they were well feathered on body and wings; the tail was still very short. They were mottled grayish on the crown and back, with buffy tips to the feathers and buffy edges to the wing edges, and were washed with buff below. There was a slight rusty throat patch and an indistinct breast band; thus they somewhat resembled the female in this respect.

They were still in the nest on the morning of the fourteenth day, but had left it on the sixteenth. They were still with their parents a fortnight later.

Though more often met with in acacia areas, as indicated in the beginning of this account, one not infrequently sees these flycatchers in the more open type of woodland or savannah forest. As I write, a pair are flitting in the trees by my laboratory windows, collecting cobweb for a nest under way in a tall *Olinea* tree about fifty yards off.

## HIGHLAND WATTLE-EYED FLYCATCHER

*Platysteira peltata jacksoni* Sharpe

When I first acquired my small holding at Ngong, many years ago, I used to spend a day or so at week-ends wandering through the forest or sitting quietly in some secluded spot to watch and take notes of the birds around me. I frequently encountered these small black and white flycatchers, whose most striking feature is a large scarlet wattle above the upper eyelid. Both sexes were always together. They belong to the puff-

backed group, so-called because the rump feathers are long and fluffy and can be expanded into a puff over the back when the bird is excited, as at mating time.

We located the first nest in 1937—a lovely little cup nest built of bark and grass fiber, cobweb and lichen in the crotch of a fork on a pendent branch. It was only five feet off the ground and contained two eggs, greenish-white in ground-color and covered with spots and marks in browns and gray-brown. I had a hide erected, but the eggs disappeared.

We hunted for the nests in succeeding years without result, but we frequently saw young of the year in the forest. I located another nest in May, 1941. It was being built in a crotch where an upright grew from a pendent, thin branch. It was at least ten feet up in a little clear space below thick-foliaged trees. I watched the birds adding to the nest daily and it was nearly completed when during a storm a dead branch fell from above and knocked it down! I located another nest but only after the chicks had vacated and were being fed by their parents. It was in deep shade in a thick part of the forest.

Up to 1946 this bird remained one of the very few I had not photographed in my forest. I watched a pair which frequented the forest by my house. They were always about, and one day I saw them taking part in the chivvyng of a tree-snake which was gliding through the trees just under the canopy. They were in the forefront of the attack. Their notes are very distinctive—sharp, staccato, “chit chit chit,” like two bits of metal tapped together, often with two additional notes run together at the end. They also make a clipping noise with the wings as they fly. In early December, I heard the male calling and saw and heard the “frip frip,” as he flew about an area of forest where the undergrowth had been cleared. His mate was there also, and I looked in every likely spot for the nest.

The December rains were abnormally long and heavy. Many birds were nesting and I was certain these flycatchers were, too, but I never saw them with building material. Finally my youngest son discovered the nest in a crotch where a horizontal twig grew out from a pendent, thin branch. The nest was eight feet up and such as I have described but with rather more lichen and with beard-lichen and bark fiber as lining. It held just one youngster, dark brown with a yellow gape, and quite naked. The parents came about while we examined the nest, the hen within a yard of us. The tree was a drooping *Teclea*, whose pendent branches came within three feet of the ground, and the nest was on a branchlet inside this canopy.

The next day I spent two hours at the site. The female came with fair regularity, bringing small green larvae which she picked from foliage and twigs within a few yards of the nest. The male bird was nearly always somewhere in the background, but only once came to the nest, just for a



#### HIGHLAND WATTLE-EYED FLYCATCHER

Female has just fed the chick and is waiting for it to void the fecal sac

moment. However, he collected food assiduously, and on his arrival at the nest tree, the hen flew toward him and with quivering wings received the food. Often she brought it to the youngster, but frequently she swallowed it herself. Most of this food was noctuid moths, and such were not given to the youngster until three days later, when it was more fully grown.

The chick grew rapidly and on the fourth day of observation was well feathered on the head and back. It was then that I saw that my suspicion regarding the lone nestling was not unfounded, for the plumage being gradually assumed was the olive green of a pigmy honeyguide (*Prodotiscus insignis*). The foster parents behaved as on the previous occasion. The female attended at the nest, bringing all the food she captured, including moths. Only twice did she bring food which the male had taken. Perhaps



this was only fair, for the little female was kept very busy seeking food for the youngster and seldom had time to seek food for herself; her wants were thus catered for by her mate. I often thought that the male was coming to the nest, but he always perched on a horizontal about a yard away, and the female came and took the food from him.

The youngster was now receiving quite large moth larvae, imago moths, and dozens of small Diptera. One heard the quick snap of the bird's bill as an insect was taken in flight, then the clipping of wings as the bird flew to other hunting grounds. I always knew when the male was approaching by this wing noise. He hunted for food well in the thick forest and had to fly to the little open space under the nest tree to hand over his captures.

Just for half an hour, at about 1:30 P.M., a strong ray of sunlight struck the little nest and the youngster moved restlessly in its glare and heat. When the mother noticed this she brooded over or sheltered the chick from the strong rays. This period, however, coincided with a definite lull in the periodicity of feeding; from about six visits per half hour the number of feeds dropped to three in the hour.

I had completed four spells of watching. But next morning only part of the nest was in position, and we found the rest of the little cup on the ground. No chick could be found. We at once went toward a zosterops nest a few feet away, that should have held two well-feathered chicks due to leave three days later; this nest was also empty. Some creature had robbed both nests.

## KENYA PARADISE FLYCATCHER

*Tchitrea viridis ferreti* Guer.

Those who live in the cool Kenya Highlands know the male of this flycatcher as bright rufous chestnut on back wings and tail, with a variable amount of white in these appendages, and steel-blue-black on head and breast, shading to dark blue-gray below and buffy on the vent. There is a large, pale blue wattle above and below the eye, and the bill is blue. The males seen at the coast and in the less wooded areas of the Highlands toward Mount Kenya and northward, are often white on the back, wings, and tail, with black flight feathers. The females hardly differ in their several areas. It is generally accepted that these are all the same species—that the white plumage is merely a color phase which is assumed at an early period and is not associated with old age, and that the variation is commoner in one district compared with another. But we don't know why!

The species is associated with savannah woodland, park-like country, light forest and plantations. It is not found in dry thornbush or in heavy

evergreen forest but is often seen in the fringing trees along rivers and lakes. In the Nairobi area most old, established gardens with plenty of tree growth have a pair in residence.

It is a restless, buoyant, excitable, vivacious creature, with seemingly inexhaustible energy. Naturally, it is the male, with his long streamer tail and well-developed crest, that draws attention, but the more modestly adorned female has all the habits of her mate. There is no sitting quietly on some stance and flying out on occasion as an insect passes, or waiting patiently for something to move on the ground; these birds go in search of their food. They hop and flit about the foliage of trees. They flutter in front of a bush, in front of a tree trunk, along the front and under the eaves of buildings, where they take a moth or other insects or a spider.

They may take part in a "drive," when a loose company of various birds combine to work through the canopy of the forest trees. The flycatchers work below the canopy and take any insects which are disturbed from above and come through below. They hunt through the middle parts and also the undergrowth of forest, flying and fluttering in constant motion. They perch but a moment, then dash off; their eyesight is keen, their actions quick. In my little patch of forest the birds have established an association with the bushbuck and the pigmy antelopes that wander about. They follow the bucks as they move and browse, and as a moth is disturbed from the undergrowth or forest debris the flycatchers have it in a moment. They follow the fowls, who are on free range in the woodland. As these birds scrape among the debris a moth may be put up. Often the flycatchers watch, and as soon as a small colony of "white ants" is exposed, they dash down and seize a few right in front of the scratching fowl.

These flycatchers are fond of water and bathing, but not in the usual manner. They perch on a twig above the water; then, flying down to its surface, they flutter over it; then they perch on the twig to preen; then they take another dive, or several, until they are well wetted. The action is accompanied by excitable calling.

They are not silent as they hunt, for the male utters his sharp, not unmusical notes as he flies or perches for a second: "ti-twit tee-twit" or "twee-tweet," answered by the female in a higher pitch. Restless even when perched, he moves his body from side to side, raises his crest, fans and shakes his tail, and vibrates his wings, calling the while: "tii tweet tit-ti tii tweet." The courting display is an exaggeration of all the body, wing, and tail movements, combined with loud calling and much flitting from tree to tree. The female note is rendered as "chui . . . tiu-ti-chuit."

The choosing of a nest site is an occasion for much flitting about and conversation, particularly by the male. As he flies, with somewhat jerky, undulating motion, his long, central tail feathers wave up and down; as he

perches, they curve gracefully in an arc. The male has a great say in the choosing of a site. He will alight at a suitable spot, squat down, turn around once or twice, flutter around it, and hop about the twig, twittering loudly and inviting his mate to try the "feel" of it. She will perch on the fork and test its possibilities. The site is usually at, or toward the end of, a thin semi-drooping branchlet which toward its extremity has one or more upright shoots or twigs forming an angle with the stem. Surrounding leafy coverage is an essential, unless the site is well shaded from above; if there is ample top cover, the site twig may be completely bare. The end branchlets of fig trees and those of *muhugu* are favorites, and very often, if a nest has proved well situated, it may be reconditioned even three times to receive successive broods.

After a site with a suitable angle or crotch has been selected, cobwebs are laid on in the angle; then follows a mixture of bits of lichen, moss, some bark fiber, and more cobwebs, until a well-knit foundation has been laid. The walls of the "cup" are then built up by the lavish use of cobwebs, lichen, and fiber, the supporting upright of the fork being well bound within the walls. There are many species of creepers, which, when dead and dry, supply bark fiber which is much favored by birds. The bark is nicked and an end loosened off; this end is held in the bill and the bird flies off, stripping a thin strand in so doing. When the frame of the cup has been built up, it is ornamented on the outside with more cobweb and lichen and the inside is lined with fine bark fiber. The whole nest is firmly held within the fork and so finished off as to be remarkably inconspicuous to the casual observer, but it is nothing like so well camouflaged as a nest of the puff-backed flycatcher.

Both birds take part in the building, the male's effort almost equalling the hen's; during incubation, also, he is always ready to do his share. When the female is sitting she does not appear out of proportion to the little nest, but the long, streaming tail of the male makes the nest seem absurdly small. Two or three eggs are a normal clutch, four the exception. The eggs are rather rounded, though abruptly pointed at one end. Some are whitish in ground-color but most are pink and are ornamented with red-brown and umber-brown dots, spots, and occasionally blotches that are rather sparsely distributed, with few if any at the pointed end. Sometimes the spotting is concentrated in a band toward the larger end. There are a few sub-marks in gray or lilac. The size is 21-22 × 13.5-14 mm. Incubation lasts eleven or twelve days and, as stated above, is carried out by both sexes. The eggs are hardly ever left exposed.

Although the birds are noisy during nest building, calling is reduced during the period of incubation and the first few days of hatching. Nevertheless, it is often sufficient to give one the clue to the position of the nest.



KENYA PARADISE FLYCATCHER

Male at nest

These birds keep to defined territories. The male is at all times pugnacious toward others of his own species, and he will become aggressive to most birds if they approach too near the nest. The birds are close sitters when with eggs and are equally attentive when the young have emerged. The hen broods for the first two or three days and scarcely leaves the nest. She is fed by her mate.

The female hunts for food somewhere in close proximity to the nest site, but the male goes farther afield. He announces his return when still some way off and then again when actually at the nest side. When at the nest he postures; he spreads and raises his tail, quivers his drooped wings, and splays his crest. The pale blue wattles around the eyes are especially effective when one sees him at less than four feet off. The long and strong rectal bristles show up plainly.

Food is supplied with regularity up to noon and from three to sunset. Moths form the bulk of the diet, but moth larvae, nymphal mantids, and long-horn grasshoppers are also supplied. When the young are well feathered they are given exceptionally large moths such as humming-bird hawk moths, which are diurnal, and *Sphingomorpha*, a large noctuid. I have watched at dozens of nests from very close up and apart from an occasional "painted lady" (*Pyrameis cardui*) no butterflies have been fed to the young. Even the adults take only an occasional pierine or lycaenid, out of the hundreds which may be flying about in the surrounding bush. In this area *Tchitrea* is not a butterfly hunter.

The young feather up very quickly and soon fill the entire nest, which, after all, is only about 48 mm. across and 40 mm. deep. When three are present, the nest is overstrained and becomes somewhat flattened out. They leave the nest from fourteen to sixteen days from hatching, so far as I have checked in this region, but shorter periods are on record in the coast area. They remain with their parents even when well able to fend for themselves. They are female-like in general appearance but rather duller, especially about the head, which has little gloss.

Two broods may be raised in the long season, from March to July, in a good year. When the season is over, the male sheds his long tail feathers but they are fully renewed by the time the second nesting period comes on (November-January), when a single brood is reared. It often happens, however, in this district, that no nesting is attempted during the latter part of the year.

Predators are less numerous for this bird, because of the nest position. Mammals cannot reach the eggs or young, but the nests are not immune from the attention of shrikes, more particularly the puff-backed and pied shrike.

The species is not infrequently victimized by both the yellow-breasted and the white-breasted emerald cuckoo. It is absurd to see a hulking young cuckoo in the small nest of this flycatcher; when feathering up, the cuckoo more than fills it, and the whole structure becomes flattened out to accommodate his bulk. It is equally amusing to see the little hen flycatcher trying to brood the foster child at night; she just sits on top of his back and spreads her wings over him to cover his bulk.

## ELGON OLIVE THRUSH or ORANGE-BILLED THRUSH

*Turdus olivaceus elgonensis* Sharpe

There are several racial forms of this species in eastern Africa. Most of the races are associated with forest, but the central Kenya form, to which these notes refer (*T. o. elgonensis*), has a wider choice of environment. Though essentially a bird of forest, woodland, thick copse, and the bamboo zones of high ground, it now frequents gardens where sufficient coverage exists; it is often seen around native *bomas* where cattle are kept, especially those surrounded by tall bush. It can be found in most of the wooded ravines on the hillsides. With the destruction of forest, extensive in some places, the bird has adapted itself to changed conditions. It is really a bird of the Highlands and seldom goes below 4,500 feet. It is never very plentiful anywhere; a pair here, another there, for in suitable environment the birds are sedentary. One may note several pairs in an area of forest, but each has its territory, though the area may be ill defined. However, two or more pairs may associate temporarily; for example, when safari ants are "moving house" these thrushes take part in the mixed bird parties that come for the ant pupae; also, when a nesting season is over, a family party may be noted and the young birds recognized by their mottled breasts and duller plumage. A favored fruit tree also may attract more than one pair, but the birds are pugnacious and claimants drive intruders off.

Under natural conditions, the Elgon thrush shows a preference for high altitudes, where the vegetation is evergreen and the soil damp, for it seeks most of its food on the ground from among the leaf debris: grubs, caterpillars, and soft-bodied insects. The Kikuyu country and the Mau seem to be the stronghold of the species, but, as I have remarked, many a suburban garden around Nairobi has its pair. My own little property at Ngong supports three pairs. For a short time after the breeding season the young may be present but they soon disappear. Perhaps they are driven off by the parents, for the number of pairs does not increase. There is a difference in the nesting inclinations of these three pairs: two seek rather thick, medium-sized trees with thick coverage in which to build; the third invariably selects a tall tree by the forest edge, building the nest in the upright fork of the main trunk at about sixty feet above ground.

The nest is rather an untidy structure on the outside. The majority of nests are built on a somewhat horizontal fork toward the end of a branch. Leaf debris, rootlets, and tendrils mixed with moss form the body of the nest; then sprays of fine leaflets such as *Sesbania* or *Mimosa* are laid in. The final lining is made of fine rootlets. In the Kikuyu country, nests are easy to locate, for pairs will build in the tall *Solanum* hedges surrounding hutments or *bomas* and the nests are often visible from a distance. But in forest areas

you have to watch the birds most carefully before you can find their nest site. There is usually a sure indication of the general locus of the nest in the "song perch" of the male. Locate this stance and keep a watch on the bird at song time. For such a large bird the song is really feeble and lacks variation. When the nest is under construction or when it has been completed and the hen is sitting, the male takes up his position on some tall, bare-topped tree each morning and evening and calls: "Siuu-joi, si-yu-joi chiu chu," repeated several times; then "chew chee chip chip chip." Having sung for a while, he will fly downward toward the nest site. At almost any time of the day he can be induced to fly to his "song stance" if you approach the nest area. Here he calls a warning—not a special call note, but just the first part of the song; its intonation conveys anxiety, yet at the same time he draws attention to himself. From the first stance he flies to another, continuing his call; then he drops to cover well away from the nest site.

Although I have found many nests, I was able to follow only one from its commencement to the time the young left it. For more than a week I noticed that a pair frequented a particular group of *Rhus* trees. I saw them pair up, but no nest had been commenced. A few days later, on the fourth of the month, I saw one of the birds carrying damp, rotting leaves. She obtained these from the bank of the stream near by and took them to the clump of *Rhus*. The exact position was located. Building was not continuous. There were long spells in the middle of the morning and at noon, when operations ceased; activity was resumed between 4 and 6 P.M. The female did most of the work, and the male often sat on his song tree and called. On the fourteenth of the month the nest was complete and fully lined with fine reddish rootlets taken from a particular species of grass. The first egg was laid on the fifteenth, and the hen sat close from the beginning. The next day a second egg was laid. The eggs were bluish to light greenish in ground-color, freckled with shades of yellowish-brown in a rather streaky way—a not unusual type. Sometimes eggs of this thrush are rather boldly marked with red-brown irregular spots and streaks. Some are elongate and others more rounded, but the average size is 26–28 × 20–21 mm.

There was a convenient high bank at the side of the trees and from this I could watch the hen. She sat close and deep in the nest. Her rufous flank feathers were fluffed out well over her wings and matched the red rootlet lining to a marked degree. I could walk under the nest tree without disturbing the sitting bird, but as I strolled to the spot the male invariably flew up to the top of his *muhugu* tree and called; when I passed on he dropped to the bush by the stream. From a convenient point I often saw him taking food to his sitting mate. During a full day's observation I noted that the hen left the nest for a short time at about 8 A.M. and not again

until 6 P.M., and on this day, at any rate, the male did not take over, nor indeed did I ever see him on the nest at any time.

The first egg was chipping on the twenty-ninth and by noon of the next day both chicks were out and the eggshell was gone. The female now brooded closely and seemed accustomed to my visits, but the male showed anxiety. He remained in the vicinity of the *Rhus* trees and frequently uttered a note of anxiety: "pweep pweep" or "twoip."

The third day after the hatching of the young I put up my hide at a little distance, bringing it closer each day. When I entered the hide, about 8 A.M., it was still cold and I found the hen sitting close. Food was brought to her by her mate and she passed it on to the chicks by just raising herself sufficiently to allow the youngsters to get their mouths open. Just before noon, the position was reversed; the hen vacated and the male took over, but when she returned with food she didn't hand it to her mate; he hopped off the nest to a branch close by and the mother fed the youngsters. When he came with food he brought it to the back of the nest and handed it over from a branch just below nest level; when he brooded and the female came, he left before she was actually at the nest!

This was the routine for the first three days. Thereafter, the hen brooded of a morning until the sun was warm and then both birds hunted food. Their favorite hunting ground was under the strip of thick *Rhus* and *Euclea* by the stream. Here the earth was damp and covered by a thick carpet of leaf mold. The birds would hop about, flicking the leaves over, then stand still with head to one side, intently looking; another flick, and as soon as a larva moved it was seized. If the insect was large it was battered and brought to the nest at once; if small it was retained until more prey was secured. This made identification of the food very difficult, but I noted noctuid moths and larvae, small long-horn grasshoppers, mantids, beetle larvae, and female glow-worms. The youngsters were voracious feeders from the first, and at a week old would take a bunch of insects at one mouthful.

The newly hatched chicks were orange-flesh-brown with head and dorsal tufts of short, grayish-yellow, rusty-tipped down. They commenced to quill on the fourth day and each day showed a remarkable increase in size and growth of feathering. By the fourteenth day they had assumed the spotted plumage of the upper side. The breast and flank feathering was slower in growth. The midline down the breast and belly was still unprotected when the youngsters were ready to leave the nest on the sixteenth day. Their tails were very short but their legs very long. When they did leave the nest they could hardly fly at all and they progressed along the ground and among bush by hopping.





ELGON OLIVE THRUSH or ORANGE-BILLED THRUSH

Female on nest receiving food from male for chicks

I had watched the growth of the chicks closely. For a day or two they had been restless, standing up in the nest, preening, and exercising their little wings; one had even ventured to perch on the side of the nest. I was in the hide on the morning of the sixteenth day. The parents brought food as usual for the first hour or so; then, later, when they came they stopped short of the nest, perching on twigs within the *Rhus* tree. From here they called to the youngsters. The chicks called for food and grew very restless; then one of them hopped to the nest edge. The mother bird came closer but tantalizingly withheld the food; the youngster ventured onto a twig just beyond the nest—another unsteady hop and it was by its mother's side. It took the food and also that brought by the father; the youngster in the nest had none.

The venturesome chick clung to its branch and when the parents returned went even farther to meet them. Again the one in the nest was neglected. Two more visits and the same result! It was too bad. I took the nest chick out and placed it on a branch by its brother. Along came the parents and induced the chicks to go even farther down the *Rhus* tree; one managed it, but the second toppled to the ground. At once the mother flew down and encouraged it to hop toward a near-by bush, into which it scrambled. After a lot of fuss both youngsters were sheltered in the shrub. The male flew toward the stream, but the mother searched for food close around.

The parents were very excitable—more so than when the chicks were in the nest—and if I moved they sounded low warnings, "chuck chuck," and when I went toward the bush the notes changed to "pwerp pwerp" by the male and "tweep tweep" by the hen.

It has always been a wonder to me why young Turdidae and the young of other groups should leave the nest when still almost helpless and unable to fly. It is true that they keep under cover and that their mottled plumage conceals them, but if we humans can spot them why not a predator?

Youngsters take about a month to equal their parents in size and they remain with them for about a month or longer, if the parents do not start another nest. During the long nesting season, March to July, two broods may be reared; some pairs nest also from October to December, if conditions are suitable.

### RIFT VALLEY PIED CHAT

*Oenanthe schalowi* Fisch. and Reichw.

In the Rift Valley from just north of Nakuru south toward Lake Magadi and Longido, one finds a chat or wheatear which seems to occur nowhere



## RIFT VALLEY PIED CHAT

Female at nest hole in bank

else and is closely associated with the stony scarps and kopjes of this narrow "depressed" belt.

One sees the birds perched on top of a rock or boulder in an upright pose, with tail held horizontally and wings "depressed." They are alert and quick, but confiding up to a point.

Though many may be noted along a boulder-strewn bluff or hillside, each pair has a territory or range to which it keeps. This territory is really a foraging ground loosely held during the off-season but more strongly maintained when nesting is in progress. One can thus usually count on seeing a pair at a given spot throughout the year.

The nest site varies. It may be deep in a rock crevice; in a little recess in a boulder; in a gravelly bank, where tunnelling and excavation are difficult and so the nest chamber is just a short way in; in an earth bank, where the tunnel may run in from six to ten inches before the chamber is found; in a stone wall; on a ledge of rock overhung with vegetation. I once found a rather remarkable nest. It was built in a round hole in a rock face. The opening to the hole was about ten inches—too large to suit the birds—so they had laboriously closed up the entrance with pebbles as large as their

own heads, and bits of wood and roots until the width of the opening had been reduced to two inches. The nest proper is cup-shaped, made of rootlets and grass, and lined with fine root fiber and sometimes hair. The quantity of material used seems to vary according to the type of site; in some deep nests the material is scant, just a few bits of grass but lots of hair felted together; nests in rock holes and crevices are more substantial.

Two or three eggs are laid, pale blue to whitish with fine and sparse brownish marks, or immaculate. Incubation is estimated at thirteen or fourteen days and the nestling period is about two days longer.

The nestling is dark brownish-flesh-colored with grayish tufts of down on the head, the base of the wings, and the pelvic area, and with shorter ones on the back.

### UGANDA BLACK CHAT or ANT CHAT

*Myrmecocichla nigra* Vieill.

The species is very common in Uganda and extends into Kenya, in the Elgon-Nandi-Kavirondo country; farther south of this we have our Kenya bird, a distinct species and a larger one, but with very similar habits.

This brief note on the Uganda species is not only for itself, but to emphasize the blank which must be filled.

There is hardly any part of Uganda where the black chat is missing. The male is the more conspicuous, because he perches on some prominent anthill or boulder and displays. On alighting he dips the body forward and down, droops the wings and raises the tail above the back. The jet black of the general plumage offsets the conspicuous white patch at the base of the wings. His song is a musical warble, and one hears it to perfection of an early morning or late evening, more especially when the breeding season commences, about March. A female, in sober sepia brown with slight dark streaking on the breast, will usually be somewhere near the male because, once mated, a pair keeps together and its range is very restricted. Pairs keep to their own stretch or territory by mutual consent, but there are times, more especially of an evening, when two or more pairs will come together on neutral ground and vie with each other in song and posturing; also, when the young are on the wing one may see a dozen or more birds together.

Termite hills are used for stances and they also provide convenient recesses for nest sites, so one often finds the nest a few inches in or quite deep in a termites' nest. The nest itself is made of grass and rootlets and lined with the soft flowers of grasses in the form of a deep cup. The amount of material used depends on the size of the hole selected. From three to five eggs are laid, white with a slight bluish tinge. Most eggs are immaculate,



UGANDA BLACK CHAT or ANT CHAT

Male (left) and female

but some may have a few dark spots. Size  $24 \times 17$  mm. An old termites' nest is usually the site of the nest in the "wilds," but like our own black chat these birds now take advantage of road banks and borrow pits created by man. They tunnel in the earth to varying depths and at the end of the tunnel a brood chamber is excavated. Excavation is done with the bill, and the earth is pushed out by bill and feet.

I have always found the hen on the nest and doubt if the male takes any share in the incubation. I have no exact incubation data but the duration appears to be about twelve days.

The food fed to the young has been entirely small spiders and insects: small grasshoppers, mantids, moth larvae, and termites.

Young birds are very like the female, but they are more mottled on the under side and on the mantle.

These chats are among the first to awaken and warble just before dawn and among the last to retire for the night. During the off-season one may often see a number of a late evening, even when it has become almost dark, posturing and twittering before they enter the earth tunnels in which they roost in pairs.

## AFRICAN STONE CHAT

*Saxicola torquata axillaris* Shelley

Moorland with herbs, rough veldt and bush, preferably with some surface water near by, is the habitat of our stone chats. They are commoner in the Highlands than elsewhere and in Kenya are seldom seen lower than 4,500 feet. They are in greatest numbers on the moorlands between 6,000 and 10,000 feet.

In the Highlands, be it grass or bush country, these birds are common. They perch conspicuously on the top of a low bush or post from which they dart down to pick up some insect from the ground, returning almost at once to the original perch or one near by. They take little notice of a passing car or other vehicle and but little more of a pedestrian, so long as they are not directly approached. There is usually a pair here, another there, and so on, and it is only after the young are out of the nest that one may see perhaps half a dozen birds in one spot.

Their readiness to perch alongside road or path and their bold upright stance all suggest a tameness which is deceiving. They may dart down for an insect almost at one's feet; yet try to go near them! Just as far as one goes toward them, so far will they move off. They are bold but wary. As they move away they keep up their hunt for insects, seemingly ignoring but fully conscious of the attention being paid to them.

They are no less wary in the breeding season, and they are clever in deceiving one as to the whereabouts of their nest. In this Ngong district, I have found their nests between March and early August, and occasionally from November to January, but in the main they are "long rain" nesters.

The nesting site varies. It is sometimes in a little recess on a road bank; in the face of a borrow pit; in an old ant-heap; under a small bush overgrown with herbs; at the base of a grass tuft on a bank or on the flat; in a heap of decaying brushwood or hay; in a rock crevice. Wherever it may be, it is well concealed from view. Though water may be in the vicinity the nest is usually in a dry spot, but I have sometimes found nests in vlei land almost swamped by storm water.

To locate a nest take up a stance and watch the birds carefully. They adopt all sorts of ruses to mislead one. The male bird perches and displays on some conspicuous bush-top or dry herb. He twitters and calls and moves from perch to perch, dropping to the ground occasionally. The female at first takes up a stance on some dead herb and from it darts down for insects. She may use the same perch time after time; then she moves to another perch and from here also she seeks food. On one of her descents she may remain down quite a while but she appears again. Keep an eye on her just a while longer and note her drop again. Moments may pass and still

she doesn't appear. Now watch the male! He gradually comes nearer the perch last used by the hen; he is ostensibly hunting for food. He stands upright on the last stance and perhaps flicks his tail; then off he goes, quite a distance. Now, approaching the spot where the hen disappeared, one may actually pass over the nest site if the hen sits tight, as she often does. But as one nears the nest the male bird will return and display on some bush beyond the nest. Systematically hunt the tufts of grass, especially those with drooping edges. The nest will be there.

The nest is a deep little cup made of rootlets and fine grass, lined with finer rootlets and perhaps the seedless heads of very fine grass and sometimes a few hairs. Nests in banks often have decayed leaves and moss worked into the body structure. The cup is 65-70 mm. across and 40 mm. deep. The front edge, that is, where the bird will stand to enter or feed the youngsters, is often thickened to form a ledge or ramp.

The clutch size varies; the average is three, but quite often four eggs are laid. They are blue or bluish-green in ground-color, with a varying degree of brown spotting and freckling; sometimes, though rarely, they are immaculate. The incubation period ranges from twelve to fourteen days, a variation in length according to clutch size, virility of embryos, and temperature. The newly hatched young are dark flesh-brown and naked. Growth is very rapid; the wing quills show first, then the dorsal and crown, followed by scapulars and coverts, tail and breast, in rapid succession. The female does most of the incubating and brooding; in fact, on only two occasions have I flushed the male from the nest during the egg stage, but he will often brood after feeding the chicks when they are very small.

I have watched at many nests from a hide. Two nests presented a contrast:

No. 1. The feeding commenced just after dawn and was remarkably regular for the first two hours; then there was a slight slack period when the parents sought food for themselves. After this, feeding was fairly regular but difficult to check because the male's visits were irregular; he might come twice in a very short time then stay away for quite a long period. The female undoubtedly did most of the feeding.

No. 2. Young a week old. In the hide at 7:30 A.M. Young had obviously been fed several times. No periodicity noted in four hours' watching. The male came six times, the female five, but she brooded twice between feeds. The weather was very cold. Even at four feet it was difficult to identify the insects brought; however, I recognized three glow-worms, a very small millipede, three noctuid larvae, and one small "skipper" butterfly. The female's offerings were moth larvae, nymphal forms of long-horn grasshoppers, and a lycaenid (*Lampides boeticus*; a small deformed specimen).



AFRICAN STONE CHAT  
Male carrying winged termites

At another nest, in addition to moth larvae in numbers, the parents brought nymphs of acridids, small weevils, melolonthid beetles, several small moths, mostly noctuids, a lacewing, termites, and a spider. Some of the food was too pulped to be recognizable. After each visit the parents sat on the edge of the nest awaiting the excreta which the youngsters would void. On no occasion did I see either parent swallow it; it was picked up and dropped some distance from the nest.

Only once did I see food refused. The male brought a lygaeid bug. He tried all three young with it, but each refused. He flew off with it but was soon back with the same offering. He tried all the young and met with no response. He then shifted his position on the nest edge and held his head on one side, looking intently at his offspring. Eventually he turned and dropped the insect into the pit below the nest. Why did he bring this insect if it was distasteful? The hen came along with a nymphal locustid and all three youngsters vied to get it. Feeding went on from dawn to dusk but there were lengthy periods when no food was brought—sometimes fifteen minutes or even an hour—but taken all around one must record the par-



ents as very attentive. Not only was this so when youngsters were in the nest but also when they had left it. One noted that the approach to the nest was made known by a sharp single note, "tach." Anxiety was indicated by this same "tach" repeated several times and ending in a sharper "chiit." The female often made a low "churr" note if the male alighted by her side.

When the young first leave the nest they are hardly able to fly and so seek protection among herbage; here the parents attend to them and show great anxiety for their care. In a few days one may see them perched on top of bushes or following their parents around for food. They soon learn to fend for themselves but remain with their parents for some weeks after this, unless the parents decide to start another nest. If conditions are suitable during the long rains and just after, two broods may be raised; some pairs elect to nest again toward the end of the year, from October to December. Of five pairs I keep under observation, three nest twice a year and two only in the long rains.

## UGANDA WHITE-BROWED COSSYPHA

### *Cossypha heuglini heuglini* Hartl.

In my next note I have explained why I use this caption. This *Cossypha* has its main area of distribution in Uganda, but it extends into Kenya west of the Rift Valley and also to the east, just reaching the Nairobi district.

It is very similar to the Ukamba white-browed species, which is often mistaken for it. *Cossypha heuglini* is larger, the tail is almost four inches long, and the central tail feathers are olive-brown with a gray wash. One can identify the birds readily in the hand but under field conditions it is not so easy.

In my small holding at Ngong, both birds occurred in a proportion of one *heuglini* to ten *semirufa* in 1938; two to six in 1940; now *heuglini* has been ousted or has disappeared because of changes which have taken place in the general environment, and *semirufa* alone remains.

As is the case with most birds of heavy bush and dense copse, these cossyphas are more often heard than seen. They are retiring and secretive, very wary, but somewhat bold and inquisitive. If one sits quietly near where the bird is secreted, it will in time venture toward the fringe of the bush or tangle or even hop to the ground to get a better view; move ever so little and the bird slips away at once.

This species is certainly one of the best mimics among African birds. Many a time have I been deceived. But on many occasions the calls are inappropriate to the time of day or the month of the year—the call of a

nightjar at noon; that of the European bee-eater in June; that of the solitary cuckoo at a time when the cuckoos have long since left off calling and are silent or have departed!

The bird is as good a songster as it is a mimic, even better than the Ukamba white-brow. Its notes have purity, quality, cadence, and flexibility. The pre-dawn song is good, but the evening session even better, especially at the commencement of the nesting season and just after a shower of rain. The notes are not continuous but rather in stanzas, and their being interpolated with the calls of other birds adds to the interest.

One evening at about 6:30, as I strolled down to the stream, a *Cossypha* commenced to call. I tried to put his notes into syllables. It is a poor attempt but here it is: "chewi chowi chowi chowi . . . tilito tilito tilito . . . tuo tuo tuo . . . cheer . . . chuo chuo, twee whio twee whio tee whio . . . chuk-werp chukwerp" (long pause); then "chio-o-way chip-o-way, tuu tuu tui tui, . . . pirup piripiripirip . . . chee-wit chee-wit cheewit cheewit, . . . whipuu whipuu oui oui oui ooo ooo oubiloo, twei-u-plii."

Like all cossyphas, this bird takes possession of a territory and holds it against all intruders of its own species, especially in the breeding season. The nest is not difficult to locate. One has only to look for the female, note the part of the domain most frequented, then search the most dense portions of it. The nest will be in a bush heavily overgrown with creepers; toward the top of a bushy-leaved low tree; or in a mass of debris such as is left on some overhanging branch of a tree by a stream in flood. A great deal of decayed leaves and moss is used in the nest construction. The "cup" may be lined with fiber, but frequently only moss is used; it may be as much as 2½ inches deep. If the nest is in debris hardly any portion of it will be above the general level of the rubbish; the birds appear to hollow out the site before constructing the nest, and in such a situation there is little need for a foundation.

Two eggs are usually laid, rarely three. They are olive-brown, brownish-olive or olive with a brown tinge at the larger end, and finely and profusely freckled with a shade slightly browner and darker than the ground-color. They are semi-glossy to smooth, and measure 24 × 18 mm., on an average, a little larger than those of *semirufa*. The hen incubates for twelve or thirteen days, but hatching may be delayed for a day if the weather is cold and wet.

My experience with this bird at close quarters has been limited to two pairs which nested on my holding at Ngong, but I have casually observed many in Uganda and Kavirondo. It may be that my Ngong birds were exceptional, but I found them most amenable to gradual close approach. I adopted the same tactics I had used with *semirufa*; that is, I deliberately



## UGANDA WHITE-BROWED COSSYPHA

Parent at nest containing a young cuckoo

frequented their nest area every day, sitting quietly not far from the nest. When incubation was well advanced we were on very good terms; in fact, the hen refused to budge from her nest. I could touch her tail, stroke her, and even raise her slightly to have a look at the eggs, and later, at the newly hatched chicks. I had put up my ladder hide, but eventually I discarded the canvas walls for there was little need for them.

I had watched the nest a-building; I knew when the first egg was laid, and the second, two days later; then a week later I found there were three eggs. Later, when the young were hatched and I saw the feathering chicks, I noticed one youngster was a cuckoo. It rained almost all that day and the mother brooded; food was brought by her mate, for the chicks and for herself.

It was bright the next day and I was in the hide quite early. The hen was brooding and she remained so until I was in the hide. Presently she got off the nest just as her mate arrived with food. He went to the nest and fed

a chick. It had a large yellow gape—the cuckoo. No other heads were raised with open maws and I wondered. Where were the other nestlings? I slipped out of the hide and found a dead chick in the stream bed just by the water's edge, but there were no signs of the other. There remained only the usurper in the nest.

I climbed back into the hide and waited. The foster parents came with food and showed not the slightest sign that anything untoward had happened. No parents could have been more attentive to their own offspring than these two were to that young cuckoo. It had a seemingly insatiable appetite; it swallowed the food voraciously and still squeaked for more. It grew apace, so that it not only filled the nest but bulged above it until finally the walls were distorted and depressed so that the nest was a mere saucer. It had been made almost entirely of moss. How the hen brooded that youngster by night I don't know!

There was a tragic ending to that youngster. A day or so before I expected it to leave there was a storm and heavy rain with strong gusts of wind; it poured all afternoon and night. I went to the nest early next morning. There was no sign of the parents! The nest was tilted over and empty! There was no trace of the young cuckoo!

A second pair of these birds had a nest two hundred yards downstream. I had coaxed them in just the same manner as I had the first pair. Both birds became habituated to my presence and the hide, but not to the same degree as the first pair. The nest was in a pile of withies lying on top of scrub. Some of the bush had grown through the stems and the "platform" was secure and shaded heavily. These young are very susceptible to strong sun and heat.

All went well; the parents fed the young regularly. One of their favorite hunting grounds was on a mossy bank under trees and carpeted with fallen leaves. The two birds worked in unison; one flicked the leaves and the other seized the prey. The young were given moth larvae, beetle grubs, small spiders, glow-worms, small snails, and once a small milleped. Feeding went on with remarkable regularity up to noon, and during the break the mother brooded or sat just below the nest and dozed or preened herself. The male went down to the stream and splashed. He came to the nest soaked and bedraggled, until vigorous shaking and preening restored his beauty. He warbled softly while he preened. The approach to the nest was through thick bush. I often heard the parents utter a soft "chierk" as they came near the nest, but they were silent at it. All excreta was removed from the nest as soon as it was voided and a little was swallowed. I could see no difference in the excreta and could not make out why some of it was discarded.

The young from this nest vacated on the sixteenth day.

The young in first dress are spotted with pale rufous and rusty on the upper side and irregularly mottled below on breast and flanks; there are tawny spots on wing coverts and secondaries.

Attempts at raising broods are made during the long rains mostly, for I have only one record of nesting at the end of the year for the Ngong district. I use the expression "attempts" because these birds are most unfortunate with their eggs and young.

### UKAMBA WHITE-BROWED COSSYPHA

*Cossypha semirufa intercedens* Cab.

I may be criticized for introducing new English names in my captions, thus ignoring the names already in print in some books. I have given reasons why I dislike the hybrid name "robin-chat" and prefer to use the group name *Cossypha* (see p. 307). In Jackson's *Birds of Kenya and Uganda* the name "black-tailed robin-chat" is used. This bird does not have a black tail for only the two central feathers are blackish; the rest are bright rufous! And there are other cossyphas with similarly colored tails. Moreover, in Kenya there is another *Cossypha*, very like *semirufa*, which has brownish-olive central feathers that would look blackish in the dark environment the bird frequents. Although I switch over from a tail character to a head character for a name, I do so with the full knowledge that "white-brow" has been used for another species also with a white brow and that these two birds overlap in distribution; but note the prefix "Ukamba." Only the one species with this white-brow character occurs in Ukambani.

The range of this species in Kenya is the central plateau, 2,500-7,500 feet to the east of the Rift Valley, especially south Kikuyu and the whole of Ukambani. Its habitat is savannah forest, forest margins, heavy rank bush, fringing forest or trees along river beds, dongas (the more tangled the better), and rocky scarps. And here again, the species has adapted itself to old suburban gardens where there is sufficient coverage.

Unless "garden trained" the birds are secretive and wary; they keep to thick cover, occasionally emerging, especially after rain, to search for insects along tracks and roadsides, but quickly returning at the slightest provocation. They also emerge from cover to more open situations at dusk, more especially when the nesting season approaches. The birds are hardly visible, but their presence is advertised by their song. Though wary, they are nevertheless bold and inquisitive and can be readily "tamed" so as to come about dwellings and gardens, but they resent familiarity and are always on the alert.

They are unsociable toward other birds and are pugnacious and domineering, holding territory by combat if need be. If one strolls into the terri-

tory of a pair, one soon becomes aware of the fact. A low calling will be heard from within some dark tangle of bush or creeper: "hei hei piriit," "peu peu pireet," "cheu cheu pirit." By stooping low, one may catch a glimpse of the bird as he sits on a twig, wings depressed and tail slightly moving as he calls. As soon as he knows he is being watched he moves into thicker cover. The songster can be induced to show himself, for like all of his group he is full of curiosity. There are two almost infallible ways of bringing him to view: Imitate his low call and he is alert at once and will venture into the open to get a view of his rival; make a low, squeaking noise and he will appear to find out what it is all about.

The call note I have mentioned is one indicating awareness; it has a definite intonation. The same notes but fuller, with a distinct difference in the final "pirit," will indicate anxiety. These notes with a decided tone indicate possession. The *cosypha's* repertoire is not limited to these few notes—far from it!

I have referred to this bird as unsociable and domineering. Watch a male at the bird-bath! As he comes out of his habitual cover he perches on a low branch of some near-by shrub; he gives his call, occupants of the bath stop their splashing, and he at once flies to the bath and scatters them; he stands on the edge and calls again and looks around; then he gets in, has a drink, flaps his wings and calls again. The other birds perch on the surrounding trees and bushes and await his pleasure. And he takes his time about it!

Though intolerant of other birds it is strange that he is friendly with the smaller buck of his own environment, such as *suni*. I have an observation hide near my bird-bath and I have more than once seen a *Cosypha* at the bath and a *suni* drinking at it. I have also seen a *Cosypha* hopping behind a *suni* as it walked about the forest disturbing insects which the bird promptly snapped up.

Territory held by a pair of birds is fairly circumscribed and there is little difficulty in locating the nest site. Two factors come in here: the limited area and the almost constant type of nest site. There is some individual difference in the actual sites but they must provide thick coverage, protection from sun and rain, and seclusion. One looks for the nest where these desiderata exist. Here are some of the actual sites located: a thick creeper; a multiple-stemmed bush with thick foliage; a horizontal twiggy branch with a collection of debris on it and heavily overshadowed by the branch above; the top of a pollarded tree with numerous secondary shoots growing around it; a rot-hole between two upright trunks; a recess in an earth drain closely covered with herbs and grass; a mass of rubbish thrown on top of bushes; an old orchid basket hanging in a corner of an orchid house in a clump of orchids.

The prelude to nest-building is, of course, the courting, and song plays a great part in this. The stimulus, something as yet undefined, affects the birds even before the rainy season has actually begun; when the rains come it is accentuated. I feel certain that *cosyphas* mate for the lifetime of one or other, yet there is some display on the part of the male; there is posturing and tail flirting and fluffing out of the rufous feathers of the rump, and the male chases the hen from cover to cover; between times he sings. The singing is at its best of an evening. The song has some notes and bars entirely its own but the bird mixes these up with the calls of other birds and imitates them exactly. I have pages of notes on the call, and here is a sample:

"Kii, kaedo-kaedo kaedo kaedo, o-kal O-kai . . . twi-tilit, twi-tilit, brui, breu-i, chu-it." "Pur pur pirit, purpur-pirit, tu-tuit, tu-tuit, tuit cher-it cher-it pero-tooooo." "Per per tee, per per tee, cher jor-jii, cher jor-jee [cuckoo], per-o-wit perowit." "Whipper oo, whip-per-uu [*Cuculus*], pur-ru-tit, pur-ru-tit . . . per-pluu-pliii . . . kibengo, ki-ben-go, -ku-wit." "Cher-ter-wok, cher-ter-wok [oriole], o-kai, o-kai-ii . . . chuck chuck, chuch-chuch chuck, pili pilo-uuuu [domestic fowl], ki rek kek, ki rek kek [francolin], whii whii whii whii whiiii [human to dog], whiu whiu whiu whiuuuu."

There is a host of other bird calls, such as those of the bee-eaters, the flycatchers, and the shrikes. One can't do justice to this bird's singing.

Imagine my little sanctuary at the beginning of the rains! There are three rival males, each with his own territory, in three corners of an open space in front of the house. They vie with each other, and the garden rings with their notes of an evening and hardly less so at the dawn. Morning and evening singing continues throughout the nesting season, and truly the notes are hardly less beautiful than those of the nightingale. It is not only the notes but also the intonation and spacing, altered from time to time, that add to the variation.

The birds make little fuss when building the nest; they collect all the necessary material from their own territories. Semi-decayed leaves, twigs, and rootlets form the foundation, and rootlets, fibers, and moss are used for the body work; the whole is consolidated while damp. The birds, for both take part, are at great pains to mold the nest into shape by feet, bill, and breast. Then they add a final lining of moss and fibers. The male often interrupts his labors to warble a few notes.

It may be a few days after completing the nest before the eggs are laid—even a week—but usually, one can count on seeing the first egg in a day or two. Two are the usual clutch, occasionally three. They are olive to olive-brownish in ground-color with hardly visible freckling in a darker shade; in certain lights the eggs look immaculate. They are fairly constant in size—21–22 × 15–16 mm.—and smooth to slightly glossy in texture. There

may be one or even two days between the laying of eggs. The hen does most of the incubating but is relieved for short spells by her mate. The nest is seldom left unattended for long. The incubation period is twelve or thirteen days. Secure in thick cover the hen sits close; if she is unduly disturbed she seeks cover close by and she is soon joined by the male, who protests with a low "heu heu pirit," oft repeated.

This bird is the chief victim of the solitary cuckoo. The cuckoo lays an egg very close in color to that of the victim; it is slightly smaller as a rule, more rounded, and of a different texture. The cuckoo may remove one or more of the fosterer's eggs or they may be left; if the latter, and the eggs hatch, the young cuckoo sooner or later ejects the *Cossypha* chicks. The three pairs of *Cossyphas* that nest near my stream are regularly victimized; they seldom raise a brood of their own.

Most of the nests are placed rather low, from three to eight feet up. The male bird is much more fidgety than his mate and he will, by call and action, try to draw one away from the nest. But these *Cossyphas* are not fools; they can learn. There was one nest excellently situated for photography, and I determined to teach the birds not to mind my visits. I visited the nest twice a day until the chicks had hatched. For the first few days I was severely denounced by the male, who tried his usual tactics to hoodwink me as to the whereabouts of the nest. My visits were so frequent that he soon became resigned to them and beyond a brief warning to his mate, he desisted. When the time came for me to erect my hide they were just a little scared at first of the new structure, but they soon ignored it.

The chicks were two days old and the weather was warm, so they required only short spells of brooding, but the mother stayed close to the nest site and collected such insects as were available among the leaf debris below; the male went farther afield. He notified his arrival with food by a low "chuich," and the female hopped toward him, took the food, and came to the nest. At the second session, two days later, the male still was doing most of the foraging. I noticed, during the first few days, that as the young voided the fecal sack the parent took it up and swallowed it; later, the feces were removed and dropped.

The young were feathering fast at a week old and both parents were now very active in seeking food, the mother especially so. A count of visits between 10:30 A.M. and 3 P.M. gave a total of 31 by both parents, of which 26 were by the hen, but I think the disparity was due to the fact that the male still handed over some of his catch to his mate and she brought it to the nest.

A check on the food showed the following: a large number of noctuid moth larvae, two glow-worms, a mantid, a few nymphal long-horn grasshoppers, a moth, smaller unidentifiable insects, and white pupae. These



last were secured from a trail of safari ants which were shifting camp. The male cossypha did the raiding in an expert manner. He hopped toward the trail and studied it with head cocked to one side. Spying a desirable pupa being trailed along by worker ants, he pounced on it with quick action, hopped back quickly, perched on a branch, and flicked the attendant ants off. He himself was sometimes seized by the leg by more than one ant and they even got on his body, but as he perched on a branch he picked them off quickly with his bill and returned to the fray. I hoped that the ants would not discover the cossypha's nest and take revenge later on, for safari ants do indeed take toll of many a nestling. This nestful escaped.

Visits with food were most frequent in the morning; at about noon they slackened off, and the parents sat in a branch below the nest and preened themselves; the hen occasionally hopped down to pick up a passing insect. Feeding again became fairly regular and frequent after 3 P.M. and went on till dusk, even up to 7:30. Cossyphas are somewhat crepuscular in habits: I have seen them at the bird-bath late of an evening when there was hardly light enough to make them out.

I continued to visit the nest until the young were well feathered and noted that they left the nest some time between the fifteenth and sixteenth days. They are heavily spotted with rufous above and mottled with blackish ill-defined spots on the breast.

There was one incident at this nest worth recounting: A pair of lark-heeled cuckoos (*Centropus*) had their nest about forty yards farther up the slope. Whenever one of these birds came near the cossypha nest the male gave a warning and the youngsters crouched in the nest; then both parents flew at the *Centropus*, driving him off. *Centropus* is not averse to juicy young nestlings.

## GRAY-BELLIED COSSYPHA

*Cossypha caffra iolema* Reichw.

The hybrid name "robin-chat" has come to be used, rather loosely, for a group of African birds belonging to the thrush family. Perhaps they do exhibit a certain similarity to a robin or a chat and their confiding demeanor may recall that of the homely robin, but there the likeness ends. Since these birds represent a compact group and are so recognized by systematic classification under the generic name *Cossypha*, why not adopt this group name with suitable prefixes to designate the species? This I have done in the name cited above.

The gray-bellied cossypha is a bird of woodland, copse, and rank bush—of forest edges and clearings. It avoids dense heavy forest. It is essentially a bird of the Kenya Highlands and is not found in Uganda except in the

southwest. It exhibits a definite partiality for a rather damp environment, near water of some sort, where bush growth is tall and thick. In this natural habitat it shows itself but little, but in the older established gardens where there is suitable coverage it will respond to attention and become more sociable, though it never loses its instinctive wariness.

It is largely terrestrial, seeking most of its food of insects on the ground, in the moist undergrowth and thick bush. One catches just a glimpse of a retiring bird which slips from cover to cover as one passes. *Cossyphas* are largely sedentary, and when a pair has taken up residence in suitable surroundings they seldom wander far. They have favorite hunting grounds; sit quietly near one of these, under cover if possible, and the bird will eventually show itself. Like all of its group, the sense of inquisitiveness is highly developed in this species. You may first hear a low call, "cee chee ou wit, ce chee ou," repeated several times; presently a dark form will be seen moving about in the thick tangle and then it will move out toward the edge just to have a look at the intruder. Stay quiet and it will hop onto the ground and pretend to pick up food; if you move, it will dart into cover at once.

If a pair is nesting you may hear the male warbling his short song of a few bars, each commencing on the same note, while he sits deep in shade in his favorite haunt. The song runs thus: "whee piri hi, whii piri o; sio too, sioto, si-itwiri, si, pit ii tee whii pii ti wi, pit ti ou; chee chee ou wit, oii chee uu." The song is not as continuous as I have written it; the semicolons denote pauses of varying length. Should one be hunting for the nest the male will give warning to his mate: first a little "chirr," then the first two bars of the song repeated several times, followed by a move to another part of the thicket; there the call will be repeated a little louder and more insistently, as though the bird was inviting attention, to draw one away from the spot. He may show himself for a moment and then flit across an open space to some other thick bush, where his warbling will recommence. He may be joined by his mate, and the two will move off to yet another clump or bush.

Sit quietly and watch the hen; in time she will slip back under cover to her nest. It may be found in some thick part of their favorite haunt or in a thick bush or creeper near by; it may even be in the side of some old rubbish heap; perhaps in the thatch or grass side of an old tool shed; perhaps in some high corner of a frequented cool-house; perhaps in a recess at the end of a decaying branch or in a recess or cavity in an old pit. Most of the sites I have mentioned are those to be found in an old, well-established garden, but in the wild the nest is usually in a thick, leafy shrub or bush or in a tangle of creepers.



GRAY-BELLIED COSSYPHA  
Adult at nest in deep recess in quarry

Between the months of March and July is the principal nesting time; occasionally the birds nest again from October to January.

Except in the case of a nest in a recess, the foundation of the nest is substantial, consisting mainly of rootlets, partially decayed leaves, and moss; on top of this the nest is built of fine twigs, rootlets, and moss; bits of paper and string are often used. The cup is then lined with finer rootlets and grass fiber. The nest is roughly 60 mm. across and 50 mm. deep. Both birds take part in the building, securing most of their material from the immediate vicinity of the site. They work so quietly and unostentatiously that one may not know of their activity. The only instance where I have seen the birds flying across the open with nesting material was when a pair elected to nest in a deep recess in a quarry face. They had to cross the open quarry and so I saw them. Much material was required for this nest—large straggly bits to place in the foot-wide entrance to close it up.

Three eggs form the usual clutch but sometimes only two are laid. They are creamy to grayish-cream in ground-color, finely speckled with red-

brown and sepia, the spotting often concentrated in a ring around the large end. They vary a little in shape and measure 21–23 × 16 mm. Incubation lasts twelve or thirteen days and is performed almost entirely by the female, the male occasionally taking short spells, especially in the late afternoon. I must add this to his credit: he often feeds his mate while she sits, especially when the eggs are nearly due to hatch. I have sometimes located a nest by watching a male taking food to his sitting mate.

Most nests are well hidden, and here the parent bird sits close. On the other hand, she will slip off from an exposed nest very quickly, though quietly, and go to cover while one is still some distance off. It is almost impossible to come anywhere near a nest without the male's giving warning and attempting to lead one away from the nest. The first warning note is a low "chirr," repeated two or three times, and from a thick bush will come his low "chee chee ou wit! oii chee uu." These birds soon become accustomed to a small hide and behave normally.

I am fortunate in having three pairs of these *cosyphas* nesting regularly in my sanctuary. They are free from molestation except of course from natural predators—and these are numerous enough—such as genets, mongooses, bush-rats, and egg-eating snakes.

One pair has nested in exactly the same spot for four years, merely reconditioning the nest with fresh material and re-lining it. It is in a sheltered spot and free from weathering and storms. Another pair has used the same thick bush but not the same branch or fork. A third pair builds in more or less the same secluded area each year. A fourth pair is irregular in site selection; sometimes it builds on my side of the boundary, sometimes over on the other side. When the birds select my side, they choose an unusual spot: a deep recess in a quarry face. The hole is high up in the face and about a yard down from the top edge. They have to fly across the quarry to get to the nest from their hunting ground by the stream. Their line of approach is always the same—under cover from bush to bush, then across the quarry to a bush above the nest hole and then to the entrance. The nest proper is some distance back in the recess, and, as I have described previously, the entrance has been filled in with material by the birds. They alight at the "doorstep" and dart in at once. At this nest, the male was the more attentive. I had a hide here and watched for three consecutive days from 8 A.M. to 2 P.M. The daily average of visits between these hours was twenty.

A longer period of observation was made at a nest in a pile of grass against a hut: six hours every second day from the day the young hatched to the day they vacated—sixteen days. The parents hunted for food under thick bush quite near the nest. They flicked the leaf debris with a rapid side motion of the bill. If the insect ran they darted after it, but usually they

just hopped leisurely about, flicking the leaves here and there or occasionally hopping upward to secure an insect on a branch overhead. There was one spot under a stunted tree where grass had been thrown and termites were busy demolishing it. The cossyphas frequently collected mouthfuls at this place and brought them to the nest. The food consisted of noctuid larvae, pupae, a few moths, a few glow-worms, small acridids (crickets mostly), mantids, and termites. I noticed that occasionally the male went to an *Ehretia* tree and picked off some geometer larvae and tried them on the youngsters. They seemed to take the larvae reluctantly and one even refused them, yet I noticed that other birds were eating them.

As parents these birds behaved extremely well; they brought food with almost clockwork regularity, both birds taking part. For the first few days after hatching, when the chicks were very small, the hen did quite long spells of brooding in the early morning until the sun was well up.

The birds had a definite routine when visiting the nest: the food was given to one or more of the chicks; then, standing with head cocked to one side, the parent waited until a youngster turned in the nest to void excreta. The sack was picked up at once; sometimes it was swallowed but more often it was dropped in flight as the bird went away. The youngsters always sat facing the front of the nest and as they grew and feathered there seemed insufficient room for the three lusty nestlings.

The feathered youngster is heavily speckled on the upper side and mottled on the breast, quite unlike the parents. I thought that the young would quit on the fifteenth day but it was cold and wet up to noon and it rained all that night. They actually left the nest on the sixteenth day. I found them under the bushes. At first the parents were reluctant to feed them as I watched. The insistent cries of the hungry chicks finally overcame their timidity, but they first induced the youngsters to go farther under cover.

### SPECKLE-BREASTED SCRUB THRUSH

or MORNING WARBLER

*Cichladusa guttata guttata* Heugl.

My thoughts go back to a day in early April, many years ago, when I camped on the banks of the Tsavo River. We had walked through miles and miles of thornbush, relieved every now and then by rocky hills or kopjes; it was a long trek of over twenty miles in a broiling sun. It was dark when we pitched camp beside the river and we were too tired to take much notice of our surroundings or worry about the rhino which snorted and stamped around the camp.

Early dawn! A mere faint glimmer in the east! A slowly spreading haze of pink, then orange, then gold! Long before the sun appeared a clear note sounded from the tree above the tent. Just a few notes at first—clear, vibrant and full of tone—then a gentle warble, low yet clear, then full once



NEST OF SPECKLE-BREADED SCRUB THRUSH or MORNING WARBLER  
A mud nest on a leafy branch

more. That was my first introduction to the pre-dawn song of the morning warbler: "Poilu . . . chero-cheru . . . schee-chaе-tsчит, . . . wach-cherо-сhio quar, quar [hardly audible], tweet-widle-leeе, pliu, pliu, pliiii."

The morning warbler is a good mimic but he doesn't indulge in mimicry to any extent.

For preference, this bird lives in the tree fringes of dry watercourses shaded by small trees and bush. It loves the seclusion of those little associations of trees which grow in clumps around a white-ant mound; or perhaps it may be found among a clump of acacias surrounding a hollow where rain water accumulates for a few months in the year. You may find it in the fringing trees along rivers, keeping to the low bush mostly, but not infrequently perching in the higher trees. One often notes these birds at sea level in the tangled thorny bush growing on the coral cliffs and ridges. The range is from the coast inland to suitable environment at 5,000 feet. But the bird certainly prefers the hot country, and so occurs in the Suk and Turkana country. An essential in its habitat is that for some time at any

rate there must be open water or damp mud, especially in the nesting season. If there happens to be a permanent or semi-permanent camp near its retreat, it will visit the camp and hop around and often enter the tents. At a little camp at Kacheliba, in Suk, a pair has taken up residence within the camp grounds and nests regularly in a tree within the camp site.

The bird is an unorthodox and wonderful nest builder; it constructs the whole of the deep little cup with mud. This material has its advantages, for it can be laid bit by bit on a horizontal or inclined branch and it can be easily molded around a fork or supporting twigs or thorns at the site chosen. When the nest is complete a thin lining of grass fiber is added.

I once spent two weeks in a district where the birds were fairly numerous. There were many deep and shaded dongas, erosion gullies, and dry, shady river beds. The long rains were just commencing and the soil in the dongas and depressions was damp. Everything was freshening up. It seemed that this spot must be a favorite abode of the species, judging by the number of nests found. Some were old and disused, some newly constructed, and some a-building. Most of the old nests were in a wonderful state of preservation.

When I walked along the banks of the dongas no morning warblers would be seen, but I was sure to hear their notes. Scrambling down the bank through a tangle of creepers and thorns I reached the bottom and found a "tunnel" overhung with small trees and creepers. It was an environment quite different from the surrounding country, with its blazing, dazzling sun. The atmosphere was warm and moist for the floor of the donga was damp. Sunlight filtered in through the branches above and the light was pleasant. I was able to walk along the tunnel, occasionally having to stoop or crawl under some fallen tree or tangle of creepers. On many of the trees were orchids. The majority of the tree trunks and lower branches were devoid of foliage. Such is the habitat of the morning warbler.

Having found a few old nests and noted the preferred type of site, I soon learned to spot new ones. The occupied nests are not close together. In one donga of 400 yards there were five pairs, well spaced, each with a territory or length of donga for foraging, and there were three or four nests in each stretch, a few old and broken, some intact, and one of recent construction. Though many of the nests appeared sound, there was no evidence of reconditioning. The number of nests would seem to indicate that pairs were resident or at any rate nested in the same spots year after year. I know for a fact that one nest may be used twice in one season, as was the case at Kacheliba Camp.

The birds were remarkably tame and confiding. If I sat down for a time, the occupants of that particular stretch would be seen hopping from branch to branch quite low down and drawing nearer with each hop.

There might be a pause, or one of them might hop to the ground and pick up an insect; they might even fly just above me to get to the far stretch.

Most of the nests held eggs at the time of my visit, but I was fortunate in finding one pair which had just started to build. Only one or two bits of mud had been placed in position. The morning warblers took no notice of me. They brought little pellets of mud and each in turn molded a pellet into position. The male sometimes paused in his mud-carrying and perched on an exposed branch while he uttered part of his delightful song: "cheo, cheo, waiii . . . chae, chae-chit . . . poilu poilu"; or a shorter warble: "pirii-chii, chei-chio." The stance is an upright one when the bird is singing; the wings are slightly drooped and the tail is moved up and down and slightly fanned; the throat swells and vibrates. This warbling is a curious trait. It seems to result from a mixture of emotions: knowledge of one's presence; an indication of or claim to territory; and sexual excitement.

This commencement of a nest on a bare, twigless, horizontal branch of a *Cordia* was about five feet off the ground. When a pellet of mud was brought, it was put in position, pressed with the point of the bill, and then pressed down with a side to side motion with the flat of the bill, trowel fashion. I noted that each bird meticulously wiped its bill on the branch before flying off for more material. The pellets were laid on in an oval ring that was carried down on each side of the branch. Each bit of mud was consolidated and amalgamated, and slowly but surely the foundation was filled in, then thickened. The wall of the cup was slowly built up, and as it rose it was molded with bill, feet, and breast, the bird turning about to this or that side to obtain the correct contour. At times it seemed to stand on end with breast well down and tail up. Finally a thin lining of fine fiber was laid in. There seemed to be no hurry in building; there were interruptions for foraging and for resting.

I visited the nest for a couple of hours each day in the morning. The mud-work was completed on the eighth day. The foundation had been well buttressed on one side of the branch, less so on the other. Fine grass and bark fiber and a few very thin rootlets went into the lining. The nest held its first egg on the tenth day. The completed nest measured 70 mm. across the inside of the rim, and 45 mm. in depth. The height of the wall on the outside, measured from the top of the branch contour, was 60 mm. (If a nest is built on a thin branch the foundation mud is carried completely around it.)

Most nests are fairly circular at the rim; some are nearer an oval. The most circular are those built on a thick branch. The color of the nests varies with the earth, so they may be black, grayish, or red. If the mica content of the soil is high, the outside of the nest glistens as if it were studded or stippled with bright metal.





**SPECKLE-BREADED SCRUB THRUSH or MORNING WARBLER**

Young in nest, which is covered with powdery scale from tree trunk

Both sexes seem to take part in nest construction, but the female does the major portion. Two eggs seem to be the average full clutch; I have but one record of three. They are smooth and slightly glossy and a beautiful immaculate blue or greenish-blue, sometimes pale at the tip. Average measurements:  $22 \times 15.5$  mm.

The incubation lasts about twelve days and is done almost entirely by the female. She sits deep in the nest with only bill and tail above the rim. The young grow rapidly and as they increase in size the mother is raised when she broods until finally she seems to be sitting across the rim. I have watched a female brood her young during a shower of rain. She sat with her breast feathers puffed out over the front edge of the nest and her wings were held partly open and depressed over the sides so that the water dripped clear of the mud nest. The mud is so well amalgamated and compacted that the nests suffer little damage from rain.

I eventually found a nest containing young which were almost ready to leave it. The nest was built on a thickish branch of an acacia which was heavily armed with 4-inch thorns, some of which had been incorporated in the mud walls. It was thus structurally very secure as well as strongly protected by the surrounding thorns, though otherwise quite exposed. This



SPECKLE-BREASTED SCRUB THRUSH or MORNING WARBLER  
Adult at nest with food for the young

nest was exceptionally high up—about thirty feet—yet it was on the lowest branch of a great flat-topped acacia.

I was on the spot at an early hour next day and was seated comfortably in my hide, ready for a two-hour watch.

The parents collected food under the thick bush and creepers below the tree and in the surrounding area and came to the nest quite frequently. Moth larvae were brought and so were several nymphal long-horn grasshoppers, and glow-worms and beetle larvae were secured from a mossy depression. When the birds were on the ground they were very thrush-like. They stood with legs rather extended and looked tall; the wings were held low and the tail was horizontal, but it was frequently raised and partly fanned. I saw the adults eat small snails but didn't identify any in the food brought to the young. No fruit or berries were offered, yet the adults ate the fruits of *Cordia*.

I visited the nest again next day. On the previous visit I had seen that there were two youngsters in the nest. They employed the time between the visits of their parents in vigorously preening their wing quills and fluttering their wings—sure signs that they were soon to leave the nest. When I was settled in the hide, I saw that one youngster was already out and perched

on a flat lateral branch not far away; one was still in the nest. I waited and along came the parents, both at once, and gave food to the chick on the branch. On the next visit by the mother, the chick moved forward to meet her. He was now three feet from the nest. The youngster in the nest became restless and tried to join his companion on the branch but in doing so lost his balance and fluttered to a branch of a tree below. He squeaked as he fell, and his cries attracted the parents, one of which had food. He received the food and settled himself comfortably. On the next visit the male fed that youngster and not the one above, so he too ventured to flutter down, but he missed his footing and toppled through the herbs to the ground. The parents found and fed him.

The youngster in nestling or first plumage is rather more mottled on the back and less distinctly spotted below than the adults.

### RED-TAILED WHITE-WINGED BUSH CHAT

*Erythropygia leucoptera* Rüpp.

There are several races of this bird. The one we now deal with is found in the lower acacia thornbush of the Southern Masai Reserve, especially that part of it which lies in the southwest, including Lake Magadi and Lake Natron in Tanganyika Territory. It chooses the more dense bush and thickets along dry dongas, the kopjes and scarps, and the patches of thorn growing in close clumps or associated with other trees, where the tufts of coarse grass are protected from grazing stock and grow rank and thick.

In general behavior this bird possesses all the habits of the group; it perches on bush tops and bare trees and calls; it indulges in extravagant tail movement; it secretes its nest in well-hidden positions, often low down, almost on the ground. It is perhaps less given to keeping in cover than the previous species described, but this may be a false impression, for the coverage in its habitat is not nearly so dense. The lack of density is compensated for by the fact that nearly all the bushes and trees are heavily armed with thorns and thus give protection.

I had the good fortune to visit the country where these birds are most plentiful. It was during the breeding season and I made a close study of the birds at several nests. I located a pair and judged by their behavior that they had a nest somewhere in a circumscribed area. Both birds were perched on an acacia uttering their rather plaintive "chee-ip" call of anxiety. They flitted from tree to tree restlessly. They often came within a few feet of me and disappeared into a tangle. I went off a short distance and watched. One bird, then the other, dropped into the bush; in a little while one flew up and perched in an acacia. I walked across and off flew the hen



RED-TAILED WHITE-WINGED BUSH CHAT

Male in characteristic pose

from a well-hidden nest low down in woody herbs covered with grass. As I went forward the male uttered a warning "cheewr." He was now perched on an acacia, calling "chiip," the hen joining in with a more abrupt "chich." The nest didn't differ from the usual type—a deep cup placed well within a thick tuft of coarse grass or woody herb and grass growing about it.

The nests are seldom more than a foot above ground and more often just a few inches above it. The strong base is made of twiglets, rootlets, and dead leaves, and the cup itself is made of fine grass stems, fine rootlets and fibers. It is lined with finer fibers or hair if either is available. Sometimes



## RED-TAILED WHITE-WINGED BUSH CHAT

Female at nest with young

some of the surrounding grass is worked into the frame. An average measurement: 55–60 mm. across the rim and 55 mm. deep.

Two or three eggs are laid. They are creamy to buff in ground-color, with spots and small blotches in umber brown and red-brown and submarks in gray, all fairly evenly distributed.

The incubation, a period of twelve days, is done by the hen only, so far as I have observed, but the male no doubt does short spells. The newly hatched chicks are naked and are dark flesh-brown in color with a yellow gape and brownish-gray legs. They are fed entirely on insects and at one nest observed from a hide at four feet, the following were given: caterpillars, mostly noctuid larvae, small moths, small millipeds, glow-worms, spiders, damsel flies, small grasshoppers, and fly and beetle larvae.

I found these birds to be very tame at the nest, and this is in keeping with the behavior of many other species of the thornbush country. There was a little shady donga by this nest and most of the food was secured from the debris in the deep shade. The birds had a more or less fixed route by

which they approached the nest: first out of the donga, then to a fallen dead tree, then to a stunted bush in front of the nest, and so to the little platform of grass in front of the nest. As they alighted on each perch the wings were depressed and the tail brought up with a side and up movement and partly fanned. At the "threshold" the tail came up in a jerk well over the back, then well down as the food was given; a quick turn, tail well up, and off.

I have frequently seen these birds standing over a termites' nest, taking the "white ants" as they emerged, and I have seen them in the bare clearings of harvester ants, not for the ants themselves but for any odd larvae or pupae they might be carrying. Flying "white ants" are taken on the wing. I have sometimes seen the birds on a game trail breaking up the new "droppings" to secure fly larvae.

The song of this *Erythropygia* is not unpleasant. It conforms to the "group song" but it has its individuality. It consists of eight to ten notes, uttered from the top of a tree or boulder and runs thus: "Chuich . . . chuic-chuic . . . chick, . . . twich-iii, cheedle-iiii." The tail is vibrated and partly raised but the upward movement is not jerky. Then just before the bird goes to another stance the tail is depressed and then is brought to the horizontal and up in two jerks. It is then carried well over the back and almost touches the head.

These birds are always cheery and entertaining. Their calls are often the first to be heard in the early dawn; and the "dawn-chorus" of the thornbush country is worth listening to.

### KENYA RED-TAILED BUSH CHAT

*Erythropygia hartlaubi keniensis* van Som.

(*E. hartlaubi* of Sclater)

There are several species in this genus; they have similar body forms, similar habits though not habitats, and a "group" song or call. The species I am dealing with here is found in the Kenya Highlands. It is very partial to the bush- and grass-clad valleys between forest areas and is usually found in damp places or near water. Its stronghold is the lower slopes and foothills of Mount Kenya and the Kikuyu country. There is another form in Uganda and the Elgon-Kavirondo-Kisii country.

This species is not a very conspicuously colored bird but it renders itself noticeable by its habits, for it is fond of perching on some bush top where it continually raises and fans its boldly marked tail and sings, especially in the nesting season. It is more secretive and retiring in the off-season. With the onset of nesting time, pairs take up ranges or territories which may be quite limited in extent.



## KENYA RED-TAILED BUSH CHAT

Male bringing food to nest

This is one of the comparatively few species in which both members of a pair sing together. The male is the more vociferous and his not unmusical song is worth listening to. He perches on a low tree or bush fully exposed, and sings quite loudly. The song has many variations, but here is a record in which the male and female duetted:

*Male:* "Tieu . . . twer-twi-thew-cheet twoo-chee, weechi-wee . . . see-chic-wichi-wii . . . twer-twi, twoo-chee . . . see-chee cheo."

*Female:* "See-lit-see . . . chee-wii, lit-sii, sii-sii."

Singing is at its best of an early morning while the dew still lingers, or of an evening when the sun is just above the horizon. When his mate is sitting close, the male will often perch on a bush not far from the nest site and warble softly and intermittently, occasionally emphasizing a note here and there, and this gives a ventriloquistic effect to his call.

There are three pairs in my small holding, each occupying a restricted territory. The pairs do not come into contact. Two have their ranges on a bush-clad slope running down to the stream at the bottom of the valley; the third has a nesting territory in a bush strip by the forest edge and swampy ground near by. They have been in those areas for several years.

It is easy enough to locate the birds, or at least the male, but it is not so easy to find the nest. If the birds have actually started to nest, the first call of the male will be "pi--cher, pi-cher," a warning; then perhaps "pi-cher cher cheet"; then he will go to another bush top and sing a short part of his repertoire: "picher-chui, chui-cher, twer-twi-thew-chit, chu-wer-chu-pii"; and so he may lead you on. If in addition to the calling he flirts his tail extravagantly, first up and down, then slightly down, then higher up, then down and up over his back, almost reaching his head, you may be sure that his mate is sitting close not far off, probably on hard-sat eggs or newly hatched chicks. The nest site often chosen is the base of a woody herb in a thick clump of grass. Another favorite site is along a footpath in the scrub.

The nests are usually placed low. They are built of dry grass, rootlets, dead leaves and fiber and are lined with fine grass fiber; the deep little cup is often flush with the leaf debris of the bush. There is often a thickening of the rim of the nest at the point of access to it.

Two or three, seldom four, eggs are laid. They are rather variable in ground-color, pinkish to grayish-yellow profusely and evenly freckled with light and dark umber-brown spots, or showing a zoning of more dense spotting just beyond the largest diameter but toward the large end. The average size is  $21 \times 14$  mm. The hen does most of the incubating, and she sits for twelve days. The young are hatched naked and are dark pinkish-brown in color.

The parents are very attentive and are entertaining to watch at the nest; the male, especially, indulges in posturing and tail play. Food is sought over a limited area and visits are frequent. Most food is taken from off the ground or the low strata of the scrub, but the birds seldom approach the nest through the scrub; rather they go to a high stance and view the surroundings as a precautionary measure, before bringing food to the nest. The food call is short: "pilo-sio" or "chee-seeo."

Both birds arrived on the "look-out" bush together on several occasions, but they usually flew to the nest one at a time. If they did come together, one waited in front of the nest while the other handed over his food; in either event, the one took the place of the other in quick succession. I noted that visits took place every three to five minutes when the chicks were a week old, during six hours of observation, but there was a longish break at noon. There was marked activity of a late afternoon and feeding went on





KENYA RED-TAILED BUSH CHAT

Tail down and fanned

up to dusk. After each feed came the usual voiding of excreta. The attendant bird waited for it, either swallowing it at once, or taking it away and dropping it. I have mentioned the propensity for tail movement. It went on even at the nest and the tail was seldom down except at the moment of passing over the food.

Young begin to quill after the fourth day and feathering is rapid. The crown and back become heavily mottled with tawny-ochre on blackish-brown, and the breast is off-white, indistinctly mottled with blackish. They leave the nest on the fourteenth or fifteenth day and are only just able to flutter along; so they seek safety in low bush. The parents exhibit great anxiety at this time and no wonder, for predators such as mongooses are always on the hunt. The call of anxiety is "piri" or "pri-pri."

Although most of my pairs have successfully hatched young, many of the fledglings come to an untimely end and I estimate the toll to be about 60

per cent. Two broods may be raised in the long season, from March to July, and very occasionally one in the short period, from October to January. Courtship and mating take place very early, even before the rains have set in.

LONG-CLAWED PAPYRUS WARBLER or GREATER  
SWAMP WARBLER

*Calamoecetor nilotica* Neumn.

(*Calamornis nilotica* of Slater)

In many parts of Kenya and Uganda there are huge areas of papyrus swamp—some associated with shallow lakes, others in the floors of shallow valleys—where streams slowly percolate through the semi-floating mass of roots and silt of this giant grass, to appear again where the valley narrows and the slopes are rocky. These papyrus beds are almost impenetrable, and they hold sufficient water below them to make a false step most unpleasant. To appreciate the bird life within them one must penetrate to the middle of the swamp. Here are many small areas of open water fringed with water plantains and water-lilies—lovely but treacherous spots, the home of blue gallinules, blue waterhens, blue rails, black crakes, spotted crakes, pigmy rails, and a host of other birds. These birds are not easily seen but their calls and songs ring out over the swamp. Loudest of all, and characteristic of the environment, are the curious, croaking call of the black crane and the loud, throaty, yet not unmusical notes of the great swamp warbler.

The warblers move about the smooth-stemmed papyrus with ease, hopping from one stem to another or creeping low through the thicker growth. Most of the papyrus stems are vertical or almost so, and when the bird moves along them, one foot above the other, one appreciates why the feet are especially adapted to prevent slipping: the hind toe is long, the claw is long and strongly curved, and the large foot enables the bird to obtain a good grip of the smooth, triangular stems. It is not surprising to find that the flight of this bird is rather weak—that the whole wing is rather rounded and wing beats are rapid. They have little need of flight except to pass from one papyrus clump to another.

Although the call note is loud and full it has a throaty quality and the intonation is variable, giving it a definite ventriloquial quality. It is difficult to convey the notes as syllables. I have recorded them as a throaty "twurok," "kliuwok," and "curok"; sometimes there is a longer "klierurali-wok." The note of anxiety is expressed as "klok klok," and warning as "krok."

I was able to study this bird at close quarters at Kisumu. I was certain that a pair had a nest in a thick bed of floating papyrus and *Carex*. Forcing

my way in, I peered among the papyrus stems and separated every clump of *Carex* without success. After about half an hour of fruitless search I bent a bunch of papyrus downward and sat on it precariously.

The birds were still about and one occasionally showed itself. The papyrus was over ten feet high and so close set that visibility was limited to about fifteen feet. At last I noticed that the more venturesome bird was hopping from stem to stem, getting higher each time, and I saw it take a short flight to the head of a tall stem. Then it vanished among the "mop-heads." The other bird skulked low for some time, then it, too, worked its way in an arc toward the top of a certain stem and flew to the same thick clump of "mop-heads." It was carrying food. I finally decided that the nest was on *top* of the papyrus head.

I judged by the birds' behavior that the nest held very hard-sat eggs or newly hatched young. I cut the 10-foot stem low toward its base, pushed it down hard into the floating mass of root until it was level with my head, and tied it for security. There was the nest, a deep cup built within the top of the flowering head of the papyrus. It was made of blades of swamp grass, twisty bits of convolvulus stems, thin bits of "mop-head" twisted into the framework and finer ones laid in as a lining, and a few feathers. One chick was hatched and the second egg was on the point of hatching. The egg was grayish-white in ground-color, with dark brown and gray-brown spots evenly distributed all over and sub-marks of yellowish-gray, mostly at the large end. Size 20 × 15 mm. Having made notes, I raised the stem to a little short of its fellows and tied it securely to an adjoining one. Then I went back to my original "seat" and watched. Both birds soon appeared, the male protesting loudly, and to my joy, the female flew to the nest and sat tight. Its slightly altered height didn't seem to worry her.

Two days later, when I again visited the nest, the birds behaved splendidly. They crept about the reeds, hunted the convolvulus creepers, and often descended to the base of the papyrus clumps and picked insects off the stem sheaths. They sometimes went to the margin of the papyrus and took insects off the water-lily pads. When they came to the nest, they held on to the vertical stems beside it while they bent over and placed the food in the wide yellow mouths of the waiting youngsters. Both birds fed the young. The actions of the birds reminded me of those of the great reed warbler. The tail was often held above the wings or at right angles to the stem on which the bird clung. Beetle larvae, noctuid larvae, some unidentifiable aquatic insects, a few damsel flies, and a moth were given to the young.

These notes refer solely to the large species which one finds in the papyrus swamps around Lake Victoria, Lake Kyoga, and other swamps of

Uganda. There is a smaller species there also. In the swamps of the Kenya Highlands another species occurs and there is yet another in the coast belt. All are generally similar in habits but not so in the matter of nest situation. Our local Highland species does make its nest on top of papyrus heads and is very similar in appearance to the Lake Victoria bird, but it is smaller and browner and has an orange mouth.

GRAY-BACKED FOREST WARBLER or BROWN-CAPPED  
FOREST WARBLER

*Apalis cinerea cinerea* Sharpe

In several of my notes, reference has been made to "bird parties" and "organized drives" by a loosely knit company of birds working through part of a forest in various strata from canopy to undergrowth. These are quite a feature of forest bird-life and though not always in progress are frequently witnessed. The group to which the subject of this note belongs is always well represented in these drives. If one takes time to study the components, one soon realizes how great a number of different species are taking part.

This species moves restlessly through the leafy twigs, twisting and turning and perhaps taking a short, darting flight after an insect which has temporarily eluded it. And always its white outer tail feathers can be noted. When not taking part in a "drive" the birds will be seen in tree-tops and in the mid-growth. There will probably be two birds, for they usually go in pairs. One has a gray-brown crown only slightly different in color to the back, and the other (the male) is more brownish on the head; both have a buffy to cream wash on the breast.

Both birds move about silently for the most part, but in the early morning and late afternoon one hears their calls from the canopy, and a shower of rain will induce them to chirrup and become active after it is over. The note, "picii picii pisii pisii," is repeated up to eight or ten times. There is a slight "metal to stone" character about it. The call of one bird is often answered by the other. If, as often happens, a black tree-snake is spotted by forest birds and all start their alarm notes as they flock around, this little warbler is sure to be on the spot. The birds hop about, scolding and fanning their tails, which are then held upright, and they make short, dashing flights at the creature, even pecking it. A dozen or more species may take part in the chivvying. The snake becomes flustered by so many attacks from all directions so he slips off, sliding from one twig to another with as much ease as he would travel on the ground. He even takes jumps from one tree to another—a distance of two yards sometimes—and off he goes.

Although these warblers are tree-top birds and found deep in forest, they seem to prefer twiggy, leafy trees on the margins of the forest for nesting purposes. Many of these marginal trees have a thick covering of gray lichen and tree-moss, especially a species of *Gymnosporia*. I have located a nest in one particular tree four years in succession. The nests are rather bulkier than the usual *Apalis* nest and are built between the upright shoots of a twiggy branch or between pendent twigs. They are made almost entirely of lichen and bits of tree-moss bound together with spider web and fine bark fiber. The inside is heavily lined with feathers and some vegetable down. In outline the nest is an elongate dome with an entrance to the top at one side, the entrance facing outward. One nest gave the following measurements: top to bottom outside (not on contour), 7 inches; width,  $3\frac{3}{4}$  inches; depth inside from just within lower edge of entrance to bottom,  $2\frac{1}{2}$  inches; total inside cavity,  $3\frac{1}{2}$  inches.

Nests which I have watched in process of building have taken two weeks to complete, both birds taking part. Construction does not go on throughout the day. Three eggs form a usual clutch. The pale blue ground-color is finely speckled with discrete red-brown spots, showing some tendency to heavier spotting toward the large end; the eggs measure  $15 \times 11.5$  mm., and thus are rather elongate. Incubation is carried out by the female almost entirely and lasts thirteen or fourteen days. The young hatch naked and are flesh-pink in color.

The nests are placed rather high up (between twenty and thirty feet) on the outer aspect of the tree and the entrance faces outward. So far, I have had only one nest in view and this was from a hide which was built on a 30-foot tripod with a small platform on top. I visited the nest on several days, checking on the incubation period, and I invariably found the female sitting close and not leaving the nest until I actually touched it. The hide was put up after the young had hatched. Both birds were fearless and came and went without any sign of hesitation. At first they went into the nest to feed the young, but when the chicks were older they craned their neck to the opening and the parents fed them from outside. The food brought was usually very small and all I could identify were moth larvae and small spiders. Excreta from the young was at first swallowed but later was carried away. Feeding was steady up to 11 A.M.; then it slackened. The peak of the afternoon feeding was between 4:30 and 5 P.M., when visits occurred almost every five minutes.

The young vacated between the fifteenth and sixteenth day. Of eight nests located in my sanctuary, only three have successfully carried on to the full time; the rest have been robbed by predators when with eggs or young. All nests have been found in the long season—March to July—with one exception, and this was found in December.

BLACK-COLLARED or RUFIOUS-FLANKED FOREST  
WARBLER*Apalis pulchra* Sharpe

Of the numerous species of "forest warblers" quite the most interesting is this species. It is beautiful but at the same time bizarre; to appreciate it you must see it in life. No pen can convey its living characteristics adequately. The plumage of the bird is quite striking, but its behavior is more so, and the use of the tail borders on the extravagant.

The natural habitat is the thick tangle bush and creeper growth along banks of rivers and streams running through or by forest. Its distribution covers suitable environment from Mount Elgon south to Kikuyu. The Ngong area appears to be its southern limit. Fortune again has dealt kindly with me, for in my little sanctuary I have no less than seven pairs, each occupying a separate, limited territory.

Keeping in mind the sort of habitat they live in, it is little wonder that continuous observation in one spot is impossible. At first one locates them by their call: "cherr cheui cheui cheui-cheui-cheui-cheui," "chewi chewi chewi," "qui--quer quer." One creeps with difficulty into the tangle and looking around at last sees a little bird moving restlessly about, hopping here and there, searching above and below the branchlets, poking into the clusters of curled-up leaves and debris, and all the while moving its tail, which is held high, from *side to side*. It is this unusual lateral motion which at once catches the eye; it is characteristic. The bird sees an insect, darts forward to secure it, and the tail wags furiously—a short "chewi" call and the bird is lost to view. In some more open place these warblers hardly take any notice of one and sometimes pass quite close to one's head in their restless hunting. They are not a bit shy and it is only the thickness of the tangle they frequent that makes prolonged observation difficult.

As the birds move about, their outline is distinctive: the head is held in to the body and the bill straight forward; the body feathers are kept loose so that the longish rump feathers overlie the wings and with the tail held high and well forward, the back end of the body looks rotund; the tail is in perpetual motion.

On May 10 I located the second nest of the season. The range of this pair has been known for several years, and patrolling the area on alternate days has never failed to reveal its presence. The general behavior of the birds up to ten days ago did not suggest that they actually had a nest, but I had seen the male displaying before the hen and I saw them mate. The total area over which these birds range is roughly an acre—a long strip of tangled bush at the margin of the forest. A second pair occupies an adjoining patch of secondary bush in thin forest. Their nesting proclivities are



BLACK-COLLARED or RUFIOUS-FLANKED FOREST WARBLER  
Parent at nest

in strong contrast. This second pair builds a nest in thick, fine-leaved saplings from twenty to forty feet up, making it almost entirely of tree moss, whereas the first pair "acquires" an abandoned nest of another species and merely adapts and reconditions it. In the previous three years they have used the old nests of the green-winged warbler (*Camaroptera*), a nest of the breast-spot warbler, and the nest of a sunbird.

I saw the female of the first pair carry a feather into a patch of scrub and appear again without it. After a considerable search, scolded by the male some of the time and later by both the male and female, I separated the herbage gently and came on an obviously old *Camaroptera* nest. But there were feathers projecting from the side opening! *Camaroptera* doesn't use feathers, so this pair of *Apalis* had again used an old *Camaroptera* nest! A

glance at the inside revealed two boldly marked eggs snug among a thick lining of feathers.

On May 11 I visited the nest and observed from a bush thirty feet away. The male took food to it and the female came out of the nest and took the food when he was still two feet off. She returned to the nest, where the eggs were probably near to hatching.

On May 19 the young had hatched and the female was brooding. Obviously, the eggs had been laid some days before I found them on May 10 for the incubation period is thirteen or fourteen days. It took just a few moments to put a hide in position and as I stood to view it the male arrived at the nest, fed the youngsters, and went in to brood them.

On May 20 I was in the hide early. The hen was brooding and did not leave as I entered the hide. The male came to the nest with food immediately. The hen left on his arrival and he fed the chicks, then brooded over them. He poked his head out of the nest several times and once gave a little call. The female returned at once and they changed places. The male was soon back with food, which he handed to his mate at the nest entrance; she stretched her head out to receive it. The sun was now well up and the air warm. The hen left the nest and went into near-by bush and called; she was answered at once by her mate well over to the right, and she worked her way through the bush to join him. Thereafter, both birds came in rapid succession or together, but whereas the male always went straight to the nest, the female worked her way through the herbage to the back of the nest, then slipped round to the front and so inside. She seemed very disinclined to show herself, yet came to the nest readily enough.

May 23 was a bright day and both birds were very active. Between 10:30 and one o'clock the male came fourteen times, the female twenty times, but she often passed food to the brooding male, who then fed the youngsters. The brooding of the male was often cut short by having to remove feces voided by chicks. The young were away from the nest on the morning of the sixteenth day; they had probably vacated on the previous day. The food brought them had consisted of spiders, mantid nymphs, small nymphal grasshoppers, and green caterpillars.

The above record refers to one nest; I have records of several others and will give the chief points of interest about them. Only one pair out of seven appears to make its own nest from start to finish. This pair has done so each year, selecting a sapling olive. The nest is fully domed and constructed entirely of long-strand tree moss and is lined with feathers. Some cobwebs are used in binding the moss. One pair along the *Euclea* strip by the stream started a nest but subsequently took over an old nest of the green-backed swamp warbler. This pair has also used a nest of a sunbird and that of a weaver. Another pair has reconditioned an old nest of the breast-spot



warbler, *Apalis flavocincta*, a weaver's nest, and a bush-warbler's nest. The pairs in the *Euclea-Rhus* bush by the stream use the old nest of the green-backed swamp warbler more than any other. The reconditioning is principally done to the entrance; it is reduced in size by the addition of new material, and feathers are freely used in the lining. The same old nest may be reconditioned for two successive years. The propensity for feathers has often enabled me to trace the whereabouts of the nest of this species and others also. I "sow" feathers in the area where I suspect the nest to be, and the birds pick them up and guide me to their nests.

The usual clutch of eggs is two, but three are not infrequent. The eggs are elongate, almost long ovals, very pale greenish-white in ground-color with bold spots of grayish to lilac under the surface and more bold spots, almost blotches, of red-brown and maroon sparsely distributed over the surface. Some eggs may be more pointed and have no spotting at the acute end. Size: 17.5-18 × 11-12 mm. An occasional clutch may be pinkish-green in ground-color.

The utilization of old nests does not seem to have any value as protection against marauders. Even though some pairs may try to raise two broods in a long season, the mortality rate is estimated at 70 per cent and the population in my area is hardly more than maintained. I have twice noticed the little green squirrel by the nests of these birds and seen the owners flying at and pecking the squirrel. Though I have not witnessed it, I suspect that this animal has been responsible for the taking of the eggs, for the nest has always been found empty and bits of the eggshell have been found on the ground below.

One unfortunate pair took over a nest of the green-backed warbler which was suspended over the stream bed. When the eggs were due to hatch in a few days, at the height of the rainy season, the stream came down in flood one night and carried away the whole nest. This pair didn't learn by previous experience and again adopted a warbler's nest in almost the identical spot, but on this occasion I raised the supporting spray to well above flood level and the birds got away with their brood of two.

### BREAST-SPOT WARBLER

*Apalis flavida flavocincta* Sharpe

The little warbler about which I now write is an adaptable creature; it occurs in a variety of environments but shows a preference in regard to nesting site. I have found the bird in the taller *Acacia-Combretum-Commiphora* complex such as one finds in Ukambani, the wooded scarps of the Rift Valley, the fringing trees of rivers and lakes, the "orchard" type of country

such as one finds in the Teita lowlands, the savannah forests of the Highlands, the margins of evergreen forests at higher altitudes, the tall bush country of Kikuyu, and the well-timbered gardens in suburban areas. Accordingly, I have found them seeking for food in the tops of forest trees and in the low bush. As regards nests, all I have located—and they amount to more than a hundred—have been in low bush and low trees and the small trees at the margin of forest or in the marginal bush. Most of the nests were not five feet up; the highest was at thirty feet.

The birds are ever on the move, searching foliage and twig for small insects. They hunt with no apparent thoroughness and flit from tree to tree or bush to bush without fully searching any one; they seem to find that clumps of parasitic *Viscum* and *Loranthus* are productive of desirable food, for they look these over with care. They are also partial to hunting in the canopies of flat-topped acacias, especially when these are in full flower. Their food consists entirely of insects. They often take part in "drives," when many species of birds combine and hunt through a line of trees as a loose "pack." There is nothing of particular note in their general demeanor, except when they are excited or are engaged in courting. The tail is then carried high and often expanded spasmodically and the wings are held down.

The call note varies in response to the degree of emotion. Thus the call of the male to his mate, as they hunt, can be rendered "cheede cheede cheedle cheede cheede." This is often varied to "chira chira chira chira," to which the female responds with "chier chier chier." When a male is hunting on his own or is well away from his mate, a call which I term "directional" is "chirup chirup chirup," and the female's reply is "twea twea twea." There is a "metal to stone" quality about the notes, difficult to convey by syllables. One soon gets to know the calls and can recognize them at once. The note of anxiety, with modified intonation for anger, is "chieeerr"—a long-drawn note for the former, a more abrupt one for the latter.

In a normal year mating and nest building commence about the second week of March. Males call lustily "chirup chirup," and chase the female. There is not the restriction as to range or territory that one finds in the case of the black-collared or rufous-flanked warbler, and though a pair may keep together through the year they wander quite a bit. There is, however, a marked preference for a given locus in which to build. A pair will attempt to raise two broods in a single restricted area. They select as a nest site a leafy spot, preferably in a bush or tree with small close-set leaves and twiggy upright branchlets. In between these branchlets, near the end of a branch or at its tip, they build a small purse-nest, almost a hanging



BREAST-SPOT WARBLER

Adult carrying spider to nest

bag, with a semi-dome over a side-top entrance. It is constructed almost entirely of small bits of yellow-green or grayish lichen cleverly bound together with spider web; quite often the web used has a yellowish spider cocoon attached to it and this is left on the outside of the nest. Bits of vegetable down may be worked in or little pieces of beard-lichen may be used. The frame is securely bound to the supporting twiglets with web. A lining of down from the seed pods of *Marsdenia*, *Ceropegia*, or *Asclepias* is felted in the bowl but is not carried up the sides or to the top. The inside of the nest is only  $1\frac{1}{2} \times 2-3$  inches high; the outside length is  $3\frac{1}{2}$  to 4 inches. The extent of the "dome" or porch over the top seems to depend on the degree of leafy coverage above and when this is thick, a "top" to the nest may be dispensed with, leaving it a deep cup. The nests are really distinctive.

One finds two or three eggs with equal frequency. They are rather elongate, measuring  $16-17 \times 11-12$  mm., and are pale bluish-green in ground-color with small but distinct red-brown spots fairly evenly distributed or slightly concentrated toward the large end, and sub-marks of ochreous-gray. Both birds share in the incubating and though the female does the major share I have frequently noted a male on the nest. The hen is a very close sitter. She sits with her head to the entrance but is so low in the nest that only the tip of her bill is visible. Incubation lasts twelve or thirteen days, but I have one record where fourteen days elapsed before the three eggs hatched. New-hatched chicks are very small, naked and pink in color. The hen broods them closely for the first three days. She is then fed by her mate but she always feeds the chicks first. A large offering may first be tried on one of the youngsters and if it refuses or can't manage it, the mother swallows it herself.

Both birds are fearless at the nest. I have often had to lift a mother off her eggs or new-hatched chicks to have a look at them, and her resentment is shown by fierce pecks at my fingers. The male, too, is exceptionally fearless. He may come to the nest and hop around it scolding, and his golden-yellow eyes look really fierce. The parents will feed the youngsters when one is only a yard away. When they come to the nest they utter a low chuckling note to which the youngsters at once respond by stretching their heads up, the little thin necks vibrating. I have often had both birds at the nest together and after disposing of the food both will await the voiding of excreta. I have seldom seen youngsters refuse food, but at one nest the visits were so frequent by both parents that on the eighth visit in ten minutes the chicks couldn't take the father's offering and he had to swallow it himself.

The young are fledged and ready to leave the nest on the fifteenth day. I have a record of seventeen days for one brood. They are rather more

greenish on the upper side and more buffy below, with more greenish wash on the flanks, than their parents, and they have only a trace of yellow on the breast and no black chest spot.

These little birds are often victimized by the cuckoo, *Lampromorpha klaasi*, and one nest which originally held three warbler eggs eventually had two cuckoo eggs in it.

In spite of the fact that the majority of the nests are well concealed and the material used blends so well with the surroundings, the percentage of loss during the egg stage is very high. Shrikes and tree-rats are the principal predators and tree-snakes come a close third. Most of the nests have the entrance directed outward, so if one finds an empty nest with a hole torn in the back the perpetrator must certainly have been a rat.

Two attempts may be made to raise broods during the long season, and I have records of a few nests in the short period at the end of the year.

### GREEN-BACKED SWAMP WARBLER or GRAY-CAPPED SWAMP WARBLER

*Eminia lepida hypochlorus* Mearns

This bird lives in the tangle of bush and creepers along the river banks; by swamps and around lakes; and in bush on a hillside, where permanent springs come trickling down in deep waterworn cuttings. Retiring and secretive, it gives its whereabouts away by its loud and penetrating, yet rather pleasant song and calls. It is usually found at or near water but it does not live in the dense reed beds and the impenetrable papyrus swamps, though one may find it on the margins. Wherever it is, you may be sure that water, even a trickle, is not far away.

I am fortunate in the diversity of environments which my little property at Ngong possesses. There is forest, bush, stream, lake, and grassland, and I have three pairs of these delightful birds which I watch with some anxiety, for in five years they have between them raised only four families.

They frequent a strip of thick tangled bush and creeper-clad thorny *Carissa* growing on either side of the stream bed. The stream runs in a heavily shaded deep waterworn cutting; it is damp and dark in places, and here they creep about and find plenty of insects to satisfy them. They seem to love the half-light of the stream bed, but they are not averse to searching the *Euclea* strip and the bush well up on the slope nor yet the thick secondary bush at the forest margins.

One hears their notes occasionally during the off-season, especially toward sunset, but at the beginning of March when the first rains have fallen they call vigorously, particularly in the early mornings and evenings.



GREEN-BACKED SWAMP WARBLER or  
GRAY-CAPPED SWAMP WARBLER

Male comes to nest

I have seen the birds in pairs throughout the year, and I think they stay together for the lifetime of one or the other. The two pairs by the stream appear to have agreed to remain each in its own stretch, one to the east, the other to the west, and they don't seem to infringe on each other's territory. When one of the males starts his reeling call it is at once replied to by the other. It is difficult to put the call on paper. It starts off with a loud trilling note, "Peurrrrrrrrr," then continues "cheo cheo chee chee chee, prit prit prit pri-r-r-riiiii." The notes are clear and incisive. I have also recorded it as "chree-e-eero, chi chi chi, p-eurr-r-r-r, chweri-chi cher-chi chip churrrrrrrrr." It is so distinctive that one cannot possibly mistake it.

I have not witnessed any extravagant courting display; indeed, it would appear that such is not called for in the case of two birds which associate

the year through. What I have seen in the early days of March is as follows: The male trills loudly as he sits exposed on a low branch, the female not far off. As he trills, the rufous throat expands and vibrates, and the flank feathers, which are long and fluffy, are puffed out. He stops calling suddenly and bends forward, puffing out the long feathers of the rump and back until they form a "puff" over his back, and this together with the flank feathers forms an almost complete ball of fluff around his body. He turns slowly to right and left, and his whole body quivers; then, relaxing, he droops the rump puff and trills loudly. As he suddenly darts toward the hen she slips away to the ground, and as he approaches her again she darts into the deep shelter of the stream bed.

The site of the nest is remarkably constant in type. It is usually at or toward the end of a pendent or semi-pendent slender branch of a tree or creeper from three to ten feet above the ground over a small open space, or it may be over water or a stream bed. Indeed it often has been so low over the stream bed that disaster has overtaken it when the water has come down in flood. In many instances the hanging spray has been a thorny one—*Carissa*, *Gymnosporia*, *Scutia*, and such like. The nest is free to swing with the motion of the supporting branch. I have only once found a nest attached at its sides to two upright saplings. The nest itself is a curious structure, very like an oversized, extra untidy nest of a sunbird. It may be attached at more than one point at the top. It is domed and pendent and has a slight "porch" and a decided "threshold." It is made of long strips of bark fiber, grass fiber and tendrils, and long strands of moss. These are not woven but are loosely interlocked, with the long ends hanging loose. Within this frame the body is built, again of long strands and pliable rootlets and moss. The entrance is to the top at one side and is protected by a perch; the threshold or lower lip of the entrance is formed by long strands of the body materials that are brought to the front and left dangling. Finer fiber is used as a lining and a few feathers may be added. The whole is so untidy on the outside that one might mistake it for a mass of debris caught up on the thorny spray. Especially is this the case when the nest is over the stream bed. It looks like a collection of flotsam brought down in flood and caught up by the overhanging branch! One nest which I watched from the beginning took two weeks to build.

Sometimes an old nest is reconditioned and occupied for two seasons. On one occasion an old weaver bird's nest was used: the entrance was reconstructed and long strips of fiber were added to the outside and left dangling, so that the nest was cunningly camouflaged. Both birds helped in the building of the nest, but the male was often heard and seen trilling while his mate worked.

The full clutch of eggs may be two or three. They are long ovals, pointed at one end. The color is variable: some are immaculate white, pink or blue; in others these ground-colors are sparsely spotted with dark brown and liver-colored markings evenly distributed, or with smaller spots in a tonsure at the large end. The texture is smooth; the size is 21-22 × 13-14 mm. Both birds incubate, the female doing the major share. The chicks hatch in twelve or thirteen days.

Knowing how retiring and secretive these birds are, I was rather surprised to find that if I kept perfectly still when watching them they would go about their nest building imperturbably. There was just an occasional "preee" note of awareness.

I found a nest by a small game trail leading to the stream. The nest faced directly south, away from the stream, and was at a convenient height (about five feet). The eggs were about due to hatch and I took the precaution of gradually building up a screen of *Euclea* close to the nest; then I erected a hide and camouflaged it. The hen was sitting, but she slipped off at my approach and scolded. The male was on the spot in a minute and he added to the protest. When all was quiet the hen came back and flew straight to the nest and disappeared within. The male stopped his scolding and remained hidden. I waited more than an hour. The hen sat on and the male had not put in an appearance. I spotted him perched on a branch above a pool in the stream bed, vigorously preening his bedraggled plumage; he had obviously been in for a dip. He flew off downstream and called in a few minutes; the female left the nest, flew to the spot and took a caterpillar from her mate. Then she flew across, alighted on the threshold, and dived straight into the nest. As she alighted, her impact set the nest swinging pendulum-wise, the movement being at least six inches in each direction at first. Soon the male approached through the creepers. He carried a large green caterpillar and flew straight to the bush in front of the nest. As he alighted, the hen left the nest. The male flew to it and entered, but he left almost at once. Thereafter, both birds came regularly and between 3 and 6 P.M. had visited eighteen times.

The next afternoon the birds were even more attentive; their visits totaled thirty in three hours. The female's visits came in quick succession, for some of the food was handed over to her by her mate.

The birds moved actively through the tangled vegetation, searching every crack and cranny in the bark of the trees, investigating innumerable curled-up leaves and clumps of suspended debris and prodding any rot-holes on branches with their thin sharp bills. If a spider was lodging within he was soon removed. Long-horn grasshoppers, leaf-like in appearance, failed to escape detection; young mantids which simulated twigs and



shoots did not deceive the acute vision of the hunters. The birds were silent at or near the nest but occasionally trilled in duet when they were hunting in the thick creepers downstream. I was surprised to note that geometer moth larvae were sometimes brought for the young, for many other insect-eating species seldom give this type of larva to the young, though adults eat certain species. Very few adult moths were brought, just the odd one now and then. After each feed excreta was voided and removed by the parents. I saw no evidence that it was eaten.

The rather characteristic form or shape of these birds was well shown as they balanced for a moment on the looped creeper before reaching the nest. The loose, long rump feathers and those of the flanks squared off the short wings and accentuated the thinness of the slightly barred tail.

Toward sunset the male would start his trilling song and quite often the female joined in. It is a song that is vibrant and expressive of the joy of living.

I have had hides at several nests just to watch the antics of these birds. Their actions are fascinating; tree-creeper-like and tit-like, yet different. Their shape, their bright plumage and curious "tonsured" crown, combined with the expressive song, makes them different.

When the young leave the nest at about the sixteenth day, they too are objects of interest. Their feathering is soft and downy and their tails are very short; as they sit huddled with feathers fluffed, they look like puff-balls. Their crowns are black and there is just a tinge of chestnut on the throat; the wings are rusty-tinged and the yellow at the gape is very noticeable.

Though the parents are quietly attentive at the nest they are noisily so when the chicks are out, for they fuss and chatter if one goes near. I think this must attract would-be predators, for the mortality rate is high.

These birds are double-brooded during the long season, from March to the beginning of August. I have no record of the species nesting in the late part of the year in the Ngong area, nor any suggestion of sexual activity. I have found nests in the Meru district in November and December, but in that area the long rains are at this period.

## BUFF-BREASTED ACACIA WARBLER

*Phyllolais pulchella* Cretz.

The attractive, flat-topped acacia trees, the "umbrella acacias," which grow along the banks of our rivers and around most of our lakes, have a special little warbler which frequents their spreading canopy and the clumps of young acacias of this and other species. This tiny little warbler

haunts these trees and finds ample food among their feathery foliage. It lives on the small insects which swarm on the tender shoots and buzz about the blossoms when the trees are in flower.

It is very difficult to see these tiny birds with the naked eye; one may see just a movement among the leaves. It is much easier to study them when they come to the younger trees whose shoots are full of sap. Hundreds of aphids swarm on the shoots and suck the juices and here too are small scale insects beloved by this little warbler.

It has always interested me to see how birds can move about the very thorniest trees without being injured, and it is even more astonishing to note how they utilize the protection of these thorns when building their nests. Outstanding examples of the use of plucked thorny acacia twigs are the nests of the buffalo weavers, who build a huge barricade of thorny twigs into a series of compartments and construct the nest proper in these compartments in such a way that one cannot possibly insert one's hand in the entrance of the nest without being severely pricked and scratched. An elaboration of this type of nest is to be seen in the superb glossy starling's nest; in addition to the thorny protection around the nest this bird lays barricades of thorns along the branch on which the nest is situated, rendering it impossible for an animal to approach along the branch.

The acacia warbler dispenses with imported thorns and selects a site in some vigorous acacia sapling whose thorns are long, acutely sharp and set crisscross and close together. Among a mass of these thorns the tiny nest is built. The nest itself is a work of art—a small purse-bag with the entrance toward the top at one side, made of closely felted vegetable down and small bits of scaly acacia bark worked in and secured with spider web. Most astonishing of all, use is made of acacia juice to help bind the felting. I was interested to see that one pair occasionally brought some sort of gummy substance and worked it in with the beak. This intrigued me greatly so I watched to see where the birds sought their material. There was a large acacia not far off, one of whose branches had been bored by beetles and was half broken through. A gummy juice was exuding from the injury. The little warbler collected a mouthful of the golden scaly paper bark from the trunk, flew to the exuding sap, passed his bill over it, collected a little, and flew to the nest. The powdery scale was wiped onto the felted side and worked in with the bill. This done, the bird wiped its bill vigorously on a near-by thorn. The whole procedure was so unusual that I spent more than two hours observing the pair to make certain that this juice was deliberately collected. They repeated the act several times.

The completed nest is very small, and one I measured gave the following: total length outside,  $2\frac{3}{4}$  inches; width at base, 2 inches; depth of actual cup excluding top covering,  $1\frac{1}{2}$  inches; entrance, just over an inch. The nest is



BUFF-BREASTED ACACIA WARBLER

Male at tiny purse-nest among thorns

big enough for so small a bird, however, for when the hen was sitting within no part of her was visible, for she snuggled down and one could actually see the felted material give to her movements. The nest is held in position between the thorns by bits of the felting and spider web that are worked around the supporting thorns here and there. The thorns protecting the entrance had the points so directed forward that I could not even put a finger into the entrance; yet the birds negotiated them without injury.

The eggs are very small, averaging only  $14.5 \times 10$  mm. They are white or have just a tinge of blue in ground-color and are sparsely spotted with red-brown mostly toward the larger end, with sub-marks of grayish-brown. Three eggs form a normal clutch, but I have seen one of four. The incubation period must be about eleven days, for the eggs in a nest I was able to visit a few times from the laying of the full clutch had not hatched on the eleventh day but chicks were present on the thirteenth day. At this nest the

birds were extremely confiding and they came and went without concern. While they were hunting in separate thorn trees, they maintained contact by calling to each other. The notes I most often heard were "zipzipzip," "cher cher chit," by the male, and a higher "tchit tchit tchit," from the hen. They were silent at the nest, except for an occasional low "tcher" of rebuke, directed at me by the male.

The last visit to this nest was early on the morning of the sixteenth day from hatching. I was surprised to find the youngsters still in the nest for they were well feathered. They had their heads turned to the entrance and one was half out of the nest. The parents were hopping about the nest tree calling excitedly. They both had food and one youngster hopped from the nest and went to take the food two feet from the nest; then another chick ventured out and he was fed. The parents went off for more food. They returned and fed the chicks in the tree, ignoring the one still in the nest. This was too much for the hungry youngster and he too hopped out. I passed the tree late in the afternoon and saw that the chicks had gone, but I traced them to another tree not far off by their calls; the parents were feeding them.

The youngsters are more yellowish than their parents and look very like young willow warblers.

### RUFOUS-FACED STUMPY-TAIL WARBLER

#### *Sylvietta whytii jacksoni* Sharpe

This is one of the "lesser" birds of our thornbush country, but it also occurs in open woodland, riverine fringing trees and marginal bush around dry forest areas. It is represented by two racial forms in Kenya, a coast race and a Highland one, very similar in appearance and identical in habits. These notes refer to the high country form.

The casual observer might not at first see this little bird as it hops about low tree trunks and branches, for its plumage blends remarkably well with the grays and browns of the bark. It carries itself in a hunched-up attitude; its head is held in between the wings and its body feathers are loose. Having hardly any tail it looks a dumpy little bird. One might almost describe its movements as creeping, for the little hops are so quick and short that its progression upward, along, under, and around branches and tree trunks does not appear at all jerky.

One usually sees these warblers in pairs, hunting the same tree together, one often following the other. They flit from tree to tree; commencing at the base, they work over the trunk, then onto the branches, searching crevices and lichen, curled leaves and clusters of dead ones for spiders and larvae.

They are usually silent except just before and during the nesting season. The call is short, just three to four notes, "sii si si seeeee," the last drawn out but not trilled.

The curious hunched appearance is not altered no matter in what position they may be. It gives them a characteristic outline that is unmistakable. They do stretch their necks out a bit when they feed their young. They show little fear of man and will go on searching a tree even though one may be close to or under it. Their food consists entirely of spiders and small insects such as moth larvae and smaller acridids.

The nest conforms to the general type of the group—a pendent purse-nest attached to a drooping fork or pendent spray where there is an angle from which to suspend the nest. It may be an angle formed by the crossing of two twigs. Though the material used may vary with the locality and type available, the nests do not vary in shape or general setting. The white-browed stumpy builds in a recess or bay; this one chooses a site toward the periphery of the nest tree, selecting an inner pendent branch which droops and is clear of the ground. The nest is from two to ten feet up.

Bark and grass fiber with a plentiful use of cobweb are bound about and across the fork and from this hangs the little open purse-nest with slanting rim. Most of the nests in my sanctuary have a grayish appearance because bark fiber, tendrils, lichen, bits of dead leaves and spider web galore are used. In the acacia country the grass rootlets and fiber are brownish, the flaky acacia bark is golden or brown and much of the spider web is yellowish; then the birds make use of acacia flowers, seed pods, acacia resin and small yellowish composites to camouflage the nest. The lining is usually felted vegetable down and spider web. Whatever material is used the whole effect produced is the same: a straggly mass of debris caught up in a twig and made use of by spiders.

I have usually found only two eggs in a nest, exceptionally three. They are ovoid to ovate in shape and white in ground-color, with spots, freckling and small blotches in gray-brown and dark brown with pinkish-gray to lilac sub-marks. The surface is smooth. Size: 17.6–19 × 12.5 mm. The hen does almost all the incubating over a period of not less than fourteen days.

The newly hatched young are very small and generally pinkish, with a brown tinge to the dorsum. The mother spends most of the first three days in brooding; she is fed by her mate. Later on, both parents attend the chicks, but at one count I found that the hen made seventeen visits to twelve by her mate.

Food brought for the youngsters consists of spiders, moth larvae, small moths, and large soft scale insects such as mealy bugs. Sometimes quite large larvae are brought but they have to be pulped before being handed over. The nestlings grow rapidly and when the time draws near for them to

leave they spend the time between feeds in preening themselves and exercising and stretching. I have no exact record of the nestling period, but one nest first located with newly hatched chicks gave seventeen days. For the first few days, the parents deal with all excreta by swallowing it, but later it is carried away and dumped.

### WHITE-BROWED STUMPY-TAIL WARBLER

*Sylvietta leucophrys leucophrys* Sharpe

In June, 1940, when I had but recently taken up residence in my sanctuary, I found a single white-browed stumpy-tail giving a little piping call ending in a trill: "stree chi chi chirrrriiiiiiii." Though I often came upon this solitary mite in the thickest tangles of the forest there was no sign of a mate. Not until December were two birds encountered in a distant part of the forest, but they gave no indication of nesting. Two years of drought followed, and the nesting seasons were badly upset and delayed.

I went through my forest with a "tooth comb" as it were, and was rewarded by locating two pairs. In June one pair commenced nesting within a few yards of my house. Just behind my bird-bath there is a thick tangle of *Scutia* and *Toddalia* growing over a *Grewia*, the whole forming a little arbor. It acts as a refuge for the small bathers when a goshawk occasionally swoops down after the birds. The site chosen by the warblers was a thin pendent spray of thorny *Scutia* which ended in a fork, and in this was the mere beginning of a nest. Strands of tree-moss and spider web had been entwined on each arm. The spray was in a little recess in the outer contour of the creepers. It was protected above by thick foliage but the spray itself was free for about two feet all around. Both birds took part in the building and as they sought for material, the male often trilled his little song. Gradually the nest took shape and when it was about three-quarters built I inspected it. The space in the fork had been filled with a network of strands of moss, fine beard-lichen, spider web and fine bark fiber, and a small, deep cup hanging from this triangle had been made of the same materials. The frame of the cup was still a fairly open network. While I stood looking at the exquisite bit of work, both birds came into the creepers, each with a strand of material. They were not more than a yard off. The male made a low note of protest but otherwise showed no fear. Moving back a pace or two, I watched both birds come to the nest and begin threading and twisting the strands into the framework of the cup. For over an hour the birds came and went and took not the slightest notice of me.

Each day there was a noticeable increase in the bulk of the nest; it was now a hanging purse-nest with the top and one side open. The interstices of



WHITE-BROWED STUMPY-TAIL WARBLER

Adult at nest

the framework had been filled in with strands of moss, spider web, small bits of dead leaves, and flaky bark; long strands of moss hung down from the outside of the nest and longer ones dangled from the bottom. The front rim of the cup was thickened up, and on the tenth day a lining of fine bark fiber was added. The nest was complete. It looked like a bunch of moss caught up in the thorny creeper.

The first egg was laid on the fourteenth day, the second two days later. Then the hen began to incubate. The nest was just about on a level with my eyes but I couldn't look into it. On the occasion when I went to see if the second egg had been laid I reached forward and gently put a finger into the nest. I felt something soft. I fetched a box and standing on it looked into the nest. There was the little bird sitting deep, head to the back and bill straight up. She didn't move. I had never seen a bird so tame. I went to see if she was safe every third day. If I gently tapped the side or the nest she would look over the front edge then turn her head away. The two eggs were a lovely pink with just a suggestion of mauve and were spotted with red-brown and maroon mostly toward the large end. It was not until the sixteenth day that the first youngster hatched. On some of my inspections the bird sat with her head turned and buried deep in the loose scapular feathers. One could not tell that a bird was sitting in the nest, so well did the plumage blend with the inside of the deep nest.

The birds were so tame that I did not require a hide. They came to the nest with tiny caterpillars taken from crevices and under bark, and they searched curled-up leaves and extracted spiders and moth larvae. Visits to the nest were frequent. I fed the hen with small larvae as she sat brooding. I was interested to note that very young nestlings had rather peculiar nostrils which projected almost like those of a young cuckoo.

There was a very cold spell toward the end of July, with slight frost at night, and many young were found dead in their nests. The little warbler suffered, for one chick died. The remaining youngster did well up to just over a week; then one day I found the nest empty. I suspected the shrikes for I had caught them at a zosterops' nest not far off.

During the next few months the birds hung around this same corner of the forest. They were silent for the most part, but as March came round again I heard their familiar call frequently of a late afternoon. I traced the male by his lively calling and saw the two birds and witnessed their mating. I had removed their old nest in late December, as I wished to study it in detail, but I had not removed the whole spray. The cut end had now thrown out shoots and another fork was ready should the birds return to the exact spray. One day, sure enough, there were little strands of fiber and moss bound to the prongs of the fork. A call ending in a trill made me



glance toward the creepers and I saw the mate flit to the spray and add the strand of moss he had brought.

The nest was eventually completed by April 13, but the hen was still putting finishing touches to it. She sat inside and turned around several times; then she pushed hard at one side with her breast, came out and pulled and pushed at the material, hopped inside again and tried it anew. She pulled bits of moss out here and pushed them through there, and then settled down.

By the sixteenth two eggs had been laid. On April 21 I viewed the nest, and tapped gently with a twig; she popped her head round and looked. On April 30 I called again, and to my gentle tap she made no response. I saw she was sitting snug and low down but wouldn't move. I spoke to her and stroked her head and back, but she just closed her beady little eyes. I put a finger under her and eased her up until I could see the eggs. They had not hatched, and it was now fifteen days since the last was laid. The chicks emerged on May 1. The hen brooded throughout the first day and was fed by her mate. On the third day the male was coming freely with small spiders and tiny caterpillars, and the hen took short spells at hunting. Both birds were busy feeding the young throughout the fifth day and hardly brooded them at all. The parents hunted through the bush and about tree trunks around the nest site, spying into crannies and curled leaves and flicking up bits of lichen to see what was under them. As soon as an insect was caught they flew to the arbor and hopped through its twigs to the nest.

Other little birds are very tame but none are as tame as this warbler. On one occasion, when I was tilting the nest a little to get a better view of the youngsters, the hen bird came and perched on the side of the nest. She fed the chicks and flew off. I saw her coming back and placed a finger on the front of the nest. She paused just a moment with head cocked to one side, alighted on my finger, and fed the youngsters.

By the tenth of May the two youngsters filled the nest, and to see how the mother brooded at night, I visited the nest just at dark; she was perched on top of the chicks with her head and bill pressed into the angle of the fork.

The young warblers grew apace. By May 16 they were getting active and stretched up well whenever the parents brought food. There was no need for the parents to come to the front of the nest; they stood on the arms of the fork to feed the youngsters. Two days later one youngster was already in the creeper at noon but they were both in the nest that evening. Next day they had vacated altogether and were traced to coverage near by. I lost track of them a fortnight later.

On July 7 the parents were carrying nesting material to a *Rhus* tree with drooping trailing branches, about thirty paces from the old nest site. As

before, the nest was in a little recess or bay in the outer contour of the tree about ten feet above the ground. The nest was completed and held two eggs. They lasted just one week and were taken by a pair of shrikes which had a nest near by.

I have mentioned elsewhere that for some reason or other several of the birds in my sanctuary nested again in November and December; these warblers were among them. They selected the *Rhus* tree once again. All went well, and the youngsters duly hatched. But one day as I approached I saw a *Dryoscopus* drive the mother off. I dashed in and drove the shrike away. I thought I had given him such a fright that he wouldn't return, but next day the nest was empty.

A young white-browed stumpy-tail warbler is very like an adult except that it has no white eyebrow and is washed with yellowish on the under side.

### YELLOW-BELLIED GRAY WARBLER

*Eremomela griseoflava abdominalis* Reichw.

This is a small, rather inconspicuous warbler of the *Acacia-Combretum* steppe country. It is silent for the most part and it moves with little hops and short flights from twig to twig and among the leaves, as it seeks small insects, mostly caterpillars, on which it feeds. It is somewhat tit-like in its actions but is less restless and less vociferous than the tits. In many ways it resembles a white-eye (*Zosterops*). One may occasionally see a small party of four or five, but this group will be made up of two adults and their offspring; single birds are more often noted, or perhaps a couple hunting through the foliage of some large-leaved *Combretum* or searching the feathery leafage of an acacia.

Birds of the acacia country are more active in the early morning or late afternoon. During the heat of the day they sit silent within the leafy shade of some large tree.

In the nesting season one hears the high twittering call of this warbler. The general run of trees in the *Acacia-Combretum* country is small except along the river and stream beds, and the nest is in low stunted trees three to six feet from the ground. It is best located by watching a pair of birds. The little nest is highly cryptic—a small cup slung in the cleft of a horizontal fork. It is made entirely of cobwebs, with gray, white and yellow lichen meshed into the strands, and here and there small, scattered bits of bark and acacia fluff and scaling; the inside of the nest is lined with vegetable down. The body of the nest is secured to the supporting twigs by strands of cobweb, and if it is in an acacia the strands of gossamer may be twisted around supporting thorns. The "anchorage" looks insecure and I



YELLOW-BELLIED GRAY WARBLER

Male leaving nest

have known more than one nest to come adrift, in part anyway, under the weight of a brooding parent and three lusty youngsters.

Three small eggs form a normal clutch; there may be only two, and four are unusual. They are whitish in ground-color with rather sparse gray, black and liver-colored spots and marks, mostly concentrated in the form of a zone around the larger end. Some eggs may show a slight bluish tinge to the ground-color; size 15.8–16 × 11.5 mm. Incubation lasts about twelve days and the hen sits very close. At all times exhibiting little fear of man, a sitting bird will allow one to touch and stroke her as she broods. She may then leave her nest but will perch on a branch within a yard or so

and scold, "chee-chiri, chee chiri chit." This will cause her mate to appear and both will scold; a variant note is "chee cheechiri-twit." If one retreats a few feet, the hen will return to her nest at once.

A sitting *Eremomela* is almost invisible; the cup nest is deep and she sits well down, with bill and tail almost vertical; the curious gray of her upper side blends with the grayish cobweb-bound rim of the nest and its silvery-gray lichen.

The young also blend into the nest, though their grayish uppers have a slight greenish tinge. The young remain in the nest from twelve to fourteen days if not disturbed. They are fed entirely on insects, moth larvae predominating, and they seem to have insatiable appetites. I spent a whole day at one nest containing three young, and the parents were kept busy all the time bringing food and clearing away excreta. A little of the excreta was swallowed by the parents but most of it was dropped at a distance from the nest. The distribution of food was remarkably fair. On the arrival of a parent the little necks were upstretched and quivering and the gapes were held wide open.

Once the nest has been vacated the youngsters do not return to it. The parents usually have to coax them to leave it. After a visit or two with food, the next supply is withheld and the parent perches on a twig a little way from the nest and with full beak calls to the young. A little fluttering of the wings, a stretching of the legs, and one youngster hops onto the branch by the nest, to be followed perhaps by another. Then the parent flies to a near-by bush and again calls. I watched the whole process at one nest and I could detect no difference in the call note of the parent; yet the chicks instinctively knew what was required of them. When drawn into the shelter of a small tree the youngsters wait within it for the visits of the parents. It is only when they are strong on the wing that they separate or follow their parents about.

### GREEN-WINGED FOREST WARBLER

*Camaroptera brevicaudata aschani* Granvik

(*C. b. abessinica* of Sclater)

If you take a stroll through any of the Kenya forests, avoiding roads but keeping to game trails and native paths, you are certain to come across this little bird; attention is first directed to it by its curious note. If the nesting season is on, you will hear its note of anxiety—"kiwert kiwert" or "chee-ack," perhaps accompanied by a curious clipping of the wings—indicating a nest or fledglings somewhere in the vicinity. If you sit down and remain still you will see a small dark bird hopping alternately between the ground



GREEN-WINGED FOREST WARBLER

Male at nest

and the herbage, its wings held slightly down and its tail cocked up, wren-fashion. It isn't easily scared for it seems to appreciate the fact that the thick coverage it frequents is sufficient protection under ordinary circumstances.

The birds usually go in pairs. If the breeding season is near at hand you will probably hear the male calling or perhaps chasing the female. He sits on a branch and calls "chitip chitip chitip," moves up and down, droops his wings and cocks his tail well over his back; then he dashes toward the hen with clipping wings. She makes off and alights on the ground and faces him as he comes after her; she waits until he reaches her; then she slips into cover, clipping her wings loudly; and so it goes on, in and out of the bush and sometimes up into the taller trees—but always the clip clip of the wings. A rival male may be attracted and for a while the two males will fight, pecking at each other as they sit on the ground; then one will go off, calling and clipping his wings, and come up to the top of the undergrowth a little way off and call. The fight may be renewed. At last one

retires—probably the one who intruded—for although pairs keep to their own area, territory may adjoin, and the males are not above having a little scrap occasionally. They seem to enjoy it just as much as the female enjoys trying to evade the male, though they have been together throughout the off-season.

The great majority of nests are built quite low—sometimes just a few inches above the ground, more usually two feet up, and very occasionally six feet up. All nests conform to a type. These birds are in truth veritable “tailor-birds.” They select a site where there are herbs with large leaves, maybe a composite or a labiate, or perhaps an acanthaceous plant—some plant whose leaves are large and do not drop readily. Two leaves, perhaps more, are perforated just within the edges and stitched together with cobwebs and bark fiber so that the sewn leaves form a “purse” with a small opening on top and on one side. Sometimes a separate leaf is brought down and stitched over the top to form a dome. Within this pocket the nest is constructed of fine strands of bark and grass fiber laid in circllets; some ends are pushed through the leaves to hold them in position. Many of the forest pairs are content with just a fiber lining, but where composite or asclepiad down is available the birds are sure to use this in addition to the fibers. A well-constructed nest will show none of the inside lining, whether it is fiber, wool, or down; the leaf porch comes over and obscures the entrance, so that one may easily overlook a nest that has been cleverly stitched.

Some of this softer lining may be added during or after the laying of the eggs, and I have not infrequently taken advantage of this to induce a pair to reveal the whereabouts of their nest. In the case of this warbler, I bait with kapok or asclepiad down, just as I use feathers from an old “eider-down” quilt for species which like feathers. I bait the area for a day or two and if the bait has gone by the evening I assume the birds have taken it. I bait again next day but sit down quietly, keeping an eye on the bait. Nine times out of ten, the lure succeeds.

In times of drought, the forest undergrowth suffers and takes quite a time to recover sufficiently to give good coverage for these birds; at such times we find them seeking sites that are higher than usual, in sapling dombeyas, in *Vitis* creepers, or in passion vines, to a height of twenty feet. These are unusual sites, for the majority are in the undergrowth. The eggs are rather elongate, 17–19 × 12–13 mm., immaculate or spotted, the ground-color blue, white, or very pale pink; if spotted, the marks are black or very dark brown to red-brown. Usually they are sparsely distributed, but if they are small there is often a “tonsure” about the larger end. Three eggs form a normal clutch, two are not infrequent, and four an exception. Incubation is carried out by both birds but the hen does the major share; it lasts twelve days.

The birds are very sensitive about their nest, and the male always gives a warning when one is quite a distance from it. This warning is a rather abrupt "cheeaek" that changes to a long-drawn "tschiiiiii" which has almost a mewling character about it. If really agitated, as when the fledglings are just out of the nest, the male will deliberately draw attention to himself by calling and clipping his wings and moving farther and farther away in the hope that the intruder will follow him.

I have found the birds to be rather timid. They are very close sitters and seldom leave their nests unless forced to do so. Their attention to the youngsters is very marked. I did a count of visits at one nest and within an hour both birds had visited the nest twenty-five times between them. It must be remembered that small warblers seldom collect more than one insect; having secured it they come to the nest at once. Food of the type they like is usually plentiful in the undergrowth. I have noticed that they collect much of their food on the ground. They search among the leaf debris, prying under leaves and twigs but not flicking them over as a thrush does. They also search in the spaces between root buttresses of large trees. Moth larvae, nymphal mantids, acridids, spiders, and "white ants" are freely given to the young.

The parents are meticulous about removing excreta and will give the youngster time to turn and evacuate before they leave the nest. The excreta is dropped well away from the nest.

There is a short time lag between hatching and quilling, but after that, feathering is rapid and the young are ready to leave after about sixteen days. They differ in color from the adults; the lower surface is often sulphur-yellow, the tail is more greenish, and the bill is always brownish-horn. The plumage is soft and fluffy.

The principal nesting season is between March and July but odd pairs may also breed in the short season from November to January. Though strictly birds of open forest and forest fringes many may be noted in the bush below trees fringing rivers and lakes and in gardens where coverage is good. In times of drought they hop about the edges of lawns and around shrubs, and when the forest floor is very dry, they ascend to the mid-growth in search of food. There are times when insect-eating birds are hard put to it to find sufficient food.

### MOTTLE-BACKED BUSH WARBLER

*Cisticola hunteri prinioides* Neumn.

The habitat of this species is the bush near streams and swamps, along the margins of lakes, and on mountain hillsides. Its habits are the same wherever we find it. Most noticeable of all is its habit of "duetting." When



MOTTLE-BACKED BUSH WARBLER

Male leaving nest

one pair starts, adjoining pairs join in and several along a ridge or around a swamp may contribute. The call is very distinctive. One bird starts loud and trails off, "pitiit--y-ri-ree, pirit-y-ri-ree"; the second bird answers, "pirrit-ti-ti-pirrit-ti-ti," followed by a sharp "whit-sii whit-sii-twer, whit si whit-si." This call is made from the tops of reeds or bushes. When the birds are hunting deep in the bush one may hear a more throaty warble, the male calling "whi-chu-wou-itthri, rirrrrr," to which the female replies "chii-cheedle-lu-u-u-whit." I have abbreviated the calls; they are usually repeated several times. In the evening the calling is again at its height and may go on almost to dusk. The birds lack the nervous disposition of the brown-headed bush warblers; the calling seems a spontaneous expression of *joie de vivre*.

The birds are actually very retiring and keep to thick cover. Were it not for their trilling call one might easily overlook them. When I came to reside on my Ngong property I found a few pairs in residence. The mist some-



times lingers in the valley by the stream, and out of the mist one hears the joyful trilling. I think the mist and dampness of that strip keep these birds here.

The nests may be from just a few inches to four feet above the ground. They are fully domed, ball-shaped, built within an herb or between a woody herb and a tuft of grass, and supported below and on the sides of vegetation but not slung to it, though adjacent grass blades may be brought over and interlaced loosely into the dome. The nest, which is made almost entirely of dry and discolored grass blades, resembles a mass of leaves and debris. The camouflage is extremely good. The entrance is a large one about halfway up the side, and is covered by the untidy dome; from the lower part of it long strands of grass hang down. The inside of the nest is heavily lined with fine grass and grass fiber, copious layers of vegetable down, and a plentiful supply of feathers. This feather lining is unusual in the genus *Cisticola*.

The mottle-backed warblers scold when one is near their nest, but there is no fluster or vociferous calling.

There are two main types of eggs: (1) a pale blue ground-color with bold red-brown spots which may be mostly at the larger end or evenly distributed; (2) a pink ground-color and bold red-brown or maroon spots. An unusual type laid by one pair is sky-blue with maroon marks. By these variations I can tell which pair is occupying a given area or which of them is nesting a second time in one season or in the late breeding period at the end of the year. A clutch of three seems normal, two only may be laid, and four are very rare. The size is 16-17.5 × 11-12 mm. The incubation period is twelve or thirteen days, and the female does most of the sitting.

At one nest with three young, I had been in a hide for some time and the parents had come freely and regularly. Suddenly the male scolded some ten yards away before coming to the nest, feeding, and leaving. The female now sat in a bush calling. This was most unusual. Soon a mongoose appeared below the nest, reached up, poked in his head, and pulled out a nestling. I shouted, and the mongoose dropped the chick and ran. In a moment the birds were feeding the two remaining young as if nothing had happened. Soon the birds called anxiously. Sure enough, the mongoose came back, grabbed another chick and made off with it. The parent birds had returned but were now much perturbed; there was only one chick left. The male fed the youngster, but the female perched on top of the hide, flew to the nest and then back to the hide and then back to the nest and up to a bush. Here she was joined by her mate. She was fidgety and kept on calling. Suddenly that wretch of a mongoose slipped in and grabbed the last youngster.

I knew of two nests of brown-headed warblers not far off, each with three young of the same age as the youngsters which had been taken. I told my boy to get one from each nest quickly. He was back in a moment and the chicks were put into the nest. I was still in the hide and waited expectantly. The parent birds came back. The female perched on a bush, but the male came to the nest, perched on an upright and craned his neck to look into the nest. He gave a low call and both birds went off and in a few seconds returned with food; feeding went on as though nothing untoward had happened. Two hours went by and the foster chicks fared well. Moth larvae and small moths, young mantids, nymphal grasshoppers, one lycaenid butterfly, a geometer moth, and more and more caterpillars were supplied. The birds seemed content. Were they really deceived?

The youngsters were snug in the nest next day, and twice after that I had sessions in the hide and saw them make their first venture into the bush. They were still with their foster parents a week later; then I lost track of them. They may have met with mishap, for the parents commenced another nest, this time near a pond, and here they reared three youngsters who left the nest seventeen days after hatching.

Young in first plumage are very like adults, but they have a larger black smudge in front of the eye and the body feathering is fluffy and rather strongly mottled above and yellow-tinged below. The bill is brownish, not black as in the adult.

### BROWN-HEADED BUSH WARBLER

*Cisticola cantans pictipennis* Madar.

All through the Kenya Highlands there are areas of bush growing in clumps in vlei land, on margins of forest and swamp land, and on the hillside and on land lying fallow after cultivation—areas where the rainfall is usually good and the herbage profuse. These are the habitat of the brown-headed bush warbler. It makes its presence known by its readiness to perch on a bush and scold vociferously if one has intruded on its hunting ground. As it calls it moves its body up and down, flicks its wings, and flirts its tail.

To put the male's call notes on paper is difficult. The usual call one hears is "plea-yip, plea-yip si plea-yip" and "chiro chiro," alternating with "which is it, which is it, pich-ii-pii pichi pii," then changing to "whit-cho-ki, whit-cho-kii" and ending with "mischif mis-chif mis-chif." Here are others: "tok-ith-lii, tok-ith-ii, plee-ship."

The nest is in a patch of woody herbs or a small bush with broad leaves, such as *Vernonia*, *Solanum*, or young *Aspilia*, and is built between two or more uprights and attached to the leaves. It is seldom more than two feet



BROWN-HEADED BUSH WARBLER  
Male carrying long-horn grasshopper to nest

off the ground and is well hidden in a little clump of leaves loosely stitched together and to the nest. The nest is a domed structure of grass and bark fiber loosely interlaced with spider web, and in the bowl and partly up the sides is a lining of down. The entrance is large and to one side. The amount of vegetable down or fluff will depend on the degree of incubation of the eggs. The eggs may be laid when there is little down, but it is added to from time to time; often the male carries down to the sitting hen, who takes it and puts it in position. An average nest is about  $5\frac{1}{2}$  inches from top to bottom and 3 inches wide; the depth of the cup from the front lip is about 2 inches. The bulk often depends on the amount of material used between the leaves. Occasionally a nest has only a few narrow leaves on the outside.

The eggs are very variable; they may be white, pink, blue, pale greenish-blue or pale greenish in ground-color; they may be finely and evenly freckled with gray-brown and red-brown or they may have the spotting concentrated toward the larger end. A clutch of three is common, two are frequent, and four are occasional. They vary in size: 16.5–19 × 11.5–12 mm. One clutch measured 19 × 14 mm. The hen sits close after the first day or so and incubation lasts from twelve to fourteen days. The male often assists.

Pairs have their restricted ranges where they hunt for food, capturing most of it in the herbage just above ground level. They frequently hunt in clumps of grass. The territory is jealously guarded by the male. The bulk of the food is made up of lepidopterous larvae but small moths, small grasshoppers, crickets, and weevils are also brought, and once I noted a small skipper butterfly fed to the young.

Visits to the nest are frequent. At a nest with two youngsters, the hen came eight times and the male five times in half an hour. Though the male does his share, he is never too preoccupied to keep a sharp lookout for intruders.

The youngsters feather up rapidly but seem in no hurry to leave the nest; sixteen days in the nest is frequent, but bad weather may delay the departure. To witness the exodus, I have gone into my hide very early on the sixteenth day. One or more of the youngsters will be on the "doorstep," so to speak, awaiting the arrival of food. One may even have fallen out and scrambled back. The parents come with food. Perching a little way off, they call and hop from stem to stem; they even come to the entrance and fly back to the bush. As soon as one youngster has ventured to take the plunge he is rewarded with food. The others may be ignored for a while, but they get hungry and in time flutter out. They are hardly able to fly, but there is little need for them to use their wings except for balancing, as they hop about the herbage.

I have a record of one pair which nested three times during a long season; their first two clutches were taken by predators; at the third attempt they raised two youngsters. Some pairs nest during the short season, but I cannot say with certainty that they are birds which nested in the long rains. Until we get evidence that a marked pair does nest twice a year, that is, in two seasons, we can only record that the species may be found nesting in both seasons.

The white-breasted cuckoo sometimes lays its eggs in this bird's nest. It may destroy one or more of the original eggs, or it may leave them, in which case the young cuckoo ousts the other youngsters.

## RUFIOUS-FACED BUSH WARBLER

*Cisticola erythrops sylvia* Reichw.

The habitat of this warbler is the herbage and bush growing near somewhat damp places such as swamp land and the margins of rivers and streams, secondary bush in forest clearings, and forest margins.

These birds are rather retiring. They keep to the more dense herbage, seldom exposing themselves; if disturbed, they escape observation by skulking in the thick cover. Just sit quietly and sooner or later they will show themselves. If the nesting season is near, the male will stand on top of the bush and call loudly. The first note will be clear and incisive: "peet . . . cher-a-peet, cher-a-peet, chur-wit-pit, chur-wit-peet, chur-wit-pit." After calling, he will drop down into the bush, and presently one will hear two birds duetting: "tik-ra-ra . . . twit, tik-ra-ra . . . twit, ra-wit ra-twit twit twit," the "twit" being that of the hen.

It is not always easy to locate the nest unless one of the birds is carrying a bit of fluff or food to it; but fluff-carrying does not necessarily mean that the nest is under construction. The fluff lining is often added to after the eggs are laid, and, moreover, I have frequently noted that the gathering of nest material, fluff, or twig is a nervous reaction to being watched. I have often taken advantage of this and have "baited" the area where I have suspected the nest to be.

This warbler builds a nest of distinctive type; its eggs also are fairly easy to distinguish. The nest is usually in a woody herb with broad leaves, a *Solanum* for preference, for large leaves are an indispensable component of the nest structure. Two or three leaves are stitched together with cobwebs for about three quarters of their margin, leaving about two inches free on one side of the stalk. A leaf cup or cradle is thus formed. More spider web and some grass fiber are pushed in and out to strengthen the joints; then vegetable down from *Asclepias*, *Marsdenia* and *Senecio* is used in quantity to line this cup, but it is not carried far up the sides and the overhead portion of the leaves. The base of this felted down may be three quarters of an inch thick. If the leaves are large, little or no inner material is visible from outside. The nest is then like a leaf ball that has a quarter of the top side cut away and is suspended by two stalks; possibly a leaf overhangs the entrance. Hardly any grass is used in the inside and this helps to distinguish the nest of this species from others of somewhat similar outward appearance. The site is well concealed by surrounding vegetation. Both birds take part in the building.

The full clutch consists of two or three eggs, pale blue or greenish-blue boldly and sparsely spotted in brown, with sub-marks in lilac or blue-gray. The size varies a little but average eggs measure 17 × 12 mm. The

female does most of the incubating and sits for twelve days. She is frequently fed by the male. The sitting is not continuous at first; there are often short spells off in the morning and evening, but the longest breaks seem to be in the late afternoon between 5 and 6 o'clock. The hen often returns with a bit of fluff. Periods off become less frequent as incubation advances, and when the eggs are due to hatch the female sits tight and often refuses to budge.

The chicks are hatched naked and for the first two days the mother broods them closely and the male attentively supplies food. I have noted that these birds show more solicitude for their young than most warblers, with the exception perhaps of the mottle-backed (*Cisticola hunteri*).

As the birds hunt through the thick herbage they communicate with each other by low calls; the male not infrequently climbs to a bush top and trills and the hen joins in. The male usually notifies his readiness to return with food by a low call, and both birds may arrive at the nest together. Should the hen be at the nest feeding the chicks when the male arrives, he hands his food over to his mate and she feeds it to the youngsters. When the fecal matter is small, as during the first day or two, it is swallowed; thereafter it is carried away and dropped some distance off.

The rate of feeding morning and evening at two nests observed worked out at a visit every ten minutes during two and three hours. Small imagoes and larval moths, nymphal acridids, and mantids were freely brought. If an insect was large it was passed backward and forward across the bill and rendered flaccid before it was offered; if still too big it was swallowed by the parent.

The approach to the nest was always through the herbage, but when feces were taken from the nest the birds flew away with them.

The young leave the nest on the fifteenth or sixteenth day. They are rather paler above and below than their parents, and more buffy about the head. When they sit hidden in the bush the parents are very concerned for their safety. If you approach the spot where they sit hidden, the male will perch on a bush calling anxiously and flicking his wings and fanning his tail so that the pattern of "mirrors"—the dark subterminal bar and whitish tips—is plainly visible.

The young are difficult to locate, for they have the habit of dropping down to low cover or even to ground when an alarm is given. They will remain with their parents for some time after they are able to fend for themselves. Parties of five may be seen, but the youngsters can always be picked out by their paler, softer plumage.

The nesting period in the Ngong area is from March to July in a good season, when two broods may be attempted.



RUFOUS-FACED BUSH WARBLER

Male emerging from nest after feeding young, as female arrives; note stitching of leaves of nest

## LESSER STREAKY-BACKED GRASS WARBLER

*Cisticola galactotes nyansae* Neumn.

These little birds are truly fascinating creatures. In eastern Africa there are four races, all very alike in habits but differing in color and size. The one I deal with is the bird of the Kenya Highlands and the Lake Victoria Basin. It is a bird of rank grass and reeds in the vicinity of lakes, swamps, and rivers; of low-lying land where lush grass and reeds flourish for a time in temporary water pans. It lives along the margins, disappearing deeper into cover if disturbed, but climbing again to the grass tops to look around and scold loudly. Its note is a sharp "chit chit," changing to a louder "prit prit prit" if it is alarmed, when it slips down from its perch and disappears.

One often hears it calling from the margins of the swamps an oft-repeated "chirriiii." This is its hunting or directional call and is often used to collect the young when they are out of the nest. Part of the courting call, usually uttered after the male has displayed and carried out his upward flight and fluttered down with clicking wings and expanded tail, is a low "whoit-whit, whoit whit," just as he alights; the "schrrriiii" note that follows is almost like the ratchet spring of a watch passing over the cog as the spring is wound.

This little warbler is not likely to be confused with any other, with the exception perhaps of the following species, *C. robusta*, which is larger, more robust, and not so boldly striped; also, its head is not so rufous. Besides, it has a different habitat.

The birds are not much in evidence during the off-season. There is some evidence of a local movement from temporary breeding places to the more permanent reed beds and river sides.

The "ball nest" is constructed between and attached to upright stems of strong grass or reeds; adjacent grass blades are brought down and incorporated into the body, which is made of dry grass blades. The whole structure is rather loosely interlaced but held together with cobwebs and long strands of vegetable down. Spider cocoons, flaky acacia bark and small composite flowers may be incorporated in the outer layers of the frame. The inside is thickly lined with vegetable down, especially in the bottom. The nest is thus fully domed, with the entrance to one side. The height from the ground varies from a foot to two feet up—occasionally higher if the nest is on a bank. Sometimes it is built in swamp grass and reeds standing in water, and I have known a nest in such a situation to be swamped out after a storm. The nest may be in a grass tuft, well up in the stems. An average nest will measure about 4 by  $3\frac{1}{2}$  inches, on the outside. The entrance is in the upper third.





LESSER STREAKY-BACKED GRASS WARBLER

Parent carrying beetle grub to nest

The eggs are not variable to any degree: shape rather round, almost oval, slightly more pointed at one end; ground-color pink with fine reddish-maroon spots evenly distributed; texture smooth and glossy; average size  $15 \times 12$  mm. Five are an unusually big clutch, but four and three in about equal proportion are common. I have nearly always found the hen on the nest and suspect that she does the major portion of the incubating, which lasts twelve or thirteen days. The newly hatched chick is very small and delicate pink in color, with a conspicuous yellow gape and pink feet.

The female is slightly smaller than the male but otherwise very similar. She is a good sitter; the male is ever on the alert and gives a warning if one is near the nest.

It is a delight to watch these birds at close quarters. One is soon aware of their extreme agility. They pass through the tall grass and reeds not by hops but by straddling from stem to stem or blade to blade; they are experts at balancing. They can keep the body horizontal when they are holding onto a stem with only one foot and just touching a stem below with one toe. They often assume an upside down attitude; that is, they grip an upright stem and swing the body head down and parallel to the stem so that they can pick off an insect below. The tail is often raised and fanned just as they approach the nest. One then realizes how conspicuous the tail pattern is.

They come to the nest by working through the reeds and grass stems behind and to the side of the nest; then they approach the entrance either from below or above. They never come directly to the front. I found the birds to be rather shy, but they are birds of cover and naturally are nervous when the vegetation in front of their nest is opened up. Parent birds seldom range far from the nest and all the food collected comes from the vegetation within twenty yards of either side of the nest. Moth larvae, nymphal grasshoppers and mantids, spiders, and very small snails are brought to the nest regularly; occasionally newly emerged, soft damsel flies are offered.

The common and harmless (to man) green grass snakes are frequent in grass and reeds by water, and though they live largely on small tree-frogs, I suspect that they take young unfeathered birds. A beautiful specimen slithered through the grass toward a nest I had under observation and came just above the nest, when the male bird saw it and fluttered above it. The snake glided on with remarkable facility, passing over grass blades and stems without even shaking or depressing them.

The nestling period appears to be between fifteen and seventeen days. The young feather fast after the first few days and when almost ready to leave the nest they spend the time between feeds in preening. When one starts its toilet the others follow suit. It is often amusing to watch one or another trying to get to the top in a crowded nest.

The fully feathered youngster differs from his parents, for the crown is tawny like his back and is heavily striped; the wings are rusty-edged; the margins of the tail feathers are broadly tawny-buff and the "mirrors" less distinct. The under side differs also, for the throat and breast are yellowish and the abdomen and flanks are sandy-colored. The subadult plumage is nearer that of the adults.

This bird is really a long season nester in the Kenya Highlands and is often double-brooded. A few may nest in the short season. The mortality rate from natural predators is high and flooding takes its toll. In addition, the human element comes in, for native herdsmen often drive their herds and flocks across these areas of lush grass, and many a nest is trampled down.

### GREATER STREAKY-BACKED GRASS WARBLER

*Cisticola robusta ambigua* Sharpe

Some of the warblers of the genus *Cisticola* legitimately come within the group term "grass warbler," as distinct from the few already referred to as "bush warblers." The grass warbler population in a given area is remarkably unstable, and I have been puzzled as to where the birds go during the off-season. There is no mass migration as with most migrants; they seem to go by dribbles, but where to?

Let me cite a case: the grasslands within five miles of my sanctuary are frequented by dozens of pairs from March to August, in a normal season. I have located as many as thirty-six nests in a five-acre block. If the short rains have been good and the grass rains of the long season have produced adequate coverage, the birds are about average in numbers, but if the veldt land has been heavily grazed and drought conditions have been concurrent, few if any of the birds will turn up in their usual nesting grounds.

In a normal year in the veldt land during the last week of February and the beginning of March, the grass rains have freshened up the foliage of the short rains and already new growth is evident in grass, herb and bush. Then, if a male streaky-backed warbler is put up, he will at once perch on top of a low bush or clump of grass and commence calling "tsit tsit tsit," and like as not he will be joined by a smaller edition of himself, the hen. They will not show a great deal of concern, for though they have paired and taken up territory the nest may not have been started.

Visit the area again in about a week. The male will now take his perch on a twig or clump of grass while you are still some distance off, and as you approach he will sound a warning "tsit tsit tsit tsit." Walk on and if you are near the nest site, the calling will be intensified and he will bob up and



GREATER STREAKY-BACKED GRASS WARBLER

Parent carrying moth larva to nest

down and fan his tail, showing the white tips plainly. The female has got up and perched on some dead, woody herb.

Walk back a few paces and sit down, keeping an eye on the hen. Watch her next flight and mark exactly where she drops down. Wait a while and the male will take a short flight and circle over the spot and return to his perch. The nest should be there, in a short thick-set tuft of grass. Toward one side of the center a few grass blades bent over form a little bower or dome; below this is a hollow, where the old grass has been thinned to form a cup. The nest is just being started.

Visit the nest a week or so later. More grass blades have been bent over, interlaced and latticed, and the dome has now been completed; below the dome, dry grass blades have been laid in and interlaced and some of the

living grass worked in between, so that there is now a "ball" of grass cunningly built into the little hollow, the entrance facing outward but concealed. The inside is lined with fine grass and maybe a few bits of down or fluff. Many nests are low; others may be higher up in a taller grass clump; some may be in a site where woody herbs and grass are growing together; another may be in a large clump of swamp grass so that it is two or even three feet above the ground. But all will have the same architecture: grass blades brought over and worked into the dry-grass ball, a finer grass lining and a little or plenty of down.

The size of the clutches varies: three eggs are commonly laid, four quite often, sometimes only two. The ground-color may vary: white, pale blue, turquoise blue, very rarely pale pink. Some are immaculate, but the majority are sparingly spotted with red-brown, claret, or dark brown, almost black; the distribution may be even or mostly at the larger end. The texture is smooth, and a hard-sat clutch may have a slight gloss. The size on an average is  $17.5 \times 11.5$ –12 mm.

Most if not all nests have young on the fourteenth day after the laying of the last egg. The parents were excited before but they are exceedingly so now. As we approach the general nesting ground we note a male here and there and hear a "pit-pi-raerrrrr," a note which ends in a quavering, almost bubbling "pi-pit-treeeeeee." I interpret this as indicative of claim to territory. As we walk along the vlei, the familiar "tsit tsit" of warning and anxiety will be heard, and if we linger overlong at a nest annoyance will be indicated by "chipsit-wit, chipsit-twit."

From hides at nests I have recorded food supplied to the young: nymphal grasshoppers commonly, crickets, moths and moth larvae in quantity, sometimes a few small chafer grubs, a few small weevils, and an occasional glow-worm; a small scarabaeid beetle once.

Compared with some other warblers, these birds are timid. They don't seem to lose a sense of uneasiness even when a hide has been in position for days. It is shown in their indirect approach to the nest: having secured food, they fly a short way toward the nest, then come to it by creeping through the grass, or even between the grass tufts until behind the nest; then they come through the nest tuft to the entrance.

My records for the nestling period show a variation between fourteen and seventeen days, but I think the shortest period recorded is for a nest which suffered so much disturbance that the young left prematurely. When the young leave, they are just able to fly, but they have little need to do so as they take shelter under tall grass tufts and herbage until strong on the wing.

I have more than once located a spot where parents were attending young, and have searched the spot and found the youngsters, who on the

first note of warning had gone to ground and dispersed in different directions. Their striped plumage blends well with the bits of brown grass and dark earth at the base of grass tufts. The whole of the upper side is tawny-brown and dark striped, the under side yellowish on throat and breast, buffy on flanks, and whitish on the abdomen. The young remain with the parents a long time and may be seen in the area where the parents have started another nest. When the nest is completed and the hen is sitting, the young disperse, but they often hang around and I have more than once seen a subadult bird come to the nest. The fact that young of this species seem to remain with or in the vicinity of the parents raises an interesting point. When one takes a careful census of pairs, broods, and nests one finds the females to be in excess of the males and broods. What is the explanation? The late Admiral Lynes, who was an authority on *Cisticola*, suggested to me the possibility that the male of a pair, having assisted in raising a brood to the flying stage, takes to himself another wife, leaving the first to look after the youngsters! This remains to be proved.

In the main, the streaky-backed warblers nest in the long season from March to July. They go into molt from August to October. Very few nest in November and December in the Ngong area, but elsewhere some do. One must, however, keep in mind the fact that long seasons and short seasons vary in different parts of Kenya.

### SHORT-WINGED GRASS WARBLER

*Cisticola brachyptera katonae* Madar.

This small, rather drab species is found in the "park country" and open woodland, along the margins of forest, in forest clearings, and on grass-covered hillsides where there are a few trees. One might easily overlook these warblers if it were not for the male, who perches on some bare exposed twig on bush or small tree and whistles his "sissling" little song. His "sii sii sii sii sii" is often the prelude to an aerial display; he flies up, then up a little farther, dips down, then goes up and up, and by a series of jerky stages circles round and round, and dives suddenly; then up he goes again, cruises around, dips once again, and drops into the grass. This is part of the courting display and may be witnessed in early March.

The bird builds a small ball or domed nest in a clump of grass or woody herb and grass. It has a side-top entrance, well concealed by the dome and surrounding vegetation. It may be just a few inches off the ground or eighteen inches up. Medium-broad grass blades are rather loosely interlaced and latticed with some of the adjoining grass worked into the outer frame; the interlaced grass is strengthened by the use of cobwebs. Finer grass is laid in

and then a final lining of vegetable down of varying quantity is added, mostly in the "bowl."

Three or four eggs form a normal clutch. They are white or pale blue with small dots and spots in claret red to dark brown, either sparsely distributed or concentrated toward the larger end; a few grayish sub-marks may be present. The average size is 16.5 × 12 mm.

Though these warblers are common, I have only once been able to study them closely from a hide. It was erected when the eggs were nearly ready to hatch. The female was rather timid at first and sat on a small bush some distance away; the male in a near-by tree called "sii sii sii sii" in descending scale. I entered the hide and my two attendants went off after walking around for a while. When they had gone out of sight, the male bird began chivvying his mate and trying to induce her to go to the nest. After a minute or so of this she alighted on the clump of grass in which the nest was situated, sidled down the grass stems onto the top of the nest and so to the entrance. I spent two hours in the hide. Once in, she sat tight and "stayed put." The male sat preening himself on his lookout perch in a tree.

A week later, when the young were four days old, I was in the hide again. Both parents came with food at intervals, never very frequently. The hen came direct to the nest front from the grass and herbs opposite the nest, but the male invariably flew up to his stance before coming over. On arrival at the nest, there was just a momentary pause before diving into the entrance; once they were in, I saw nothing but the tip of the tail. Having fed the young and picked up the fecal sac, the birds turned and flew from the entrance. So far as I could observe, only moth larvae were fed to the youngsters.

The incubation period had been fourteen days and the nestling period about seventeen, as far as I could judge. The youngsters were in the nest early on the morning of the sixteenth day but had gone when I examined it two days later. I saw them being fed in the bush on the far side of the gully.

The nesting season will be found to vary with the distribution. Here, in the Ngong area, from March to July is the main breeding time; if conditions are favorable, a few pairs nest also in the period from November to January.

#### WHITE-BROWED or TAWNY-FLANKED LONG-TAILED WARBLER

*Prinia subflava immutabilis* van Som.

(*Prinia mistacea immutabilis* of Sclater)

As in the case of many other birds with wide distribution, this species is represented by many forms—three at least in eastern Africa—differing

only slightly in color and size, hardly at all in habits, and only slightly in calls. The Kenya Highland race with which we deal is found in scrub, secondary bush, and scrub surrounding forest.

This warbler is very characteristic of roadside scrub, where it may be seen perched on some bush top and calling, with its tail cocked up, or quietly moving through the herbage searching for insects. When disturbed it protests freely, uttering a high-pitched "cheet cheet cheet cheet." The note of warning to its mate or to young is a long-drawn "cheeee." A variation of the call is directional, that is, a call to its mate some distance off, and can be rendered as "chita chita chita chita," oft repeated.

This species is among the first to breed. Courtship and mating can be witnessed in early March, and if the season is good, nests can be located by the end of that month. These birds are often double-brooded in the long season, and some pairs nest again in the short season, October–December. If the short rains have been good, woody herbs and small bushes will have put on new growth and though the foliage may suffer during the hot months of January and February suitable nest sites are ready to hand when the birds commence building. They usually nest in low herbage, but I well remember the first nest I found in my garden at Kisumu—seven feet up, toward the top of a small *Casuarina* tree.

Most nests are attached to two or more uprights, with or without the inclusion of adjacent leaves. The nests are distinctive; they are constructed throughout of fine green grass fiber which is woven and interlaced to form an elongate semi-domed purse-nest with the opening toward the top on one side. The interlacing is close and as the grass dries the weave becomes springy. Fine grass fiber may be added as a lining, but often the eggs are laid before the lining is added. If leaves are incorporated, the form of the nest is not altered. The attachments to the supporting uprights are usually done thoroughly; strands of fiber are taken around the supports several times. The commencement of a nest is interesting; the two uprights are loosely bridged across with twisted fiber, which is threaded in and out to form a cradle; the bowl of the nest is next added, and then the top. Two or more sites may be tried out before a final one is selected. Though the nests are green at first they fade to straw color on drying out.

The male is almost as active as his mate in nest building and I think it is he who tries out a site; if it doesn't meet with the hen's approval they move elsewhere, but the finished nest will be somewhere in the same locality. Nests are often started before new foliage has fully grown and are somewhat exposed, but they soon become hidden by surrounding herbage whose growth is very rapid after the rains set in.

The clutches vary a bit, but a pair will always lay the same type. The eggs are among the most beautiful we have. They have a peculiar marbled





WHITE-BROWED or TAWNY-FLANKED LONG-TAILED WARBLER

Parent bringing caterpillar to nest

appearance. The ground-color varies from white to pink, blue, grayish-olive, or dull green. The eggs are boldly but sparsely spotted and blotched with dark brown and red-brown and have black scroll marks here and there but mostly toward the large end. The surface is smooth and glossy. The size is variable:  $14.5-16 \times 11-12$  mm. The clutch size varies also; three are frequent, two or four are occasional, five are rare. Clutches with a greenish ground seem to predominate. Incubation lasts eleven or twelve days and is carried out by the hen mostly. She leaves the nest readily in the early days of incubation but sits close as incubation advances, from about the fourth day. She will then only fly off when one is almost on top of the nest.

These birds are very excitable and soon give away the position of the nest. They perch on some exposed twig, moving their long tails up and down and sometimes sideways and occasionally fanning them or bringing them well forward over the back and head; they then have a very wren-like attitude. If one sits quietly, they quiet down, and very soon the hen will drop to the herbage and work her way to the nest, or she may even fly toward but not to it.

They take kindly to a hide and once used to it both parents come to the nest readily. Often both are together, but since the opening is just large enough for one bird to feed the chicks, the other has to wait his turn. Until the young have commenced feathering, one or other of the parents broods for a while after feeding the youngsters, and if the mate then comes along, as often as not the food is given to the sitting bird. Except when the young are very small, feeding is done from one of the uprights supporting the nest or an adjacent one. The parents lean well forward and cock their tails up. When in this position the body is held almost parallel to the upright, so the birds have to grip tightly with their feet.

I have often found when working from a hide that birds which have nests close by will frequently visit the nests of other species just to have a look and very rarely to hand a bit of food over to the chicks. I saw a golden flycatcher come to a nest of *Prinia*; at a puff-backed flycatcher's nest a golden-breasted bunting came to investigate; at a buzzard's nest a sunbird perched on a leaf just above the sitting bird.

The bulk of the food is collected from the low herbage within a small radius of the nest, and visits are frequent. This food consists of larvae of moths, mostly noctuids, though some geometers, small spiders, nymphal acridids, and an occasional beetle larva are given. Feeding is maintained throughout the day. It is most frequent in the morning up to about 11 o'clock, when there is a slackening off, and becomes very frequent again between 4 and 6:30 in the afternoon.

Nestlings feather up quickly but stay in the nest up to sixteen days if the brood is large or weather is inclement; the average nestling period is fourteen days. Youngsters are very like the parents but lack the white eyebrow, are more buffy below, and are rusty-tinged on the wings. They remain with their parents for about a month and are then well able to fend for themselves. In a good long season a second brood may be raised, and often the second nest is in the same general locality as the first.

The mortality rate is very high, as much as 60 per cent, mongooses, rats, snakes, and shrikes contributing to the death rate.

### KENYA BANDED SAND MARTIN

*Riparia cincta suahelica* van Som.

The great open down-lands of the Kenya Highlands, the vast veldt or grasslands of the Rift and the Athi valleys, and the Kapiti plains are the haunts of the graceful banded sand martin. Formerly nesting in the natural banks along deep eroded channels of rivers, in the vertical faces of earth left by landslides, or in the open banks of eroded dongas, the birds now make free use of man's activity in the provision of borrow pits, earth embankments and dams.

In flight the birds are slow, graceful, silent, and deliberate. They seem to move without effort upwind; then they turn and come sailing down with outstretched motionless wings, until, to renew the hunt over that beat, they turn and with gentle wing beats follow a line just above the grass-tops. They have the same slow deliberate wing beat as that of the tern. As they fly along they dip every now and then toward the grass-tops and in passing take up an insect. If there is an expanse of water near by they skim its surface, and where they touch it there is scarcely a ripple. The hunt over, they perch for a while; it may be on a bare twig at the top of a bush, on a large stone or a little mound of earth, or even on the ground. Where one alights another follows—a pair in all probability, for although they may hunt as a pack, they associate in twos. As they alight they give their short, not unmusical call: "chirip cherip chee chirup." The note is full and rounded and may end in a little trill, "chiruiiii." They sit facing into the wind. With a low "chee cho" one takes wing and the other follows, and they re-start their up-and-down beats just above the waving grass.

Just behind my sanctuary there is a wide stretch of veldt, and where roads have been made across the vlei there are many borrow pits and one large murrum pit. The vlei becomes waterlogged and the pits fill with water during the rains; lush grass and water plants thrive, and so do frogs and insects. Water hens visit the spot, the little malachite-crested kingfisher

nests in the banks, and so do two pairs of banded martins. Unfortunately, the spot is rather public and the nests are robbed regularly.

One year I was in luck; a pair of banded martins selected a small concealed pit in which to nest. They burrowed the tunnel for three weeks—not every day or all day, but just in short spells. It went in and slightly up, then turned right at about 22 inches. That was all I could note with reflected light and a measuring stick. At last the birds were collecting and taking bits of grass and, later, feathers to the tunnel. I helped them in the matter of feathers and supplied quantities from my pillow. Then, for about a fortnight, only one bird was seen about except of an evening. It spent a lot of its time perched on a dead twig at the top of a *Carissa* tree near the pit or on top of the *Carex* by the water's edge. I saw it take food presumably to its sitting mate. A day or two later both birds were seen hawking insects over the grass-tops and taking their captures to the nest hole. Obviously, the young were hatched.

I gave them a full ten days; then a brushwood hide was slowly put up and camouflaged. I went to the hide early for a whole day's session. The male came and perched on a tree above the nest and twittered; the female fluttered a moment around the hide, then went off hunting. It was not long before the birds returned, each with a mouthful of food. The female darted in straightaway without any pause at the entrance. The male perched on top of the hide. As the female left the entrance he fluttered down. He was in the nest for about two minutes and I heard a youngster squeaking.

After a few visits by both birds at intervals, I had made notes on such food as I could recognize. There were a number of small tawny chafers, other beetles, moths, lacewing flies, Diptera, and moth larvae. I was interested to note the larvae. All the other insects might have been taken in flight, but the larvae must have been taken from grass or herbs, probably from grass flower-heads, as the birds passed. Feeding by both birds worked out at one visit per ten minutes throughout the morning until about noon. Then there was a distinct lull until 3 o'clock. The birds spent this time sitting on a twig, basking in the sun and preening, and lying on the ground with wings and tail outspread, sunning themselves.

Hunting and visits to the nest speeded up and were most regular between 4:30 and 6 o'clock. I closed down for the day at 6:30 and went back to the nest early next morning. The agility with which the birds entered was remarkable; on flying to the entrance they seemed just to touch the earth and run into the hole without a pause. Today's catch included mantid nymphs and a silphid beetle. The quantity in each mouthful surprised me.

On the occasion of a third session in the hide, the parents stayed in the tunnel a much shorter time than previously; they were met part way by some hungry youngster.



KENYA BANDED SAND MARTIN

Female, with food in bill, perched in front of nest burrow

I paid my last visit when the young were twenty-one days old. I had seen them in the tunnel by the aid of a torch. Even without artificial light I could make out the two white lines on each side of the mouth, and these showed up more than in the adults. I am sure that they serve as directional marks for the parents. I enlarged the tunnel entrance, the better to see the feeding, entered the hide, and my boy went off. As usual, the parents came promptly, but seeing the enlarged opening they hesitated and began to flutter in front of it. In the meanwhile one youngster had come out to the new mouth of the tunnel and begged for food; the other one was not far behind it. The parents fed them. I could now see not only the feeding but the food. The actual feeding was straightforward—part of a mouthful to each chick. There were only two in the nest.

After feeding the youngsters several times the parents commenced to induce them to leave. They came with food, fluttered in front of the hole, then alighted on the ground in front of the hide. They made a low enticing call, "chee cho, chee cho." One youngster came to the enlarged entrance, but retired. The parents continued to call, but as I estimated that the young had at least a day before they were due to leave I restored the entrance and re-entered the hide. Hardly had I settled in when the parents returned. They didn't hesitate a moment but went straight into the tunnel as though it had not been tampered with! Such is habit!

Feeding went on as usual that afternoon and increased toward sunset, when many more insects were on the wing or had crawled up the grass stems. I left at 6:30.

On the afternoon of the twenty-fourth day from hatching, the youngsters were sitting on a dead twig some ten yards from the nest hole. I investigated the tunnel. The chamber was nine inches wide, six inches from back to front, and five inches high. It was full of feathers, some of which I had supplied, but others were francolin feathers, fowl feathers, and neck feathers from a crowned crane. The nest was swarming with fowl lice; no wonder that the birds preened themselves so vigorously!

I found the remains of two white eggshells among the feathers, so apparently the shells were not removed. I had never seen any excreta being removed by the parents and naturally expected to find some in the nest, but there were only bits of chitin. Did the parents dispose of it by swallowing, or did they hold it in the mouth and drop it in flight?

After the nesting season is over, several families flock together and a number leave their nesting areas and frequent the larger, permanent swamps and the lake sides. Quite considerable flocks may follow a grass fire, and here among the varying species of martins, swifts and swallows, the soft, delicate flight of *R. cineta* stands apart from all others.

## KENYA DUSKY SAND MARTIN

*Riparia paludicola dohertyi* Hart.

This little dusky martin skims over the reed beds and swamps along our rivers and lakes, flies low along mountain streams, and hunts across the bush-clad hillsides; it ranges from lowland swamps at 3,000 feet to upland tarn at 11,000 feet.

Dozens may be seen of a late evening during the off-season, roosting on slanting papyrus stems and reeds, all facing into the breeze. They take a little time to settle down and when one takes flight the others follow. They settle a moment and off they go. At last they return, huddle in little groups, and so spend the night. The flocks split up as the breeding season draws near, and pairs go off to some favored nesting site. It may be a bank along a river, a road cutting, a quarry, a borrow pit or the bank of an eroded gully. Four pairs frequent the grounds of my holding; two nest in an old quarry and two in the banks of a murrum pit. They are tame enough, but difficult to study. As tunnel nesters they offer difficulties in estimating incubation periods unless one is prepared to dig them out.

When these little birds arrive at their nesting site, they make a thorough examination of the bank face. They try a spot here and another there, sometimes excavating to six inches or over before they decide for one reason or another that that particular spot is unsuitable. On the other hand, two or three pecks may decide them one way or the other. Sandy or friable earth presents little difficulty, and earth with very small pebbles can be managed, but stony and clay soil they don't like. I have examined a "finished with" nest that was as follows: a tunnel twelve inches long in red earth containing small bits of murrum, inclined upward after the first six inches and directed to the left, ending in a small chamber  $3\frac{1}{2} \times 4\frac{1}{2} \times 3$  inches high. The floor of the chamber was half an inch lower than the highest point of the tunnel floor. The chamber floor was lined with bits of fine grass and feathers. The average diameter of the tunnel was  $1\frac{1}{2}$  inches; the entrance hole was almost flush with the bank face. The tunnel is excavated by removing little bits of earth with the point of the beak and pushing the earth back through the hole with the feet. My quickest pair completed the work of a tunnel in two weeks, but the usual time is three weeks.

The work of excavating is not continuous. Both birds assist in the work, doing short spells that alternate with periods of long cessation when the birds perch on some twig or rootlet, preening or sunning themselves. They often sit warbling in a little crevice or on a projecting rock. They work silently but when they change shifts the arrival utters a low "chee, wer-chi-cho, wer-chi-cho." This little call is uttered when a bird alights by its mate. At the commencement and until the hole deepens quite a bit, just one bird

works; later on, one will nibble and the other help in removing the earth from within the tunnel.

I noticed that when the birds were exploring various spots and both were engaged at different places they seemed to carry on a conversation; then one would fly to the hole being tested by the other and more talk would go on.

The earth work completed, the next thing was provision of grass and a few feathers. The bits of grass were picked up from the floor of the quarry or from a lawn near by; for feathers the birds went about three hundred yards up the valley to the chicken runs, but they also picked up the stray pigeon or dove feathers. By noting when the female went in and spent some time in the nest, when she spent most of the day inside, and when food was carried in for the first time, I estimated that the incubation period was about twelve days. Incubation by the birds was not consistent throughout the day; there were spells when both birds were off the nest for ten minutes or more. At a depth in a solid bank, nest temperature probably would not fall greatly in a short while.

I have waited until the birds took their last flight in the evening and more than once have seen both birds enter the tunnel and remain; apparently both spend the night there.

Taking the first date on which both parents took food in and the day the young flew from the nest, and adding two or three days for the first days of hatching when the female sat and the male took food to her, I reckon the nestling period to be twenty-five days. The young can fly remarkably well from the first venture into the outer world. The birds were very attentive and regular in bringing food. There was a distinct break at noon until almost 3 o'clock. The birds spent the time resting in a shady crevice, preening or just dozing.

They collected most of the food as they flew to and fro over the *Euclea* strip by the stream or skimmed over a small reed-fringed pond. They came to the nest with their bills "chokablock" with insects, among which I recognized chironomids and other small Diptera such as syrphids and muscids; and later in the afternoon they came with the flying form of *Pheidole* ants, which were issuing from a nest in an old tree.

As the male came to the nest hole he usually uttered a low "chi-choo," while all I heard from the hen was a hardly audible "chi." I could hear the youngsters welcoming the arrival of their parents with "chi chi chi" in duet.

Once or twice as I watched, a saw-winged martin fluttered in front of the entrance and once entered but rapidly withdrew. This bird had a nest on the opposite face of the quarry, and I think it was just sheer curiosity which induced it to inspect the dusky martin's nest hole.



A fortnight after the young had vacated and were now strong on the wing, I saw the male testing out a hole that had been partially excavated by bee-eaters. The two birds completed this tunnel and hatched a second brood by August.

Though the majority of this species seem to flock after nesting, our pairs remain in the valley throughout the year and they nest both in the long and the short season.

### BLACK SAW-WINGED MARTIN

*Psalidoprocne holomelaena massaica* Neumn.

The saw-winged martins' requirements appear to be an elevation of 4,000 feet and over, a temperate to cool climate, high humidity, forest, and suitable earth banks for nesting purposes. They skim up and down the valleys of the forest, along its edges, and over the canopy—always near trees and seldom out in the open plains. The evening is the best time to see them fighting backward and forward over the treetops, because at this time many treetop insects make an evening flight and the winged forms of tree ants take their nuptial flight. The flight of these insects is stimulated by a shower of rain and then these martins can be seen hawking until dark. During the day they perch on the top of a tall dead tree in the forest or at its edge, and of an evening they congregate on some favorite high perch, resting for a while, then flying off over the treetops.

Man and his activities in and near forests have provided these birds with many artificial nesting sites: earth banks along forest roads, borrow pits, saw-pits, embankments, quarries and the like, and it is in these places that we now find the tunnels most frequently. Natural nest sites are banks of streams and rivers, earth exposures due to landslides, and banks along erosion gullies. I see them in pairs, just one or two here and there, for as a rule they are not colony nesters. A pair will tunnel in an earth bank of a hollow perhaps only three feet across, a hole surrounded by vegetation. I have seen a nest in a "pit-trap" along a narrow game trail in the forest. I once had a pair tunnelling in a 2-foot-square hole prepared for a pergola upright.

I am unable to give a definite period of sexual activity, even for my limited sanctuary area at Ngong. Pairs are nesting in my quarry in most months of the year, and I am unable to say whether the two pairs now nesting in January are the same that bred in July and November.

My records show that it takes a pair three weeks to make a new tunnel from start to finish. As in the case of the dusky martin, excavating is leisurely, with long spells in between shifts. Little bits of earth are removed with the bill and pushed out with the feet. The tunnel and chamber com-

pleted, the birds fly to the forest and collect mouthfuls of beard-lichen. To collect it, they perch on a branch from which the lichen is hanging, and taking up several strands they fly off, breaking the threads by the force of their flight; or they may just flutter in front of a pendent bunch, grab pieces in the bill and flutter back, then sideways and off. The chamber is lined with a thick pad of this lichen, and a neat cup is formed. Examination of a disused burrowing showed that the tunnel went in with a slight upward incline for fifteen inches, ending in a chamber just off the line of the tunnel with its floor an inch lower than that of the top of the tunnel; the brood chamber was low but wide and measured  $3 \times 5 \times 2\frac{3}{4}$  inches.

The birds lay two or three pure white eggs, which are rather long ovals, with an average measurement of  $20 \times 13$  mm. So far as I have been able to estimate, incubation lasts fourteen or fifteen days and is done mostly if not entirely by the female. The nestling period is at least twenty-five days and the young are able to fly when they leave. I have noticed that incubation is not continuous; the hen is frequently off the nest during the first week, but as development advances she sits closer.

Though I have spent many hours in a hide by these tunnels it has been difficult to see the food that was brought to the young. The parent's mouth may be full but just a few insects project at the sides. However, we do know that in their evening flight particularly, when they go over the forest top, they take quantities of flying ants. They seem less partial to hawking insects over water than either of the other two martins mentioned previously. Their favorite beat is up and down the *Euclea* strip by the stream and over the treetops of the forest. During the very brief and occasional pause at the nest entrance I have detected a few muscids and syrphids. Small flying termites are caught of an evening after a shower of rain. Feeding commences early and is fairly consistent up to noon with an average of one visit every five minutes by both birds; then it becomes spasmodic until about 4 o'clock, and after that it goes on until dark. During the mid-day spell, resting, sun-bathing, and preening are indulged in.

One can recognize the sex of the visiting birds only by the color tone. The male is the darker bird, rather more oily bluish-black with a slight greenish sheen; the female is duller, more greenish-black. There is a size difference that is only appreciable when the two birds are at the nest together. The male is the larger.

### GREEN-BLACK CUCKOO SHRIKE

*Campephaga flava* Vieill.

This bird is not unlike a small cuckoo in markings, and in many respects it is cuckoo-like in flight. The bill is broad and yellow at the gape. The legs

and the toes are short. As the name implies, this is a betwixt and between sort of bird. Once one gets to know the look of it in the field, there is no mistaking it. But this is not the end of the trouble to the field worker for there is a variety of the male in which the "shoulders" are yellow, and the two varieties occur together. Then there is another species which is con-



NEST OF GREEN-BLACK CUCKOO SHRIKE

Typical nest and eggs

fusingly like *flava*, but the male is purply- (not greenish-) blue-black and it lives solely in forest. Its female too is quite different for she has a yellow breast (not white washed with buff). In the dry forests around Nairobi, both species occur; study the male and if you can't make up your mind if it's green-black or purply-black, look at the female (for they are usually in pairs) and if she is yellow-breasted and not barred below, it is not *flava*.

The flight is rather weak, slightly undulating, and, as a rule, merely from tree to tree. When the bird alights one notices how short the wings are compared with the length of the tail, and how the rump feathers project up from the level of the mantle and line of the tail. As a matter of fact these feathers are long and are stiff and thick at their bases so that in profile there is a bump just above the root of the tail. This outline is characteristic of the "group."

The birds move and hop about the trees searching under leaves, among the lichen, and in cracks in the bark for insects; very often an insect lurks

below a leaf at the end of a twig and cannot be reached from above, so the bird flutters below it and picks it off. These birds are rather slow and are not agile in their movements. They don't search a tree thoroughly but move from one tree to another after examining a branch or two.

They are usually silent, but occasionally one may hear a rather low squeak, an absurdly low note for such a large bird. But this weak voice is common to the whole group. It may be likened to "sii sit sit," uttered as the birds move about, but a female also calls thus when she is collecting material for her nest. I have trailed two females to their nests in my sanctuary and was surprised to note how far they went for nest material. In both cases there was a plentiful supply on trees quite close, but they preferred to go one hundred yards off to some particular tree which had just the lichen they wanted. The nest sites in my forest have been at the top of lichen-clad trees, from thirty to sixty feet up, in a triple fork or an angle formed by two uprights growing out of an inclined branch. Elsewhere I have found nests at ten or fifteen feet, but all the trees in the area were short.

The nest is made entirely of lichen, usually a small species with flat and rounded "leaves," yellow, gray or green in color; the small bits are meshed together with cobwebs. This material, combined with the lichen-clad fork, renders the small cup-nest inconspicuous; it harmonizes so well that it might be just a clump of lichen growing in the fork. The small shallow cup can scarcely retain the two rather big eggs, but it suffices, for the bird sits low and flat and is actually resting on the nest rim. She sits with wings held just away from the body and the rump feathers are spread out over them. Her head is held well into the body and the beak is horizontal. Her olive and yellow greenish-barred plumage appears mottled and harmonizes well with the nest and the whole surroundings.

The very remarkable color of the eggs is yellowish-green or grayish-green with dark brown and purply-gray marks and harmonizes to a marked degree with the gray-green and yellow lichen of the nest. Just two eggs are laid and they average  $23 \times 17$  mm. in size. The collecting of material and the building of the nest is done entirely by the female and she alone incubates the eggs. The male bird accompanies her on her trips to and fro for nest material, but I never saw him giving a hand.

It was this coming and going which first drew my attention to one pair. The line of flight from the lichen tree to the nest tree was direct and over an open bush area. I spent nearly a whole day just watching the pair, particularly the hen, as she built the nest. The foundation had been completed, and as each bit of material was added and bound with cobweb, she got into the middle and pushed and stretched the material with her breast and feet. This molding was done on practically every visit, and certainly every time, when the slight bowl was being formed. Building was rather erratic: there



## GREEN-BLACK CUCKOO SHRIKE

Female on nest, a shallow structure of lichen and cobwebs in a lichen-covered tree

were two hours of strenuous work followed by a long break, during which the birds sought for food. Work began in earnest again about 4 P.M. and went on until nearly 6 o'clock. The female brought a few strands of beard-lichen and worked these in with her bill; the strands, being rough, held easily. The nest was completed in ten days, and then I saw that she was sitting close. She was always on the nest when I examined it each day from a distance and she refused to get off on the thirteenth day, when the eggs should have hatched. I sent my boy up the tree and he reported that one chick had hatched. Two days later when I visited the spot the bird was not on her nest. My boy ascended the tree and reported the nest empty. I searched the ground below the tree and found re-

mains of eggshells, one with the membrane still moist. I suspect that a pair of *Dryoscopus* shrikes, nesting not far off, took the chicks.

I once located a nest in a low tree at eight feet. The nest was extremely well camouflaged and the bird so tame that I could touch her with my hand. She indicated annoyance by slightly turning her head and opening her bill, thus exposing the rich orange of the palate. The sun was very hot and she often panted with the heat. Had it not been that I saw the male fly to the nest and feed his mate, I should have walked past it without seeing it.

Another species, the gray cuckoo shrike, nests in my sanctuary, but not one pair has succeeded in even hatching their eggs; they have always been robbed by shrikes.

### COMMON FISCAL or LONG-TAILED PIED SHRIKE

*Lanius collaris humeralis* Stanley

The long-tailed pied shrike has a wide range, from 2,000 feet to 10,000 feet, in Kenya, and throughout the greater part of Uganda it is common enough and most folk know it. It is perhaps more common in Kenya in the higher ground from 3,000 to about 7,000 feet. It was originally an inhabitant of open bush country, park land, and veldt land where there are a few scattered trees. It has now become a "hanger on" in towns, settlements and farms, and is a common garden bird. It is a common sight even in the center of Nairobi; in the residential and suburban areas nearly every garden has its pair. Dozens of fiscals sit on the electric light and telephone wires along the Ngong Road—not bunched together but spaced along the stretch, each with its hunting ground. They have become so accustomed to humans and traffic that they are bold and almost fearless. If a desired prey is right in front of a human or even a moving car they swoop down. Many are killed by rapidly moving vehicles.

Whether they be inhabitants of town or bush their habits are the same. Perched conspicuously on some bush, tree, or other vantage point, they scan the ground, sitting motionless or moving their tails slowly up and down. They prefer a stance in some open area or where the grass is not too long. Often the prey they seize on the ground is too big or too obstreperous to carry off at once, so, holding it firmly with one foot, they peck it fiercely until the victim becomes tractable; then it is taken in the bill and carried aloft to the perch.

Small insects are swallowed whole; others are placed under one foot and eaten piecemeal. Sometimes recourse has to be made to a spike, a sharp-pointed twig, a thorn or a point of barbed wire; after the victim is impaled it is torn to pieces. This does not happen so often as one might suppose;

the prey can be handled without this adjunct. It may be necessary when the capture is a large locust, a scarab beetle, a lizard or mouse, or a small bird—something which has powerful movement of the legs or is too bulky to hold under one foot.

The making of "larders" occurs but is not a common practice. Besides the insects and other victims already mentioned, spiders, mantids, crickets, small snakes, and frogs are preyed upon; all the food is taken on the ground. There is the exception—the taking of flying termites on the wing—but these shrikes are not experts at this. The birds of their menu are usually fledgling or nestling grass finches removed from a nest.

This bird is useful as a destroyer of obnoxious insects such as garden pests, but I personally regret to see him drop down among a flock of little waxbills feeding in the grass; or rob a warbler's nest; or seize a fledgling pipit. To make matters worse, it is sometimes sheer devilment—a lust to kill. I have seen him seize a waxbill, which, flustered by his sudden onslaught, became caught in "tangle-grass"; he took it, crushed its head, impaled it on a sisal leaf, and left it; it was still there a week later.

The species is resident, non-migratory, and sedentary. Given a suitable locus where hunting is ample, food assured, and nesting sites available, a pair will remain for years. Such a locus becomes a "territory" from which others of its own species are rigorously kept away. While the majority of pairs hold down a territory, especially during the breeding season, we meet with the exception. I know of two pairs which nested within ten yards of each other and shared a territory. In and around my sanctuary are four pairs, each with its restricted hunting ground and nest site.

Not infrequently during the off-season, only one bird, a male, may be resident. I suspect that some mishap has overtaken the female. As the breeding season draws near a female turns up. Sometimes an outsider male may appear at almost the same time. It is now that we see not only rivalry for the female but forcible claims of right to territory. The males take up stances on top of a bush or small tree; they "swear" at each other with a rather harsh longish "cheee-iii" accompanied by much tail movement, up and down and sideways. This goes on for a while; then one flies at the other and gives him a glancing blow with a foot. The opponent ducks but keeps his footing. The attack is repeated more forcibly, the bill as well as the feet coming into play. If the opponent is not dislodged the attack is renewed. This time both feet are used; they take a firm grip and the opponent is pecked vigorously. The grip is shaken off and the rivals spar in the air, rising vertically until their clawing feet interlock or a wing is grabbed. Thus holding fast, they drop to the ground. Neither gives way. (I have more than once walked up to a struggling pair and stood over them.) Panting and struggling they separate at last. Then they take up their posi-

tions again; the attack is renewed. They fly at each other in mid-air; then they separate; then one decides he has had enough and flies off, pursued for a while by the other. The victor returns to his favorite perch and calls loudly, "chii-uirrr." The tail is moved vigorously and the feathers of the head are raised and lowered. All the while, the female has remained on her perch making a "chii-ur" call.

I have not witnessed the whole of the courtship but have noted posturing, ruffling of the breast and head feathers, and a bolt upright stance with wings just out from the body, while a "chii-ur" is uttered. The male chases the female from bush to bush and then he perches and sings: "tuu-li-uu, tuu-li-uu, tu-liiii." I have seen the actual pairing. The female indicates her willingness by depressing her body to the branch on which she is perched, and quivering her partially raised wings rapidly, while she keeps up a low "chee chee."

The fiscal has a limited range of notes, some of which I have already given. Variation in intonation is the mode of expression: warning is expressed by a long-drawn "cheee"; encouragement to the female or young by a full "chuuri"; anxiety by a rather plaintive "chuu-liiii" or "tuu-lii"; anger by a harsh "churr" and "chee-iii."

Within the territory, there is always a particular tree which is habitually used as a nest site, for preference a thorny tree, such as an *Acacia*, a *Gymnosporia*, a *Carissa*, or one with thorny creepers about it—a tree with fairly thick foliage on its contour and multiple twiggy branches within. The nest is usually just within the zone of thick foliage. It is rather bulky and has a firm foundation of twiglets. Very often old flowers of *Ocimum* and labiates are used. Rootlets, grass, bark fiber and cobwebs, often with cocoons attached, form the body, and if there happens to be a rubbish dump near by, bits of paper, string, and cloth are used. The inner lining is usually the fine heads of flowering grass and fine rootlets. The new nest is sometimes superimposed on the old one. I have an example where three nests are built thus. An average nest measures across the top, rim to rim,  $3\frac{1}{4}$  inches; depth of bowl, 2 inches.

The eggs are usually putty-colored to grayish-green with an ochre tinge in ground-color, speckled with brown and grayish under-marks evenly distributed or in a tonsure at the large end; an unusual variety has a buffy-pink ground. The shape varies considerably but is most often a pointed or elongate oval; the surface is smooth or just very slightly glossed in hard-set eggs. The average clutch is three; quite often four are laid, very occasionally five. I have some evidence that the female commences incubating before the full clutch is laid; thus there may be two days between the hatching of the first and last egg and a corresponding difference in the size of the youngsters. Incubation lasts from twelve to fourteen days. The young are





COMMON FISCAL or LONG-TAILED PIED SHRIKE

Adult with young not long out of nest

hatched naked and are flesh-brown in color, with marked yellow gapes and yellow mouths.

Feathering is rapid, appearing on the wings and dorsum first; the crown is soon covered but the feathers on the breast tracts and sides of the abdomen are slower. The barred plumage is typical of the shrike family. The nestling period is sixteen to eighteen or even twenty days in a large brood. The average nest is small for a brood of four, and the more advanced young may squat on the nest edge or on top of the smaller youngsters.

Hides put up at various nests have enabled me to gain an insight into the food given to the young. Both parents are assiduous in their attention, though the male does a major share during the first few days, as the hen broods and keeps the chicks warm. The following have been brought to the nest: Noctuid larvae and imagoes, grasshoppers, mantids, crickets, spiders, small skinks, tadpoles, scarabaeid beetles, melolonthid beetles, two nestling warblers, and a small blind-snake. The visits were fairly regular from dawn to about noon, spasmodic until 3:30 P.M., then frequent up to dark. The parents usually came one at a time; if they arrived near the nest together one would wait either within the tree or on a bush a little way off.

It was at one of these nests that I tried an experiment to test out defense of territory and its extent. I had previously noted what I took to be the hunting range of this pair. I secured a stuffed male shrike and set it up at 200 yards from the nest, but I got no response. By gradually moving it closer I found that resentment was shown at from 30 to 75 paces, depending on the direction from the nest. Resentment took the form of a warning or challenging call at first, and actual aggressive attack if the intruder was within the territory. The dummy was frequently biffed, pecked, mounted and torn, so aggressive were the attacks. On the following day I took my dummy and stake to the hide and set it up about five yards from the hide and the same distance from the nest tree. Notes of anger indicated that the intruder had been "spotted." The attacks commenced—a glancing swoop, attacks with bill and feet, then a swoop to the back and tight pecks to the head. Feathers were pulled out. One impetuous swoop made the dummy lean over to one side. It was the male who did all the attacking. The female at first perched on the nest tree, "swearing" volubly; then she went into the tree and fed the youngsters, leaving her mate to drive off the intruder.

While the dummy was bent over, the male pounced on it and went through the act of copulation! This recalled to mind other occasions where I had seen the same thing in both wild and captive birds. It happens in this way: one bird bullies another until the latter is exhausted and squats on the ground; then the aggressor mounts it and acts as though he were copulating. I have a tame superb starling who shares a cage with a female

Delagorgue quail. The quail had a broken wing which I had to amputate. It is now "fit as a fiddle." The starling chases the quail around until it is exhausted and squats; he then mounts it. It is a curious example of erotic display engendered by conquest.

These shrikes do a lot of good, but small birds dislike them. A pair of fiscals in a garden of limited size will keep small birds away. The shrikes not infrequently swoop down among a group of small birds drinking at a bird-bath—sheer devilment, just to see the small fry scatter!

From recorded data, it would appear that these shrikes breed all the year round, but unless these records are analyzed and the area of the record noted, they may be misleading. Kenya is so varied climatically and ecologically that the nesting periods of different localities do not coincide; also, the nesting period may vary from year to year because of factors as yet little understood. Here at Ngong, taking an all-round average, we know that two broods will be raised during the long season, and one, possibly two, attempted in the short period.

### GREATER LONG-TAILED PIED SHRIKE or FISCAL

*Lanius cabanisi* Hart.

A bird of the thornbush and acacia country, drawing attention to itself by its habit of perching on the topmost twig of a bush or tree, where it calls and displays in a fantastic manner, more especially when there are two or more birds together! One bird starts the chorus with "cha cha raa" and the next comes in with "chit-er-rowe, chit er row," and calling together they make a great din. They pose at the same time, the body well up, the wings down or slightly open, and the very long tail swinging in all directions, up and down, side to side, in a figure eight, then over the back and fanned. This display takes place of an early morning or late afternoon especially, though one may see it at any time of the day. It is at its best just before the nesting season.

The evening display is indulged in when four or six birds congregate, as is their habit. I was camped at Emali for a few days and had located some nests. Each pair had its own territory and foraged within it during the day but four or six birds would come together of a late evening, just for a chatter and display. It is difficult to tell the sex of the bird unless one is able to get a good view of the flanks; if there are chestnut streaks along them, the bird is a female.

The nests are not difficult to locate, for these birds seldom hunt far from their nest site and one bird is always on the lookout. The bird may be silent, but if you approach, it gives a warning call. If the nest is a-building or the

clutch is not yet laid or is very fresh, the hen will at once join her mate on the treetop. They may not call, but their tails will be moving all the time.

I recall an occasion at Stony Athi. I went for a stroll in the evening. I spotted a male perched on the side of a thorny bush and walked toward him. He called, and his mate came from the bush and joined him. As I reached the tree both birds flew a little way off, perched again and began to scold. The nest was just within the tree at about six feet and contained half-fledged young. The parents perched on a point of vantage and scanned the ground. As soon as they saw an insect move they dropped down, picked it up, and flew back to the perch. If it was small it was taken to the nest at once. On one occasion the male secured a very large grasshopper. He had some difficulty with it on the ground but he eventually managed to hold it tight in the beak and came to his perch. The insect still struggled. He nipped its head several times until it was quiet; then he tore off the head, the hopping legs, and the wings. He passed it to and fro sideways in the bill and flew to the nest with it. Adjusting it further, he offered it to one youngster; the chick tried hard but the food went down only so far and stuck. The parent pulled it out of the chick's mouth, billed it again, tapped it hard against a branch and then offered it to another youngster. He got it down halfway; then it stuck. The father tried to take it but the chick closed his bill and turned round in the nest. He panted and struggled and at last the morsel slowly went down.

These youngsters had a wonderful capacity for food. The grassland around the nest tree was full of insects, so foraging for food was not difficult, and though visits were frequent the youngsters were not satisfied. After most feeds the parents waited alongside the nest to take away the fecal sac. On one occasion, a youngster voided onto the side of the nest while the parents were away; the female returned with a grasshopper, but on seeing the excreta she dropped the insect, took the fecal sac and flew off with it. She didn't bother to retrieve the fallen insect.

The nest of this species is rather large. It is placed in a horizontal fork or on an inclined branch with upright laterals. The materials used are rootlets, twiglets, bits of grass, bark fiber and grass roots, and the nest is lined with finer grass roots. Very often spider web is worked around the rim of the nest, and sometimes spider web in a felted mass is found in the bottom of the bowl. Felted masses of web are common in the acacia country and these birds make use of it, as do Gabar goshawks.

Four eggs are often laid, but three are the usual clutch. They are putty-colored, darker at the larger end, and spotty with rather faint yellowish-brown and gray sub-marks and sepia and dark brown surface marks. The marks look as though a light wash of ground-color had been put over them. The size is about  $25 \times 19$  mm. Incubation lasts thirteen or fourteen days,

and the nestling period is sixteen to eighteen days. The young may vary in size, because the eggs are sat on from the beginning and more food is given to the most forward chick, though on the whole I have found that food is distributed fairly evenly among a brood.

The young are rather grayish-barred with ochre on the crown and mantle and are slightly barred below. They leave the nest when hardly able to fly and take shelter in some thorn tree until they are able to perch high with their parents.

These shrikes are not averse to taking lizards, small snakes, and young birds when opportunity offers, but I haven't found them to be such robbers as the lesser long-tailed shrikes.

The chief nesting period in the Kenya Highland plateau area is from March to July in a good season and occasionally in the short period from October to December, but since the species has a range from the coast to 5,000-6,000 feet, there is variation in the nesting times.

### GRAY-BLACK BUSH SHRIKE

*Laniarius funebris* Hartl.

This common species is a skulker. One may see a bird occasionally on the outside of some small copse or at the fringing bush by a donga, but it will disappear into cover if it becomes aware of being watched. This reticence does not deter it from calling, for the notes resound from all directions. One hears the loud almost defiant-sounding notes most often in the early morning and again of a late afternoon. The birds ascend to the top of a bush to call, the notes being accompanied by posturing, especially if a female is in the offing. The calls are varied. A single bird, the male, makes a loud call: "chow chow wit, chow chow wit" or "co-co-wit," often preceded by a long-drawn "ah-horr," or "ah-haw." The pair may duet; the male call is "co co aa," answered immediately by "chee chee" from the female.

Toward the beginning of the nesting season, say in March, one may perhaps see the posturing of the male. He calls and when so doing holds himself upright on extended legs; as each note is uttered he depresses the head and body and may swing from side to side. Then he bends forward, depresses his wings and raises the long, fluffy feathers of his rump into a puff above his back. These rump feathers, though blackish at the ends, have white bases, and these are exposed so that the puff has a mottled appearance. The tail is raised and fanned. After a while he takes a short flight from one cover to another, but the wings are quivered rapidly and the puff is expanded.

These shrikes hunt for insect food among twigs and leaves and also on the ground under a tangle. I once saw them taking termites from beneath leaf debris. The bird hopped around one spot and darted forward to pick up some insect. Soon I heard that curious rattling noise which termites make when disturbed as they work below dry leaves. The noise is made by the soldiers, who, with rapid movements of the head and the strong mandibles, tap the leaves above them. The shrike was taking up termites. He flew into thick cover when he saw me. I noticed that where the shrike had been busy there was evidence of scraping by red-legged francolins. Doubtless these birds had slipped off as I entered the copse, and the shrike had spotted the moving insects.

Nests of this shrike are not difficult to find. They are usually placed from four to five feet above the ground in low bushes or trees at the fringe of a copse or in the marginal bush of a donga or in some low tree on a rocky scrape. No preference is shown for any particular tree. The nest is built toward the end, but not at the tip, of a strong horizontal branch with small lateral branchlets. Top coverage is usually present but the immediate surroundings of the nest may be devoid of leaves. The nest is constructed of fine twiglets and rootlets, many of the twigs with remains of seed pods and flower bracts. These are arranged to form a rather shallow cup, loose-looking and somewhat open in mesh but quite strong and resilient because of the twisty, wavy nature of the material used. The cup is about 60 mm. across and 25 mm. deep.

Most of the nests have held only two eggs—rarely three. They are pale greenish in ground-color, or with just a slight bluish tinge marked with fine speckling and freckles and larger irregular brownish marks, often showing a concentration toward the larger end. The sub-marks, in gray and lavender, are mostly at the larger end. They average  $23 \times 17.5$  mm. in size.

The female incubates for about twelve days. If the nest is in a fairly exposed position she may slip off long before one comes near it, but she will sit close when the eggs are due to hatch. Both parents are bolder when the nest holds young, and for the first few days both take part in brooding the chicks. The birds invariably approach the nest from behind, through the thick vegetation, and feed the chicks from the back rim of the nest. Insect food includes grasshoppers, mantids, melolonthid beetles and moth larvae. Both parents are often at the nest together. The excreta is removed as soon as voided, this taking place almost directly after food has been given. One or other of the parents waits on the nest edge with head cocked to one side until the feces are extruded. They are occasionally eaten by the parents but are usually dropped some distance from the nest.

The young are ready to leave the nest after the fifteenth day. They are duller than the parents and have slight buffy tips to the feathers of the

crown and mantle. They can hardly fly at all and sit under cover in some thick bush, but the growth of feathering after leaving the nest is very rapid. Many a fledgling falls victim to a mongoose or a genet at this stage.

### PIED BUSH SHRIKE

*Laniarius ferrugineus ambiguus* Madar.

The pied bush shrike of the Kenya Highlands is commonest in the thick fringing bush along forests, in copse and tangled bush growth in dongas, and in heavy secondary bush which has sprung up in deserted shambas, but it is not uncommon in old established gardens with plenty of coverage. Ample and thick cover are requisites of its environment.

The bird has very distinctive notes and a variety of characteristic calls. Two birds may duet, the second coming in with notes so exactly on time that one might think only one bird was responsible for the calls. (One bird *can* produce the whole series.) The most familiar call is the full, rounded, penetrating "hooo hii hoo," which when heard at a distance has a metallic quality that has given rise to the popular name bell- or anvil-bird. The call is sometimes modified to "huuuu-i-huuu" or it may be just a long, quavering "hoooooo." Then there is the more distinctive "kit-tu-iii" uttered by the male, to which the female responds "hoooo" or "huuuuu." Still other calls are "tuu-li" by the male and "heur" by the female, both oft repeated, and "piru" by the male and "hooo" by the hen. A loud call associated with the courting display is one I liken to the passing of a whetstone across the blade of a scythe: "schrang schrang." To this the female responds "oouuu." The call of anxiety is a low "teuch teuch" or "cheuch."

These birds hunt for food by creeping and hopping among heavy tangled bush, often searching the ground for insects that lurk in leaf debris and moss. When on the ground they stand with legs at full length, tail slightly raised above the wing tips, and body feathers drawn close. They don't flick the leaves over as do thrushes but they may turn a leaf or a bit of bark if they have seen an insect disappear under it. They just hop, disturbing the insects as they move. I have sometimes seen them on the ground at a termites' nest and at the trail of safari ants (*Dorylus*). They may sometimes come out of the bush and hunt in the side drains of a road or the silt along a path after heavy rain. They are secretive and skulking; if one does see them momentarily in the open, they immediately take cover.

Their flight is rather heavy—a continuous action of the wings until just on the point of alighting. They prefer to evade observation by hopping into a bush rather than taking flight.

Courtship posturing and calling are indulged in. The male stands upright and raises his head as he calls "schrang schrang," followed after a

pause by a loud "kit-tuu-iii," and as the note is uttered he depresses the head and body. After calling thus for a while, he drops his wings, fans his tail, and raises the long rump feathers, which are soft and mottled with white at the bases. Then he lets them droop fanwise in a most effective manner. He moves up and down and calls and flutters toward the hen. She slips off her perch and goes farther into the bush followed by the male. He repeats his display and utters his "schrang" note, head up, then down, as if forcing the call out. Then follows a low quavering "hoooooo." After copulation both birds take a short flight and commence to duet. Though I have recounted this behavior in sequence, there is often an appreciable lull between acts when both birds sit eyeing each other. When the hen shows an inclination to move, the next act begins.

Since these birds are so retiring in habits, it has surprised me to find some of their nests in isolated bushes and clumps apart from the main forest fringe. Such a situation possibly has its advantages as protection from would-be predators, ground vermin particularly, who could not approach unseen. These nests have usually been in thorny bushes. All the nests are fairly low, from four to six feet up as a rule, but one was at thirty feet in a mistletoe. The nests are rather shallow, open mesh structures made of rootlets and fine twiglets with a sparse lining of fine rootlets, open enough to allow one to see eggs or young from below.

Both sexes take part in nest construction, but the bulk of the work falls to the female; the male encourages her with calls. The female also does most of the incubating.

The eggs are longish ovoid, bluish or greenish-blue in ground-color with freckling in umber-brown and with sub-marks in gray. Quite often the spotting is mostly toward the larger end, sometimes in the form of a capping. Average size:  $23 \times 19$  mm. Some eggs are almost complete ovals or rounded.

The hen is a timid sitter for the first few days but she soon sits tight and if the nest is well hidden, as it usually is, she will not leave when one walks past it.

These birds are predators. I have witnessed them taking eggs and young from nests and taking young field mice (*Leggada*), but they are also very useful birds. Medium-sized and small birds chivvy them, and this is a sign that they are disliked in the avian world.

It is not easy to ascertain the range or hunting areas of these birds because of the thick vegetation in their environment, but by cutting blocks into sections and stationing boys at intervals I have estimated that they hunt within a radius of twenty yards of the nests. Nesting pairs are usually well spaced and there appears to be no overlap in territory; in fact, they are so far apart that I have never witnessed squabbles on the border line.





#### PIED BUSH SHRIKE

The male has just fed the still-hungry young

At one nest kept under observation, the chicks were two days old. The hen brooded them most of the day, but she left the nest for a while when the male brought food. He approached by climbing through the thick vegetation and came to the nest from behind. The female always gave warning of his coming. He made a low "chuck" when some distance off. He brought grasshoppers and green mantids. When the hen returned to the nest she carried small moth larvae. The young were fed twenty-five times in  $2\frac{1}{2}$  hours, mostly by the male.

When one week old the young were given a more mixed diet which included noctuid larvae, mantids, long-horn grasshoppers, *Saturnia* moths, two tree-frogs, and one small skink. On the third session in the hide, in addition to the menu given above, two nestling barred waxbills were brought, two tree skinks, and a twelve-inch-long green tree-snake. This last was brought by the male, who held it midway along the body so that the two ends trailed along his sides. The youngsters were excited and opened their mouths wide. The bend of the snake was pushed into the mouth of one chick but of course the snake straightened out as soon as the

parent released it. He caught the snake up and worked it in his bill until he came to the head end. He pushed this into the mouth of the second chick, but the weight of the body caused it to come out. He tried again and the same thing happened. The female had appeared on the scene by then, carrying a moth larvae. She disposed of this and seizing the tail of the snake she pushed it well down a chick's mouth. The chick struggled bravely. Meanwhile the male had taken a loop of the snake and tried it on the other youngster. Naturally, the youngster with the tail couldn't get very far, for the weight and the struggles of the other chick kept pulling the tail end out despite all efforts; finally it came out altogether. The parents tried all sorts of ways to get the snake right, and at last the male took the head and pushed it into a waiting maw. The recipient of this end did his best. He swallowed hard, panted, and swallowed hard again; he moved his neck from side to side and managed to get about two inches down. And there it stuck! His neck was outstretched, and the rest of his body sagged with exhaustion in the nest. The mother picked the tail up and gave it to the other youngster. It was very thin and wriggled. She pulled it out of the chick's mouth and inserted it again; then he got it down far enough to close his mouth on it.

At least fifteen minutes had gone by; the parents looked at the youngsters and flew off, leaving the chicks each with an end in his mouth. The one with the head tried manfully and managed to get a little more down. I thought to myself, surely the head must now be in the youngster's stomach! He can't possibly get more down! The chick with the tail held fast to it but he just lay in the nest, having given up the struggle long ago. The parents returned with more offerings, but the chicks were "fully engaged." The mother swallowed the mantid she had brought. She then tried to take the head end of the snake from the first chick but he held on tight, so she pulled on the tail end and it came away from the mouth of that youngster. The father had looked on, and as soon as the tail was out he offered his food and the chick took it. The hen flew off again, but her mate stood and looked at his offspring with the snake head still in his mouth. He picked up the tail end and passed the hind part of the snake to and fro in his bill several times; then taking up the tail he pushed it into the mouth of the free chick. The position was now as before. The male then flew off. Chick no. 1 still had the head fast, but he had sunk into the nest. Chick no. 2 had two inches of the tail down and he shut his eyes and seemingly went to sleep. They had now been nearly an hour at this game and I thought it time for me to intervene. I climbed down from my hide, and stretching up to the nest cut the snake across with scissors just short of one chick's bill, and pulled the tail out of the other's mouth.

The young were none the worse for a snake diet when I visited them two days later. They were now well feathered and starting to preen themselves between feeds.

Next day the offerings included two newly hatched finches, a small skink, and all the insects of previous occasions.

These young shrikes are hatched naked and are a warm pinky-brown in color; the gapes and the mouths are yellow. They leave the nest well feathered but only just able to fly a short distance. The first plumage differs from that of the adult. The dark upper feathers are strongly tipped with ochre and the under surface is dull white with some mottling on the flanks. When the subadult plumage is assumed the yellowish tips to the upper side are lost except on the wing coverts but the under surface is still dull; the flanks are buffy. The young may remain with their parents until just before this change takes place.

Of the several pairs I have located in my sanctuary few breed in the short rains; most nests are found between March and August in a good year. The species nests at other times in different areas of its distribution.

### PUFF-BACK FOREST SHRIKE

*Dryoscopus cubla hamatus* Hartl.

Those "hunting parties" which I have previously referred to as taking place in forest are almost certain to contain one or two puff-back shrikes. Notice that when the male flies he shows a white rump, while the female's shows gray.

The species is a forest and woodland bird, ranging from the coast, where it is represented by a distinct race, to the Kenya Highlands, particularly east of the Rift Valley. In the thornbush country another species is found. The puff-back shrikes frequent the tops of trees of the mid-stratum and the canopy. They hunt diligently among the foliage, often quietly; all that one may note is the moving leaves. In spite of the contrasting plumage they may often be overlooked, but when they come to the leafless twigs below the canopy they can be spotted at once. Also, they can be identified at once by their calls as they hunt in the trees. The notes are best heard as the breeding season approaches. I have come to the conclusion that a given pair will remain together throughout the off-season.

Not infrequently one may witness the display of two males for the attention of a single female. The two rivals perch in a tree and vie with each other in calling "two-weeoom tuu-weeoo" or just "weeoo," followed by a long-drawn "ki-eeeh." They fly at each other, chasing one another from tree to tree, until one retires. The female goes on hunting for larvae unconcernedly. Having chased the rival off, the male comes fluttering down toward

the hen; perching not far off he displays and calls "ki-erk kirrrrr." To this the female responds by stooping and clicking her bill and opening her mouth in a threatening manner. The male sidles up to the hen, swaying his body slowly from side to side, and as he gets near her he raises the white rump plumes above his back until they form a "puff"; his wings are drooped and his tail is expanded. He changes his call to "whee-oo whee-oo" and comes closer. The hen chases him off, clicking her bill loudly. He comes back and repeats the display and calls, and then the female makes a low "ooo-ooo-uuu" note and clicks her bill. The male takes a short flight with fluttering wings and fully distended "puff." As he alights he postures, raising the puff until it forms a white ball above his back. He tries to alight by the hen but is again driven off. He comes again, but the hen flies off, clipping her wings audibly. The male follows, and when they alight he displays and calls softly "tee-wee-uuu." The female partly opens her wings, bends down, and accepts the male. Both birds then fly a short distance, noisily clipping their wings and calling loudly. The male alights on a high tree away from and above the female. He comes fluttering down with quivering wings and spread-out puff, calling the while, and alights by his mate. Then they go off into the treetops to hunt, calling to each other as they forage. The male often brings caterpillars and feeds the hen. A day or two later one sees them looking over possible nest sites, but the nest is not begun until a few days later.

Two pairs of puff-backs have nested in trees near the house for many years. Neither interferes with the other unless a too close approach is made to the nest site. As a rule they keep to their own territories. The nest sites are moderately high, twenty and forty feet up, and the type of situation is similar—an upright fork with two or more arms toward the end of an upright branch just below the leafy tip, or an inclined branch where two uprights form an angle. There is no coverage at the nest itself. One curious fact is that the birds advertise the whereabouts of the nest by continuous calling as they go to or from it, and the bird that is busy working the material will often call to its mate who has gone off for more. This, combined with the fact that the nests are well camouflaged, strikes me as odd.

Practically the whole of the nest frame is made of bark fiber bound together with cobwebs. Cobwebs form the first attachment to the site; then strips of bark are laid in position and cobweb is worked across them and fastened to the rough bark or the supporting branchlets immediately adjacent. The base of the nest is firmly anchored. As the structure slowly progresses up the crotch of the fork cobweb is bound round the supports, and as the flexible bark fiber within the fork is bent and fastened with web the body gradually takes shape. Though both birds fly to the nest with material, the female collects most of it and does the actual building. As the cup

takes form she sits within it, adjusting a bit here and there with her bill and molding the curve with her breast. The whole cup is firmly knit and bound with cobwebs on the outside, and very often little bits of bark and lichen are worked in and held by web, some of which may have the spider cocoons still attached. Ten days seems to be an average time to build a nest, but one pair completed a nest in six days, having started it two days after the eggs of their first nest had been robbed.

Two eggs form an average clutch and on rare occasions in the Highlands three may be laid; three are not uncommon with the coast race. The eggs are pale pink or rich pink in ground-color with fine freckling and short streaks in gray-brown and umber and with grayish sub-marks, particularly at the larger end. An occasional erythristic or very reddish egg may be laid. The surface is smooth and mat. The average egg measures  $23 \times 15$  mm. Incubation is shared by both parents, though the male's share is just for brief spells when the hen is off, especially of a late afternoon. Incubation lasts thirteen days, and the birds sit close.

The young are hatched naked, flesh brown on the back and pink below, legs grayish-brown, gape and mouth yellow.

The puff-back is a fussy parent, calling when near the nest, and one or the other is always about the nest tree. They are extremely devoted to their young, as they are to each other.

I have one record of unusual camouflage of a nest. I had a little stand of croton saplings which had grown to about eighteen feet. A pair of these shrikes selected one of them to build in. The common brown croton sapling (*C. megalocarpus*) grows rapidly, sending out a branch which has a multiple fork toward the end; then one of these arms grows and also forks until a small tree with a thick canopy is formed. The forking provides excellent nesting sites for many birds. The shrikes built their nest in a fork fourteen feet above ground. About the time the eggs were laid the whole of this district was infested with a moth larva which specialized in crotons. Every croton tree—sapling or giant forest tree—was completely defoliated. The sapling in which the shrikes had built did not escape; from being a tree with a wide-spreading thick canopy, it was in three days reduced to stark naked stems.

However, the birds didn't desert. The parents in turn shaded the eggs from the sun, which now beat down on the unprotected nest. The birds panted with the heat. Deprived of normal shade and coverage, the nest showed up dark and conspicuous in the fork; then I noticed that its color was changing to gray and brown and examined it closely; quantities of cobweb and lichen were now worked all over the outside of the nest and a little way up the arms of the fork so that the nest now blended with the col-

or of the tree stems. I watched the birds laying on this additional material during two days.

The day the eggs were due to hatch I went to the nest and found that no bird was sitting. Then I heard a familiar call and the male arrived at the nest, looked in, picked up eggshells and flew away. In five minutes the female appeared, came to the nest, and settled down. Presently the male arrived and handed food to his sitting mate. She raised herself slightly and put her head down and seemed to be feeding a chick. Then she resumed her brooding. Going up my ladder I looked into the nest; there were two wriggly chicks in it.

I put my hide up on top of the ladder next day and went into it straight-away. The birds ignored my presence. That day, the hen brooded all the time; food was brought to her and some of it was given to the chicks. She got off only once during the four hours I sat watching.

I gave them two days clear before I entered the hide again. The camouflage about the nest had been increased, especially around the nest edges, so that when the mother sat deep she was invisible from the ground level. She sat brooding for a long time and was fed once by the male. She got up when her mate came next, and flew off, leaving him to feed the youngsters. She was back in about ten minutes and fed a noctuid larva to a chick. The male called from a near-by tree, and as he came she flew off. And so it went on all morning. The male always heralded his coming by a loud "too-wee-oo." On one occasion when the hen was brooding and the male gave his notification of arrival, the hen raised herself in the nest, quivered her wings and opened her mouth to receive the food.

When the young were a week old, I entered the hide once more and did a count of the visits. A five-hour watch gave twenty-one visits by the male and twelve by the female, but she had brooded between feeds. The food brought was noctuid moths and larvae, half-grown saturnid larvae, many long-horn grasshoppers, and two crickets. It is of interest to note that no croton moth larvae were brought, although they were still about in thousands!

At another nest the male's captures were often very large, such as a half-grown saturnid larva, and though he had pulped them well they were still too big. When he brought the first one the hen was brooding and as her mate arrived she stretched forward and gripped the larva by its tail end; then ensued a tug-o'-war. The larva stretched and stretched until it broke in half. Long-horn grasshoppers of large size were held by the male while the female took off antennae and legs.

The young did well and feathered fast, and eventually left the nest on the seventeenth day. Their plumage is very similar to that of the female,



PUFF-BACK FOREST SHRIKE  
Male at nest in defoliated tree

but they are more buffy on the breast and more grayish on the flanks. The bill is brownish-horn instead of black.

One nest was in a tree in which there was a nest of *Crematogaster* ants. Most of the ants kept to their trail on the lower side of the branch. The female was caused a deal of annoyance when these ants crawled about her; in fact, she spent most of her time picking them off as she sat incubating the eggs. At first, few ants entered the nest after the chicks had hatched.

The young did well until they started to feather and could move about a bit. The movement of preening seemed to annoy the ants, and they swarmed all over the nest, abdomens cocked up, as is their habit, and they emitted a pungent odor. On each visit the parents cleared the nest of ants, but it became badly infested while they were away.

When the young were within three days of leaving the nest the ants came down in force. Next morning one youngster was out of the nest clinging desperately onto a leafy twig, while the other was still in the nest covered with ants. I cleared the nest of ants, pulled dozens off the chicks and returned both birds to the nest. The following morning one chick was dead in the nest, the other dead on the ground, and the whole tree was a seething mass of infuriated ants.

## LESSER RED-WINGED BUSH SHRIKE

*Tchagra australis* Smith

This shrike ranges from the coast to Uganda in three distinct racial forms, but all have the same general habits. They live in the bush country and scrub lands, and our Highland form loves the *Lantana-Aspilia* bush of the Kikuyu country, the deserted and overgrown cultivations and the bush-grass of open valleys.

They are shy birds and if put out of one bush they fly to the next and disappear. If they happen to be on the ground in search of insects (and they take much of their food off the ground), they run and slip into cover, but they don't go far. If one stops to look for them, one may hear the low note of awareness: "chiii" . . . "chiii"; walk toward the sound and the note changes to "chierk," but it comes from another direction; the bird has silently moved its position.

Of the many shrikes frequenting the bush and scrub areas, the red-winged exhibits the most spectacular display at breeding time. With the approach of the nesting season the calls are frequently heard. They start in the very early morning just at dawn, when the dew still lies thick on the herbage. The male perches on the top of a small tree or bush; he calls "cheewo, chee-wo, wa, cheewo" and then changes suddenly to "piri-wich-i-tii, whichii wichii." The notes are accompanied by posturing and swing-



ing of the tail. The tail movement is jerky—up, across, down, across, up. Calling loudly, he suddenly flies upward twenty or thirty feet; then, wings aquiver, rump feathers outspread and tail fanned, he sails downward, the while he makes a long call starting loudly at first then gradually trailing off. It sounds like “piri-chero-cherochericeri ri-t-ri” or “piri-tweo-tweo-tweo tweotwii-chi-chichichichi.”

This is part of the courting display and call. It is often made while the hen is busy nest-building, and one can locate the whereabouts of the nest by watching the direction of the downward flight. The pair may have gone a little way off to collect nest material which the female takes to the nest site in an almost direct route through the bush. The male flies upward, calls and descends toward the nest. It is the reverse when the birds have young just out of the nest. Making short flights and calling, they move away from the young, hoping that a chick will follow. As they fly they expand the tail so that the dark barring and white tips are plainly visible.

Nests of this species are usually sited very low, from a few inches off the ground to four feet up. They may be on a low stump from which sucker shoots have sprouted, in an upright double or treble fork of a sapling, or in a horizontal fork with multiple upright shoots. They appear frail, because the fine rootlets and twiglets of which they are made are interlaced in an open mesh, leaving interstices, so that the eggs are visible from below, but the nests are really very resilient and the outside is worked together with cobwebs, especially around the rim. Finer rootlets are laid in as a thin lining. The nest is a deep saucer rather than a cup. Low nests are subject to attention from field rats such as *Arvicanthis* and from mongooses and snakes. Siafu ants (*Dorylus*) also raid them when these ants are in open rank or in foraging formation. The time taken to build a nest probably varies in ratio to degree of urgency. The quickest time I have noted was five days, but a week to ten days is about usual. Both sexes take part in the construction.

Two eggs are usually recorded as the full clutch, but three are quite frequent. The size of the clutch seems to vary in accordance with prevailing climatic conditions; in a good season, when food supply is assured and abundant, three eggs seem to be the rule. The ground-color varies from almost white to pink; the markings are of two types: bold red-brown and liver-colored spots, short streaks and oblique dashes, and gray to bluish-gray sub-marks of smaller size. The surface is smooth and mat. A slight gloss may be present on hard-set eggs. The hen does most of the sitting, relieved now and then by her mate, during a period of twelve or thirteen days. She sits very close and I have noticed that the more exposed the nest the tighter she sits, even from the first, and as incubation advances one can walk up to the nest without causing her to leave. If the bird is put off, she stays in the bushes close by and utters her note of anxiety, “chierk,” which

soon brings her mate to her side. The concern they display, especially when with young, makes these birds almost fearless. The hen at one nest frequently dashed at a dachshund pup at my feet. One could almost dispense with a hide when watching some pairs, but they vary in this respect.

The owners of one nest were so tame that I erected the hide a few days before the young were due to hatch. I went into it the day the eggs were chipping. The mother sat close, and every little while she raised herself and looked into the nest; sometimes she put her head down and gently billed the eggs and moved them slightly. I had to leave the hide at noon, but before going I stroked the sitting bird and she moved onto the edge of the nest. Her tail covered the contents and when I gently moved it aside, she turned and pecked my finger. One chick had hatched.

I returned to the hide at 2:30 o'clock and sat until 5:30, when the light became bad. The male had come once and fed his sitting mate. I presumed that the second chick had hatched because I had seen the hen raise herself and, head down, move the eggshells about until the halves were brought together, one inset in the other; then she had pushed them to the back and gently worked her breast down onto the chicks, and brooded. I waited until 6 o'clock and still the shells hadn't been removed. Next morning at 6 o'clock I put the mother off and the shells had gone. The young were fed only twice that morning.

I returned four days later. The young were still naked and brownish-pink in color; their eyes were mere slits, and the wing quills showed blue under the pink skin. They were more active and responded at once; as soon as the parents came near the nest up went their shaky little necks with mouths held open wide. Small moth larvae were fed to them. I noticed the male holding a nymphal grasshopper under one foot and pulling the legs off with his bill; then he took the insect and passed it to and fro across the bill and came to the nest. The insect was well pulped but the chick had some difficulty in getting it down.

When the chicks were a week old, the head, back, and wings showed quills just bursting at the tips; the eyes were wider and the mother had ceased to brood except for very short spells. Both birds often arrived at the nest tree together, but they fed the chicks one at a time. The food now consisted of nymphal grasshoppers, small crickets, moth larvae and small mantid nymphs. The visits with food averaged once in every twelve minutes until mid-day, when there was a lull, and the afternoon feeds increased rapidly toward evening and continued to almost dark.

On the fourteenth day, when the youngsters were well covered with feathers and completely filled the little nest, I did another short spell in the hide. The youngsters never seemed satisfied; they welcomed the arrival of their parents with low squeaks; even after being fed, they asked for more.



LESSER RED-WINGED BUSH SHRIKE

Female sitting on nest

A few moth imagoes were added to the menu, all noctuids, but one geometer larva and a black weevil were also supplied. Best of all—a good feed for the young and very interesting to me—was a small pink hairless *Leggada* mouse, pulped and disemboweled. It was too large for one chick and had to be divided. Nymphal long-horn grasshoppers were now given with legs still attached, and the long antennae often projected from the youngsters' mouths for quite a while, until the body went down. So anxious were these youngsters for food that they now stood on the nest edge to

receive it. I thought that they might be tempted out of the nest by the parents but there seemed no inclination to do this while I watched them. They actually left on the sixteenth day. They were able to fly only a short distance, and they spent most of the time under thick cover, where the parents visited them with food.

Their plumage is something like that of the adult, but they lack the pronounced black and white stripes near the eyes and the under side is more washed with buff to ochreous; the bill is horn-brown instead of black.

The bill of the adult presents an interesting feature: the lower mandible curves upward from about half way and there is a sharp hook at the end. I think this modification assists in taking insects off the ground and holding them firmly, especially the beetles which form a considerable part of the adults' diet.

### GREATER RED-WINGED BUSH SHRIKE

*Tchagra senegala armena* Oberhl.

The species has a wide distribution in Kenya and Uganda from the coast to the Highlands, but seldom above 7,000 feet. These birds frequent a heavier type of bush than the lesser red-wing and prefer the thick tangle of overgrown dongas and dense copse formations. They are less given to exposing themselves, less given to display, and are skulking and difficult to put out of cover. One sees them on the ground under thick bush, where they do most of their hunting for insect food, largely beetles. One occasionally disturbs a bird at a cow pad or game dung when it is busy breaking up the dung for beetles, mostly scarabaeids, or, as often happens, when it is searching the drier dung for termites. One of the most striking features of the bird is the curious blue color of the eye, a color not often seen in birds in these parts. As the bird flies it partially spreads its tail, and then one notices the bold pattern.

The call is varied; the warning note is a "churr," but anxiety is indicated by a clear call like "chu-ti-boi," uttered once or twice. This note is also part of the directional and display call but with a different intonation and additional notes: "chu-pi-ti-boii," emphasis being laid on the compound syllable "boii," which is often repeated. The display flight is very like that of the lesser red-wing but more exaggerated, and the calling takes place on the ascent and trails away as the bird sails down.

Birds which keep to thick cover are always on the alert and are watchful for anything unusual; most of them are adept in misleading one as to the location of the nest. Most nests are in rather low thick bush at about four feet, with plenty of top cover. They are rather more robust than those of

the lesser red-wing and are made of fine thorny twiglets, rootlets, and vine tendrils and are more thickly lined with grass rootlets. They measure about 80 mm. across the inner rim and about 40 mm. in depth.

The eggs have a pinkish-white ground-color with large irregular blotches and spots, short linear liver-red marks toward the larger end, and underlying marks in gray and lavender; sometimes there are finer spots, generally and widely distributed. Three form a usual clutch.

I have usually found the hen on the nest, but doubtless the male takes a share in the incubating. It lasts about twelve or thirteen days. If they are closely examined, the birds show resentment by repeated low "chuck" notes from deep cover; even when one is at the nest, the male may call loudly from a bush some way off, fly up and drop to cover, just to distract attention. If one sits quietly a little way off, the female is soon back on the eggs. She hops quietly through the bush and slips onto the nest without exposing herself.

The nest may be on a horizontal branch with lateral supports, or it may be in a multiple fork. The birds are attentive to the young and overcome some of their usual reluctance to show themselves in an anxiety to attend to their offspring. The young are fed on moth larvae, nymphal grasshoppers and other acridids, beetles, and spiders, and if there happens to be a temporary water pan or pool where frogs are breeding and the water is low, tadpoles are secured. I have seen an adult bird eating a tree-frog.

The youngsters feather rapidly and soon fill the nest; where there are three, one is often covered by the other two. They stay in the nest for about sixteen days. The first plumage is duller than that of the adults; the crown is brownish, not black, the head stripes are not so bold, and the under surface is dull and washed with ochreous. The eyes are brownish-gray, the bill horn-brown, the feet brownish. To keep in touch with the young after they have left is difficult; one can trace their general whereabouts by watching the adults, especially the male, but they keep to the thick cover until they are well able to fly.

### HIGHLAND WHITE-BELLIED PIED TIT

*Parus albiventris albiventris* Shelley

Here in the Kenya Highlands, in the forests, both evergreen and savannah, in gallery forest along rivers, in wooded areas, and in old established gardens with indigenous trees, the white-bellied tit lives. In the acacia country, especially along the tree fringe of rivers, a pink-bellied tit occurs, and in the thornbush country the white-cheeked tit is common. Then there are black tits in Uganda and Nandi, and several species of penduline tits in

the acacia country. We are here concerned only with the pied tits—true tits in habits, actions, voice, and methods of finding food.

They are really forest birds, and since they frequent the treetops, just below the canopy, they may easily be overlooked. It is when they occur in more open woodland and in orchard country that one notices them the more. They are usually in pairs, or for a short while in family parties, but there are never very many in one spot. They are frequent members of a "drive," when several species of birds band together and move through a portion of a forest as a loosely knit company, working the vegetation from canopy to undergrowth. These birds work in the canopy or just below it. They creep and hop down or up, around and under branches, searching every hole and cranny in the bark and investigating clumps of lichen and moss, curled-up leaves, masses of orchids, and clumps of ferns. Quick, restless, and ever on the move, they flit from one branch to another and all the while they keep up a rather harsh intermittent "tcgrip" or a variant of it which is like "twach twach twach" and "chrip-twsich-twach." Some of the notes are not unlike those of the great tit; thus, the call "tch-ir tch-ir tch-ir" is frequently heard, but the warning note is a harsh "chirrr."

These tits roost in holes in trees, in crevices between two main upright and close-set trunks, under portions of bark that have become partially separated from a trunk, and in knotholes. They are always noisy when going to roost, and they take time to settle down. They may go into a hole, remain there for a while, hop out, hunt around for a bit, pop in again, and still not be settled in for the night, for they frequently pop their heads out to have a final look around.

Most of the roosting places are from forty to eighty feet up, but one does occasionally find one at about four feet. These holes are often quite shallow—mere depressions or recesses—but most of them go in a few inches. This habit of utilizing holes as sleeping quarters may sometimes deceive one into thinking the hole is a nest site, since a pair will be fussy and noisy while at it. But the point can be easily settled by watching during the day. Frequently a nest hole may subsequently be used for roosting and vice versa, but few sleeping places are lined.

Of the several nests I have found, all have been high, not under twenty feet, and one was eighty feet up. These nest holes vary in type; some are rot-holes in a trunk or at the end of a broken branch, in a crevice between two contiguous trunks where rot has set in and caused a cavity, or—and it is a favorite site—in the holes and recesses in the gnarled trunk of an olive tree. Occasionally an old woodpecker's or barbet's nest may be used. Thus, the entrance to the nest hole may vary in shape and size, but my experience has been that these tits prefer a hole with a narrow entrance—a crack just large enough for them to negotiate.



HIGHLAND WHITE-BELLIED PIED TIT  
Female, with moth in bill, about to enter nest cavity

One nest was made in a twisted olive at thirty feet. It was in a crevice formed by two main trunks growing over a central decayed one which had broken off, leaving a hole some eighteen inches deep. The birds were in and out of this hole for ten days before the eggs were laid. I watched them taking in bark fiber and bits of hair and fur and some beard-lichen. There were four eggs eventually, and I could just see them by the aid of a torch. Two young hatched on the twelfth day, and on the sixteenth, when I noticed food being taken to the nest regularly, I set about erecting a hide on a forked branch opposite the nest and about eight feet from the entrance. The birds settled down to the presence of the hide with little fuss.

I saw the parents hunting the crevices in bark of trees and heard them calling to each other. The male secured a large green caterpillar, and after he had bashed it about to stop its wriggling, he came to the nest tree and alighted about six feet from the nest entrance. He quivered his wings rapidly and called to his mate. He then flew to the trunk well above the nest crevice and came spiraling down the tree into the top of the narrow crevice and disappeared. He was out in a moment. At last the female found a larva and flew straight to the crevice with it and entered. She was inside for one and a half minutes. I could hear her low "chir-chr-chrrr." She appeared at the entrance with a large fecal sac in her bill and dropped it in flight several yards away from the nest tree. She made four more visits in fairly rapid succession before the male appeared again. He was shy and scolded. The female made three more visits before the male decided to come down to the crevice. He next arrived with three large noctuid larvae. One was still active and curled about his face, so he tapped it against a branch.

He was still in the nest when the female returned with a large flattish hairless larva which looked to me like a glow-worm. As she was about to enter the crevice, the male pushed past her and flew away. She entered and stayed down quite a long time and I heard her encouraging her youngsters with low calls to take the food. She presently appeared in the crack, but she still had the food; it had evidently been refused by the chicks. Perhaps they didn't like it, or it may have been too big. I expected to see her swallow it, but instead she flew off and dropped it. Just as it reached the ground a white-eyed flycatcher flew down to it, picked it up and flew off, and I saw her swallow it.

The male showed cunning in approaching the nest hole, entering by a narrow slit at the back. Twenty-three visits were made by both birds in four hours; the female was responsible for fifteen.

Three days later I went into the hide again. There was little variation in the behavior of the birds. Thirty-seven visits were made in five hours. Six spiders and one long-horn grasshopper were brought; the rest were moth larvae. Three or more caterpillars were often brought at one time.



The young tits were seen with their parents in the surrounding trees twenty days after hatching. They were just able to fly, but not yet able to follow their parents around as they did later on. I went to the nest tree that same day at about 6:30 P.M. and found the parents trying to coax the youngsters back into the crevice for the night. It was quite fifteen minutes before they were safely shepherded into the hole. The male fussed around for another half hour; then he, too, squeezed in.

### BLACK-HEADED ORIOLE

*Oriolus larvatus kikuyuensis* van Som.

(*Oriolus monacha kikuyuensis* of Sclater)

There are two species of black-headed orioles in the Highlands. One lives entirely in heavy forest. It is distinguished by its yellow hind collar and jet black central tail feathers. A second is found in acacia country in trees fringing rivers and lakes, and in the drier savannah forests, such as we have around Nairobi. It has hardly any yellow collar and the central tail feathers are olive-green.

This latter bird is very conspicuous, but since it keeps rather to the tops of tall trees its presence is made known by its full and far-reaching and not unmusical call. The notes are very varied: they may be monosyllabic, or a series of notes. Here are some calls I have recorded: a loud liquid "pliuu," a treble "o-pi-oo," a double "deg-wur," and sometimes a series such as "o-ko-wer-uu," "wha chi ki-uu," "chip cha oble," "ki-chu-ku-puwa." There may be a series of running notes, low but distinct, in the form of a song: "tuu-ga-wak-kok wok-chu-wek," "kik-chu-woou-ku-pawa," and so on—a curious and distinctive mixture. The above are its own notes, but to cap it all, the bird is an excellent mimic!

I watched a courting pair early in March; the male was in a high *muhugu* tree calling loudly; the female was in a tall *Maba* about ten yards off. The male increased the volume of his notes and flew in a downward curve to a tree about thirty feet below the hen. Here he displayed: he spread his tail and depressed it; at the same time his wing tips were raised and brought up and forward, and his head was depressed. In this attitude he slowly revolved on the branch; then, bending down, he suddenly brought his fanned tail over his back and lowered his wings and expanded them fully. Throughout the whole of this performance he kept up a continuous calling, low yet distinct—a mixture of starling calls, notes of sunbirds and cossypha calls interspersed with the liquid notes he ordinarily uttered! The mimetic calls were an astounding feature of the performance. The whole display was carried out on one branch. There was a short silence;

then he displayed again, but this time his head was held high with the neck outstretched, the tail was expanded and held high, and the wings were partially opened and held low on the branch as he bobbed up and down. The female suddenly flew straight down toward him but alighted on a branch just in front of him. Both birds opened their mouths, moving the lower mandible rapidly. The male redoubled his calling, hopped over to the hen and attempted to mount her, but she evaded him and flew to another tree. The male continued to display. The female flew to his side and pecked him and pulled at his wing, but he continued his performance. Presently he flew to a high tree from which he came sailing down with quivering wings and outspread tail and alighted beside the female. He made a low, purring note to which the hen responded by crouching low with wings drooped; then she allowed the male to mount her. Both birds then flew with loud liquid notes across the valley and back to the forest edge. It was obvious that they intended nest building very soon, and I kept the pair under daily observation.

On the morning of March 16 the orioles were very noisy shortly after dawn, and at 6 A.M. I noticed the pair flitting across the open area in front of my house toward a tall *Schrebera* tree. I sat on the balcony near my bedroom and watched them come and go several times; on each occasion, the female had a mouthful of beard-lichen. I took up a good stand near by and watched from 8:30 to 11:30.

The female came and went frequently, and though the male occasionally went with her, he spent most of the time in the *Schrebera* tree calling encouragement. The female always came with long strands of beard-lichen and took them to a tall *Maba* tree—not to the actual nest site but to a branch a little way off. Then she hopped to the leafy branch on the end of which the nest was being built. She collected the lichen from a tall *muhugu* about one hundred yards away from the nest tree. The two birds maintained contact by calls. That of the male was frequently “chip-o-way,” varied occasionally by “whi-thoou” and by longer calls like “ki-thoa-woak” and “see-cho-libukuu.” The female’s notes were higher-pitched and shorter. Both birds made a curious “mewing” note when near the nest.

The nest was slung to a horizontal fork and was made in the form of a cradle. One end of the long strands of lichen was twisted onto one arm of the fork, then looped around and worked into the previous loop; the second end was made fast to the opposite arm. The birds were active up to about 11 A.M. Then they left the spot and went foraging for food in the forest. Building was resumed about 4 P.M. As a fresh piece of lichen was added the female got into the cradle and stretched it with her feet, adjusting loose ends here and there with her bill. She often pressed with her

breast against loosely interlaced strands. The nest was still being added to on March 27, but I noticed that the hen sat in the nest for long spells.

The male was sometimes at the nest edge toying with a bit of lichen, but he never did any real nest building. On March 30 the hen was sitting and remained on the nest till noon. She returned to it at about 2 P.M. For the next few days she sat very close but on the evening of April 4 I noted both birds chivvying a cuckoo (*Cuculus solitarius*) and trying to drive it off. The cuckoo went away eventually but was seen about the nest site on most evenings for a week after. I never saw the cuckoo actually at the nest. On the evening of April 12 there was great commotion around the orioles' nest. The birds were calling loudly, so I went to investigate. A pied shrike (*Laniarius*) was seen near the nest and the orioles were diving at it. I drove the shrike off and later saw that the oriole was sitting.

The eggs were about due to hatch. Next morning I went to the usual spot from which I observed the nest; no bird was sitting. The orioles came, and the female went to the nest, stepped into it, got out and looked around, then went back to the nest edge. She pulled at the lichen and hopped all around the nest, making a low mewling note. The male came and looked at the nest; then both birds flew off. Their behavior was very strange. Two hours went by and the birds didn't return. I examined the leaf debris below the nest and discovered the remains of two eggs. I feel certain that the shrike had revisited the nest and taken the eggs, which were on the point of hatching.

On April 24 I heard the orioles calling from a fig tree close to my bedroom window at about 6 A.M. and I saw the birds mating. To my certain knowledge there were only three pairs of orioles in my forest and adjoining areas. One I knew still had a youngster just from the nest, the second pair had a nest in a patch of wood adjoining my forest, and the pair of the "house area" had lost their eggs but ten days ago. My recently bereft pair were evidently already contemplating another nest.

I kept them under observation and heard them calling to each other as they hunted in the canopy. Then one day I saw the female visiting the same tree where all the beard-lichen had been collected previously; she was pulling bits off and adjusting the long strands in her mouth and then discarding them. The following day, accompanied by the mate, she was around the tree again. She plucked some lichen and held it in her bill for some time; then the male flew off in the direction of a very large fig and the female followed, still holding the lichen. I located the nest site on a branch of the giant fig.

I watched them all the following day. The female as usual did all the work of bringing material and putting it into position. The male sat on a tree near by and looked on. When the female gave notice that she was

returning with material the male answered and often went to meet her. On one occasion he became very excited and commenced to display and the hen alighted beside him. He made a deep dive with tail widespreading and wings aquiver, and sailed up to a high tree; the female followed him but turned in her flight and went to the fig tree.

At odd times during the next few days I viewed the progress of the nest. On April 30 the hen was sitting. The male was in attendance in a tree near by. Between this and May 6 I always found the hen on her nest or else she would turn up in a few moments and settle down. On one occasion, after she had been sitting for some time, she got up, stood on a twig by the nest, then hopped back and snuggled down.

On May 14 I spent the whole day in observation. On my arrival the hen was off, but the male was in the fig tree mounting guard. He called occasionally and was at last answered. The hen was returning, and the male quivered his wings. She alighted beside him, and I noticed that she had food. She hopped to a branch above the nest, then onto the nest branch and sidled down it to the nest. She stood for a while, then swallowed whatever she had brought, stepped into the nest and settled down. She remained sitting for forty minutes; then, getting up, she looked into the nest, hesitated, and flew off. She was soon back again, accompanied by the male. She unhesitatingly went to the nest and settled down. The male hung around and sought for food; once he brought a large caterpillar to the sitting hen. All the while the birds called to each other, and I wondered why they should advertise themselves and the nest site.

The eggs must have hatched, yet the actions of the birds indicated otherwise. Next morning I was on the spot very early. No bird was on the nest, but in a moment of my arrival both birds arrived with food. The male came first; he perched on a twig just above the nest, bent down, and appeared to be feeding a youngster; then the hen took his place and she too bent down to the nest. When she raised her head her food was gone. She then stepped into the nest and sat close. The chicks must have hatched!

The male went off but was back in a short time, carrying more food. This he gave to the sitting hen. She half raised herself, fed some of the food to the chicks, and ate the rest. The incubation period had been fourteen days.

The nest was forty feet up, at the end of a leafy pendent branch overshadowed by foliage above. Two days later I erected a tripod and placed a hide with a rope ladder on top of it, about twenty feet from the nest. The birds were not disturbed. I watched them for an hour. The female was often off the nest and always returned with food; the male, too, made frequent visits.



## BLACK-HEADED ORIOLE

Bird at nest

I went into the hide at about ten o'clock next morning. The male came to the nest first; then the female came, fed the chicks, and sat brooding them. She continued to brood until her mate again came with food—a large green caterpillar and something black. Both were fed to the chicks by the hen, who had hopped to one arm of the fork.

Both birds flew off, and I examined the two chicks through binoculars. They were flesh-pink in color, with a deeper, almost mauve bill; the head seemed mottled and on the crown was an area of pale yellow down which stood up on end. There was yellow down at the base of the wings and on the dorsal tracts to the pelvis. The eyes seemed to be still closed.

The parents returned to the nest together. The male again fed the youngsters first; then the female hopped over and gave her food. This consisted of moth larvae. The visit was repeated in a short time and again the male was the first to come to the nest. After he had disposed of his offering, the youngsters settled down, seemingly not expecting more, so that when the mother stood by the nest she had to rouse the chicks by making a low "tscher." Up went the little heads at once, mouths agape. A pinkish larva was given to one of the chicks. It was large and hung across his mouth, so the mother took it, pulped it a bit more, and re-offered it.

Both parents left and went off in different directions. I heard them calling to each other. The male came back first, perched within the fig, and called "plew-oo," to which the mate replied from somewhere in the forest, "o-ko-heeut." They exchanged calls repeatedly, and all this time the male held his larva in his bill. He altered his call to "chit-cha-noble," to which the female replied "ki-chii-ku-paewa." The female arrived with a bill full of larvae and as she came she called "whi-re-kerrrrr." The male greeted her arrival with a low "chirr"; bending down, he raised his rump feathers and spread his tail. The male was the first at the nest but he didn't offer any food until the hen was on the opposite side of the nest. They fed the youngsters alternately until all the larvae were disposed of. Then they flew to a tree close by and the male began to posture. He fanned his tail, drooped his wings, and swayed from side to side. All the movements were slow and deliberate and ended with a slow flight which was very different from the forceful flight-glide from tree to tree—the mode usually adopted.

I spent the next two days at the hide, but now I could see only one youngster in the nest. It received a wealth of attention. On one occasion the male brought a large black and cream larva which I recognized as a saturniid caterpillar, a species greatly relished by orioles and cuckoos. When fully grown they measure about 85 mm. in length and 12 mm. in width—a mouthful for an adult and much too big for a youngster to swallow. However, the male had brought one of these. He had evidently beaten it well, and it hung down on either side of his bill. He approached the nest and the youngster put up his head and opened his mouth wide. The father looked and then flew to a branch. There he beat the caterpillar with sharp lateral movements and rubbed it against the branch until most of the hairs were gone and the insect was flaccid. It was still too big and while he was trying to reduce its bulk, the female arrived, fed the chick, and came to her mate.

She stood watching his efforts; then, leaning forward, she took the larva and swallowed it. His second offering of this kind was not quite so big, and when he brought it the hen was brooding. He handed it to her, and she swallowed it without attempting to offer it to the chick. The youngster was now a week old; his eyes were open and he greeted the arrival of his parents with a low mewling sound. The second youngster had disappeared.

There was an interval of three days before my next visit. That night the clouds looked threatening and about midnight a strong wind got up, followed by a downpour. I was out early. Both birds were in the nest tree calling excitedly. The nest was tilted toward the front and it was empty! I climbed down and found the nestling oriole alive. There seemed to be no evidence of damage and the soft herbs had broken his fall of forty feet. He was nearly dead with cold. I took him to the house and warmed him up; then, rigging a soup ladle on a thin, 20-foot stick, I climbed to my hide with the young bird, reached across, and tipped him into the nest.

The orioles watched from the branches above the nest. They had been remarkably quiet—just an occasional “plew.” I came down the rope ladder, sat under a tree a little way off and watched. The female came to the nest. She stood a while on its edge, then settled down to brood the chick. I wished I had been able to rectify the forward tilt of the nest. Next day I found the chick dead under the nest with a large purple bruise on his abdomen, presumably from his fall. This was on May 21.

The pair hung around my house for a few days and then I heard and saw unmistakable signs that they were contemplating a third nest. They were actually mating. On the morning of May 26 I found the male perched in a leafy branch toward the top of a *Schrebera* tree. He was calling softly—a low, mewling note such as the female had used to encourage her young. I saw him turning about in the branch just where it forked. The female flew toward him and alighted just above the branch. Her mate joined her and touched her with his bill. She hopped to where the male had been and turned about in it. Both birds flew off into the forest. Soon the male returned to the *Schrebera* and called and was presently answered by the female. I saw her pulling at some lichen. Getting a strand free she took wing and came to the *Schrebera*. She sat toying with the material and it dropped. Both birds sat for a while, then went over to the forest.

In the late afternoon I took a stroll past the tree and saw that a few strands of beard-lichen had been put into position. I waited. The female came three times in rapid succession, preceded by the male on each occasion, and she carried mouthfuls of lichen. She twisted an end to one branch of the fork and the other to the other branch. Then she hopped onto the intervening loop and stretched it. The female went off for more material

but the male came to the branch and he too tried the loop of lichen. By May 27 the nest had progressed rapidly. Two days later the hen was sitting.

On June 12 she was sitting tight, and as I watched, the male arrived with food. He perched on a branch above the nest and seemed to hesitate, but the female looked up and opened her mouth, so he hopped down and fed her. Then she raised herself, bent down, and seemed to be feeding young. Once again, the young had taken fourteen days to hatch.

I paid a daily visit to the nest. The parents soon became very active in bringing food. On June 29 I could just make out a very mottled youngster in the nest. On July 3 the chick was in a leafy branch above the nest. One youngster had been raised to post-nesting stage by this pair at last.

I have often noted in other areas that only one youngster seems to survive to the subadult stage. At this age they are somewhat like the parents, but though the head is dark it is boldly streaked with yellow; so also is the back. The yellow of the breast is streaked with blackish.

Orioles are entirely arboreal and seldom come to ground. Although almost entirely insectivorous, they will sometimes take fruit such as wild figs or the small black fruits of the *muhesu* (*Trema*).

I have referred to the nests as being made entirely of beard-lichen. This is the material of choice, but in some areas, where it doesn't exist, the birds use bark fiber and grass fiber, and for camouflage they employ bits of bark, flakes from acacia, composite flower-heads, and even bits of string and cloth.

The eggs of the Highland race have a creamy-buff ground with sparse, dark brown freckles and gray to grayish-purple sub-marks. They measure  $22 \times 15.5$  mm. The eggs of the coast race have a white ground, with the black or dark brown spotting more clearly marked.

## PIED CROW

*Corvus albus* Müll.

The association of the pied crow with human habitations must go back several centuries, perhaps even to the days of prehistoric man, but in spite of this, he has never lost his natural cunning and wariness; indeed, it may be that the trait has developed.

The advent of the white man to East Africa has meant an even greater concentration of crows around towns and villages. The establishment of military camps in Kenya during World War II produced another influx to the environs of towns. Every camp had its quota.

Personally, I cannot recall ever having seen these crows away from human habitation of some sort; they are "hangers on" of townships and vil-



lages, frequenting the rubbish dumps, the slaughterhouses, and the market places. The bold spirits will take their chance to pick up the odd trifle at any time; the timid will just hang around until the hubbub of business is over, and then they come in. They go early to bed and before sunset they are winging their way to their roosts, but they are early astir and shortly after dawn are already on their scavenging work along the still-deserted village streets.

In spite of modern ideas of sanitation and their application to the larger towns, the pied crows hold their own. Mombasa is full of these crows, Nairobi attracts a goodly quota, and Kisumu has its hundreds.

I once asked an old Swahili at Mombasa where the birds nested; said he, "They have no nests. They just live in the mango trees, and they live a very long time." I explained to him that they must have nests to produce young and suggested that we might take young from the nest. He assured me that there were no young birds on the island, and there were no nests! As a matter of fact, I knew of two nests, yet there were hundreds of birds about. Where do they breed and when? Some roost in the baobab trees near the native quarters; others flight over to the mainland at sunset.

There are hundreds of birds in Nairobi township, yet I know of perhaps three nests in the town. At Kisumu, where the bird is very common indeed, not a single nest was to be found when I lived there in 1912, and I know of only one now. In Uganda there are several places where nests are common.

The fact is that only a certain number of the crows we see appear to nest at a given time; the remainder hang about the towns. Then, also, we know that nesting birds travel a great distance to obtain food for the young. They raise large broods, four or five being not uncommon, and though the young are voracious they take a long time to feather up. They then take about two years to become fully mature; thus, many of the birds we notice are non-nesters.

These crows nest away from habitation as a rule, often selecting quite low trees in which to build. They make a large nest of twigs, roots, and coarse grass stems in the form of a slightly hollow platform, and this is lined with grass, strips of bark, a quantity of hair, bits of cloth, string, eagle feathers, and sundry other things, all of which go to make an almost felted layer three or more inches thick. The same nest may be used more than twice. I have a nest from which I have taken hair of some five species of mammals, including the curly hair of the natives. I know of a pair of pied crows in Nairobi, who habitually visited a car park. Selecting a car with a padded roof they would rip the cover and extract the hair and felting from inside. A medium-sized nest will measure eighteen inches across the bowl, which is about three inches deep, while the whole nest may be twelve inches from rim to foundation.

One clutch of five eggs was of the usual pale greenish ground-color with frecklings and streaks of gray-brown and umber, but the embryos inside them were all of different sizes and so of different ages. The biggest was quite a week in advance of the smallest. This would indicate that incubation starts almost as soon as the first egg has been laid, and the clutch is not completed for some days. This also accounts for the fact that one frequently finds a nest with young in very different stages of feathering.

The incubation period of a clutch of three was nineteen to twenty-one days, and the nestling period not less than thirty-five days, but I have seen youngsters out of the nest and sitting on branches while two chicks still squatted in the nest. New-hatched young are pinky-brown with tufts of grayish to black down on the head, the base of the wings, and the dorsum to the base of the tail.

I have not been able to study at close quarters the food brought to the chicks, but observation from a short distance has revealed that large numbers of larval scarab-beetles (*Oryctes*) are given. The parents dig up these grubs and use their bills to dig and extract the larvae. Bits of carrion are also brought.

Two crows nest regularly on the edge of my sanctuary, but they select a tall solitary eucalyptus tree and build the nest at ninety feet, and there isn't a branch on the tree for the first fifty feet. They have raised three broods.

I have referred to the food collected by these birds in terms of scavenging, mostly, but they dig up newly planted maize and other crops, and they raid chicken runs and steal fowl eggs. They also take the eggs from large nests of wild birds—hawks and eagles—and from ground nesting birds such as francolins.

Let me cite a few instances: I found a nest of a francolin and visited it occasionally. On one visit, I disturbed a pair of crows at the nest. They had eaten all but two of the eggs. On another occasion I had kept a nest of the crested hawk eagle under scrutiny and three days before the eggs were due to hatch had commenced to build a hide in a tree opposite the nest. The eagles were not a bit worried, and all promised to be well. The next day, just after dawn, six crows came along, and amid much cawing and shrieks from the eagles two crows slipped in and took the two eggs. They also took the single egg from a nest of the hooded vulture in my sanctuary. Again, while I was in a hide at a white-backed vulture's nest which held a fair-sized youngster, crows came and took the remains of regurgitated food at the nest edge.

KING GLOSSY STARLING or GOLDEN-BREASTED  
SLENDER STARLING

*Cosmopsarus regius regius* Reichw.

It seems strange that this beautiful bird should be associated with country avoided by most humans—desert and thornbush, waterless for the most part. One refers to the country as waterless; there are a few rivers such as the Tana, the Northern Guaso Nyiro, and the Sabaki, but the river beds and water-holes are dry except for a short time during the rains. There is some underground water and sufficient moisture in soil and vegetation to maintain the immense termite population in the areas. I mention termites in particular, for they are undoubtedly one of the staple foods of the mixed bird population of the thornbush.

The golden-breasted starlings are usually seen in small flocks of half a dozen to ten birds in the off-season, in pairs when the nesting time comes round. Slender in build, they have rather long legs, and their slimness is accentuated by the thin straight bill and very long graduated tail. The slender build is best seen when the bird is on the ground; the thin neck is held stretched and the legs are extended. All movements are quick and alert. Progress on the ground is by hops and short runs. At each brief stop the tail is raised a little above the wings. When the bird is alighting on a tree, it raises the tail. When resting at noon it sits and preens, keeping up a low warbling that is delightful to listen to. This is a trait common to many starlings. Toward sunset they perch on tops of trees, preen themselves, and call to each other. Their plumage glistens in the horizontal rays of the setting sun. If disturbed they fly off with a chorus of "cheeo cheeo." They go usually from one clump of trees to another; the wing beats seem to lack force, and the flight is not powerful or swift or sustained.

In nestling or first plumage, the young differ from the adult by having the whole head, neck, and upper breast dull blackish with just a suggestion of a greenish gloss; the wings are less glossed with violet, and the yellow of the under side is duller and paler. The eyes are dark grayish. The young commence to molt at about three months and when six months old are similar to the adults. The change in the color of the eye is a gradual one, commencing at about the third month. These starlings are almost entirely insectivorous, but some fruits are eaten. They hunt among flowers and foliage for insects and on the ground below spreading acacias for larvae and termites. When termites are on the wing, they are taken in the air. The birds hunt the termites on the ground by flicking open the earth tunnels and earth-covered debris and turning leaves with a quick lateral movement of the bill.



KING GLOSSY STARLING or GOLDEN-BREADED SLENDER STARLING  
Female at entrance to nest hole on under side of branch

The nesting season is hard to define. Breeding birds were noted on the Tsavo River in April and May, and on the Tana River in November and December. The nest is in a hole in a tree—perhaps an adapted, disused nest of a woodpecker or a barbet, perhaps a rot-hole at the end of a decayed branch. We examined one of these nests closely: it was in a rot-hole in a living *Commiphora* and appeared to have been drilled and deepened by a woodpecker in the first instance. It was on the under side of a thick branch; the entrance was about  $1\frac{3}{4}$  inches across and the hole inclined

downward for more than ten inches to where the chamber was four or five inches across and heavily lined with dry grass, felted hair and feathers. The nest hole was about five feet from the ground. This particular nest held four lusty young. They differed in size considerably; the biggest was feathering; the youngest was still almost naked and much smaller. One cannot say whether the disparity in size was due to different times of hatching or to amount of food given by the parents; perhaps it was both. In a crowded, dark nest hole such as this, the more active chick would certainly claim more attention than the weaker one. Indeed I noted that when the parents came to feed them there was always one chick very close to the entrance. I spent a long time at this nest. The birds were remarkably tame for they came and went while I sat and watched them, only a few yards away. I noted that each bird clung to the lower edge of the nest hole, supporting the body with the tail "woodpecker" fashion.

At each visit both parents arrived together; they alighted on a dead tree near by; then they came to a branch not far from the nest hole and perched on the branch at the entrance. When one had disposed of its food, the other took its place; then both went off foraging. Visits were frequent—once every fifteen minutes by both birds to begin with. Soon I noticed that three adult birds were arriving, each with a bill full of food. They followed in rotation to the nest hole and all three came back time after time with more food. What was the third bird doing at this nest? I watched them very carefully and feel certain that there was one male and two females; but in what relationship? The adults called to each other as they came to the nest tree, "cheeo cheeo," and when one was at the entrance another would call a longer "quechee chee cheeo." The parent at the entrance would often make a low note. Having fed the chicks, the last to attend would partially enter the hole and retreat with excreta sacks. So long as I sat still, though quite exposed, the birds took no notice of me; if I moved, the warning "chiarr" would be uttered. We examined this nest hole by carefully cutting out a section of the side wall. When all had been noted the section was replaced and nailed into position and the cut sealed with mud. This over, we watched the parents come and go with food as though nothing had been interfered with.

The bulk of the food consisted of quite large larvae of moths and beetles. One long-horn grasshopper and one red berry were also fed.

### SUPERB GLOSSY STARLING

*Spreo superbus* Rüpp.

These starlings are common enough. The odd pair sometimes appears in Nairobi, but their natural habitat is the lower country of the Rift Valley,

Ukambani, the Northern Frontier, Suk, and so on—districts of thornbush and acacias.

Around habitations they are bold, daring, yet wary; they hop and run about the ground a few yards off; they stand upright with wings lowered



SUPERB GLOSSY STARLING

below a slightly lifted tail, their conspicuous white eyes ever watchful. They pick up insects, and around camps, hutments, and in the market squares they find scraps of food. They take up temporary residence at a camp, perching in the trees somewhere near the cook's tent and the kitchen. When the pots and pans are scoured and the contents thrown out, down they come to pick up bits of meat, maize meal, and so on. They come down into the chicken runs and help themselves to the hot mash. But this sort of food is really foreign to them. Nearly every permanent camping site has a bare area of ground around the *bandas*, and white ants are just underground awaiting the first shower of rain to bring them up to the surface to destroy whatever vegetation may be lying around. At the first streak of dawn, these starlings are down, taking toll of the insects. True ants also appear and clear their tunnel entrances, which have become silted up by the rain. These ants are taken also. This is a nearer approach to the starling's natural diet, in which white ants figure largely, although other insects—grasshoppers, mantids, moth larvae and beetles—are also taken. Certain berries and small fleshy fruits are relished. One often sees these starlings on a bare patch of ground which certain game use as a communal latrine; here they come for fly larvae and termites. One sees them

on a road side working through the grass and leaf debris which has been washed and piled by rain and wind; beetle larvae are found here.

Toward mid-day these birds roost in some shady tree, and between preening and dozing they warble their not unpleasant song. Some of the



THORNY BARRIERS TO NEST OF SUPERB GLOSSY STARLING

Barriers erected along approaches to nest

notes are hardly audible, but I have often taken down what I could hear: "twish-i-u, twish-i, twish-it, twish-u twish-u, twish-u-wit, cher-ere-ter, bol-shi-vii, bol-shi-vii, cher-wii tuu; whit whit jorae, whit-jor, whit whit whit-uuuu, sii-i-or, chee-tor-rae, whit-perit whit perit, whii-tuu whii tuu, which-o wicho." Then there is the warning "chiirrr," rather long drawn. Intense excitement is indicated by a repeated "whit-chor-chi-vii" and an upright stance; the pupil of the eye contracts to a mere pin point.

The birds throughout their range are not limited to one definite period for breeding, for this varies with locality. The site selected is usually a thorny one. It may be in a small, very close-set thorny tree, in a young acacia sapling, or on a thick branch of an old acacia. The nest is an untidy domed structure with a side entrance made of thorny twiglets and lined with grass and feathers, if they are available; it often has a tunnel approach. If the nest is in a close-set thorny tree, the natural thorniness suffices, but if the bird considers that thorns *in situ* are not sufficient it brings varying quantities of thorny twigs and places these around the nest on all sides. It may even line the approaches to the nest with these thorny twigs, making it impossible for any soft-footed predator to approach. The untidy appearance of the nest is largely due to the thorny barricade around it.

A clutch of four bright blue immaculate eggs is common; five are occasionally recorded. They vary in size and shape; the average is about  $27 \times 18$  mm. Incubation lasts about fourteen days, and there is often some spacing in the hatching of the young and subsequent discrepancy in size and feathering. Both parents seem to incubate, but it is difficult to tell the sexes as they are so much alike.

I have watched at nests "in the wild," and have noted that insects—mostly rather large moth larvae, noctuids and sphingids—and some berries were brought to the young. At nests near habitations, this natural diet has been mixed with a quantity of culinary scrap. All the food is taken off the ground.

In color the fledgling is duller than the parents, especially on the head and neck, and the white breast band is hardly noticeable. The eye is brown, then turns to gray; it changes to white or cream only when the bird becomes adult. The molt from nestling to subadult commences at four months and is gradual and complete in two months, but the eye color is not fully changed until there has been a complete change of plumage.

### RED-BILLED OXPECKER or TICK BIRD

*Buphagus erythrorhynchus caffer* Grote

The oxpeckers are common wherever stock and game occur; they perch or work their way about the hides, tolerated by the animal until they approach too near the eyes or ears. The beast's skin quivers as the bird moves over it in woodpecker-like fashion, and the animal may swing his head round to drive the bird off or swish at it with his tail, but no real effort is made to get rid of it.

The birds are on the animals to take off ticks, for they feed on these pests, but at the same time they take the blood of the animal when it oozes and clots at a spot where several ticks have been attached. It is alleged that the birds deliberately keep these wounds open, even enlarging them in order to obtain more blood. It is even suggested that they make wounds in the skin for this purpose. Hide dealers complain that skins are ruined by the oxpeckers. Proof of deliberate injury to sound skin is still wanting, and we know that European stock kept free of ticks is free of *tick birds*. It seems, then, that ticks on the animals are the primary reason for the birds' presence on the animals. The oxpeckers are carried around by the animal as it grazes; they stay on it when it lies down; they remain associated with it until late of an evening; then they flight as a flock to one or more roosting places. These roosts are in a crevice or hole in a dead tree, a cliff face, a stone or mud wall of a building or a stone wall around a paddock; they





RED-BILLED OXPECKER or TICK BIRD

Bird perched on domestic animal

may sometimes occupy a crevice below the wall and the eaves of a house. Dawn sees the birds early astir and they flight to the grazing grounds.

Extremely little seems to be known of their breeding biology, and data collected at nests are sadly wanting. The birds are always with us, but they nest in places that are difficult to reach. Two dead trees at the edge of my forest have cracks and deep crevices to which the tick birds resort at night and in which I know they nest, but the holes are eighty feet up, in rotten trees.

I once located a nest in Ukambani, in a dead acacia. The entrance to the nest was a long slit in the hard outer wood about two inches wide. The nest chamber was eighteen inches below the bottom of the slit. The inside of the tree trunk had decayed, providing a hollow some six inches in diameter. The hollow did not appear to have been enlarged at the site of the nest. The nest itself was a cup of felted hair and fur, some four inches thick. Below this was decayed wood and underneath was another layer of thick



RED-BILLED OXPECKER or TICK BIRD

Birds perched on rhinoceros

felt, suggesting that the hollow had been used for nesting some time previously. The three eggs in the nest were dull mat in texture, creamy in ground-color, and evenly speckled with gray and lavender as sub-marks but with pink and maroon surface marks. Size  $23 \times 17$  mm. The ground-color of the eggs may vary from white to pink or pale blue, well or only slightly spotted. The feathered youngster is a dull edition of the adult and the bill is brownish-yellow instead of red.

PALE-BREASTED ZOSTEROPS

*Zosterops senegalensis fricki* Mearns

Unlike the yellow-fronted zosterops, this little yellow species is a bird of the open woodland, the acacia and thorn country, and the copse and park country. It is as plentiful as the golden-fronted in my sanctuary, for nest sites and food are abundant in the bush by the stream and in the small bushy trees on the slopes above. Moreover, numerous *muhesu* trees grow all along the forest edge.

At almost any time of the year flocks of a dozen to twenty of these birds may be seen working the tops of the taller bush where *Vernonia* grows, for

its shoots are covered with aphids, loved by these little birds. When the *muhesu* trees are in berry, each pendent spray may have two or three birds searching the berry clumps for insects and taking some of the fruits. They come within a foot of anyone who stands under the trees, and they unhesitatingly flit over his head from twig to twig. They are very quick in their actions and restless in their search for food, twittering as they move or flit about. They are passionately fond of water and at my bird-bath twenty or thirty may be around at one time. If a large bird comes along, they fly into the near-by bushes with a whirl of wings; then, when the coast is clear, they drop down, so many at a time that they look like falling yellow autumn leaves. They soak themselves and then flutter to the bushes to dry and preen their bedraggled feathers. They may often be noted in the leafage of some tree just after a shower of rain. They flutter among the raindrops still adhering to the leaves and when thoroughly wet they shake their wings and body, preen vigorously and fly off.

Their main food is undoubtedly small insects. Day after day I have noticed them foraging in the same line of trees and bush along the hill slope. When they reach the forest edge on the east they turn and work the *Euclea* strip by the stream. They adopt this same sort of routine approach to their roosts. Exactly on time, they appear in certain bushes; still in loose formation, they go on to others, taking up any odd insect in their path. When they come to a very leafy tree they split up into pairs and each goes to its particular spray, where they sit side by side. The whole movement is accompanied by twittering notes, rather pleasant to hear. More than once I have gone out at night and shone a torch to the spot where I knew two birds would be snuggled up to each other.

During the heat of the noon day, the birds take shelter in a leafy tree; they sit in rows, gently warbling or preening or just dozing. When it is time to get moving, one pair will fly off, followed by the others in dribbles, and the afternoon hunt begins. As the nesting time approaches the flocks split up. This takes place before the beginning of the real rains and one can be sure that nesting activity will soon begin. As in the case of the larger species, pairs remain together, though they may associate in flocks during the off-season. I have often seen one bird giving food to another during an organized drive; why should this be unless they are a mated pair?

The birds nest in quite low trees and bushes *outside* the forest area, often in a tree standing by itself. The little cup-nest is built at heights varying from three to ten feet, in a leafy horizontal fork in a slung position, so that the rim of the nest is level with the fork or angle. It is made almost entirely of very fine bark from creepers, bound together with quantities of spider web and often decorated on the outside with spider cocoons. Though similar in architecture to that of the yellow-fronted zosterops it has a totally



PALE-BREASTED ZOSTEROPS

Parent feeding young

different appearance because different material is utilized; it is also much smaller. This bird is only about half the size of the other.

Both parents take part in making the nest, which is completed in little more than a week. Some of the finer bark lining may be added after the first or second egg has been laid. The eggs are very small, about  $14 \times 10$  mm., pale blue in color, and immaculate. Three is an average clutch but I have seen some containing four. Both birds incubate, for a period of eleven days. The young are extremely tiny; they are pink in color, with very prominent yellow gapes.

I remarked on the tameness of the other zosterops. This species is even more tame. I have fed a sitting bird with small larvae and stroked it while it sat. Not only is this tameness shown when they have eggs; when the young are hatched one can stand by the nest and see the chicks being fed.

They feed the young continuously throughout the greater part of the morning, but ease off for about two hours at noon; then feeding is almost uninterrupted up to dusk. Both birds are often at the nest together, one on

either side of the supporting fork, but they wait their turn. Excreta is removed at once, but it often happens that a large brood voids more than the parents can deal with at once, and though the chicks void over the side of the nest, some is caught up in the vegetation around. Small moth larvae are the only insects noted by me as fed to the chicks, but not infrequently the food is so small and mashed that one cannot make out what it is; probably it is small aphids. At one nest, tiny nymphal long-horn grasshoppers were brought but proved too large for the chicks. A count of visits was made at one nest with three chicks. In two and a half hours fifty-eight visits were made by both parents, roughly one every three minutes, though actually the intervals were often longer, especially when both parents had been at the nest together. The food is put into the back of the chick's mouth.

The young feather very fast and leave the nest about the fourteenth day, but the actual date may be governed by the weather.

It is distressing to note how often these birds suffer from depredations of shrikes, rats, mongooses and snakes.

## KENYA GOLDEN-FRONTED ZOSTEROPS

*Zosterops kikuyuensis* Sharpe  
(*Z. virens kikuyuensis* of Sclater)

The smaller the bird, the more fearless it is—a remark true in many instances and well exemplified in the case of this zosterops. There are several species of zosterops in East Africa, but they all possess a total disregard for humans. This species should be reckoned a forest bird, for one sees it in this environment all the year round. It is almost certainly to be noted among the heterogeneous crowd of birds taking part in an organized hunt through the forest trees, and it will be high up in the leafy branches of the canopy where it may be difficult to see, although the incessant twitter, easily recognized, is clearly audible.

One can see these birds best when they are in small flocks hunting over the trees at the forest edge or flitting among the branches of a *muhesu* tree, where they sidle down the slender pendent twigs to get at the small black fruits growing among the terminal leaflets. *Zosterops* feeds on a mixed diet of small berries and insects. These birds are very useful as insect eaters because they devour quantities of aphids. As fruit eaters they prefer the smaller berries but are not averse to figs or the juicy pulp of a pawpaw; the damage they do to cultivated fruits is negligible.

They are very numerous in my little forest and exceedingly tame. Each year dozens of their nests are located. They are usually to be found in

saplings and small trees of the mid-growth or in creepers and tall undergrowth, at heights varying from three to twenty feet, and nearly always in the forest where the tree growth is not too thick. Many nests are placed in the fine-leaved bushes and trees around my house.

The nest is distinctive—a small cup slung between the arms of a horizontal fork, or in the angle of a stem and a long-stalked leaf, or between two stems of a twisting creeper. The nest is made of moss, beard-lichen, fine bark fiber, and cobwebs, all firmly worked together and bound with more cobweb along the rim. The inside is lined with fine fiber from grass or bark. The outside may be ornamented with green moss and spider cocoons. The cup is small but deep; an average measurement is rim to rim 45 mm., depth inside 35 mm.

Two or three eggs are laid, usually three, pure blue or white and unspotted. They measure 17–18 × 12 mm.; thus they are rather elongate. Both birds share in the incubation, which lasts eleven or twelve days. One can stand and watch these birds from a distance of a couple of feet. If the nest is a bit high and one has to pull the twig down, the sitting bird may get off; more often it just continues to sit. I have often had to touch or stroke a bird to make her get up to let me see the eggs. Pairs vary, of course, in degree of tameness, but as a rule they show little fear.

As the nesting season approaches, the flocks split up. I have seen no evidence of courtship. I strongly believe that two birds mate for life, because even when in flocks and roosting in the same leafy tree, they sit in pairs side by side, two here and two there.

Most pairs seem to have their own particular spot in which to build, and they may use it season after season. It often happens that two nests may be in close proximity. In a small bamboo clump I once noted two nests of the golden-fronted and three of the pale-breasted species. In building, one end of the material is worked around a supporting arm of the fork; then the other end is fastened to the opposite arm and made fast. The first pieces of long strand moss may not seem evenly looped, but after a sufficient number have been fixed the little bird perches on them and by pushing here and stretching there the springy foundation is soon laid. The nest building may take a week to ten days.

The nest is shaded by overhanging foliage in most instances and is so well protected from rain and sun that the parents only brood the chicks at intervals and at night after the first two days. In one nest built in a *Datura* plant the birds were unlucky in their choice, for the large leaves always drooped and hung limp toward noon, and the little nest was exposed to the full force of the sun. The mother would shade her young by brooding; then it would get too hot and she would pant distressingly and rise slightly to



## KENYA GOLDEN-FRONTED ZOSTEROPS

Adult at nest

cool off; then she would stand on the edge of the nest and try to shade the chicks. I erected a little shade over the nest and she took to this at once. That wasn't the end of her troubles. The nest was slung between the branch and the stem of a leaf, and as the youngsters grew, the nest became heavy—too much so for the stem—and the leaf gave way. I found the nest completely over on one side and the youngsters clinging desperately to the cup. The distressing cries of the parents directed me to the mishap. Cutting a thin, forked twig, I pushed it into the ground so that the fork gave support to the bottom of the nest. The parents successfully brought off their brood of three.

They are extremely attentive to their young, coming every few minutes with tiny caterpillars. They seldom range far from the nest and secure most of the food in the surrounding vegetation; they move by little hops or short flights, searching among creepers, tops and lower sides of leaves, poking into crevices and clumps of moss and lichen, clumps of leaf debris caught up in branches, and every curled-up leaf. The search is thorough, but as soon as one or two larvae or spiders have been taken they are brought direct to the nest. There is no hesitancy or creeping in a roundabout way to the nest tree. I have never seen berries offered to the young.

The young leave the nest on the fifteenth day as a rule. They are able to fly only a very short distance, so they lie up in some leafy bush or small tree. At night the parents huddle close to the young, one on either side.

Sad to relate, few clutches are brought to full maturity. Shrikes and tree-rats take a heavy toll of eggs and young. The species is double-brooded in the long season; even a third may be attempted if the two previous have failed, and some pairs nest in the short season.

These birds have a short song extremely hard to write down. One most often hears it when a pair is sitting together under some leafy spray taking shelter from the burning sun. It is a low, hardly audible, warbling song. The usual note one hears is the directional call as two birds hunt: "whii-tu-tu-her tu" or just "whii-tu"; then there is the little company call as a flock flits from tree to tree when hunting or when it is going to roost.

I have recently discovered that these little birds are victimized by the pigmy honeyguide. The honeyguide will lay up to two eggs in the zosterops' nest, removing the rightful eggs one at a time as her own eggs are laid.

## EMERALD LONG-TAILED SUNBIRD

*Nectarinia famosa aeneigularis* Sharpe

The emerald sunbird is most plentiful in the higher areas of the mid-plateau of Kenya from 5,000 to 10,000 feet, where it is found in close association with certain flowering plants such as lobelias, aloes, gladiolus, and *Leonotis*. The parasitic *Loranthus* and many of the taller labiates also attract it and around homesteads many exotic flowers prove attractive.

The male is excitable and pugnacious, and with chattering calls will drive off from his feeding ground not only his own species but others of the group. When he displays during the courting season, he raises and fans his tail, droops his wings, expands the yellow breast tufts, and holds his head well up, as he pivots on his feet from side to side. His throat expands and vibrates visibly as he utters quick sharp notes: "ti-wer-chii wichewiiii tschit tschit tschit." He flies toward the hen, who flies off, then doubles back



quickly. After chasing her around for a while, he perches, then sings and displays. There is nothing very spectacular about it, but all his actions are quick and restless.

The pair chooses as a nest site some sapling or other thin woody herb which grows tall and has a slight lean outward away from the forest margin or clump of bush. It may be on a free horizontal or pendent spray. The position is often low, perhaps from three to five feet, but it may be as high as thirty feet; it is usually clear of immediate vegetation.

The nest is an elongate hanging structure, with a side-top entrance protected by a "porch." Fibers of grass or bark are twisted around the stem near its end, and from this base a pedicle is formed with strands hanging down; into and between these strands more fiber is added until a loose frame is made. More fiber, tendrils, and spider web are worked in until the hanging bag is formed, leaving the entrance toward the top and to one side; over this a porch is made of the same materials. The frame is thickened with bits of decayed leaves; vegetable down is laid in and is especially thick at the bottom. This is the type of nest made by birds away from forest, and such as may be found in the Ngong area. In the higher altitudes beard-lichen and moss may replace some of the grass fiber and very often quantities of down are worked into the body of the nest as well as into the lining. The nest is from six to eight inches long, but its length depends on the amount of material hanging from the lower end; the depth of the cup from the front rim is about  $2\frac{1}{2}$  inches. The hen does all the work; the male encourages her by calls and chivvies her if she isn't hard at it.

Many days may be taken to complete a nest and sometimes a few days elapse before the single egg is laid. The laying of only one egg (very rarely two) is an interesting character of these long-tailed sunbirds. The egg is elongate, pale creamy in ground-color, streaked in ashy-brown and gray longitudinally, almost marbled, and spotted with dark brown. Incubation lasts thirteen or fourteen days and is done by the hen only.

The Ngong area is relatively dry, just within the limits of environment suited to the species, and only a few pairs may be noted, but the birds are relatively common on the eastern slopes of the Ngong hills. Only two pairs have nested near my sanctuary. Many sunbirds are unsatisfactory subjects for photography because only the female comes to the nest, and the emerald sunbird is one of these.

If one is uncertain as to the whereabouts of the nest, one need only spend a short time watching the male. He will frequently fly to the nest site and perch on top of a bush near by. He will twitter and swing about and show off. As the female flies from the site, he will go after her and continue to chivvy her until she evades him.



EMERALD LONG-TAILED SUNBIRD

Male perched on stem near nest

I put up my hide at a nest which was suspended toward the end of a spray of *Toddalia* at the side of a clump of small trees. The nest was clear of adjacent vegetation, but all around the clump of trees were masses of *Leonotis* growing to eight and ten feet. I built the hide among these. The nest held one youngster a week old. The female came to the nest as frequently as one could wish and behaved splendidly, but during three days in the hide never once did the male come to the nest. It was not the hide which he minded, for he was often feeding on the *Leonotis* flowers within a foot of it.

Except when the hen was actually feeding the chick, her actions by the nest were quick, jerky, and excitable. When she alighted on a *Leonotis* stem she moved the whole fore part of the body up and down, keeping balance with her tail, and just as she was about to fly to the nest she would jerk her head. She was silent at the nest but the male made up for this by constant twitter. The grip of the bird's feet on an upright stem was amazing; holding on tightly she could swing her body upright or downward and backward without changing grip, and the ease with which she circled around a stem was interesting to watch.

The food supplied to the chick consisted mostly of spiders and plenty of nectar from aloes and *Leonotis* interspersed with small moth larvae. I feel certain that some of the nectar was regurgitated. After the visible insect food was given, the hen held her head up, worked her tongue in and out with her mouth open, and dribbled a drop or two into the chick's mouth. While she worked her tongue I saw her throat contracting and expanding.

The nestling period is about fifteen or sixteen days according to my records, but fourteen days has been recorded by a co-worker. The first full plumage is very like that of the female but it is duller and there is a dark patch on the throat. Even when the youngster had left the nest, the male bird made no attempt to feed him, but his excitement when the hen took food to the offspring was intense; he swayed about on his twig and twittered lustily.

A pair may raise two broods in the long season, but I have no records of nesting in the short rains in the Ngong area; however, if the short rains run into the grass rains of the long season the birds will nest early, even at the beginning of March, provided the *Leonotis* has remained in bloom. I very much doubt if there is a short season breeding time, for the male goes into eclipse plumage about the end of August. He molts his metallic plumage for one very similar to that of the female, and few males are in full plumage toward the end of the year.

## BRONZY LONG-TAILED SUNBIRD

*Nectarinia kilimensis kilimensis* Shelley

The curious salvia and *Leonotis*, so common on all the hillsides in the bush country, along the forest edges, and in derelict fallow land, are a great attraction to sunbirds of all species, and wherever they occur one is certain to see the bronzy long-tail. This, the commonest of the group of sunbirds with long central tail feathers, is particularly common in the Kenya Highlands. It is very pugnacious and a bully, intolerant of its own species and scarcely less amicable toward other species. Watch a male in a patch of *Leonotis* chivvyng a bird here, another there, and wasting much time which might be employed in taking food! Though the stand of flowers may be extensive it doesn't make any difference; he spots a rival at the far end and he is after it. As he flies after the intruder he twitters loudly "chee-wit-chee chee wit wit," and having driven off the enemy he perches on top of a tall stem and calls the louder, swinging his body from side to side and fanning his tail spasmodically. When he thinks he has the patch of flowers to himself he flies to a stem; alighting just below a whorl of blossom and bringing his body upright to the stem he pushes his bill deep into the base of a flower and sucks up the nectar. Then he goes on to the next one in series and so around the whole whorl, sucking only those flowers which are mature. This basal puncture is used for long, tubular flowers; short ones are sucked from the front. Fuchsias are a favored exotic and many flowers are damaged by the basal puncture.

There is little evidence that the male goes into an eclipse or female-like plumage in the off-season; we find him in full dress all the year round, in the Ngong area at any rate.

These birds select a variety of positions for the nest, some low, others high: it may be on an upright stem with a slight incline towards its end, at about three to four feet; it may be on the outer twiggy branch of a tree, at ten feet; it may even be in a tall tree, at forty feet, but wherever the nest is situated the construction is the same, though the materials may differ. If it is in *Leleshwa* country the downy flowers of this composite are worked into the body of the nest, and if the hairy seeds of the white clematis are fully ripe many of these may be incorporated. The nest is like an elongate bag or pocket attached by a thick pedicle to the supporting stem, and with a porch over the side-top entrance. Though suspended it is not freely movable, for the supporting branch is well within the thick pedicle, which is part of the top, and adjoining thin leaves are often worked into the body of the nest. The materials are grass and bark fiber knit together by interlacing and the lavish use of spider web; vegetable down may be incorporated. The porch is fashioned by the use of fiber and fine grass flower-



BRONZY LONG-TAILED SUNBIRD

The female puts her long tongue in a flower

heads (devoid of seed) so placed that the stem is within the body of the nest but the feathery ends project outward over the entrance. The threshold on the entrance is thickened up and bound with cobweb. The inside lining is of vegetable down felted together; it may be over an inch thick at the bottom of the nest.

The nest is really elaborate yet untidy, for strands are left with ends hanging loose but the body work is well knit together. The hen labors alone. It is a work of much patience and toil, taking perhaps two or more weeks to build, and in the end it holds one egg only, for that is the normal clutch. Two are rarely found. The one egg is incubated and the chick cared for by the female alone. The mother sits close from the beginning, deep down in her cozy felted nest with her bill tip just above the entrance lip. Should she hear any untoward sound she lifts her head slightly and looks out. The male hangs around the nest site, fussy and calling, as he did while the nest was being built, but he does nothing to assist his mate; I have never witnessed him taking food to the sitting hen, and I know that she leaves her nest for a short time two or three times a day just to get some

food. But even then she is chivvied by the male, and before she has had time for a decent feed she is chased back to the nest.

The hen incubates for about fourteen or fifteen days. The newly hatched chick is dark brownish and naked. The bill is short and soft, and the gape is thickened by yellow pads; it grows in length very quickly but is still very short when the chick is ready to leave the nest, for the youngster is fed for a long time after vacating. I have watched at some of the nests from a hide, and though the male has come near the nest he hasn't ventured to it, though he has often perched on the hide. The hen exhibits remarkable energy, coming to the nest every few minutes. She brings spiders and small larvae and nectar to the young. When she is hunting for insects she flits from tree to tree, searching twig and foliage with sharp eyes. She alights on a twig and scrutinizes the foliage above her; her head moves up and down in a jerky fashion, and if she can't reach an insect by stretching up, she will flutter below the foliage and dart at it. Spiders are usually taken as the bird flutters in front of the web. Nectar is collected from the flowers by piercing the base. She is seldom still except when she is clinging to the front of the nest to feed the chick.

Late of an evening the hen sits on top of a bush, sunning and preening herself. After the sun has set she returns to the nest to brood. The male seeks shelter under a leafy spray in a tall tree and roosts for the night.

The chick is induced to leave the nest on or about the sixteenth day. He hesitates a long time before he flutters out, and he is able to fly only a very short distance. The parents show great excitement until they get him under a bush or into a tree. The male fusses, but the mother does the feeding. The youngster greets his mother's arrival with sharp little calls and flutters his wings. Between feeds he preens his wing feathers, removing the dry sheaths from the bases. His wings grow quickly and after a day or two he follows his mother around, calling and quivering his wings, and it is all she can do to keep him satisfied. At last he learns to pick the spiders off the flowers and leaves and to take the nectar from the flowers, yet still he pesters his mother for food. A day comes when he has to fend for himself, perhaps three weeks after his exit from the nest, for the parents are building another nest or re-conditioning the old one.

Sometimes this indefatigable little hen has to act the part of foster mother, for not infrequently the white-breasted cuckoo selects her nest and foists a parasite's egg on this willing dupe.

## KENYA YELLOW-BREASTED SUNBIRD

*Cinnyris venustus falkensteini* Fisch. and Reichw.

This little Highland bird is found in the dry savannah forest, along forest margins, in the tall bush country, and in the acacia country, especially along river courses and lake sides. Its usual habitat is low; that is, it keeps to the bush and is seldom seen in tall trees unless they happen to be in flower or are covered with the parasitic *Loranthus*, the flowers of which attract sunbirds from all around. One may see them on the gaudy flowers of *Erythrina* or *Spathodea*, but as a rule one sees them frequenting the patches of flowering *Leonotis* that are common in waste land and on hillsides.

The yellow-breasted sunbird is common around Nairobi and the male is one of the most beautiful we have. These sunbirds are usually seen in pairs throughout the year, but several may come to a stand of *Leonotis* and feed together, for the males are not very aggressive or jealous of each other except during the breeding season.

The courtship is not very elaborate, but the male can then be seen at his best. He perches on the topmost twig of a bush or small tree, stands upright, and pivots from side to side, with wings held slightly open and breast feathers fluffed out. It is then that one can see the yellow and orange breast tufts. He twitters and sings all the while, his throat expanded and vibrating. His plumage glistens; at one moment the throat looks black, at the next it is deep purple; the head and mantle glisten blue as he makes a sudden flight toward the hen, who may be quietly feeding. She meets his advance with a little threatening attitude, putting her head low and opening and shutting her bill; then she darts off, doubles back, and resumes her feeding. The male chases her about, and at last she submits.

It may be a few days before they select a site for the nest—a lowly position among the bush. It may be on a slightly bending shoot of a lantana bush, on a twig of a woody labiate, or at the tip of a leafy branch of a sapling croton. Many nests are two or four feet off the ground and they are seldom more than ten feet up. They are usually by a little open space, toward the edge of a path or roadway, on a bank, or at the margin of the forest.

The nest is built toward the end but not at the tip of the stem or spray, for it is usually sheltered by overhead leaves. It is a hanging or pendent or hanging-bag nest suspended by a pedicle made by twisting material around the supporting stem and looping it down into the body work of the nest. Cobweb, grass and bark fiber, scaly bark and bits of fluff and often skeleton leaves—all go to form a hanging purse with a side-top entrance protected by a little porch. A thick lining of vegetable down from creepers and composites completes the inside, most of the felting being in the bowl of the

nest. A few feathers may often be added, and I have often supplied these little birds with good surgical cotton wool. The nest is built in perhaps two or three weeks. The quickest bit of work I have recorded took ten days to the laying of the first egg. The hen does most of the work, but the male assists between his spells of singing and twittering from some prominent stance. I think that his song does encourage the hen. I have watched the birds as they built. As the hen has gone off to fetch more material, the male has accompanied her to the dead creeper from which fiber was collected and when she has gathered a billful, he has flown up to his stance and sung and then joined his mate at the nest and helped to work in the material. The most casual examination of a nest will disclose the immense amount of work that has been done to fashion it out of thin bits of material and spider web. It is often camouflaged by bits of fiber that are left loose at the end and dangling from the sides and bottom; or perhaps bits of spider cocoon or dry composite flowers decorate the outside; sometimes long strands of spider web attach it to the adjoining twigs or leaves.

The nest may be completed yet untenanted for some days before the first egg is laid; the second may follow next day, but usually not until the day after. Two form the normal clutch. They are grayish-white or buffy in ground-color, freckled and streaked or almost marbled with red-brown and umber, and 17-18 × 11.5 mm. in size.

Once the clutch has been completed, the hen sits close. She leaves to feed in the early morning and late afternoon; in between she may be fed by the male. The eggs hatch in fourteen days. She continues to brood throughout most of the next two days, but the brooding is interrupted by short periods when she seeks food for the young and for herself. I have seldom seen the male on the nest at this time.

At all nests that I have observed from a hide, the male has been at the nest with food as frequently as his mate. If the male came to the nest first and finished feeding the chicks, he perched on a bush close by and as soon as he saw his mate coming he welcomed her with a short twittering song and waited for her to dispose of the food; then they flew off together. The difference in disposition between this bird and the large long-tailed species is marked.

It was not always easy to see what food was given, for it was so small, but I recognized spiders, moth larvae, and a small moth. Feeding was most regular from dawn to just before mid-day, and after an hour or two it was brisk up to sunset. Nectar was given, along with the insects. Very small Diptera were fed to the chicks at one nest. It seemed to me that the bulk of the food given by the male was nectar, for very few visible insects could be detected in his bill; yet he was frequently at the nest.





KENYA YELLOW-BREASTED SUNBIRD

Male near nest

I have sometimes found a nest with two sunbird's eggs and on the next visit have found only one egg, that of the white-breasted cuckoo; not infrequently a young cuckoo has been the sole occupant. It surprised me to note how attentive these birds are to the foster chick; in fact, they seem to exhibit more concern for its welfare than they do for their own, if that were possible, for they are both model parents. It may be that they are more excitable when they have a large youngster to look after. It is astonishing to see how the young cuckoo fits into the small nest, but he does, and he fills it completely when he has feathered.

The low elevation of the nests renders these birds very liable to attention from predators such as mongooses, rats, egg-eating snakes, and bush shrikes. The fact that these nests are pendent is not sufficient safeguard, since they are not freely movable and are often on an inclined stem which the predator can climb. He gets to the nest level, tears a hold in the bark just above the cup, and extracts the contents.

Two broods may be attempted in the long season, and one in the short period.

### HIGHLAND VIOLET-THROATED BLACK SUNBIRD

*Chalcomitra amethystina doggetti* Sharpe

The black sunbird is really a forest species, nesting high but seeking its food among the flowering herbs and shrubs. It is extremely fond of the spiky *Leonotis*, aloes, and hibiscus, and like most sunbirds favors the flowers of *Loranthus* and *Erythrina*. It is adaptable, for we find it in the fringing forest along rivers, among the taller acacias of the high plateau country and in areas of cultivation where many indigenous trees remain standing, especially *Markhamia*, of whose flowers the birds are very fond. They also like the honey of the banana and plantain flowers. In many a garden in the Kenya Highlands a pair or two of these sunbirds have become resident and hold their territory.

This sunbird is never still, not even when it is perched, sunning itself. If not busy sucking honey-water from the flowers the male will be perched on some exposed twig twittering and calling, preening himself, or chasing off an intruder, or chasing his mate about her business. His call is a high-pitched, excitable one of four notes oft-repeated, "cheet cher chew chuit," or punctuated to "chewit," "chewit," then "chit chit chiwiit."

One pair has frequented the immediate surroundings of my little house for several years; another resides in a little bay at the forest margin to the east; yet a third commands the garden on the hill slope. All are resident; others come, but are driven off. The first pair has selected certain tall trees



HIGHLAND VIOLET-THROATED BLACK SUNBIRD

Female carrying spider to nest

around the house in which to build; sometimes the same branch may be used in two seasons. These sunbirds nest twice in the long rains and twice in the short season; throughout the year they have either eggs or young or fledglings. This is unusual, but there is always a rotation of food plants or trees in flower.

They build the nest toward the end of a slender leafy branch from fifteen to forty feet above ground. It is of the purse-bag type with a side entrance protected by a porch, but it hangs from a short, strongly made pedicle which takes in about four inches of the stem and any adjoining twigs or leaf stalks; it is thus secure. As I write, there are, around my house, four well-preserved old nests and one new one in occupation. Only once has an old nest been re-conditioned and occupied. To start the suspension of a new nest cobwebs and bark fiber are worked around the stem; then more fiber from a creeper is brought and attached to the base, with one end left free. When several strands of fiber and spider web have been attached and draped downward more material is worked and laced into these and so the pocket takes form. The hen often enters this frame and pushes it here and there; she pulls in a strand and soon the threshold is built up. Bits of lichen are worked into the body and secured with cobweb. The frame is filled in and thickened up, the porch built and the threshold thickened up and laid over with cobweb. Then comes the inner lining of fluff from asclepiads, composites, and clematis. The felted down may be over an inch thick at the bottom of the nest. The porch in this nest is often strongly made, for fibers are arched over the top of the entrance and filled in with cross fibers and lichen. It is less like an afterthought, such as one sees in other sunbirds' nests. The female does all the hard work. The male may occasionally come along but his visits are merely to perch on a twig near by and call, as he pivots from side to side. I have not seen a nest completed in less than ten days and some have taken at least two weeks to construct.

The full clutch is two, but sometimes only one egg may be laid. They are rather elongate, off-white to putty-color in ground, with smudge streaks in umber-brown running lengthwise; there is also some spotting. They are rather large for such a small bird and measure  $19 \times 13$  mm.

The male leaves all the incubation to his mate. She sits for thirteen or fourteen days. She comes off for a feed of an early morning, then twice again between 11 and 2 o'clock. She also has a lengthy spell in the late evening, or as long as she is allowed by the male, for he bullies her and chases her about and only by sheer tenacity does she manage to visit several flowers and take a few spiders before she is made to return to the nest. She has little off-time after the young have hatched, for the bulk of the work in feeding falls to her. The male is always about, and gives due warning

should any danger threaten. The female, coming and going with marked regularity, seems to ring the changes in the matter of food, though with no fixed alternation; spiders, then nectar, or so it seems, but very often the food is very minute, and honey-water is given with it. Small moth larvae, small moths, and small flying termites are brought, in addition to spiders. The tongue is moved in and out before nectar is given, and I feel sure it is regurgitated by this means.

The feeding rate worked out at once every ten minutes for a five-hour period of watching. As the youngsters grow, feeding is accelerated. The young leave the nest on the sixteenth day. Two chicks that I saw in an olive tree near the nest site were being fed by *both* parents. They were still being fed three weeks after leaving the nest. It is at this stage when many lose their lives, for as they follow their parents, calling the while, one or other of the goshawks that feed in my forest swoops down and takes them. This sunbird has also been victimized by the emerald cuckoo.

### SCARLET-BREASTED BLACK SUNBIRD

*Chalcomitra senegalensis* Linn.

Several races of the scarlet-breasted sunbird occur in eastern Africa. These are birds of the savannah forests, park-country, acacia thorn, and fringing acacia of rivers and lakes. Away from cultivation they frequent trees in flower, such as *Erythrina*, *Bauhinia*, certain acacias, and trees which harbor the parasitic *Loranthus*. One or more pairs are sure to be seen in a plantation of bananas, for they are passionately fond of the flowers, which hold quantities of nectar and are attractive to small insects. *Leonotis* will attract them to hillside and derelict *shambas*, and the wild aloes of the drier thornbush are one of their great standbys for nectar.

This species has quite the best "song" of any sunbird. There is no great variation, but the sequence is more prolonged. Starting with the usual "chewit chewit" it goes on—"sii sii swit sii sii swit chewit"—for quite a long time. The bill is held open and the tongue is visible as the throat vibrates and glistens. The song is uttered as the bird perches on a prominent twig on which it pivots to left and right, putting real vigor into the call—just sheer joy of living. The song over, it dashes to a flowering tree, feeds awhile, then dashes back to its perch, active and restless, seldom still. The male is more in evidence on account of his more striking plumage and his behavior; the female is just as active but is less obtrusive, seeking her food as does the male but without fuss or clamor. In nesting season the male excels in song, posturing and vivacity.

The nesting site is high or low according to the type of country; the general look of the nest varies with the materials used, but it is ever a sunbird's

nest. In cotton-growing areas, especially in eastern Uganda, a great deal of cotton fluff is combined with the bark and grass fiber, cobweb, and other material of which the nest is constructed; it then has a definite "cotton-wool" appearance. A nest in the acacia country has fine rootlets, tendrils, and spider web for the frame and pedicle and into these are worked some asclepiad down, grass fiber, bits of bark, skeletonized leaves, and dry leaflets, all held and bound with spider web and gossamer from the web of moth caterpillars. The porch is made of fine, seedless grass heads, the stems worked into the body but the fine ends projecting forward and held by cobweb; the inner lining is asclepiad down. Such nests have a grayish look. They are firm in body but with many hanging straggly bits. They measure nine inches in length and four inches at the thickest part.

I discovered a most unusual nest by seeing a female going to a mass of spider web between twiggy forks at the top of a small tree. I thought she had gone there to collect cobweb, but she didn't appear to leave the tree. After a while I tapped the tree and the bird flew out. On pulling the tree down I noticed a few bits of grass flowers projecting from one side of the mass of spider web and below this projection was an entrance hole, leading to a considerable cavity lined with asclepiad down. In the nest was one egg. Outside the felted lining there were bark fiber, grass, and long strands of down forming the usual style of sunbird's nest. The makers of the web were still present and very much alive. I came to the conclusion that the site chosen by the bird had been beside an existing spider web, that a nest of the usual type had been constructed, making lavish use of the cobweb to hand, and that in due course the spiders had spread themselves all over the structure, entirely enclosing the nest except for the entrance, which the sunbird kept open.

I have only once had the opportunity of studying these birds at close quarters from a hide. The male did not come to the nest to feed the youngster. The female was attentive and brought spiders, small moth larvae, and small Diptera. She also fed nectar to the young.

There was only one youngster in this nest, although the usual clutch is two. The ground-color of the eggs may be whitish, putty-color or gray-brown, with more or less longitudinal smudge marks in gray-brown and gray; occasionally the streaking is more bold, less diffuse, and the gray sub-marks are more distinct. The egg usually measures about 18-19 × 12 mm.

Incubation is carried out by the hen only, and lasts thirteen or fourteen days. The nesting period is about seventeen days.

## YELLOW-BREASTED COLLARED SUNBIRD

*Anthreptes collaris ugandae* van Som.

The bird of the Kenya Highlands and adjacent Uganda concerns our notes in particular, but the account may apply in most respects to the other races. The natural habitat is along forests fringing rivers and in savannah and evergreen forest and woodland. Though frequently noted at the forest margins and in well-wooded gardens, it is really a species of the forest treetops.

Time after time one sees the birds as members of a "hunting party," travelling through the treetops in company with forest warblers (*Apalis*) and such like, and at these times they seek insect food almost entirely. They are much less addicted to nectar than other sunbirds, but they do frequent the forest tree flowers such as *Albizzia* and *Erythrina* and of course *Loranthus*, from most of which nectar is easily obtainable. Flowering herbs and succulent aloes are also visited. Nearly all flowers of forest trees attract a vast number of small insects, so that these little sunbirds obtain from them both nectar and insects.

Though this bird possesses the characteristics of all sunbirds—agility, restless activity, and constant twittering—it is less pugnacious than many. One sees pairs or small family groups, three or four together in a treetop, but the youngsters of a brood soon have to fend for themselves.

There is a certain constancy in the matter of nesting sites, even a strong partiality for one given spot, and a certain spray or tree will have a nest season after season. The majority of nests are placed high, seldom as low as ten feet and more often from twenty to forty feet up, in strong contrast with the site of *Cinnyris venustus*. The site is usually a pendent spray of a creeper or a scandent shrub or a tree armed with thorns. Most of these trees and creepers grow at the forest margins, and it is here that one should look for the nest. There is little difficulty in locating it, for the parents "give it away" by their behavior, and it is usually easily detected by its exposed position. To get to it is another matter, for it is high, set clear from adjoining trees, and the spray is thorny, severely so in some cases. Nests in such positions have two factors which lessen the chances of attack from predators: the free position and the thorny support. A nest may be built near a wasps' nest; if so, the supporting tree is without thorny protection. The nest is largely built of cobwebs, caterpillar web, bark fiber, fine tendrils, skeleton leaves, and bits of bark, often ornamented with frass from beetles and larva workings, spider cocoons, scaly bark and shrivelled leaves, with much trailing material hanging from sides and bottom—a pendent purse-nest with side-top entrance protected by a porch. If there is a little bunch of



YELLOW-BREASTED COLLARED SUNBIRD  
Female arranging nest material; male with grasshopper nymph



leaves just above the nest, the protecting porch may not be fully developed. A thick lining of down is laid in.

For four years one *Scutia* spray in a little clearing of my forest has supported five nests in succession—not always an entirely new structure, for the old nest may be re-conditioned. If urgently required, a new nest may be built in as short a time as ten days, but in such cases the final downy lining is put in after the clutch is laid.

Though the bulk of the work is done by the female, her mate does a fair share, and he also assists in incubating. The two eggs are very small and are white to grayish in ground-color, with spotting and marbling in red-brown and umber and sub-marks in grayish; though large, the spots and streaks are diffuse at the edges. Size 15–16 × 11–12 mm. The incubation period is twelve or thirteen days. These little birds are far less aggressive than most sunbirds, but they resent a too close approach to the nest by another of their kind. While the hen is sitting, the male will often perch on a high twig above the nest and twitter his short song: "tschu er-tschee wer tchwer chee." When the female comes out of the nest the two birds greet each other with a low "tchee tchee."

Both parents show much concern for the young, and visits to the nest with food are remarkably rapid. Both may often come at the same time, but as one feeds the chicks the other will sit on the spray awaiting his turn, or he will hang onto the nest side. I have only occasionally seen both birds at the entrance and then they fed the chicks alternately. The parents appear to have a great attachment for each other and there is little sign of the male bullying the female.

The youngsters are fed moth larvae, spiders, aphids, and small Diptera. They seem to have an insatiable appetite and feeding goes on through most of the day; there is a lull toward mid-day.

The youngsters greet the arrival of the parents with a little "tschee," as soon as they hear a flutter by the nest. They feather rapidly and are ready to leave the nest about the seventeenth day. The first plumage is somewhat like that of the female but rather duller and more washed with olive below. The young are very demonstrative after leaving, and they flutter their little wings and call audibly. One can locate their whereabouts by their twittering cries.

## GOLDEN-CROWNED WEAVER BIRD

*Othyphantes reichenowi reichenowi* Fisch.

(*Ploceus reichenowi* of Sclater)

There are only three species of weaver birds which nest regularly in my sanctuary and in five years of work I have not secured full details of their

biology. Reichenow's weaver is one of them. It is a common species in the Highlands of Kenya, represented by a distinct race in the Elgon area.

The male is handsome enough, but very quarrelsome and domineering. A common garden bird and a frequent visitor to bird-bath and food-table, he is intolerant of other species when he is in possession. He is destructive to seedlings and growing peas, but he fully compensates for this by the quantity of injurious insects he takes.

Away from gardens and habitations pairs will be seen here and there throughout the woodland and park-country, on bush-covered hillsides where there are clumps of small trees, by bush-covered dongas in veldt land where small clumps of trees form little islands in the pasture, and along the margins of forest. Pairs will be noted around native settlements where *bomas* of giant *Solanum* surround hutments, or they may frequent the residual patches of trees and bush on non-arable land. They are seldom seen in forest; they prefer trees of small growth and open dry forest such as are common around Nairobi.

The bird has a song of sorts but the usual sound is a chatter: "swii, chee chee cheechit." The warning call is a long note followed by a sharp, short one: "swiii . . . chit."

As with many other weavers, these birds, especially the males, often while away the time by picking bits of grass and weaving them or rather tying them into knots around a twig or thin branch; they seem to be merely amusing themselves.

When the impulse to start building comes on, usually about the end of March or in November (for the species breeds twice in a year), the pair tries out various sites. The male starts the nest, but the female decides whether the site is suitable and the work is to go on. She may be satisfied with a particular tree, but not just the site selected by her mate. The testing may go on for two or three days; then the hen may change her mind, even if she assisted in the preliminaries.

The site selected is usually toward the end of a leafy branch of a small tree at about six to ten feet up, though one may find a nest high in a tall tree. One pair in my sanctuary invariably builds in a tall *muhugu* at sixty feet. The nest does not dangle, because the support is bound in within the roof or dome of the nest. Grass is wound around the branch and tied into knots at the site from which the nest is to hang. This interlaced base may include adjoining twigs, and from this foundation is made a woven loop which corresponds to the dimensions of the middle of the nest; that is, the lip of the brood chamber. From this loop and attached to it strands of woven interlaced grass blades gradually form the body and the overhanging roof of the entrance. The whole frame is then thickened up by inter-



GOLDEN-CROWNED WEAVER BIRD

Male with food at nest

lacing more grass. The lip of the chamber is thickened by closely interlaced grass. The inner lining is made by laying in flowering grass heads; those most favored are *Pennisetum* and *Chloris*, for their "heads" are feathery and soft. The bowl of the nest may have a lining two inches thick. The completed nest is somewhat retort-shaped, but the entrance "spout" is short and directed downward. The nest has a rather untidy appearance. The surrounding leafage may cover the whole nest except its base, but when it is built in eucalyptus or casuarina trees (both exotic) it is conspicuous.

More than one nest may be started, but only the brood nest is taken to completion. The male bird may add to the frame of the other nest and make a substantial job of it, but it will not be lined; this he uses as his sleeping quarters. He may build yet another nest close by, just to fill in time while his mate is sitting, but it will remain a skeleton. It may thus appear that more than one pair is nesting in a single small tree, but this is not so, for pairs nest singly. Throughout the period of nest building the male is noisy, calling as he comes to the nest or when the female arrives with nest material. When the eggs have been laid he quiets down, but he keeps guard and sounds a warning, a sharp "pitwich" if danger is imminent, or a long drawn note to denote awareness.

The eggs of this weaver are handsome, rather elongate, and pointed at one end. They vary in ground-color from white to pink or blue or greenish-blue, greenish or salmon-color. The spotting is always rather bold—large marks and small ones combined in liver-brown, with lilac-gray sub-marks. Very occasionally an immaculate egg is laid. (The yellow-breasted emerald cuckoo frequently lays in this weaver's nest, but her eggs are slightly smaller, a different texture and more finely spotted.) The size varies: 22–24 × 15–17 mm. Two is a usual clutch, but three may be noted occasionally.

The hen incubates the eggs over a period of eleven or twelve days. She sits close when once the full clutch has been laid. She prefers to sit tight even if the nest is inspected and waits until she is compelled to move.

During the first week, the bulk of the food brought to the young consists of either moth larvae or small nymphal grasshoppers, spiders, small crickets, mantids, chafer beetles, winged termites when available, and the winged form of *Crematogaster* ants. Judging by the very short stay of the adults in the nest, there seems to be no regurgitation of food.

The parents come to the nest tree and perch on a branch to the side of the nest; then flying down, then up, they go straight to the entrance. If one is already in the nest when the next arrives he or she clings to the bottom of the nest, then flies in as soon as the other vacates. Though the female brings most of the food, the male is hardly less attentive. When the bird

leaves the nest one foot grips the edge of the short tube as the bird lets his body swing out before actually flying off. This is the usual way of exit when the youngsters are large enough to wait at the lip of the nest so that the parents have no need to enter. They often hang onto the nest bottom near the entrance and feed the chicks. The very conspicuous whitish eye of both parents is a noticeable feature. The young void excreta over the lip of the nest so that it falls clear of the short tube onto the ground. The parents do not remove it.

Some young are ready to leave the nest on the fifteenth day, but as there is often some difference in the size of the two chicks, two more days may elapse before they vacate. Young in first plumage are somewhat like the female but are rather washed with olive on the head and mantle and are duller below.

### HIGHLAND SPECTACLED WEAVER

*Hyphanturgus ocularius suahelicus* Neumn.

(*Ploceus ocularius suahelicus* of Sclater)

The group of weavers to which this species belongs is rather distinctive in both general habits and type of nest architecture. They are solitary in nesting habits, and though they may show a distinct preference for sites above or near water some pairs will build a nest in a small acacia over a dry watercourse or donga, or in a small thorn tree surrounded by scrub. The requisites for a suitable site seem to be a slender, pendent spray, thorny for preference and reaching to ground level if possible, with a clear area in the immediate vicinity of the site. Of the several pairs which have nested in my sanctuary 95 per cent have been over or close to the stream bed or over a pond.

The nest is built at or near the tip of the pendent spray. It is a long-mouthed, retort-shaped nest hanging by a pedicle constructed of fine grass fiber. If fiber from a palm is available this is preferred, but fiber from a banana tree or from the leaves of a canna may be used. The fiber is obtained thus: the bird nips the margin of the leaf blade toward the base; then she tears it up just a little, seizes the freed end in her bill, and flies off; thus a long, thin strip is obtained. Whatever the material used, the shape of the nest is not altered. The weaving is an intricate one and the meshing small and close. The nest is strong and resilient; a fortnight to three weeks may be taken in its construction. More often than not, the eggs are ready for laying before the nest is fully double-meshed over the "bowl" or the inner lining of fine grass has been added. Thus one can often see the eggs through the mesh in a newly made nest. If the eggs have been laid in a

hurry, the lining is soon put in. Both birds take part in building, and both share the duties of incubating.

Two eggs form a usual clutch, but three are quite often recorded. They are elongate, white to pale blue in ground-color, with gray-brown freckling on the surface, and gray sub-marks. The spotting may be evenly distributed or concentrated toward the large end. Size 21-25 × 14-16 mm.

While the hen is sitting, the male often occupies his time by building another nest. It may be complete in all details but remains unlined. This he uses as a roost. If he is full of excessive energy he may thicken up the tube of the brood nest or add to its length. The tube is roughly eight to twelve inches long, but I have many records of tubes of two feet, and of one monstrosity which was eight feet long, but the actual entrance to that nest was through a side hole at two feet; the balance was just misapplied zeal. Incubation lasts eleven days. The newly hatched chick is dark flesh-pink and almost naked except for small down tufts on head, base of wings, and rump. The hen broods close for a day or so and while she sits the male brings food. Thereafter both parents are active in supplying food. The usual call between the two birds as they hunt is a single "peit," repeated once or twice, but the male has a short song which he often utters as the female incubates the eggs; it is really a trilling call of several notes almost run together: "pi-sir-see-sir-sit."

When these weavers go foraging for food they work deep into the thickest of creepers and tangled bush, preferably in damp spots, and creep about just like many a warbler. I have often mistaken them for such. They creep up and down stems and often hang upside down. I have seen them in many a queer attitude: clinging by one leg or hanging upside down with legs wide apart; bringing the head up between the legs and looking around; releasing one foot as the body swings down and a lower branch is seized with the free leg as the other lets go. They are quite the most agile and acrobatic of the weavers I know.

They search among the debris of leaves caught up in the creepers and examine all the clusters of dead leaves and curled-up leaves. They hunt among moss and vegetation at the base of tree trunks, and the reason for all this is that their own food and that of the young is 90 per cent insects. I have seen them bringing quantities of small noctuid caterpillars, beetle larvae, glow-worms, and small crickets to their young. Spider webs are raided, also. They come very readily to the nest and care little for a hide; beyond an occasional low "peeit" just before flying to the entrance, they are silent when bringing food. When the young are very small, all excreta is removed from the nest by the parents, but as the youngsters grow they turn in the nest and void over the lip of the brood chamber, the feces falling to the ground through the entrance tube.



HIGHLAND SPECTACLED WEAVER  
Adding to spout of nest in tip of wattle spray

One nest which I watched carefully for many days was built toward the end of a banana leaf. The birds had stripped the leaf from the base to where the nest was attached, utilizing the leaf fiber in the construction of the nest. All went well until just before the eggs were due to hatch, when the leaf rib gave way and the nest was nearly on the ground. I obtained a thin stick, bound it to the back of the rib, and tied it firmly to the main stem. The nest was in its original position. The birds continued to sit, and the young were duly hatched. When the young were just over a week old the whole plant collapsed under the weight of its large bunch of bananas. When I found it, the two young birds were out of the nest and squatting among the banana leaves. They were apparently uninjured and the parents were feeding them on the ground. Such care and attention deserved reward. I obtained a tall, pronged pole, raised the plant, and propped it in position. Fortunately the nest was uninjured, so I picked the two youngsters up and popped them into it. The parents had been around all the time and when we had finished the job we sat down a short way off to see what would happen. First of all the female flew to the ground where the chicks had been and called to the young. They responded, but not from the ground, and the mother was puzzled. She continued to call. Just then the male alighted on the tree and when the chicks called he became excited and hovered by the nest, then flew off. Meanwhile, the mother localized the calls and after some hesitation went to the nest, entered the tubular spout, and fed the chicks. Thereafter, both birds came with food and fed the youngsters as though nothing had happened to their nest.

The chicks vacated at about the usual time, fifteen days, and were often seen with their parents in the *Euclea* fringe by the stream.

When the young are fully fledged they soon learn to fend for themselves because pairs breed a second time during the long season. They may build a new nest, as this pair did, or just re-condition an old one.

Most of my spectacled weavers have brought their broods to the full-feathered stage. The position and form of the nest seem to give protection from most predators, even snakes. I once watched a green tree-snake trying to get at the young in a spectacled weavers' nest. The brute negotiated the slender, pendent branch and reached the nest but could not manage the 12-inch tubular entrance and fell into the pond below the nest. He was a good swimmer so that was nothing, and he was soon basking on the bushes near by. But a week later he did take two newly hatched zosterops from a nest on the opposite side of the pond!





MASKED RED WEAVER

The male constructing the ring from which the body of the nest is built out

MASKED RED WEAVER

*Anaplectes melanotis* Lafres.

This species is widespread in East Africa but is nowhere common. It is found only below the 5,000-foot contour. We see it in the Ukamba and Masai country, and all through the thornbush country to Suk and Turkana, and in the lower Kikuyu and Meru districts.

These weavers are not conspicuous as a rule; they hunt about leafage and twigs for insects, which form their main diet, and since they are not social or gregarious in nesting habits they are never seen in numbers even at a nesting site.

Unusual in color, they are also unusual in nest building. The nest is distinctive: retort-shaped, as are many, but constructed almost entirely of flexible twiglets and tendrils which are so resilient that they are not meshed into a close weave and the ends are not worked in; the resultant nest is untidy and definitely twiggy looking. There is no definite type of site for the nest except that it is usually toward the end of a branch with good overhead leafy coverage. It may be five to twenty feet off the ground and hang exposed. There may be more than one nest; in fact there are usually two in close proximity, but only one is the brood nest; the other is a night roost or just evidence of the male's excess energy in building. The brood nest is the one most thickened up around the ball of the nest, and this is due to the laying in of finer twiglets and some grass fiber. But the thickening up may not be done or completed before the eggs are laid and often one can see the outline of eggs when viewing the nest from below.

The nests which are most in evidence are those built in close proximity to human habitation: a house, a temporary wattle and daub thatched *banda*, or a thatched *banda* in a semi-permanent camp site. This bird of the wilds will select a tree close to or even right up against a dwelling, using the same tree or another close by, season after season. Apparently it realizes that proximity to human dwellings gives it a degree of safety from predators. The male is most often seen nest building, but both birds construct the brood nest. When this is complete, the male amuses himself by making other nests and these can be seen in all stages but none fully completed. The hen does most of the incubating of two immaculate blue eggs during a period of twelve or thirteen days. She is assisted in this task by the male.

Though I have found many nests I have never had the good fortune to observe them for more than a few days. The young have been fed almost entirely on insects. Fledglings are like the female in general color though rather duller.

The months in which eggs may be found vary with locality. I have found them in March, July, September, November, and January in various parts of Kenya, but in any one locality only two broods, or possibly three, will be raised in any one year.

## CARDINAL WEAVER FINCH

*Quelea cardinalis* Hartl.

Our weaver finches and so-called whydah birds offer a field with vast possibilities for research in intra-continental migration. How often do we read that species appear and disappear at certain times of the year! Where do they come from? Where do they go? The present bare record refers to movements in one small spot in a vast continent—records I am unable to co-ordinate with other data.

Our cardinal finch is widespread, for we find it, at times, in Uganda, in the northern parts of Kenya, and south to Ukamba and the Teita hills, mostly below the 6,000-foot contour. The majority of records refer to small flocks or groups among which males in full breeding dress are present, but they just disappear, or seem to, but where to? They nested in hundreds on the banks of the Stony Athi one year, during May and June; nests were numerous in the low-lying marshy ground near Emali in March and April the previous year; great numbers were found nesting in the swamp grass on the flats on the Magadi road in June and July; and a year later they were nesting all over the land by my sanctuary. They thus exhibit a partiality for open grasslands in the shallow valleys, the vlei land which at the beginning of the year holds water that produces a thick and luxuriant growth of grass and herbs. Though they may select an area one year, they may not come near it the next, or for two or three years. The selection of an area for breeding purposes depends on whether it provides sufficient coverage and an assured food supply from that coverage in the form of certain grass seeds, particularly species of *Panicum* and *Setaria*.

The records of breeding do not give the same months of the year in various parts of their range, but since they move around so much, breeding here one year and there another, one is led to wonder about the limitations of movement of a given flock in respect to nesting. In other words, will a flock that nested in Emali one year, be found nesting in, say, Embu the following year, and in the Rift Valley the next year? Wholesale ringing and checking offer the only solution to the problem.

Let us suppose that we have located a stretch of a reed bed or an area of tall swamp grass where the birds are busy nesting. Attention will first be directed to the conspicuous male. He perches on a tall reed or bush and displays; standing upright, he quivers his partly open wings, fluffs out his body feathers and fans his tail jerkily, all the time uttering his curious "sizzling" note, his throat feathers raised and vibrating with the effort. This note can be imitated by passing one's fingernail gently but quickly over the long, fine teeth of a comb. It is a rapid "chit chit chit chitchitchit." A female will appear on a grass stem a few yards away and the male will fly

at her and chase her around until she takes refuge in the grass. Several males will be displaying and calling and chasing females about. The males will be well spaced for the most part, but two males may be chasing one another; one has intruded into the territory of the other.

If we walk, sometimes ankle deep in water, about the area we shall soon find evidence of nests in all stages of construction and degrees of tenancy. Many beginnings will be noted, and from these and others more advanced, the whole process of nest construction can be followed. Two grass stems are selected about three inches apart; between them, at heights varying from two to three feet above the ground, strips of grass blades are twisted and tied until a bridge is formed. This bridge is of remarkable strength and consists of many twisted strands securely lashed to the supports. It is the strength of this bridge which at once distinguishes the nest of the cardinal from that of the brown-shouldered (*C. a. eques*) or the red-hooded whydah (*C. laticauda*), both of which may be nesting hereabouts. Their bridges are not nearly so thick and robust. From this bridge or threshold, grass is woven up the stems and an upright ring is formed, about  $1\frac{1}{2}$  inches across and 2 inches high, and from this, the ball nest or domed structure is built out. The bottom half or third of the ball is below the bridge or threshold. The weaving is close and strong and the whole nest compact and taut. A lining of finer grass is laid in, before or at the time the eggs are laid.

The males often start these bridges, and if the females approve, they carry the structure to completion. As the hen incubates, the male completes a nest frame to another of the bridges and uses it to roost in at night. Between feeding and displaying he may spend the time in weaving the commencement of many nests. There seems little doubt that he is polygamous, though I have not been able to check up on the number of females associated with one male. He certainly has two or three wives; if one does a count of the males it always appears that females are in excess of three to one. When I have spent hours at a nest not a single male has come to it; only hens have sat on the eggs or brooded young and fed them.

The eggs of the cardinal, though conforming to a type, are variable in ground-color and spotting. They may be white, blue, or greenish, finely spotted in dark brown or boldly marked in dark brown and umber; the spots and marks may be evenly distributed or mostly at the larger end. The eggs vary greatly in size, but an average is  $18 \times 12$  mm. Three are the usual clutch, but four are not rare. The incubation period appears to be from twelve to fourteen days according to the clutch size, and the nestling period is sixteen or seventeen days.

I found the females to be fairly tame at the nest but more excitable than most weaver finches. They flicked their wings and hopped around the nest before coming to the entrance. They cling to the threshold and bend for-



CARDINAL WEAVER FINCH

Female at nest

ward into the nest to feed the chicks. Nearly all the food is partially macerated grass seed and is regurgitated into the bill and passed to the youngsters. The young open their mouths wide and food is placed far back into the mouth so that a youngster has no need to bill the food at all. An occasional moth larva may be brought.

Two parasitic birds have been noted at a cardinal colony: the paradise whydah and the bronze cuckoo. We have seen eggs of the former and eggs and young of the latter in the nests.

### YELLOW-RUMPED WHYDAH

*Euplectes capensis xanthomelas* Rüpp.

Difficulty is often experienced in identifying a whydah finch accurately when it is in the stripy non-breeding plumage. The female of this whydah is rather heavily built. She has a strong, thickish bill and always has a yellowish-brown rump and a patch of this same color on the bend of the wing. The male in off-plumage is rather larger and heavier, and he always has a yellow rump and a yellow patch on the shoulders.

The non-breeding birds form fairly large flocks, all of their own kind or mixed with other whydahs. These flocks may be here one year and there the next, depending on where suitable feeding grounds are to be found, but taken by and large, they will be somewhere near permanent swamps and reed beds by rivers and lakes.

For breeding grounds they are less partial to damp and swampy ground than some species, so they have a greater choice of suitable localities. They often select areas of short bush mixed with a good coverage of tall grass. There are many suitable areas of this kind in the Nairobi-Ngong districts, and here the breeding season is between March and July in a good year, but later in a bad season. The male is polygamous, so one will not find a great number of males in a breeding ground. The males turn up first on the breeding area. They "peg out" a territory.

In a day or two, females can be noted. The males perch on top of a bush or small tree, singing a hardly audible song, with now and then a "sizzling" note that is more readily heard. They fluff out the body plumage, especially the yellow rump and the velvety flank feathers, and as they raise their heads to sizzle, a ruffle around the neck is visible. Soon a male leaves his perch and flies with audible clicking of wings, rump plumes still fluffed out and tail spread, sizzling as he flies. He makes for a patch of herbage. A hen bird flies from this cover and is pursued by the male a short way. He returns to his perch and in a short time the flight is repeated to the original patch or to another, where a second hen rises.

Later, one may disturb a male from the bush or grass. Where he got up, the chances are that one will find just a few bits of green grass twisted between two upright stems of some woody herb, a couple of feet off the ground. This is a speculative site for a nest. In a day or two, if more material has been added, the chances are that the site has been adopted by the hen. The male may start several nests, from which the female selects one as suitable. She then adds to the bridge and soon a circle of grass is built up between the stems; then more grass is twisted and woven and the domed or ball nest is formed. The male assists up to a point; then the hen takes over and the frame is thickened up and finally fine grass is laid in, mostly just within the "bowl" of the nest; the top or dome may be left as an open network. This is often the case when foliage protects and shades the top of the nest. Once a female is busy on a nest, the male goes about the task of looking after his other wives. There are usually two males on our bush slope and each has two or three females. A male that has had only two to begin with may find a third later in the season. The stage of incubation of the eggs and the age of chicks in the two or three nests are not the same.

The nests are started when the herbage is comparatively short; thus a nest which has been toward the top of two growing stems may eventually be a foot or more below the fully grown leafage of the stems. If this happens, the tops of many of the herbs are nipped off for a couple of feet all around the nest site, allowing the birds more easy entry to the site, for they fly straight to the nest and do not approach through the vegetation. One may often detect the position of a nest by looking over the herbage and noting spots which have been trimmed in this way. The nest is not so compact a structure as that of the cardinal weaver finch; in fact, it is rather loosely constructed in its upper third.

The eggs of the yellow-rumped whydah are distinctive; the ground-color is whitish to bluish-white largely obscured by dark brown and gray-brown, rather streaky, somewhat diffuse marks, almost a marbling in the long axis. Some marks are confluent, and so the ground-color is not easily seen. One occasionally finds eggs which have smaller marks and thus a more visible ground-color, but they all have a brownish tone, and this distinguishes them from the greenish eggs of the red-hooded whydah. The size is rather variable: 18-22 × 14.5-15 mm. Three are the normal full clutch.

The female does all the incubating and sits close for thirteen or fourteen days. She has to come off for short spells in order to take food, for I have not noted that the male feeds her on the nest. Her first spell off is between 7:30 and 8:30 A.M., when the sun is warming up; then she is off again about noon, but her longest period is in the latter part of the afternoon about 5 o'clock. She is hardly given time to secure a decent feed, for the male chivvies her most of the time.

Throughout the nest building and during incubation, the males are extremely jealous of their females and their territory, and infringement by a neighboring male is met by aggressive attack—not actual combat, but fighting at the intruder to the accompaniment of much loud “sizzling.” There is little excuse for infringing territory for food, for each has an ample supply of grass seed, which is the staple food.

The male takes no part in the feeding of the chicks. As with many other seed-eating birds, even the visits of the female are rather widely spaced because she feeds the young by regurgitating the contents of her crop, after which she broods for long spells up to half an hour or goes off for more food. The hen seldom shows any hesitation about coming to the nest and facing a hide. She always flies straight to the nest area, then descends the stem to the front and so to the nest. She at once dives her head into the entrance and holds onto the nest front until feeding is completed.

When the youngsters are first hatched they are flesh-brown in color and have short tufts of down on the head, the scapulars and the mid-joint of the wing, and the dorsum toward the pelvis. They are usually ready to leave the nest on the sixteenth day, but I have one record of twenty days.

In a good season, most hens are double-brooded, but the toll of eggs and young by predators is very high. By the time the young are well feathered the male bird has begun to molt to the female-like non-breeding dress. This molt is very interesting, for there is a color change and the type of feathering is also altered. The young in first dress are very like the female, but are rather more mottled below and duller. When the season is over, parents and young join flocks of their kind and resort to more open country where they move from one feeding ground to another, roosting in reed beds and papyrus swamps.

### RED-HOODED WHYDAH

*Coliuspasser laticauda suahelica* van Som.

(*Coliuspasser ardens suahelica* of Sclater)

This is perhaps the commonest of the whydahs in the Highlands of Kenya. When both sexes are in the streaky brown plumage of the off-season they become members of those huge bands of weaver finches which flight over the large reed beds and papyrus swamps of an evening, preparatory to settling down for the night. By day, they are out in the open grasslands in smaller bands, taking toll of the old crop of grass seeds or taking advantage of grain crops planted by man.

As the nesting season draws near, in February, some of the males begin to grow long black tail feathers; then the body becomes patchy, the streaky





RED-HOODED WHYDAH

Female at nest

brown body feathers are replaced by black ones, the crown of the head toward the nape becomes red, and the red chest band appears. It is during this change that small bands fly over bush and grassland on a reconnoitering flight. They fly high, suddenly coming down to an area of grassland where they settle for a while, perhaps feeding a little; then they get up

with a whirl and visit another spot. The flights may be repeated. Then, toward the middle of March, when the grass rains begin to freshen up bush and veldt, a smaller band, perhaps just three males and a dozen females, may appear on the bush slope. The males are more noticeable than the hens, for they are now in their black and red-hooded plumage, with long wavy black tail feathers. After a day or two of coming and going, the males split up, one here, one there. The females are there, too, but they are not noticeable until evening, when they band and flight to the vlei for a final feed, then back to the *Euclea* saplings to roost.

This is the usual sequence in my area at Ngong, but in the lower areas of the range, in the grasslands of Emali, for instance, the change of plumage and the arrival at the breeding grounds take place much earlier, and the birds already have eggs and young by March.

It doesn't always follow that if they nest in an area one year they will return to it the next; it all depends on climatic conditions and the suitability of coverage. I know of an area where I used to find the nesting birds year after year, but that ground has been drained and the pasture heavily grazed and not a bird has been near it for four years: there is now no coverage.

For the purposes of this note, I shall deal with the birds as I have found them in my small holding at Ngong. We will suppose that the males have arrived on a suitable area accompanied by, presumably, hens. The males have selected their territories and have begun to display. This initial display is part of the courtship and the females have not yet fully acquiesced in the selection of the site nor yet accepted the male, for I have noticed a diminution in the numbers of the females once nest building has been started. The vlei land by my sanctuary is ideal nesting ground, provided the short rains have been good and the grass rains of the long season have started to fall. Scattered over the vlei are little mounds with woody herbs and small trees, surrounded by bush; the grass is usually tall. The area is suitable for nests, food is assured, and there are ample stances on which the males can display.

The males take up stances in their territories. Here they display. They sizzle and fluff their feathers out and quiver their wings. They assume amusing attitudes in which their long tail seems to get completely mixed up. Then they fly just over the grass-tops with a weak, fluttering flight, tails spread in a shallow S and hoods raised. They sizzle as they fly and then alight on another bush in a flopping attitude. Then they commence to display again and become thoroughly worked up until they assume what I can only describe as a remarkable contortion, for tail plumes and wings are completely mixed up as they bend and sway. The sizzling note changes to a

most curious blowing and hissing, for all the world like an adder which suddenly deflates its air sacks. Then comes more sizzling and another flight. This time they drop into the grass, where they flop around as they did on the bush.

A hen is in the grass as the male contorts himself, and she now takes wing. The male gives chase, flying more normally but still waving his tail in that curious S formation; the hen goes to ground and the male alights on a bush. And so the performance goes on during the morning and is repeated again toward 5 o'clock. Between times, the male has toyed with bits of grass and has twisted them around upright stems of herbs or grass. The female has already approved of a site and has made a serious beginning to a nest. The construction is very similar to that described for the previous species, but the whole domed nest is much more flimsy and more loosely interlaced, especially in the upper half. It is about  $3\frac{1}{2}$  inches high by  $2\frac{1}{2}$  inches across. The eggs are often laid before the inner lining of fine grass has been added.

Two or three eggs form a usual clutch; occasionally four may be laid. They have a pale bluish-green ground-color freckled with gray-brown and umber, and gray sub-marks. The spotting is usually evenly distributed, though some of it may be confluent at the larger end. The average size is  $22 \times 14$  mm. Incubation is carried out by the hen only, over a period of thirteen or fourteen days. She is easily flushed during the first few days but sits close as incubation advances; she will hardly move when the eggs are on the point of hatching.

I have watched carefully at many nests, and though the male has come sizzling to a bush near the nest he has not come to it, nor have I ever seen him making any attempt to feed the young even when they were out of the nest. Youngsters are brooded for long spells between feeds. The actual feeding times are widely spaced, for the parent has to collect up the grass seed, which takes time, and once she has emptied her crop the next batch cannot be regurgitated for some time. Visits to the nest are not very frequent, in consequence, when the chicks are very small, but they are speeded up when the youngsters are well feathered. A little at a time is fed to each chick in turn. The food is brought up into the mouth and pushed to the bill tip with the tongue; when the first mouthful is finished more food is regurgitated. The hen clings to the front of the nest and stretches in to reach the youngsters.

The young are ready to vacate on or about the sixteenth day. They take shelter among the bush and tall grass until they are able to fly. Many fall victim to mongooses and harriers; eggs and new-hatched young are often taken by rats and snakes.

## JACKSON'S DANCING WHYDAH

*Drepanoplectes jacksoni* Sharpe

Man provides facilities for some birds while destroying the essential environment for others. The day is not far distant when visitors will have to go well outside the Nairobi municipal area to see this bird, but there are still a few places around the city where the dancing whydahs can be seen in the breeding season, and one can only hope that these grounds will remain secure to them. A step in this direction has already been taken in the establishment of the National Game Park south of the town.

The species has a limited distribution and is confined to the Highlands of Kenya. It requires open veldt where the grass is not too high and coarse; patches of medium grass where the males can construct their playgrounds; and thick, not too tall grass where the hens can build their nests.

In the area around Nairobi one may expect to see the birds displaying between March and August in a good year. They have nested in the vlei land near my sanctuary twice in six years, and in each of those two years the short rains were good and the long rains started early and continued to their full time. The grass coverage was ideal.

Jackson's whydah is supposed to be polygamous. Jackson strongly contested this suggestion and gave evidence to support his view, but it is not convincing. Here are some of the data I collected from a limited area of three acres.

One year the dancing birds did not appear on the ground until April instead of March. There were three male birds, and they constructed their dancing grounds, two in fairly close proximity, one a little way off. There appeared to be ten hens. The males were very energetic in laying out their dancing grounds; the irregular circles with the recessed central tuft were clipped with beak and trodden down by foot. The more the birds danced the more defined became the rings; finally the trodden grass became slightly browned. The dancing continued for a fortnight, up to the time the nests were ready and one or two held eggs; thereafter it slackened off when all the nests held eggs, and practically stopped when the nests held young.

The dancing ring starts off as an ill-defined circle about a yard across, with a hummock or tuft in the middle. The ring is gradually enlarged by the cock, who trims the grass down by nipping short lengths off with his bill; these bits are allowed to lie in the track, where they shrivel and disintegrate. Dancing may commence long before a ring is completed. By the cock's clipping and treading, the ring is enlarged and the central tuft is trimmed and recessed on one or two sides; the grass around the ring is sloped off. The ring is then wider and may be four feet across.



JACKSON'S DANCING WHYDAH

Female at nest regurgitating food for young

When a male comes to his playground he first walks about the track; then he nips off a bit of grass here, another there; then he crouches and quivers, shaking his body from side to side, and "sizzles." He then goes forward to the central tuft and enters the slight recess. He raises his head and neck ruffles, puts his head well back, and brings his tail up and forward till it just about reaches his head. He sways from side to side and goes forward with jerky movements in and out of the recess. He wheezes and makes a rattling noise. This over, he commences his jumping or dancing, rising two or more feet into the air with wings quivering and tail cocked up except for two feathers held at the horizontal. He jumps five or six times, then rests or repeats the ground display at the tuft. Sometimes the dancing

takes place in one spot of the ring; at other times he may circle the tuft or go part of the round and complete it on the next occasion. He puts great energy into the actions. The chief times of display seem to be from early morning to about 11 A.M., but I think the best display is of an evening at about 4:30-5 o'clock. Very occasionally females may be near the ring (I have never seen them in it), but more often they will be feeding in the grass a little way off as though they were not interested. Apparently the hen selects the cock.

I noticed that one male developed his ring to a greater extent than the other two—actually he started his ring before they did—and when I came to check up on the nests I found that the two associated with his dancing ground were in advance of the others. There were seven nests in all. Five nests produced three young apiece; one nest held two young and an unhatched egg; the seventh nest was only partially completed and apparently deserted. One could only presume that there must have been at least six hens to the three cocks.

The incubation lasts twelve or thirteen days and is done by the hen only. On no occasion was any male seen near a nest, not even during nest construction.

I took notes of one nest under construction. A small scrape was made at the base of a tuft of grass where it was partly protected by an adjoining tuft. The hollow was made by cutting and pulling away old and decaying grass; then nest material, mostly dry grass, was laid in the hollow, and blades of living grass from overhead were pulled down and incorporated with the dry material until a dome was formed. The nest then became a ball nest with a side entrance, camouflaged by the green grass woven into the dome of the nest. The lip of the entrance was about an inch and a half above the front ground level. The inner lining, which was thickest at the base, was fine grass flower heads. All the nests were built at the base of a grass tuft.

The full clutch is three. The eggs are pale blue in ground-color and are spotted and freckled in brown, with ochre sub-marks. The texture is smooth and very slightly glossy as incubation advances. The size is 21-22 × 14-15 mm. The female sits closely; in the early days of incubation these birds desert much more readily than do other whydahs, if the eggs are touched.

I put up hides at two nests when the young were half grown. Both nests were well camouflaged with long veldt grass. I spent four days at each of the two. No male appeared at either nest, but the females came without fuss or hesitancy. The males seemed to take no interest in the young. They spent most of their time feeding by a marsh or chivvying the females. The

hens gathered most of their grass seed from a small, reedy swamp where they showed a distinct preference for certain seeds, especially those of a *Panicum*. They had to fly about fifty yards from the swamp to the nest site. They alighted about a yard off, then walked over the grass toward the nest entrance. I was struck by the way they carried themselves when walking on the grass; their legs were extended to the full and their bodies held well up; had it not been for their heavy bills one might have taken them for big larks or pipits, for the poise and manner of walk were very similar. Their feet looked large and the legs very long. When they were actually at the nest entrance they had to lower the body almost to the feet before they could reach the chicks in the rather deep bowl of the nest. They fed the chicks by regurgitating food into their mouths. The hen gave just a little to each chick and served all in rotation until the supply was finished. The feeding thus took some time. The food was regurgitated ten times and the average stay at the nest was about six minutes. Visits were once in an hour. When leaving, the hen flew straight from the nest entrance.

As the hen came to the nest she often made a low call which I recorded as "chio chio chio," and on leaving she made a longer note, "cheiio"; while at the nest she was silent. No insect food was given, though I know that adults take termites.

New-hatched chicks are pinky-brown with sparse gray tufts of down toward the back of the head, at the base of the wings, and in the dorsal and lumbar regions. Quilling commences on the wings first; the body feathering is rather slow.

The young leave the nest at about the seventeenth day. They can hardly fly, but they are experts in hopping through the grass, and their long legs are definitely useful there. The young from three nests were herded into a small clump of woody herbs and were tended there by their respective parents. Later on, I discovered that the parents roosted with the youngsters in the tops of these bushes.

I found no evidence of an attempt at a second brood, and all birds—parents and such young as had escaped from predators—had left the area by the second week of August.

### BRONZE-HEADED MANNIKIN

*Spermestes cucullatus scutatus* Heugl.

This little finch is often associated with the black-headed mannikin at their feeding grounds, especially when the two species flock to an area where the sticky-grass (*Setaria*) is in full seed. They are easily distinguished, for the bronze-headed mannikin has no rufous on the back. The



BRONZE-HEADED MANNIKIN

Male at nest

two species have very similar habits but the bronze-headed mannikin is more catholic in food requirements and thus has a much wider range and less restricted environment.

One often sees these mannikins near native villages when the threshing of millet is in season, but in the main they live off the land, feeding on a variety of grass and weed seeds. Their method of securing seed from long-stemmed grass is similar to that described for the other mannikin.

These birds associate in flocks of a dozen or more during the off-season and split up into pairs when the breeding time approaches. The nests are rather more bulky and more untidy than those of the other species. They are almost always made of the pink-flowering grass-heads of *Rhynchelytrum repens*, common in patches, in grassland and on fallow land and derelict *shambas*. The nest is a domed structure with a side entrance protected by the feathery grass-heads which project over the opening. Most nests are situated in positions protected by fine twigs and heavy leafage or thorns, toward the ends of branches, and they may be associated with wasps' nests. The height varies from five to forty feet. Both parents share in nest construction.

Four or five eggs are laid, seldom more. They are pure white, long ovals or bluntly ovoid and measure  $14 \times 10$  mm. The eggs are not distinguish-



able from those of *S. nigriceps*. The incubation is carried out mostly by the hen during the day and lasts ten or twelve days. At night both birds incubate. My nestling records show a variation from fifteen to seventeen days.

The parents feed the young by regurgitating partially softened seed into the mouth, apportioning a small quantity to each chick. The seed is not regurgitated all at once, and several efforts may be made before the crop is emptied. Feeding is fairly regular but well spaced during the morning; then there may be a long break, but the visits become more regular again from about 3:30 to 6 o'clock. The morning session timed at one nest gave a visit every twenty-five minutes by both parents. When the parents came to the nest tree, they alighted a little way off from the nest, approached through the leafage, and slipped into the entrance. They remained in the nest a long time. No excreta was removed, so the entrance to the nest became fouled with feces, most of which fell through the loose grass at the entrance as it dried or was shaken off. One might expect that the plumage of young and adults would become soiled, but this is not so, because the fecal matter soon dries and crumbles. The nests are often full of dried feces mixed with sheath-covering from feathers. One might also think that the odor from the nest would attract vermin to the nest side, but I have no evidence that these birds suffer any more than others. The tree-rat (*Dendromys*) does take eggs occasionally, but no more than from cup nests. I have recounted the wholesale taking of young by the goshawk, *Astur tachiro*.

The young bronze-headed mannikin in first plumage is earthy-brown above with slight rusty margins to the inner wing feathers; the under side is buffy, with a brownish wash on the breast and flanks, and is tinged with gray on the throat.

### BLACK-HEADED MANNIKIN

*Spermestes nigriceps nigriceps* Cass.

The black-headed mannikin or rufous-backed finch, as it is sometimes called, has a favorite food—the seeds of the common grasses, *Panicum maximum* and *Setaria* species, which grow in profusion along paths and cuttings and roads in light forest and forest clearings. Thus we find these finches in greatest numbers in open forest and forest clearings. For many months of the year they associate in flocks or small groups and family parties, but they split up into pairs as the nesting time approaches.

In the Ngong area the chief nesting season is between March and August, but in this latter month most nests have well-feathered young. A few

pairs nest again in the short season from November to January. The height of the nest from the ground varies from four to over forty feet according to the type of tree growth, but the majority are about twelve feet up. The nest is usually built in a twiggy and leafy fork, upright or inclined. It is always toward the end of the supports.

The favorite nest material is fine sprays of a wild asparagus with flat leaf sprays, but cultivated asparagus may be used. The nest is a domed structure, fairly thickly built, especially around the base or bowl. The sprays are arranged in the inside so that the ends project forward and partially close up the entrance, which is to one side, usually facing outward. There is often no additional lining. The parents share the work of nest building. The general appearance of the nest is at first bright green, turning yellowish as the asparagus fades. Fresh asparagus is often taken into the nest when the young have hatched.

Strangely enough, I have never witnessed any signs of courtship display except to note a male billing a small bit of asparagus and moving up and down in front of a hen and twittering the while. He seems to have no song—just a low twitter.

The four or five pure white eggs are rather small, rounded or elongate, with an average measurement of  $14 \times 10$  mm. Larger clutches have been seen, but they are exceptional. Both parents incubate, and the eggs hatch in about eleven days. The nestling period is fourteen days as a rule, but as often happens in a large brood one or more youngsters may be weak, their growth retarded, and their exit delayed.

The stems of *Panicum* are so thin that they cannot carry the weight of even this little bird, so, to obtain the seed, one or more will alight on the stem and cause it to bend over gently until it comes to rest, supported by other stems; then the birds edge along to the seed sprays and husk the seeds at their leisure. When the head has been stripped of all ripe seeds, the birds fly up and the stem rights itself. The seeds of *Setaria* (sticky-grass) are taken on the ground or from heads which have become stuck together and matted to the leaves.

I have spent perhaps five hours in a hide at the nest of this mannikin and found that, like many other seed-eaters, its visits to the nest are relatively infrequent. The time between each feed is long because the parents have to replenish their emptied crops and the small seeds they eat take a long time to collect. Moreover, when both birds have come to the nest and fed the chicks, the youngsters' crops are full and it is some time before they require another feed.

The excrement is not removed by the parents and the nest becomes fouled, but since the feces are not liquid they soon dry and crumble. When



BLACK-HEADED MANNIKIN

the young are a bit older they evacuate to the entrance and this becomes soiled but the plumage of adults or young is not contaminated. These mannikins, more than other birds, make use of old brood nests to sleep in, and if these disintegrate, as many do after a time, several birds will combine and construct a sleeping nest capable of holding a number of birds. They also make use of old weaver birds' nests to roost in. If one sees a mannikin carrying asparagus to a tree, it is as well not to assume that a brood nest is under construction. If more than two birds are taking part in the nest building, the nest is probably temporary sleeping quarters. If in a week or so it does hold eggs, you will find that the occupants are now only two; the helpers in the nest building have gone off. I have visited a sleeping nest at night just to make certain how many birds were in it, and on one occasion I found eleven adult birds in one nest.

These birds have a strong trait of curiosity in their make-up, and more than once I have seen subadult birds visiting the nests of other finches. On

one occasion a small flock of four subadult birds came to a nest of a waxbill and proceeded to pull the nest to bits just to have a look at the squeaking youngsters inside.

Young black-headed mannikins are rather different from their parents. They are dull earthy-brown above, slightly darker on head and tail, and off-white below; the bill and feet are brownish. They are rather difficult to distinguish from the young of the bronze-headed mannikin, but they are darker on the back.

### SINGING SILVER-BILL FINCH

*Euodice cantans tavetensis* van Som.

For many years, little seemed to be known of the nesting habits of this finch, though the bird was common enough and still is very plentiful in the thornbush and dry acacia country. Then some data began to accumulate. The late Admiral Lynes described a nest at Dafur as a small ball-shaped grass structure; he added that occasionally this finch used old weaver nests to lay in. The clutch was described as four to nine pure white eggs.

In 1941 I examined more than two dozen clutches and only one might have been stated as being in a small ball-shaped grass nest; all the others were in the old nests of weaver birds: Speke's weaver, the intermediate weaver, the chestnut weaver, and the black-faced weaver. True, some of the clutches were nine eggs, but it was evident that they represented two distinct stages in incubation, for some of the eggs were very advanced, with embryos fully formed, and others were fresh! The justifiable inference was that two females had laid in the one nest, starting at very different periods. Some nests held young *and* a clutch of fresh eggs.

The full normal clutch would appear to be four or five. Another most interesting fact was that the nest selected not infrequently already held the egg or eggs of the original owner, who had long since deserted! These were the blue eggs of Speke's weaver, the white eggs of the intermediate weaver, the speckled eggs of the black-faced weaver, and so on. In addition, a nest now occupied by *Euodice* sometimes held the eggs of another finch, viz. the cut-throat finch *Amadina*—white eggs also, but larger than those of *Euodice*; altogether a very complicated situation!

In another area I found these finches, without exception, occupying weaver bird nests. Then I found an old nest of the black-faced weaver (*Sitagra vitellinus uluensis*); it was used by two hens, so I looked for males. In two hours of watching, just three birds arrived, only one of which was a male. Did he own both females, and if so why did both lay in the same nest when other vacant nests were available in the same tree? In due course,

after fourteen days, I found that some of the eggs had hatched; there were four youngsters, and there were five partially incubated eggs in the nest. One bird brooded and incubated, till I put her off. The sixteenth day after the hatching of the first young, they had vacated, but a hen was sitting on a second lot of very small youngsters.

What happens in the case where two species are mixed I don't know, but I see no reason why both females should not sit together in the large interior of a weaver's nest. The birds are friendly enough in the trees around the nest. It is probable that the first tenant would act as foster parent to the stray youngsters. When the foster child had feathered up it would join others of its own kind as happens in the case of the parasitic finches, *Vidua* and *Anomalospiza*.

Singing silver-bill finches are usually seen in small flocks, either on the ground picking up small grass seeds or in short grass picking seeds off by making little upward hops to bring the seed heads down.

They have a twittering or sizzling call; some of the notes are only just audible. The songster sits on a bare twig on a bush top or in an acacia and sings away for minutes on end, and though one can hardly hear his song one can see by the vibration of his throat that he is absorbed in his effort.

### KENYA PARTRIDGE FINCH

*Ortyospiza atricollis mulleri* Zedl.

The general coloration of this bird shows a strong resemblance to that of the French or red-legged partridge of Europe—it is a replica in miniature. There is also a similarity in behavior in that one may almost walk on top of this bird as it crouches low to the ground, just like a partridge or a quail. Then it gets up with a whirl of little wings, but there the likeness stops, for the finch will flight up and up, then around, and drop suddenly.

These little finches are found on veldt land where there are patches of short tufty grass with open spaces of clear ground and sand, and for preference where surface water is close at hand. They like short grass to feed in and nest in, and they avoid tall, rank grass. Not only are they very partial to water, but some of their favorite grass seed is obtainable only near water. They are always near water early in the morning, at noon, and again in the evening. As one approaches a temporary water pan or a stream bed where the water remains in little rocky pools, one may not notice a single bird until they suddenly spring up—their upper plumage so closely resembles the surroundings as they crouch low. It is exactly the same when one flushes them from heavily cropped pasture land.

If they happen to be nesting one puts them up singly or in twos. If the nest is somewhere near, one can tell by their aerial antics whether the nest



KENYA PARTRIDGE FINCH  
Male in front of entrance to nest

holds fresh eggs or young. When a breeding bird is flushed she will fly off and go up and up in a circle until she is almost lost to view, but all the time one can hear the distinctive little "quick-queer queer" oft repeated, and as the male joins her he will utter a longer call: "qutwiter-qutwisi ich" and "queer twer quiri ti quit." To find the nest watch the birds as they fly around! Note where they suddenly drop down! One of them will presently fly up, but not "skying." Walk up quietly to where they dropped and the chances are that you will flush either cock or hen from the nest. It will be just at ground level, within the base of a small tuft of grass and hardly visible. There will usually be a small bare area just in front of the entrance. The only indication of the nest will be a few grass blades arching over a small dark entrance.

The nest is a small, domed structure built in a little scrape within the side of the tuft right at its base. It is made of grass and fine grass rootlets and



## KENYA PARTRIDGE FINCH

Female leaving the nest

is probably lined with feathers. The eggs are very small, pure white, four to six in number and measuring on an average  $13 \times 10$  mm.

I have often found nests within about six yards of each other. There have been two hens, but only one cock. Is the little finch polygamous? I had a hide beside one nest and the other was only four paces off and visible to me. Both nests had young. Females came to the nests with food quite often and a male came occasionally, but I'm sure there was only one male. Moreover, when I came out of the hide and the hens were brooding, only one male gave an alarm. Sitting quietly in the hide, I always had warning of an approaching bird. As it came from the feeding ground it did a half circle fairly high in the air and called "quii-queer" or "quick quick queer" as it dropped down a foot or so from the nest. Then it ran through the grass

tufts to the little clear spot at the entrance, paused just a fraction of a second, and slipped in. Both male and female fed the young and brooded them.

New-hatched young are very dark, with dark and whitish-gray tufts of down on the back of the head, on the shoulders, and on the lumbar-pelvic region. They have four white tubercles at the corner of the mouth, a row of five black spots arranged in horseshoe shape on the palate, a black angle toward the tip of the upper mandible, and three black spots in a triangle on the tongue. These mouth marks are direction points, I feel sure.

I had a unique experience at another nest, which held two-day-old chicks. I waited patiently for the birds to come. The hen bird arrived, but she was extremely timid, more so than I had ever experienced with this species. She kept on taking short flights; then, landing a few feet from the nest, she just stood, calling anxiously. She got up and fluttered over a patch of grass not two yards to one side of the nest, then flew off. She returned almost at once and her mate was with her. Both birds fluttered over the grass clump and called excitedly. I heard the male flying around and around above the hide, calling anxiously; then I saw a multi-lined grass snake glide through the grass, across the foot-wide clear space in front of the nest. It put its head into the nest; then it withdrew, with a young finch in its jaws. It turned and disappeared.

The parent birds were fluttering over the nest site when the reptile returned and took a second chick. I killed the snake and put it in my car. It was fully an hour before the hen bird dropped to the clearing; she stood on its margin literally quivering with fear, and she wouldn't go to the nest. So I raised the grass a little from in front of the nest entrance. The hen dropped to the nest again just a little nearer than before. She craned her neck toward the entrance, and seeing the chicks, slipped in and brooded them.

Passing the nest a day later, I was pleased to see that the birds were feeding the remaining chicks quietly, as though nothing had happened at the nest the day before.

### BLACK-VENTED CRIMSON FINCH

*Lagonosticta rubricata hildebrandti* Neumn.

The habitat of these finches is the marginal bush of forest, the bush in forest valleys, and the fringing bush of rivers and streams, where they always keep to the low strata and are very timid. One often catches a glimpse of them in the marginal fringe of roads through forest where the herbage is thick and seeding grass plentiful. They may be just on the ground in the



**BLACK-VENTED CRIMSON FINCH**

Male sitting above nest

roadside drains, picking up fallen seed, but with a twitter they disappear and will not come out again until all is quiet.

The courting display is a mild act. The male perches on a low, bare twig twittering his short song; then, hopping to the ground, he picks up a bit of rootlet or grass and returns to his perch, where he commences to bob up and down by flexion of the legs, twittering all the while. Soon he sidles up to the hen, drops the bit of stuff he had in the bill, gently bills the lady, and dances up and down, often jumping over her back. Then he tries to mount her. If she acquiesces she squats to the branch and quivers her wings.

I have never seen these birds in flocks; one may see a pair with subadult young, but they soon have to fend for themselves and go off. Occasionally of an evening, when many birds seek their last meal of the day, a pair of these finches may join a party of other small seed-eaters at a spot where sticky-grass is growing thick. They are very partial to the small seeds of this grass. If one comes upon the birds suddenly all the other finches fly off, but the black-vented finch just disappears into the nearest cover.

The nesting season during the long period commences toward the end of March or the beginning of April. Pairs will be seen here and there, and though their nests may be well apart there is no restricted territory.

The nest is a fully domed structure. The materials used and the bulk of the nest depend on its situation. Most nests are found in such places as a pile of brushwood, among debris tossed on a road bank, in a thick tuft of broad-leaf sword grass, in a pile of debris at the base of a forest tree, and very occasionally in a low, woody herb. If the nest is within vegetation, it is built of broad-leaf grass, most of it green, and the domed structure is fairly large, roughly about six inches in diameter, and ball-shaped; if built in a grass clump, some of the overhead blades are brought down and incorporated in the dome. Such a nest is well concealed. If the situation is mostly a mass of brown and decaying debris the domed nest is in itself quite small, because a recess or space between layers is selected for the nest. Dead grass and rootlets, skeleton leaves, and grass fiber are brought in sufficient quantity to fill the recess or a portion of the space so as to leave a chamber of roughly 3 by 3½ inches inside, allowance having been made for the thick lining of feathers which is almost always laid in. Such nests are not then ball-shaped, nor are they really domed, for part of the top is merely the leaf debris over the top.

Such nests are always well concealed, for the side entrance is often covered by twigs and leaf rubbish. In these situations there is usually a little ramp of nest material leading to the entrance, and I look out for this if I am searching for the nest in a pile of debris.

I sometimes localize a pair, and having looked over the area and noted suitable sites I just sit down and watch the birds. I see the hen carrying nest material to a spot. When the nest is complete, the male starts his little song "twee, twee-tii-hiiiiiii," the last note prolonged and like a little low "hinny"; then the song goes on, "pit pit pii, twee hiiiiiii." The nest is not far from his song perch.

I often bait the ground where I suspect the nest to be. I sprinkle a few feathers on the ground and sit down and have a smoke. The birds simply can't resist feathers and will come for them at once, whether the nest holds eggs or young.

The eggs of this little bird are pure white with a fine smooth texture. Four or five form a clutch. They measure 14–15 × 10–11 mm. Incubation is carried out by both parents and it lasts ten or eleven days as a rule but may be longer if the clutch is large. I have sometimes found a dwarf egg among a large clutch of six eggs.

It happens that my sanctuary is particularly favored and several pairs nest here regularly. At least a dozen nests can be found in a good season, representing first and second broods per pair. As one watches, the first

indication of the bird is that sharp "pit pit" note from cover; then the bird hops through the lower branch of the overhead trees, eventually coming to the nest site. There is usually just a momentary pause before it enters the dark crevice or recess.

When there is a full brood of five, the number of visits to the nest with food is comparatively high, for it doesn't take long to empty the small crop of its contents. A single bird may come once in half an hour but the two together make a visit every fifteen minutes, and that is rapid for seed-eaters. During that brief pause on the threshold the first mouthful of food is regurgitated and a portion worked to the bill tip; then the parent enters. The arrival at the nest is usually greeted by twittering from the chicks inside. These youngsters have bright bluish tubercles at the gape and black spots on the tongue and palate. The stay at the nest is seldom more than five minutes, unless the parent wishes to brood the chicks for a while. The average nestling period seems to be fifteen days, but it may be lengthened in a full brood and delayed by weather conditions. Disturbance may cause a brood to flutter from the nest prematurely. If this happens it is almost impossible to put them back, and I usually leave it to the mother to induce them back.

Young in first plumage bear a slight resemblance to the female, but they are duller and have very little red on the head; the belly and under tail coverts are dark rusty brown, and the bill is brown.

Youngsters take shelter under thick cover and will seldom be seen until they start moving around with their parents. They can be recognized at once from their parents because of the duller plumage.

### CRIMSON FIRE FINCH

*Lagonosticta senegala kikuyuensis* van Som.

If one were to ask about the natural habitat of this little crimson finch I think the majority of replies would make some reference to human habitations—native villages, homesteads, or urban residences. All such are, strictly speaking, adopted habitats; the natural habitat is the bush and scrub of dongas and river fringes and the close bush on hillsides where little streams trickle down the slopes, for these finches are never far from water of some sort. Nevertheless, the adopted habitat holds a greater population than the wilds, and it now seems commonplace for these little birds to frequent the habitations of man.

Most folks are familiar with the extreme friendliness of these little finches: how they hop around the house, picking up the odd crumb, how they feed among the fowls, how they take little portions from the dog's food

dish or search for odd titbits on the veranda, even coming into living rooms and bedrooms! There may be just a pair, or a family party of six or seven, or a little company when two families unite, in which the majority are dull and brownish youngsters. Adults and young take a keen delight in splashing in a bird-bath.

Close association with man has made these finches very catholic in their choice of nesting sites. Here are some sites associated with dwellings: in the thatch of a hut or house; on top of a wall under the thatch; in a crevice between thatch and rafters inside a house; between rows of cups on a shelf; on top of books in a bookshelf; in a pile of stacked boxes in a yard; inside an old motor tire; in a crevice of a cracked wall; in a bundle of wire netting. Then there are sites in the garden: in a clump of ferns; in the head of an aloe plant; in a weaver bird's old nest; in a pile of rubbish and brushwood; on top of a cossypha's nest; and so on—almost any place sheltered and wide enough for the little domed nest.

The nest itself is made of grass, decaying leaves, and fine rootlets and tendrils built into a domed structure with a side entrance just an inch or so higher than the floor of the chamber and often protected by nest material that has been directed forward. There is often a small, sloping ramp to the entrance. If the nest is built in or near a dwelling, bits of string, cloth, and paper may be worked in. Feathers and bits of wool and fluff are put in as a lining, and some of the feathers are usually placed with their curved tips toward the entrance so as to obscure it completely. Fowl feathers predominate and it often happens that they are badly infested with mites, but, strangely enough, these parasites don't seem to worry the finches. In the wild, they use dove, francolin, and bustard feathers. They have a passion for feathers and will often add to the lining even up to the time the youngsters are well feathered. The male seems to be the chief purveyor of feathers.

There is a definite courtship display—not very spectacular maybe—in which a feather is an adjunct. The two birds sit side by side in a low bush. The male warbles a low tune, almost inaudible; I have been unable to record it satisfactorily. His little throat expands and vibrates as he stands in an upright position with crown feathers slightly raised. He flies off and hunts around for a feather; failing this he brings a bit of grass. He hops to the twig and utters the little “zit zit” note as he jumps up and down, just releasing the twig each time. He sometimes drops the feather, hops down and retrieves it, bobs up and down on the ground, hops back to the twig, and hops toward the hen. Dropping the feather, he gently passes his bill over the hen's cheek and nape in a little caress. If the female is willing, she quivers her wings and mating takes place.



CRIMSON FIRE FINCH

Bird at nest in alo

This finch lays a large clutch—five, six, or eight eggs—but one or two in a big clutch may be infertile. Incubation is shared and lasts about eleven days. The hen sits close. If you tap gently on a nest you get no response; then presently a little red-ringed eye appears among the entrance feathers. When the hen knows she has been seen she retracts her head quickly. Tap the nest again and out she darts with a little twitter of protest. Looking around, you will almost certainly see the male join the hen. There is no loud twitter; they just hop about the branches anxiously. If you retire a little distance, one of the birds, usually the male, ventures to the nest site and stays by the entrance. The female then comes and enters the nest.

A timid bird often hops about the bush or picks up a small bit of grass or rootlet from the ground and flies up with it into a bush. She may do this two or three times but on each move she comes nearer to the nest; then, working to its back, she remains quiet for a while, then quickly slips round and into it.

A newly hatched chick is pinky-brown in color, and the gape is ornamented with small, white tubercles. The young are silent for the first few days when the parents bring food, but later they squeak "sii sii sii sii," as the parent pauses in putting a morsel of softened seed into one mouth after another, and then pauses to replenish the supply in her mouth. Feeding times at a nest near a dwelling are more frequent than at a nest in the bush, for food is more easily obtained. When I have watched at a "bush" nest, there have been three main feeds in the morning between 8:30 and 11 o'clock, a long mid-day break, then regular feeds about every half hour by both parents in the afternoon between 3 and 6:30 o'clock.

The nesting period seems very variable and is probably in ratio to the size of the family. My shortest recorded period is fourteen days, but I have one record of eighteen days for a brood of six. The youngsters remain associated with their parents for a very long time and may be about the locality when the parents start another nest.

There is a general impression that these birds nest at any time during the year. Careful notes taken in my sanctuary show that here the birds breed between March and July and between September and February, but an individual pair has nested during a good year in more or less the same spot and had broods in April and July and one brood in December.

I feel certain that these little birds pair for life.

Food taken around a dwelling may be any form of finely divided cereal, maize meal, bread crumbs, fowl food, and so on, but in the bush the staple diet is small grass seed and minute seeds from a small labiate. Water is an essential, and the birds will go comparatively long distances for it.

## GRAY-HEADED WAXBILL or YELLOW-BELLIED WAXBILL.

*Coccygia melanotis kilimensis* Sharpe

Mixed flocks of small finches may often be seen busily stripping the ripening seeds from grasses. They concentrate in patches where the sticky-grass (*Setaria*) abounds. The little flock on and under its matted carpet probably contains the two species of mannikins, the barred waxbill, the red-rumped waxbill, and the gray-headed waxbill. When flushed, these little finches fly up into the nearest bush or small tree, with a little twitter, and remain perched until the disturbance is past, when they drop to the feeding ground again. They are seldom far from the fringing bush of forest or the bush along wooded dongas and scarps, for it is here that they build their nests. One may find them by forest at fairly high altitudes—as high as 9,000 feet—but they are nowhere common. A flock of twenty is unusual, for they usually associate in small groups of hardly a dozen. They can be recognized easily by their small size, gray head, and red and black bill.

They are fairly common along the margins of the forests around Nairobi, and several pairs nest regularly in my sanctuary. For a nesting site, they select a rather thick, leafy spray toward the top of a small tree, at six to fifteen feet; sometimes they go even higher, if they elect to build in a clump of mistletoe, as they frequently do, in a high tree. The nest is a domed structure, almost a ball nest, with an opening to one side, usually toward a supporting branch and covered over by flowering grass sprays in the form of a short entrance spout. The nest is built of rather coarse grass stems rather loosely interlaced, the whole forming a much bulkier structure than the nest of the "cordon bleu," which is frail-looking. The nest is lined with finer grass heads, and sometimes feathers may be added. The birds take a week to ten days to build a nest. It is usually well hidden by the surrounding foliage; if it happens to be in a thorn tree, and fairly well exposed, it will be protected by the surrounding thorns. Not infrequently, it may be near the paper-nest of a wasp.

Both birds take part in building the nest, and both incubate. A clutch of four or five is common, but six are not infrequent. The eggs are very small, pure white, and of fine texture, the shell so thin that the yolk imparts a creamy-pink tinge to the color. They measure  $14 \times 10$  mm. The incubation period is twelve or thirteen days. The new-hatched young are pinkish in color, with just slight downy tufts on the head and dorsum. The gape is furnished with small tubercles, and the palate and tongue have black spots in a pattern. The incubating birds sit fairly close, but I have found them rather more timid than most estrilds, until just before the eggs are due to hatch; then they will only vacate if the branch is touched.



## GRAY-HEADED WAXBILL

Female at nest

The food consists entirely of very small grass seeds, which in a half-macerated state are regurgitated into the mouth in small quantities; little portions are then handed out to each chick. A feed may take as long as five minutes before all the youngsters have had a share. As with others of the group, feeding times are rather long-spaced—sometimes more than an hour apart. Both birds often come to the nest at one time, but one remains outside until the one within has finished. They don't always come together.

The youngsters are ready to leave the nest between the fourteenth and the sixteenth day. At some nests I have noted that parents and young return to the nest to roost for a few nights, but later they take shelter in some dense bush or small tree. The young remain with their parents for some time, but when a second brood is started, the first young join up with other



broods. The birds are double-brooded in the long season; in this area there has been no evidence of nesting in the short season.

### MASAI BARRED WAXBILL

*Estrilda astrild massaica* Neumn.

This species lives anywhere in the Kenya Highlands below 8,000 feet, especially in scrub country and grassland where old cultivations lie fallow—anywhere, in fact, where weed growth includes an abundance of the sticky-grass (*Setaria verticillata*) or any other species with small millet-like seeds. If you wish to see these birds in hundreds, visit a large reed bed or papyrus swamp of an evening just as they come in to a favorite roost. The flocks fly in from all directions just at sunset. There are certain spots in the swamps where they habitually roost, yet on arrival they fly from place to place with a whirl of wings and noisy twitter. They eventually come to their favorite stance and they perch close together in rows along a strong reed or papyrus until their weight brings it down to rest on a lower stem. Then a bird from the outside tries to squeeze in, the balance is upset, and all go off, fly around, and settle again. All flocks do not roost in swamps; some choose a patch of bush for the night, but there is always that restless movement before final settling down.

At the roost, flocks begin to stir just before dawn. They twitter and wag their tails from side to side and peck at each other. They flit about the reed bed for a while and some will take a drink. Then, almost as though by signal, they rise and fly low over the grass to some area where the sticky-grass is growing. It may be a patch just a few yards square, but they drop to it in tens and twenties, until the patch is full of them. Some are on the ground picking up fallen seed or shelling the seeds from recumbent stalks; others are feeding off stalks that have massed together; others may be seen jumping up and pulling down an upright stalk—and all the while there is squabbling and twittering and much tail-wagging. On a large patch of seeding grass one may find these birds associated with other grass finches such as the masked weaver finch (*Quelea*), the orange-bellied finch (*Sporraeginthus*), and the buff-breasted waxbill (*Estrilda rhodopyga*), and if one disturbs such a concourse the *Estrilda* will be the last to leave.

As the breeding season approaches the flocks break up. Though these waxbills are not social in their breeding habits, in some quite small areas one may find several nests. Such popular nesting ground will have a goodly amount of *Setaria* and other small-seeded grasses.

There are two main types of sites: small bushes, trees, hedges, or creepers at heights varying from four to ten feet; and grass clumps within grassland

and not more than eighteen inches up. I suggest that birds which select a position in grass were themselves reared in such a situation. The birds that build high are those which live in the bush and garden; those that build on or near the ground are in the vlei land, beyond the forest.

All nests, wherever situated, are fully domed structures with a side aperture approached by a tubular entrance or tunnel varying from five to four-tenths inches in length according to situation, and all have a "cock nest" or superstructure in the form of an open cup nest built on top of the dome. The "dummy nests" vary. Some are very elaborate and well made and are ornamented with "pink-grass" and feathers; others are merely a loosely made saucer. Very occasionally, the dummy nest holds an egg.

I located a nest in the veldt land and as I stood looking at it, the owners arrived. I sat down a little way off to watch. The dummy nest was a well-constructed one; the nest proper, but for the tubular entrance, could not be seen. In a short while I saw the male fly over the grass with a piece of pink-flowering grass (*Rhynchelytrum repens*) in his bill. He dropped to the nest site, then left *without* the grass. He was back within ten minutes with a red feather from a Rhode Island fowl. He took it to the nest and flew off. He did this at least six times, carrying either a feather or a bit of pink grass. As he flew toward the nest he passed close overhead and twittered loudly. He knew I was watching.

I examined the nest and found that all the material the male had brought was now arranged in the dummy nest. As I stood contemplating this piece of work, I heard the male twittering. He had brought another feather. He perched on a little woody herb twittering and wagging his tail and I went backward ten paces. As I stood, the bird rose and came to the nest and put the feather in the dummy nest and sat in it until I walked forward. It seemed to me that this particular male had deliberately directed my attention to that dummy nest (*a*) by decorating its interior with conspicuous grass and feathers, (*b*) by coming to it in my presence, (*c*) by sitting within the dummy until put off.

Here is another instance from my diary: "*Estrilda* nest in creeper over brushwood fence, height four feet. Nest usual type, dummy nest moderately good. Eggs hard sat. Put up hide in evening." I entered the hide next day; my entries read: "Female sitting tight on hatching eggs. Male excited and hopping about fence; tail play excessive, until boys went off. He saw me enter hide. Male came with feather and thought he was taking it to nest . . . he put it in dummy nest. Eight feathers now in dummy nest. Why? Is he inviting attention to this empty dummy?" It cannot be force of habit because dummy nests are not, *as a rule*, lined, certainly not with feathers.



## MASAI BARRED WAXBILL

Male and female at nest in withy fence; cock nest above

The nest is made entirely of grass, not woven but crisscrossed; the outer frame is untidy, but within this the bending of the grass stems (with or without flowering heads) diagonally over each other results in a thick compact ball nest with side entrance; the inside is lined with fine grass and occasionally with feathers. The tubular entrance is made of fine grass stems, heads outward, worked into the frame of the nest and crisscrossed in a loose network, leaving a tube with a bore of about one inch.

The full clutch of eggs is usually five; six and seven are often recorded. They are pure white but the yolk gives them a slightly pinky look. Not infrequently there are one or two larger eggs in the nest, in all probability the eggs of the pin-tailed whydah, a parasitic finch which often victimizes *Estrilda*. Later, when the chicks are well feathered, there will be one large brown-plumaged youngster—the whydah chick.

Incubation is shared by the parents, though the female does most of it. Both birds are in the nest at night. Incubation lasts about eleven days.

Both birds brood when the chicks are very small, and both provide food. The number of visits by the parents is roughly three in an hour. The birds are fairly tame at the nest, but they are always excitable—constantly on the move—and the greater the excitement the more the tail moves from side to side. It seldom stops; even when the bird is regurgitating food the tail is moving. When the bird alights just in front of the tube entrance the wings are flicked, especially when the nest is on the ground or a few inches up. Just in front of the entrance there is often a small clear area to which the birds come before entering the tube.

The birds often come to the nest together. On one occasion I was in a hide at a nest about four feet up in a small bush. It was a rather conspicuous nest with an unusually large dummy structure that completely hid the brood chamber below. The whole structure may have been a deliberate form of camouflage in view of the exposed position. The birds were fairly attentive to the young but very restless. As I watched, a flock of black-headed mannikins came on the scene. One male happened to alight just by the *Estrilda* nest. He came to the nest and began pulling out a stem of grass here and there. Then he extracted one with ripe seeds on it and commenced to husk and eat the seeds. He was joined by other mannikins until there were half a dozen on the nest, pulling it to pieces and feeding on the seeds! The poor waxbills were hopping about the bushes, greatly excited, while the mannikins went on with their destruction. It had gone far enough, and there was plenty of that particular grass not far away, so I put my hand out of the hide and drove the birds off.

Here is another episode illustrating fixity of habit. It is difficult to view the young as they are fed. I wanted to witness this, so I inserted my fingers into a nest side and made an opening through which the young could be seen as they squatted in the bowl of the nest. I kept the aperture open with two little stakes. Then I built a hide and waited. The parents arrived; they hopped from grass stems to the clear space by the tube mouth; they saw the hole in the nest side and not only saw the chicks but heard them as they set up a twittering. Two youngsters craned their heads through the opening; yet the parents one by one entered the tubular tunnel, came to the chamber, now with its side open, and fed the chicks in full view. The hen fed the chicks first, regurgitating and giving a little to each chick, though two, more advanced than the others, clamored for attention. When she had finished she made room for her mate. He too fed the chicks one at a time, a little to each. They did *not* take a short cut and come out by the hole in the nest side; they turned and came out via the tube! This to me was remarkable and indicated fixity of habit. To test this further I took a sharp pair of scissors and cut the entrance tube for its full length on one side, then

lifted the upper portion of the cut tube and kept it up by three thin bits of grass stem. The entrance was thus only half a tube. I crawled into the hide and waited. Both birds came in. They twittered and wagged their tails as though quite at their ease, went to the spout, entered, and hopped its entire length and so to the brood chamber. Having fed the youngsters they turned and hopped down the entire length of the half tube. They did this twice. While they were away I repaired the nest. The birds came back, entered the tube, fed the chicks in the chamber, came out of the tube and so away, as though nothing unusual had happened to their nest. The whole incident was remarkable. Can a bird with such fixity of habit be credited with a deliberate act of trying to deceive by adding feathers to a dummy nest in order to attract attention away from the nest proper? I leave the reader to judge for himself.

The young usually vacate about the seventeenth day. They are duller than the female and browner. The white tubercles at the gape and lower bill, the black mouth marks—two at the tip, three across the palate—and the black tongue marks are all present. The young remain with the parents until long after they can fend for themselves. These birds are usually double-brooded in the long season and may nest again in the short rains or just after.

#### ORANGE-BELLIED WAXBILL

*Sporaeginthus subflava clarkei* Shelley  
(*Estrilda subflava clarkei* of Sclater)

In eastern Africa, this waxbill occurs in the grassland of the coast belt, the veldt of the mid-plateau, the Lake Victoria area, many parts of Uganda, and the Bwamba Valley, West Ruwenzori. It is not numerous anywhere. The flocks seldom number more than twenty birds; they are often associated with other waxbills as they feed on the sticky-grass and millet grass of swamp lands. Small flocks are often seen in the native reserves where quantities of *whimbi* and *mwele* are grown, such as the Meru, Ukamba, and Kavirondo areas.

These waxbills are curious in their nesting habits. Many pairs build their own nest, others adapt an old nest of a weaver finch, a warbler or a weaver, merely adding heads of flowering grass to the entrance to reduce its size and obscure it. Most of the "self-made" nests that I have found have been in grassland near low-lying swamps or among swamp grass. Such a nest is a rather frail ball or domed nest of fine grass, not very closely interlaced, and though the entrance is covered over with grass heads directed outward, the entrance tube is seldom more than three or four inches long. The nest is



ORANGE-BELLIED WAXBILL

Male perched near nest

usually built between two upright grass stems at about eighteen inches to two feet from the ground. It may occasionally be situated in a small woody herb, but it is always in grassland.

In a good season, when the grass is well grown and the water lies in the slight hollows, a few pairs nest in my area. Both birds take part in the nest building, and later, when the clutch is completed, both share in the incubation; in fact, the male has been on the nest as frequently as the female when I have made visits to the nests. The eggs are pure white, rather small and so thin-shelled that the yolk gives them a creamy appearance; a full clutch varies from four to six, the latter rather exceptional. An average measurement is  $13 \times 10$  mm.

The birds sit very close and, when there are eggs, vacate only when one is very near the nest; they won't move at all if the eggs are on the point of hatching or if the chicks have just hatched. Incubation lasts about eleven days. The young are pinkish-brown in color with short tufts of down on the crown and the scapular and dorso-lumbar regions; the belly is yellowish. The gape is yellow with small nodules at the base of the mandible; the palate has five black spots and the tongue three.

These birds are hardly ever still; the head moves, the tail is in motion from side to side almost continuously, and the wings are frequently flicked.

Feeding of the young is rather infrequent, as with many seed-eating species. The food is regurgitated into the mouth. This food is all very small grass seed. It takes some time to share out the contents of a crop among four or five young, so the bird is at the nest some little time.

Breeding in the Ngong area takes place between March and July, when two broods are attempted. The number of nesting pairs varies with the degree of grass coverage.

### CRIMSON-CHEEKED BLUE WAXBILL

*Uraeginthus bengalus brunneigularis* Mearns

In one or other of its various races, this species extends from the coast belt through the greater part of Kenya to Uganda and far beyond; it does not occur at high elevations. Away from urban areas, we find it in thorn-bush; in the bush fringe of dry watercourses; in light woodland; in orchard savannah country where the trees are of relatively small size; and in the tall bush of valleys and hillside. We also find it in association with native villages and settlements. There is always a mixture of scrub and grassland in the areas it frequents, and some form of surface water is sure to be present.

Though subject to some local movement, these waxbills remain in the same general locality, if sources of water hold out. There is little evidence

of flocking, and apart from small family groups, most birds are seen in pairs. It sometimes happens, of course, that a few pairs may be attracted to one particular spot when a certain species of grass seed is ripening. They are seed-eaters almost exclusively; much of the very small seed they favor is taken from the ground, when the seed falls. Like many other ground feeders, they prefer to sit on the ground rather than take wing; they rise only when necessary, and perch in the nearest small tree or bush.

Once a pair have mated, the two appear to stay together year after year; they are seldom apart unless the hen is sitting, and the attachment they show for each other is marked. Where one goes, the other follows. And yet, when the breeding time draws near, the male goes through a little courtship display very similar to that noted with the crimson finches. As the two birds sit close together, the male twitters his little song; it is so low that one hardly hears the note, but just occasionally slightly louder notes ("sii siiat sii") can be detected. One can see that he is singing because his throat feathers are raised and are vibrating. A feather or little rootlet is an accessory to the up-and-down movement of the "dance" which is preliminary to the gentle caressing with the bill over the female's ear and head.

In recent publications it has been shown that in the Sudan many of the nests have been in close association with wasps' nests. One writer went on to ask: "Did the bird choose a site near a wasps' nest or did the wasps come and build after the finches had made their nest?" A little observation and a little thought would have shown that undoubtedly the birds built after the wasps did, because a wasps' nest takes months to construct and reach a stage when even two or three cells are complete, and the birds' nest takes but two weeks to build. In Kenya we do occasionally find the nest alongside a wasps' nest, but in the Ngong area this is quite the exception. I have located dozens of nests and only one has been near a wasps' nest. To be so placed is no doubt an advantage, but a wasps' nest is not a necessary requisite to a site.

There are other means of protecting the nest, thorns, for example, and 95 per cent of the nests, here at Ngong and in the surrounding country, have been in thorny trees; the rest have been in bamboo clump, a creeper, and a small bush.

The nest is a small, loosely interlaced domed nest made of fine grass with a side entrance an inch above the level of the floor of the chamber. The bowl of the nest is lined with fine grass and a few grass heads may project over the entrance in the form of a roughly constructed short tube, but this is not usual. The actual protection for the frail nest has been the surrounding thorns. A small acacia tree, a *Gymnosporia*, or a *Rhus* is selected, and the nest is placed well within the tree. Two nests in a bamboo clump





CRIMSON-CHEEKED BLUE WAXBILL

Male on guard at nest while female is away

were made entirely of fine grass rootlets. I have noticed that the more frail or thin the interlacing of the dome the greater the protection by thorny twigs, indicating that the birds realize the value of thorns. A few feathers may be added to the lining.

The small eggs, which average  $15 \times 10$  mm., are pure white in color and immaculate, thin-shelled and smooth in texture. Four or five are usually laid, sometimes only three. Both parents share in incubating, but the female does the major part. Both birds are in the nest at night until the young are hatched. Incubation lasts eleven days, during which time the hen sits close and won't vacate until one is very close or the tree is touched. While sitting, the female is often fed by her mate, but she has her spell off duty of an early morning, perhaps twice later on, and certainly toward late afternoon, when the birds seek water. At the nests I have studied, the male was the bolder bird and the more frequent in visits with food.

The food is brought in the crop and the first supply is regurgitated into the bill just before entering the nest. The bird stands on a twig near by, stretches its neck, and works the food downward in an S motion. The small grass seeds are partly softened and agglutinated, and as the food is forced up into the mouth a small portion is pushed to the end of the bill. The bird then enters the nest. Two or three more regurgitations may suffice to exhaust the supply. The entrance to the nest is small, so that when both birds come to the nest tree at the same time, one waits on a twig alongside the nest until the first has finished feeding the chicks. Feeding times are well spaced, but when the youngsters are half grown the morning feed works out at once in every fifteen minutes for both birds. There is usually a break at about noon, and the afternoon feeding is regular from about 3 o'clock to 6:30. I have seen no evidence of removal of excreta, and most nests hold dry droppings.

These waxbills are very much less excitable at the nest than other species; there is no excessive tail or head movement. The parents showed some anxiety when a prying boy came toward the hide to have a look at it. Both birds uttered a sharp "seat si siseat sii."

The exact nestling period is difficult to calculate; my shortest record is sixteen days, but I also have one of nineteen days. Bad weather often delays exit. On the other hand, I have known chicks to vacate the nest and then have found them in it that same evening and the next morning very early. Apparently they use it as a roost for a while. Youngsters feather up fast and fairly evenly, but in a large brood one may lag behind the others. I have sometimes examined the crops of the young after a full day's feeding. One can see the little seeds through the thin skin over the crop. All crops seemed filled to the same capacity, indicating that the parents distributed the food fairly.

Going to roost of a night, the birds sit side by side on a twig under deep shelter, and they often bill and preen each other, twittering the while; then, snuggling close, they fall off to sleep.

The main breeding season for the Ngong district is from March to July. I have found very few nests in the short season. One occasionally finds that the pin-tailed whydah has laid one or two eggs in the nest of this waxbill, but they can be distinguished by their larger size.

Essentially seed-eaters, yet occasionally taking small moth larvae, these birds can't resist the flying termites, and I have sometimes seen them flying upward to take the termites on the wing. They are not experts at the job.

### PIN-TAILED or PIED WHYDAH

*Vidua macroura* Pallas

We once described the pied whydah as a clown—an apt description, for when an amorous male displays before a hen his antics border on the extravagant and grotesque.

The species is most in evidence when the males are in breeding plumage and small flocks of two or three males and a dozen or more apparent females come about our dwellings and frequent the villages.

The males in female-like eclipse plumage are slightly larger than the hens and have red bills. The back striping is bolder, the wings and tail are blacker, and the under side is whiter. The smaller female, besides being less boldly striped, is buffy-white below and the tip of her bill is dark (the bill becoming blackish or horn-brown at breeding time); the wings and tail are brownish-tinged, especially at the edges of the feathers.

The species is widespread through Africa, but here we shall deal with the bird in and around Nairobi. In an average season, mixed flocks which have been frequenting our gardens and native huts will tend to thin out just about March. The majority of the birds will have disappeared. One or two males will have assumed the full breeding dress in February. Whether or not these parasitic birds will remain depends on the presence of waxbills and other small finches in or around the immediate vicinity.

Probably long before the flock has split up there will have been some evidence of approaching sexual activity; males will have displayed, jumping up and with rapid wing beats hovering for a few moments, then dropping among the feeding flock again. This display will be maintained, developed and exaggerated by the remaining cocks. While the few hens are quietly feeding on the ground a male jumps up and hovers in front of a hen, his tail "plumes" waving and bending as he rises and falls. The hen makes off and flies to a bush or small tree, the male pursuing her. He starts



PIN-TAILED or PIED WHYDAH

Male perched on twig

hovering again, and as he moves from side to side in the air the hen crouches and watches him with moving head and clicking bill. This is a preliminary to a further split in the small flock; if two males have remained, one will go off with two or three hens to some other area. The remaining cock increases the frequency of his display and then one may see the mating taking place. But the hen does not accept the male readily, and he redoubles his antics. As he hovers, the body is held upright, the head just a little forward and the tail well down, so that with each jerky movement the long tail feathers move in a series of waves and curves.

These birds are polygamous. I have had a male and three females under close observation in my sanctuary. The male has displayed before all three hens, and I have seen him mating with all of them. Moreover, when I have known that a female has gone to the nest of an *Estrilda* to lay, the male has mated with one of the remaining hens. Here is further proof of polygamy. A male and two hens frequented a strip of grassland near the forest. I noted that they ranged over two acres in one direction and an acre to the south around the corner of the forest.

I found four *Estrilda* nests with a *Vidua* egg apiece, two *Vidua* eggs in a *Spermestes* nest, one in a crimson finch's nest and one in a gray-headed wax-bill's nest (*Coccygia*)—eight eggs in all, of two types, and they were not laid by one hen *Vidua*.

The hens seek out the nests of waxbills for preference, but they also make use of the nests of fire-finches, crimson-cheeked waxbills, *Spermestes*, and serine finches (*Polioptila*) to my certain knowledge. When the females are ready to lay, they go to these nests and lay one or two eggs in each. I have seen the male accompanying the hen to two known *Estrilda* nests. Quite often, in the vlei land, I have seen a male fly from a bush and drop to a certain patch of grass, then leave with a hen. That patch has held an *Estrilda* nest. I have located waxbills' nests by watching the movements of the hen and cock pintail.

The eggs of the pintail are pure white, with just a tinge of creamy color due to the color of the yolk; they average 15–16 × 12 mm. One, two, or rarely three eggs may be laid in the foster parents' nest. It depends on the number of nests available, and I doubt if each whydah lays more than four or five eggs. No attempt is made to destroy the eggs of the foster bird, nor does the nestling *Vidua* eject any of the rightful chicks; it is brought up as one of the family by the foster parents.

The young whydah in first plumage is totally unlike either male or female parent. It is uniform brown above, slightly rusty-colored on the margins of the coverts and secondaries, and pale buffy below, slightly whiter on the throat; it has a blackish mark in front of the eye, and the bill and feet are brown. It is, of course, larger than the other chicks in the nest, but the foster parents attend it as carefully as they do their own youngsters.

At what stage does the young whydah, so unlike its foster brothers, seek its own kind? How does it recognize them when it has only been used to the plumage of the foster parent?

### STEELY-BLUE PIN-TAILED WHYDAH

*Vidua hypocherina* Verr.

I include a brief reference to this pintail whydah mainly because we know very little regarding its breeding economy.

The species is nowhere common. Its habitat is the scrub and thornbush of the dry areas of Kenya from the coast to Masai-land, Ukamba and the Northern Frontier to Turkana and the lower Kavirondo country. Just one or two males may accompany a dozen or more females or subadult males. One puts them up from areas of short seeding grass, when they will fly a short distance and perch; one may see them at a temporary water pan associated with other finches when they come to drink of a late afternoon.

Nothing is known regarding their nesting, except that I have seen the female at the nest of the bronze-headed mannikin. This suggests that the species is parasitic, as is the pied whydah, but proof positive is still lacking.



STEELY-BLUE PIN-TAILED WHYDAH

Male perched on twig

At Kisumu, where a male and a few females frequented my garden, the male was seen to display before the hens in much the same way as the pied whydah, though not so elaborately. His favorite stance was on a euphorbia hedge. The birds were around the compound for a full three months and I am certain that the females were making use of *Spermestes* and *Uraeginthus* nests, which were numerous in the small trees around.

### KENYA CANARY or BRIMSTONE SERINE

*Serinus sulphuratus sharpii* Neumn.

During my first two years of residence at Ngong, I searched likely places for the nests of these birds and watched their movements carefully, but to no avail. The birds came in small flocks to feed in the seeds of *Aspilia* during the dry months; they remained a short time and disappeared when the rains came. Apparently there was no reason why they should not nest here; food was plentiful and nesting sites were available. I had found several nests a couple of miles off in the bush country and along the forest margins and even in coffee trees. These birds have a bad reputation among nurserymen and market gardeners, who allege that the birds destroy seedlings and the buds of sprouting peas. True, when the birds were with me, they helped themselves to the seeds of zinnias, sunflowers, composites and labiates, but not to excess, so I was anxious to see what food they gave to their young when there was greater necessity for foraging.

Their song is not comparable to that of a domesticated canary, but it is still a song. It runs thus: "poi chee, chiri chee, kui kui tschiru sisisiiiiii, . . . chiruchiru . . . chiru-sit." They commenced to sing just at the time they left my area, when the grass rains started. I was thrilled to hear a bird perched on top of a tall bush singing early one morning when I thought they had all gone. As I approached, the hen with a rootlet in her bill flew to a small *Rhus* tree. The male greeted her with a fresh burst of song.

I watched from a clump of bush for two hours and saw the hen come several times with more material to the top of a slender upright branch. The bringing of material ceased toward noon and I saw both birds feeding on *Aspilia*.

The nest was completed in just over a week. It was in a little triple, terminal fork at fifteen feet, well covered by foliage. The hen was sitting a day or two later, so I looked into the nest. It was a deep little cup, with the base made of rootlets and labiate (*Ocimum*) flower stems. Fine wavy rootlets formed the bowl, with an inner lining of felted composite flowers and asclepiad down, mixed with the soft silvery-gray shoots of *Gnaphalium* and *Helichrysum*. There was a fair proportion of spider web mixed in the construction; it was particularly plentiful around the rim and where the sides

of the nest were worked around the supports. The cup was about 55 mm. deep and 60 mm. from rim to rim.

Three eggs were laid over a period of four days, and then the hen commenced to incubate closely. The eggs are bluish in ground-color with sparse, rather large spots and scroll marks in dark brown, mostly toward the larger end. The average size of the eggs was  $20 \times 14$  mm.

The first egg was chipping on the thirteenth day, and the chicks were all out and the eggshells removed by the fourteenth. The hen had to be pushed off the nest for the inspection, but she only went to the next spray and returned to the nest as I left. Her only sign of anxiety was a long-drawn "see-it," to which the male at once responded, and both perched on the spray together.

As the nest was high, I used my tall adjustable double-ladder hide. The serine brooded for a while; then she commenced to preen and finally dozed. She came to the alert as the male alighted in a near-by tree and called. The hen replied and her mate came to the nest. She greeted him with quivering wings and open bill. He regurgitated and fed her with small portions. As she received each little bit, she raised herself a little and fed the chicks beneath her. When the meal was over, she got up, stretched, and stood on the side of the nest opposite to her mate. Both birds were by the nest for about five minutes; then the male flew off and the hen stepped back into the nest, settled down on the chicks, and dozed. She started up wide awake as a shrike called from the near-by bushes, and she remained alert until the shrike moved well away.

The male was away for nearly an hour, but during that time the hen regurgitated a little food and fed the youngsters. When the male arrived, his mate slipped off the nest and perched on a tree near by, from where she watched him feeding the young. It took quite a time, for only small portions were regurgitated at a time and each chick was given a little. All the food was whitish and soft—the kernels of *Aspilia* and sunflower. No whole seed was noted. The feeding was very deliberate and gentle; there was no violent movement in getting the food up. The placing of it in the chick's mouth was also gentle, and the next youngster was not fed until the parent saw the chick swallow. The female had behaved like a new-fledged youngster when she was given food.

During the whole of that day, the male did all the foraging. I could always tell when he was somewhere near, by the alert expression and attitude of the brooding hen, and as he came she quivered her wings, and called a low "suii suiii."

I noted that shortly after the chicks had been fed, the mother bent down and picked up excreta, which she swallowed. Later on, excreta was removed; later still, the chicks evacuated over the side of the nest.





KENYA CANARY or BRIMSTONE SERINE  
Male regurgitating food for brooding female

Up to the first four days the youngsters showed little sign of quilling. They were pinky-brown and naked except for long tufts of down on the head and dorsal surface. Quills appeared quickly during the next few days. On the sixth day those of the head, dorsum, and wings showed signs of bursting at the tip, and from then onward feathering was rapid. The youngsters spent the time between feeds in removing the dry sheaths, which they ate, and in sleeping. On the tenth day they about filled the nest. They were now greenish on the back and streaked. The mother had long ceased to brood except for very short spells early in the morning, but she sat by the nest and sheltered the youngsters from the sun at noon.

Feeding rates increased, and the visits of the sexes became irregular; that is, they didn't always come together, and one turned up as soon as sufficient food had been collected. They emptied their crops much more rapidly now.

I was in the hide on the morning of the fourteenth day from hatching. The youngsters now more than filled the nest. They were all very busy preening and stretching and pushing each other about. One youngster had

to preen while perched on the nest edge. When the parents came with food they had to feed the chicks from the twigs around by stretching forward and downward.

On the afternoon of the fifteenth day they vacated, and I found them in the leafy branches below the nest. I saw them with their parents in the *Aspilia* bushes for about two weeks. They were remarkably tame and allowed me to come up to within a yard of them.

This was a beginning to the nesting of the brimstone canary in my sanctuary; since then, two pairs have nested regularly during the long season, for the past four years. No nests have been seen during the short season.

### STREAKY SERINE FINCH

*Polioptila striolata affinis* Richm.

(*Polioptila striolata striolata* of Sclater)

This finch can be found almost anywhere in the Kenya Highlands, except in thick evergreen forest, up to 10,000 feet in the bush zones. There are various racial forms in East Africa, but the habits of all are the same. The bird is most common in the bush country where woody herbs predominate and where small trees are grouped on little mounds; but it also occurs in woodland, and nowadays it has become common in our gardens, much to the regret of the gardeners. The bird is a seed-eater, true enough, but it also eats insects and berries. It undoubtedly does damage to seedlings, growing peas, and such like, but it also does a deal of good in keeping down garden pests such as moth larvae and small beetles, and it takes its share of termites; it also takes aphids, a real garden pest.

These finches breed in both the long and short seasons; we find, as a rule, two broods during the months from March to August and at least one in the later season.

The nests are usually situated in low bushes, small trees, and creepers, well shaded by leafage and usually only three or four feet above ground level. The site is either an upright fork or an inclined branch with secondary upright shoots. The nest is a deep cup, made of twiglets, rootlets, and fine grass, with moss and bark fiber worked into the frame. The inner lining is either vegetable down or down mixed with hairs, very fine rootlets, and possibly a few feathers. The nests on my plot are largely constructed of the dry flower stalks of a labiate in which the very small stalks of the flower whorl persist. When these are laid down and bent into position they lock, and a compact frame results. The nest is then thickened up with grass fiber and has a final lining of down and feathers. The nest is snug and deep, measuring 55 mm. in width and 40 mm. in depth. When the bird sits low, only her bill and tail are above the rim.



## STREAKY SERINE FINCH

Female perched on rim of nest containing young

The number of eggs varies from three to five and very rarely six. The ground-color is a very pale bluish-white to white, with sparse dots, spots, and scroll marks, mostly toward the large end. Sometimes these marks are in a zone or tonsure. Often one sees an egg rather less pointed than usual, with the marks at the pointed end instead of the large end. The eggs vary very considerably in size: 15-18 × 15-21 mm. Incubation lasts about twelve days. The sitting hen is often fed by her mate.

These birds are confiding at all times. They give away the whereabouts of the nest by calling from a bush top quite close to it. The note is a long-drawn "steec-it." One can watch them as they build, by standing just a little way off; they will come and go freely. They are unafraid at the nest and when a hen is sitting one may often pull the branch down a little or open up the foliage very slowly and she will sit tight.

The parents are very attentive. Most of the food is regurgitated and then fed to the chicks, but some, such as small larvae, is brought in the bill.

These young serines are very susceptible to heat-stroke. Should a nest be exposed to the direct rays of the sun, the parents stand at the edge of the nest shading the youngster with body and partly opened wings. When the young are very small, the mother shades them by brooding in a standing position. The nestling period varies, partly governed by weather conditions. The average time is between fourteen and fifteen days, but I have two records at separate nests of sixteen and seventeen days, during cold and wet weather. I have another record of seventeen days, when for three nights we had frost and many youngsters died in the nest. The heat from the parents was insufficient to keep the chicks warm.

These finches have no very attractive song; I have never heard more than "see-rit, see-rit serit siiii."

These unfortunate birds suffer considerably from depredation by shrikes, tree-rats, mongooses, genets, snakes, and lark-heeled cuckoos. The mortality rate is so high that I have no evidence of increase of numbers in my sanctuary, though the food potential is capable of catering for many more pairs.

#### KENYA BLACK-FACED SISKIN or CITRIL

*Spinus citrinelloides kikuyuensis* Neumn.

These siskins are common in the bush country of the Highlands, especially where the common yellow-flowering *Aspilia* is plentiful and where the common wild yellow cosmos brightens up the veldt in scrub country. These two plants supply their favorite food. During the off-season one notes them in little flocks, a dozen to twenty birds, as they feed on the dry flowers of *Aspilia*; or one may see them in a patch of cosmos. The birds will be on the ground taking fallen seeds or extracting them from the ripe heads which have bent over. They exhibit remarkable skill in extracting the kernels. Taking a seed in the bill, they pass it rapidly from side to side. The husk splits and drops. If they are disturbed they get up with a twitter and a whirl of wings, but they won't go far. Some will perch in a bush; others will drop down to another patch of cosmos.

The flocks split up as the rainy season approaches, and pairs look around for nesting sites. The few pairs that nest in my area show a partiality for given places, and I can count on finding their nests in certain spots. The small cup nests are built toward the end of some upright branch of a *Rhus* tree at ten feet or over. They are typical serine nests, built of fine grass rootlets with a lining of down, the margins of the nests bound with cobweb. The deep little cup is some 45 mm. across and 35 mm. deep. Both birds build the nest, but the female does most of the work. The male sits on the treetop and greets the arrival of his mate with a cheerful "tweet ti tu."



KENYA BLACK-FACED SISKIN or CITRIL

Female at nest

Two or three eggs form a clutch. They are rather small and elongate, measuring  $17 \times 12$  mm., and are very pale blue in ground-color, with sparse spots of irregular shape in dark brown, mostly at the larger end. Incubation is carried out almost entirely by the female, who sits for twelve or thirteen days. The first few days she leaves the nest readily; then she sits very close and is off the nest only for very short spells. The male frequently visits her with food. She welcomes his arrival with quivering wings and takes the food as would a nestling, a small portion at a time.

Later, when the chicks have hatched, she still sits close for the first three days, and the male has to cater not only for his mate but the youngsters also. On most occasions the female fed the chicks, but there were times when she left the nest and the male not only took over feeding duties but brooding also, until she returned.

At one nest I erected a hide. The male bird was very timid and seldom came to the nest, but the female hardly took any notice of the hide. Feeding times were very much spaced when the chicks were small, but the time

spent by each parent at the nest was often as much as five minutes. The feeding was done by a series of regurgitations, and from each mouthful each youngster was given a small portion. The food given was small whitish semi-soft *Aspilia* kernels.

The young at three days old were small and pinkish-brown, with longish tufts of down on the head, on the middle of the back, at the base of the wings, and around the pelvic region. Feather quills commenced to show about the fourth or fifth day and they grew so rapidly that after a week the head and back began to show a definite greenish feather pattern.

The amount of food they now required was much greater, so visits to the nest became more frequent, although the male was still timid. Both birds gave a little "seepsiip" just before coming to the nest and just before leaving. The number of times the hen had to regurgitate food at one visit varied between six and eight. At ten days the three chicks filled the nest, and when the hen wished to shelter them from the sun she stood on the side of the nest, fluffed her breast feathers out, lowered her body, and partly opened her wings.

I was in the hide early on the morning of the fifteenth day after the chicks hatched. They had been given a full meal. All three chicks preened themselves vigorously, and two perched on the nest edge to stretch wings and legs. Presently both parents came into the nest tree but remained in the lower branches. They called, and the youngsters stirred. One chick presently fluttered to near-by twigs. He almost lost his balance but he clung on and by the help of his wings righted himself. The parents were excited and redoubled their calls, and this chick hopped from twig to twig until he about reached his mother. She came forward and gave him a little food. The second chick soon followed and fluttered to where the mother perched, calling. He was fed, and still the third chick hesitated. The mother came to the nest and fussed, and eventually the timid one hopped to the nest edge and fluttered down. He sat huddled on a branch by himself and the father came and fed him. Then, by dint of persuasive calls and flitting from branch to branch, the parents at last got all three youngsters together on one branch. They sat huddled together and the parents fed them, one from each side.

I saw them all in the bush each day for a week after that and then failed to trace any of the youngsters. The parents nested again about a month later.

Most of the pairs in my sanctuary nest twice in a long season, but I have failed to note any nesting activity at the end of the year.

## GOLDEN-BREASTED BUNTING

*Emberiza flaviventris* Steph.

The golden-breasted bunting, once an inhabitant of bush and scrub, stunted trees in rocky valleys and dongas, park and orchard savannah country only, has now become closely associated with many a garden in the suburbs around Nairobi. By its fearless and friendly disposition and attractive color it has endeared itself to many.

More often than not one sees these buntings on the ground, moving with quick, restless steps this way and that and stopping now and then to pick up a seed, a caterpillar, or a little beetle, or perhaps tugging at a bit of grass to get at something hidden within. If one goes toward them they move just a little quicker or side step out of the way; they won't fly up unless pressed. Should they fly, it will be to a near-by bush, but they are down on the ground again in a few seconds. They utter no sound as they hunt, but when one puts them up they protest with a little "chee-uuu." When they fly from one spot to another, the flight is undulating—a few wing beats and a slight ascent, a short downward glide, more wing beats, a glide, and so up to the perch.

The birds are always in pairs, and long association with them leads me to believe that it is a life-long partnership. They nest in both the long and the short season. There is no elaborate courting display by an already associated pair. There is some rivalry when a stray male puts in an appearance about the time nesting begins, but I have not seen any serious conflict.

For many years now, three pairs have nested regularly in my sanctuary, each in its own sphere, and they don't squabble over "territory," probably because their areas are not contiguous. Most pairs have been successful in raising broods, and though the offspring may be about for a month or two, they disappear. I don't know where they go, for the number of nesting pairs has never been more than four in my restricted area.

In January of one year, a stray male turned up, followed by two more adults. They fed about the lawns and were not interfered with by the resident pairs. At the end of February and the beginning of March, when the males were in beautiful plumage, they began calling. I wandered down a little path and located two males perched on small trees, calling loudly. One was quivering his wings and expanding his tail so that the white tips showed clearly. He raised his crest feathers and frequently fluffed out his yellow breast feathers. A hen was feeding on the ground between the two. The less expressive male flew to the ground beside the hen, but the other flew down with an expressive "pii-chee-uuu" and drove him away. This second male then picked up a grass stem and passed it rapidly across his



#### GOLDEN-BREADED BUNTING

Both parents at nest; female has just arrived with grasshopper

bill several times, raising his crest the while. He dropped the grass and approached the hen with quivering wings, but she flew a yard or two and continued to look for food. The male flew to a bush and called "pii-cheeuuu." Then followed notes I have seldom heard: "cheee, set, teri-sita-sita," oft repeated and ending in a long "pii-cheeeuu." He rejoined the hen on the ground, hunted around, and found a moth larva. He ran toward the hen and offered it to her. As she took it, the other male flew in and the two males fluttered together for a few seconds. Then the intruder retired.

The two birds hunted over the ground, and whenever the male found a grub he brought it over to the hen. He eventually found a large noctuid caterpillar. He beat it several times and passed it between the bill until it was flaccid, but instead of giving it to the hen straight away, he flew with it to the top of a *Rhus* tree and called loudly and quivered his wings. The hen flew to the tree, perched beside him, and commenced to quiver her wings.



Then she took the larva and bent down to accept the male. It was a full week before I saw the birds searching the ground for little twisty grass rootlets and I followed their line of flight to a little *Rhus* tree about five feet high. Here I saw the foundations of a nest.

By the first week of April, four pairs had built their nests. The nests are all of a type, but there may be some difference in the material used. Most are built of fine grass rootlets, some mostly of grass stems—whatever material is available. I once supplied a pair with quantities of coir from an old mat, and the whole nest was built of that material. The nest is a shallow cup built on a small foundation between upright twigs on a horizontal branch, or in a multiple upright fork, or in a creeper. It is seldom high, usually only about four to five feet up. The interlacing of the rootlets is not close, and the lining is not very thick. One may sometimes see the eggs from below. The nests look frail, but in reality the rootlets hold together because of the natural wave and small lateral roots, and the whole structure is resilient. Some nests are well hidden by overhead and surrounding foliage; others are rather exposed but have top shade. Both birds take part in the construction.

The eggs are of the usual bunting type: almost white in ground-color with just a few dark marks and scrolls, mostly at the large end. They measure 18–21 × 14–15 mm.; some are longish, some more rounded. Three are the usual clutch, but sometimes in a second brood only two may be laid. Four eggs are rarely recorded. Both parents share in the incubation, but the female does the major share. She sits close and is very tame. She often has to be put off so that the eggs can be viewed. Incubation lasts twelve days. The newly hatched chick is pinky-brown and naked except for long grayish tufts of down on the head, on the base of the wings, and on the dorsum and thighs. The gape is yellow and the mouth pink.

The hen broods for the first two or three days almost continuously. She is then fed by the male, but much of this food is passed on to the youngsters. The male takes his share of the brooding when the hen is off for short spells. There is no difficulty in watching the birds because they are so tame at the nest.

Fully 95 per cent of the food supplied to the young is insects either in the larval or the imago form. Among others I have noted noctuid larvae, small saturniid larvae, nymphal long-horn grasshoppers, crickets, mantids, termites, and a few Diptera.

I once saw a bunting capture a large full-grown sphingid larva, almost three inches long. He beat it on a stone until it was soft and pulpy; in fact, most of its "innards" had been knocked out of it. It was too big to swallow, but he made attempts to do so. While he was engaged in more beating, his

mate flew down and seized an end. They tugged in different directions until the larva broke in two. Each tried to swallow an end. The hen had the tail half and after much struggling got it down. The male had the head end and the hard, chitinous head was far too big, so he clawed it out with a foot, separated head from body, and managed to swallow the rest.

On another occasion when a bunting had a large caterpillar and was bashing it, a fiscal shrike flew down and stole it. This reminds me of another instance of intimidation. Two buntings were busy building a nest in an *Olinea* tree. It was almost ready for lining when a pair of yellow-vented bulbuls arrived and took possession. The buntings meekly gave it up after a feeble protest. They started another nest in a sapling olive not ten yards away and had it finished in record time. The female laid her first egg in four days.

I have invariably found the male to be the bolder bird when the nest has held young—so much so that I have induced him to perch on the edge of a cigarette box placed by the nest and later on to take small larvae from my fingers and pass them on to the chicks. A brooding hen will take food from one's fingers.

It is only when the youngsters are well feathered that I have seen the parent regurgitating food. This was done by a pair which came to the dog's dish and took soft maize meal; when this was given to the young, some was undoubtedly regurgitated.

The young are ready to leave the nest between the sixteenth and seventeenth day after hatching. They remain with the parents quite a long time and I have noted more than once that the young of a first brood may still be about with the male when the hen is sitting on a new clutch of eggs.

I have often found that a third or fourth egg in a nest is infertile. One female of a pair that nests by my house invariably lays three eggs, one of which fails to produce a chick.

In spite of three broods per year in good seasons, the bunting population of my small holding increases but slowly; there are now five pairs. The mortality rate is high both in the egg and in the young stages.

## INDEX

- Accipiter rufiventris*, 86  
*Alopochen aegyptiacus*, 24  
*Alseonax aquaticus infulatus*, 265  
*Alseonax minimus interpositus*, 262  
*Alseonax minimus minimus*, 262  
*Anaplectes melanotis*, 459  
*Anhinga rufa rufa*, 21  
*Anthreptes collaris ugandae*, 449  
*Anthus richardi lacuum*, 236  
*Apalis cinerea cinerea*, 326  
*Apalis flavida flavocincta*, 331  
*Apalis pulchra*, 328  
*Aplopelia larvata larvata*, 151  
*Aquila rapax rapax*, 69  
*Astur tachiro nyanzae*, 88  
*Astur tachiro sparsimfasciatus*, 88
- barbet, gray-breasted tinker, 216  
 barbet, pied, 209  
 barbet, red-fronted spotted, 212  
*Batis molitor puella*, 276  
 bee-eater, cinnamon-breasted, 187  
 bee-eater, red-throated, 193  
 bee-eater, white-fronted, 193  
*Bradornis g. griseus*, 267  
*Bradornis microhyncha ukamba*, 267  
 bulbul, white-throated forest, 251  
 bulbul, yellow-breasted forest, 255  
 bulbul, yellow-moustached olive, 259  
 bulbul, yellow-vented, 248  
 bunting, golden-breasted, 513  
*Buphagus erythrorhynchus caffer*, 426  
*Burhinus capensis capensis*, 127  
*Burhinus vermiculatus vermiculatus*, 129  
*Bufo rufofuscus augur*, 78  
*Butorides striatus atricapillus*, 22  
 buzzard, red-tailed, 78
- Calamocetor nilotica*, 324  
*Calamornis nilotica*, 324  
*Camaroptera brevicaudata abessinica*, 350  
*Camaroptera brevicaudata aschani*, 350  
*Campephaga flava*, 380  
 canary, Kenya, 505  
*Caprimulgus clarus*, 202  
*Caprimulgus fossii*, 201  
*Caprimulgus fossii clarus*, 202  
*Caprimulgus rufigena frenatus*, 201  
*Centropus superciliosus intermedius*, 161  
*Ceryle rudis rudis*, 176  
*Chalcomitra amethystina doggetti*, 444  
*Chalcomitra senegalensis*, 447  
*Charadrius venustus*, 122
- chat, African stone, 296  
 chat, ant, 294  
 chat, Kenya red-tailed bush, 320  
 chat, red-tailed white-winged bush, 317  
 chat, Rift Valley pied, 292  
 chat, Uganda black, 294  
*Chlorocichla flaviventris meruensis*, 255  
*Chloropeta natalensis massaica*, 273  
*Chrysococcyx cupreus*, 156  
*Cichladusa guttata guttata*, 311  
*Cinnyris venustus falkensteini*, 441  
*Circaetus cinereus*, 76  
*Cisticola brachyptera katonae*, 368  
*Cisticola cantans pictipennis*, 356  
*Cisticola erythrops sylvia*, 359  
*Cisticola galactotes nyansae*, 362  
*Cisticola hunteri primioides*, 353  
*Cisticola robusta ambigua*, 365  
 citril, Kenya black-faced, 510  
*Coccyzygia melanotis kilimensis*, 489  
*Colius striatus kikuyensis*, 203  
*Coliuspasser ardens suahelica*, 466  
*Coliuspasser laticauda suahelica*, 466  
 coly, Kenya white-cheeked, 203  
 coot, African knob-billed, 120  
*Coracias caudatus caudatus*, 174  
*Corvus albus*, 418  
*Corythornis cristata cristata*, 177  
*Cosmopsarus regius regius*, 421  
*Cossypha caffra iolema*, 307  
*Cossypha*, gray-bellied, 307  
*Cossypha heuglini heuglini*, 299  
*Cossypha semirufa intercedens*, 303  
*Cossypha*, Uganda white-browed, 299  
*Cossypha*, Ukamba white-browed, 303  
*Coturnix delegorguei*, 117  
 coucal, hackle-necked, 161  
 coucal, white-browed, 161  
 crow, pied, 418  
 cuckoo, red-breasted, 153  
 cuckoo, white-breasted emerald, 159  
 cuckoo, yellow-breasted emerald, 156  
 cuckoo-shrike, green-black, 380  
*Cuculus solitarius*, 153
- darter, African, 21  
*Dioptornis fischeri*, 269  
 dikkop, 127  
 dikkop, water, 129  
 dove, bronze-necked, forest, 151  
 dove, emerald-spotted ground, 148  
 dove, emerald-spotted wood, 148  
 dove, gray-vented ring, 136

- dove, Kenya dusky turtle, 131  
 dove, lemon, 151  
 dove, long-tailed ground, 142  
 dove, namaqua, 142  
 dove, red-eyed, 136  
 dove, speckle-necked laughing, 141  
 dove, tambourine, 144  
 dove, white-breasted forest, 144  
 dove, white-vented ring, 140  
*Drepanoplectes jacksoni*, 470  
*Dryoscopus cubla hamatus*, 397
- eagle, brown harrier, 76  
 eagle, tawny, 69  
*Elanus caeruleus*, 61  
*Emberiza flaviventris*, 513  
*Eminia lepida hypochlorus*, 335  
*Eremomela griseoflavus abdominalis*, 348  
*Eremopterix leucopareia*, 230  
*Erythrogygia hartlaubi*, 320  
*Erythrogygia hartlaubi keniensis*, 320  
*Erythrogygia leucoptera*, 317  
*Estrilda astrild massaica*, 491  
*Estrilda subflava clarkei*, 495  
*Eudice cantans tavetensis*, 478  
*Euplectes capensis xanthomelas*, 464
- finch, black-vented crimson, 482  
 finch, cardinal weaver, 461  
 finch, crimson fire, 485  
 finch, Kenya partridge, 479  
 finch, singing silver-bill, 478  
 finch, streaky serine, 508  
 finch-lark, rufous-crowned, 230  
 fiscal, common, 384  
 fiscal, greater long-tailed pied, 389  
 flycatcher, golden-breasted, 273  
 flycatcher, Highland wattle-eyed, 280  
 flycatcher, Kenya dusky, 262  
 flycatcher, Kenya paradise, 283  
 flycatcher, Kenya puff-backed, 276  
 flycatcher, Ukamba gray, 267  
 flycatcher, white-eyed slaty, 269  
 flycatcher, white-throated swamp, 265  
 francolin, Kenya scaly, 114  
 francolin, Ukamba gray-winged, 112  
*Francolinus africanus uluensis*, 112  
*Francolinus squamatus maranensis*, 114  
*Fulica cristata*, 120
- geelgat, brown-capped, 248  
*Glaucidium perlatum*, 200  
 goose, Egyptian, 24  
 goshawk, East African, 88  
 goshawk, gabar, 105
- Hagedashia hagedash*, 24  
*Halcyon albiventris orientalis*, 182  
*Halcyon leucocephala centralis*, 186  
*Halcyon leucocephala leucocephala*, 186  
 hawk, red-breasted sparrow, 86  
 heron, green-backed, 22
- honeyguides, 220  
 honeyguide, lesser, 220  
 hoopoe, Somali crested, 198  
*Hoplopterus armatus*, 125  
 hornbill, red-and-white-billed, 195  
 hornbill, von der Decken's, 195  
*Hyphanturgus ocularius suahelicus*, 455
- ibis, hadada, 24  
 ibis, sacred, 22  
*Indicator minor teitensis*, 220  
*Ispidina picta picta*, 181
- kingfisher, brown-bellied, 186  
 kingfisher, gray-headed, 186  
 kingfisher, malachite-crested, 177  
 kingfisher, pied, 176  
 kingfisher, violet-cheeked, 181  
 kingfisher, white-bellied, 182  
 kite, African yellow-billed black, 48  
 kite, black-shouldered, 61
- Lagonosticta rubricata hildebrandti*, 482  
*Lagonosticta senegala kikuyuensis*, 485  
*Lampromorpha klaasi*, 159  
*Laniarius ferrugineus ambiguus*, 393  
*Laniarius funebris*, 391  
*Lanius cabanisi*, 389  
*Lanius collaris humeralis*, 384  
 lark, Athi red-winged, 225  
 lark, Kavirondo flappet, 228  
 lark, red-capped, 233  
 lark, rufous-naped, 225  
 longclaw, orange-throated, 243  
 longclaw, red-throated, 244  
 longclaw, yellow-throated, 240  
*Lophoceros deckeni*, 195  
 lourie, Hartlaub's, 164  
*Lybius albicauda senex*, 209  
*Lybius senex*, 209
- Macronyx ameliae wintoni*, 244  
*Macronyx aurantiigula*, 243  
*Macronyx croceus croceus*, 240  
 mannikin, black-headed, 475  
 mannikin, bronze-headed, 473  
 martin, black saw-winged, 379  
 martin, Kenya banded sand, 373  
 martin, Kenya dusky sand, 377  
*Melierax gabar*, 105  
*Melittophagus bullockoides*, 193  
*Melittophagus lafresnayii oreobates*, 187  
*Mesobius goertae centralis*, 223  
*Mesobius goertae rhodeogaster*, 224  
*Milvus migrans parasitus*, 48  
*Mirafrja africana athis*, 225  
*Mirafrja fischeri kavirondensis*, 228  
*Motacilla aguimp vidua*, 234  
 mousebird, Kenya speckled, 203  
*Myrmecocichla nigra*, 294
- Necrosyrtes monachus pileatus*, 38  
*Nectarinia famosa aeneigularis*, 434

- Nectarinia kilimensis kilimensis*, 438  
*Neophron percnopterus*, 37  
 nightjar, rufous-necked, 201  
 nightjar, slender-tailed, 202  
 nightjar, square-tailed, 201  
 nightjars, 200  
  
*Oena capensis capensis*, 142  
*Oenanthe schalowi*, 292  
 oriole, black-headed, 411  
*Oriolus larvatus kikuyuensis*, 411  
*Oriolus monacha kikuyuensis*, 411  
*Ortygospiza atricollis mulleri*, 479  
*Othyphantes reichenowi reichenowi*, 451  
 owl, pearl-spotted, 200  
 oxpecker, red-billed, 426  
  
*Parus albiventris albiventris*, 407  
*Phyllastrephus fischeri placidus*, 251  
*Phyllolais pulchella*, 339  
 pipit, Kenya tawny, 236  
 plantain-eater, blue-crested, 164  
*Platysteira peltata jacksoni*, 280  
*Ploceus ocularius suahelicus*, 455  
*Ploceus reichenowi*, 451  
 plover, chestnut-banded, 122  
 plover, crowned, 123  
 plover, saddle-backed, 125  
 plover, spotted stone, 127  
 plover, streaky stone, 129  
*Pogoniulus bilineatus jacksoni*, 216  
*Poliospiza striolata affinis*, 508  
*Prinia mistacea immutabilis*, 369  
*Prinia subflava immutabilis*, 369  
*Psalidoprocne holomelaena massaica*, 379  
*Pseudogyps africanus*, 32  
*Pternistis leucoscepus infuscatus*, 116  
*Pycnonotus tricolor*, 248  
  
 quail, black-breasted, 117  
 quail, harlequin, 117  
*Quelea cardinalis*, 461  
  
*Riparia cincta suahelica*, 373  
*Riparia paludicola dohertyi*, 377  
 roller, lilac-breasted, 174  
  
*Sagittarius serpentarius*, 25  
*Saxicola torquata axillaris*, 296  
 secretary bird, 25  
 serine, brimstone, 505  
*Serinus sulphuratus sharpii*, 505  
 shrike, gray-black bush, 391  
 shrike, greater long-tailed pied, 389  
 shrike, greater red-winged bush, 406  
 shrike, lesser red-winged bush, 402  
 shrike, long-tailed pied, 384  
 shrike, pied bush, 393  
 shrike, puff-back forest, 397  
 siskin, Kenya black-faced, 510  
 snake-neck bird, 21  
*Spermestes cucullatus scutatus*, 473  
  
*Spermestes nigriceps nigriceps*, 475  
*Spinus citrinelloides kikuyuensis*, 510  
*Sporaeinthus subflava clarkei*, 495  
*Spreo superbus*, 423  
 spurfowl, orange-throated, 116  
 starling, golden-breasted slender, 421  
 starling, king glossy, 421  
 starling, superb glossy, 423  
*Stelgidocichla latirostris eugenia*, 259  
*Stephanibyx coronatus*, 123  
*Stigmatopelia senegalensis aequatorialis*, 141  
*Streptopelia capicola tropica*, 140  
*Streptopelia lugens funebrea*, 131  
*Streptopelia semitorquata semitorquata*, 136  
 sunbird, bronzy long-tailed, 438  
 sunbird, emerald long-tailed, 434  
 sunbird, Highland violet-throated black, 444  
 sunbird, Kenya yellow-breasted, 441  
 sunbird, scarlet-breasted black, 447  
 sunbird, yellow-breasted collared, 449  
*Sylvietta leucophrys leucophrys*, 344  
*Sylvietta whytii jacksoni*, 342  
  
*Tchagra australis*, 402  
*Tchagra senegala armena*, 406  
*Tchitrea viridis ferreti*, 283  
*Tephrocorys cinerea anderssoni*, 233  
*Threskiornis aethiopicus aethiopicus*, 22  
 thrush, Elgon olive, 288  
 thrush, orange-billed, 288  
 thrush, speckle-breasted scrub, 311  
 tick bird, 426  
 tinker-bird, Kenya golden-rumped, 216  
 tit, Highland white-bellied pied, 407  
*Torgos tracheliotes nubicus*, 35  
*Tricholaema diadematum massacium*, 212  
*Trigonoceps occipitalis*, 35  
*Turacus hartlaubi*, 164  
*Turdus olivaceus elgonensis*, 288  
*Turtur chalcospilos chalcospilos*, 148  
*Tympanistria tympanistria fraseri*, 144  
  
*Upupa epops somaliensis*, 198  
*Uraeginthus bengalus brunneigularis*, 497  
  
*Vidua hypocherina*, 503  
*Vidua macroura*, 501  
 vulture, Egyptian, 37  
 vulture, hooded, 38  
 vulture, lappet-faced, 35  
 vulture, tawny, 32  
 vulture, white-headed, 35  
 vulture, white-necked, 32  
  
 wagtail, African pied, 234  
 warbler, black-collared, 328  
 warbler, breast-spot, 331  
 warbler, brown-capped forest, 326  
 warbler, brown-headed bush, 356  
 warbler, buff-breasted acacia, 339  
 warbler, gray-backed forest, 326

- warbler, gray-capped swamp, 335  
warbler, greater streaky-backed grass, 365  
warbler, greater swamp, 324  
warbler, green-backed swamp, 335  
warbler, green-winged forest, 350  
warbler, lesser streaky-backed grass, 362  
warbler, long-clawed papyrus, 324  
warbler, morning, 311  
warbler, mottle-backed bush, 353  
warbler, rufous-faced bush, 359  
warbler, rufous-faced stumpy-tail, 342  
warbler, rufous-flanked forest, 328  
warbler, short-winged grass, 368  
warbler, tawny-flanked longtailed, 369  
warbler, white-browed, 369  
warbler, white-browed stumpy-tail, 344  
warbler, yellow-bellied gray, 348  
waxbill, crimson-cheeked blue, 497  
waxbill, gray-headed, 489  
waxbill, masai barred, 491  
waxbill, orange-bellied, 495  
waxbill, yellow-bellied, 489  
weaver bird, golden-crowned, 451  
weaver, Highland spectacled, 455  
weaver, masked red, 459  
whydah, Jackson's dancing, 470  
whydah, pied, 501  
whydah, pin-tailed, 401  
whydah, red-hooded, 466  
whydah, steely-blue pintail, 503  
whydah, yellow-rumped, 464  
woodpecker, golden-backed, 224  
woodpecker, Kenya gray, 224  
woodpecker, Uganda gray-breasted, 223  
zosterops, Kenya golden-fronted, 431  
*Zosterops kikuyuensis*, 431  
zosterops, pale-breasted, 428  
*Zosterops senegalensis fricki*, 428  
*Zosterops virens kikuyuensis*, 431





















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