



Field Notebooks - Gulls, 1952-1953 (1 of 3)

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HALCYON CHELICUTI

From December, 1985. Mostly Casamance
Some data from M Bower, Jan 74.

Habitat. Resident, but not stationary, at M Bower, 472, 507, 514, 522. In Casamance, M Bower; 461. Mixed "plateau" scrub, Casamance; 629, 630, 634, 640, 706, etc. Distribution is spotty, even in favorable habitats, several refs., 648, 652. Relatively low, 8-20 ft. up, more often than not; 458, many other refs. Not infrequent exceptions, high trees; many refs. Bare bushes and trees preferred; many refs.

Feeding. A pouncer, several refs., e.g. 672. Taking prey from leaf covered ground; 458, 462, 472. Probably feeding from low vegetation; 635. Taking insects; 458, (Cicada?), 656. Lots of head-shaking after pounces; 462. Battering occurs and can be conspicuous.

Intraspecific Relations. Doubtless sex is important in context. Territories of Larks and Streaks are overlapping; e.g. 641. Larks may "cruise" Streaks; 645. Reproductive cycles of the two species may be out of phase with one another; many refs. In any case, relations with Larks may well be difficult; 641. Sometimes there is no response to Lark songs; 645. In at least one case, Streak(s) sang after Lark songs and chase; 640. Streaks may be responsive to Lark R's; 645. They may, in fact, be (partial?) members of the Lark-Mal avoidance system; 635-640. Avoidance saves energy; 635.

Streaks seem to be discouraged by Blue-bellied Rollers; 676. They may compete with Red-billed Hornbills; 458.

ADDITIONS: Tolerated by Larks; 646. In some circumstances, Streaks

and dens may fail to interact; 680.

See also Song. Singing in response to den songs; 672

Intraspecific Social Arrangements. Sedentary, territories not large. Same; 672. Discussion (cluster pairs vs. group); 711-712. Arrangements generally reminiscent of dens; 635. Neighbors not usually far away from one another; 672. General comment young; 643. 2-1 groups; several refs; 645. Territories not always very small; 635.

One individual feeds another, silently; 642. No Begging; 643. Song phrases of different individuals of same species can be overlapping; 644.

General Comment Vocalizations. Species is generally quiet. Especially silent in flight; 629. Songs are rather infrequent; 666. See also Tables.

Singlets? Possible "Kuk" Notes ???; 642.

Warble or Twitter? Faint. With Flick-spreads as Greeting; 645.

Harsh Notes. Soft "Kaar"s in flight?; 635.

Songs. How descript; 641, 642, 644, 645, 662, 672, 680, 686, 687, 688, 689, 691, 693, 702, many other refs. Most of these are simple doublets. There also are Triplets; 645. Other descriptions; 631, 634, 640, 645. Generally rare; many refs; 672. Becoming more frequent as Hovea-

H. chelicuti

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comes to end. See Tables. Special postures apparently absent, 645, 703. But see also Sen and Mal and Fry. Intraspecific answers, 640. Intro Notes particularly conspicuous, 645.

Many references NCA. Not usually overlapping Sens, 631. But sometimes, on occasion, in response, 662.

See also Greetings.

Greetings. Can be elaborate, 634. Why should Greetings be elaborate in a species which is sedentary, with tight family "units or groups"?

Greetings do not always occur, e.g. 641, 644, 645. When they do occur, they are Flick-Spreads. Perhaps silent, 645. With Doublets, 634.

Flick-Spreads.

Hostile, 672. Silent (?) toward passerine, 672.

See Greetings. See songs (e.g. 634).

Head-bobs. Common, e.g. 629, 643. Usually U-D, 462, 472. Sometimes D-V, 461.

Orissa, Jan. 15-17, 1984
Provisional page numbering

①

Halcyon (Pelargopsis) amauroptera

Not as similar, in behavior, to capensis as might have been expected.
Very bright in appearance; 24.

Habitat. Mangrove; many refs. Probably ribbon strips. On both sides of creeks (at least small creeks); 23, etc.

Feeding. Characteristic look-down posture (presumably for prey); 22 (sketch), 25, 26. Shallow plunge in water; 22. According to H. N. Dey, pers. comm., takes small mudskippers, extracting them burrows of mud at low tide; 19. Feeding, as well as many other activities may be governed by tidal rhythm; 24. Activity may increase as morning wears on and T° increases; 28.

Intraspecific Behavior. Only seen singly; 22, 23, 25, 26, 24.

Interspecific Behavior. Relations with Black-cap obviously difficult. The territories of the two species seem to be mutually exclusive, apart from "accidental" and "forced" encounters. In other words, inds of the two species seem to be treating one another as if they were conspecific; 28. Brown-wing turns away from Black cap; 22, 25. Brown-wing induces Black cap to retreat; 26. Brown-wing ignores Black cap display (partly aerial); 26.

In general Brown-wing is less abundant than Black cap; 24.

Brown-wing seems to ignore Atthis; 22, 25, 26.

Voice. The inds. at Bitar Kanika were very quiet; 22, 23. Is this correlated with habitat, with ribbon strips?; 24. Certainly no song at dawn.

"Chak" Notes or Chatter. 26, 24.

Bibbing. Generally rare; 25. Two extreme V-D TB's before flight (escape); 25.

TOCKVS - January, 1984.

T. erythrorhynchus

① Habitats.

General comment vis à vis Blackbill, 2, 3, 16, 17, 166. In relatively thick vegetation, 16. Terrestrial, 16. M. Bourr. 183, 184, etc. Forest of Badia, 471. Forest of Manning, 183. Near Ossouye, November, 326, 335. On bare ground near Palmerie, 71. Over rice fields with Oil Palms near Niaguis, 65. In Mangrove near rice fields, Kabrousse Parc, 166. Road from Ziguinchor to Kolda, December, 362. In marshy areas, Casamance, December, 363. In very dry open areas near to Kacack, 484.

② Feeding.

In ground, 2, 16, 23, 25, 26. Both hopping and walking, 23. Feeding along small paths, 188. Picking leaves aside, M. Bourr. January, 444, etc., 522. Seeds?, 38. Ants?, 38. Leafhopper or katydid?, 38. Termites on rotten wood-borers?, 42. Beetle grub, 43. Army caterpillars, 23, 24, 27, 43, 45, 187. Chewing flycatching, 15, 468, 522. Feeding on fruit, 28. No interest in *Azania ligata*, 33.

Gleaning (or drinking) from leaves of trees, 1, 14, 23, 189. Feeding on mistle, 42. ♂ feeds ♀ (white moth?) during nest-building (excavation) period, 33. Intraspecific hostility during feeding, 23.

♂'s feed more actively than ♀'s?, 24. Intraspecific hostility during feeding

23.

③ Intraspecific fighting in general.

Species is particularly aggressive; 504. Lots of disturbance without actual pecking; 489. Many disputes unritualized in form; 445, 490, 516. Supplants silent; 459, 483. Most fights silent; 460, 483, 516. Jousting during feeding; 1, 16, 23. Situation at M. Bour, January; 445. Territorial dispute, January; 455. Chase with "Whup"s; 26. Disputes with some "Whup"s; 489. Disputes with many Rattles; 488, 489. Furious fight between two males, with pecking and grappling, Rattles and "Whup"s; 503. Dispute with "Whup"s, Doublets, Wingspread, Bowwing; 453, 489.

④ Roasts. 26, 187.

⑤ Morning assemblages and Chorusing.

Little or none; 4, 24, 37. Three individuals preening together; 1. Six individuals in same tree; 18. Perhaps a real example of communal "Singing"; 495. With "Whup" Notes and "Chuckles"; 18. With "Doublets" and Wing-raising; 18. Perhaps these performances are related to disputes?; 489. Perhaps they are characteristic of an early phase of breeding?; 37. General comment; 18.

④ Pair Bonds.

Long sustained. Maintained during non-breeding season; 449, 451. Strong; 24. Pairs visible within mixed groups; 194. ♀ controls pair movements; 36. Air greetings between mates; 43, 50, 51, 53, many other references.

⑤ Courtship

Generally slow; 38, 43. ♂ feeds ♀; 36, 43, 53, 54. ♂ tries to feed ♀ but is unsuccessful; 38. Touching of bills; 43. "Wrestling"; 45. "Feeding"; 194. No Begging by ♀; 49. Feeding of ♀ by ♂ is associated with preparation of nest, not with copulation; 48, 53, 54, 55, 56. Nevertheless, at times, feeding of ♀ seems to be more urgent than excavation; 43.

⑥ Copulation

Description, Aug. 29, 46, 47 et seq. Sketches of postures, 47.
General comment, many attempts, little display, 48.

⑦ Nesting

Description, 10, 11, 22, 31 et seq. 39, 43. Mud is important. Both sexes participate, 43. Drilling by ♀, 39, 56. Drilling by ♂, 40, 58. Some apparent division of labor in some cases. ♂ does most drilling, ♀ most plastering, 43. But ♂ does collect mud at times, 33. ♂ perhaps generally less active than ♀, 43. Comments, 39, 43, 56.

Peculiar relation of nest-building by ♀ and feeding of ♀ by ♂, 48, 53, 54, 55, 56.

⑧ General Comment Vocal Repertory

Noisy, many references, 501. Intergrading. Variations are continuous, as in Kingfishers and rollers, 187, 504. Vocalizations (also) common during non-breeding season, many references, 326, 485.

Including one really musical or plaintive whistle. I got the Redbill and the Blackbill mixed up in my early notes.

⑨ "Long"

Two phrases. "Whup"s (sometimes low-intensity). "Doublets" (perhaps always high intensity). E.g. 28, 58, 183, 191, 458.

"Whup"s

Description, 18, 19, 20, 25, 26, 27, 28, 31, 33, 37, 42, 43, 50, 52, 53, 54, 58, 183, 187, 191, 193, etc., 446. At M Bourn, 183. In flight, 458. Syncopated, 19. Hostile?, 26. Abbreviated, with chase, 26. As reaction to woodpecker, 43.

Alarm type, 7, 464, 465 (?), 469, 481 (?), 497 (after Rattle), 507, 513.

Accelerating to Rattle, 189. By ♂, in response to ♀ BB during nest-building, 33.

Hard, loud, obviously hostile notes in presence of BB's; 53. "Whup"s after fighting (483) may induce scattering or retreat by other members of the same species; 484. Alarm type "Whup"s do not, however, release mobbing by individuals of other species; 505, 523.

"Doublet"s

Description; 2, 17, 18, 26, 28, 29, 30, 36, 43, 52, 58, 183, 187, 193, 195, many other passages. At M Bour; 183, 488. "Snoring" quality; 18. Some (or all?) Doublets are really Triplets; 19, 488. Accompanying head, bill (BV), and wing (WF?) movements; 2, 18. Usually (always?) wing Wing-out and often with Bouncing; e.g. 28. "Whup" - "Doublet" - Wing-out - Bouncing before attack; 455.

Wing-out Bouncing

Description; 18, 28, 175. Sketch; 20. Int. mov. Wing-out; 19. Wing-out without Bouncing; 36. "Whup" - "Doublet" - Wing-out - Bouncing before attack; 455.

Best description complete performance; 472. Correlation of notes and movements is sloppy.

(10) Rattle

Description; 10, 489. Accelerated "Whup"s; 189. Intergrading with "Whup"s; 504. With high intensity fighting, no other ritualized component; 488, 489. By individual escaping from cattle, followed by alarm type "Whup"s; 497.

"Chuckles" also (?) accelerated "Whup" Notes; 18

(11) Visual Signals

Belly-fluffing. Obviously hostile; 489.

Plumes General; 459. Raised in aggression; 457.

HF During dispute; 457.

BW. Picking at branches and leaves, etc.; 194.

Tailraising. Locomotory int. mov. ?; 489. Associated with dispute; 489, 504. After landing; 446, 462, 504. On ground; 479. While perched; 465. Unmutualized ?; 462, 479. Largely alarm ?; 479.

U. Certainly hostile; 522. Agg. form. Comment; 457, 483. Sketch; 457. During dispute, silent, with Tailraise; 483. After supplant, silent, without Tailraise. Aux. form. Sketch; 459. Silent; 459. With Tailraise; 479. As response to Helioscinus; 459.

(12) Intraspecific Gregariousness

In Cows, January; 445. No contact notes; 447, etc.

(13) Interspecific Relations

With mammals. Ignores Patas Monkey; 2. Displaced by Helioscinus; 189. Hostile to Helioscinus; 459.

With Blackbill. Obviously compete and/or cooperate on many occasions. General comments; 30, 35, 54, 192, 194, 303. Both species feeding in same ways on road to Joel, October; 190 et seq. Redbills definitely integrated with Blackbill group Joel; 186, 190, 191, 194. Relations between the two species can be humorous; 2, 3, 187, 192, 194. But certainly not always. Blackbills may be generally dominant; 6, 7, 187. Blackbill attacks Redbill; 7, 13, 36 (supplant). Notbulking ♀ Blackbill swoops at notbulking ♀ Redbill; 32 (This does, in fact, effectively impede the Redbill. Interestingly enough the interactions seem to be quite silent.) Both species interested in same Carab; 31 et seq. Redirected aggression by pair of breeding Redbills in presence of Blackbills 53, 54. Blackbill follows Redbill; 502.

There are occasional reversals of usual dominance. Redbill supplants Blackbill; 502.

More surprisingly, the two species sometimes seem to ignore one another;

Redbill

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14, 15, 17, 19, 20, 54, 172. Both species feed on hairy caterpillars, not together; 3. Of course, the two species are sometimes partly segregated by habitat preferences and/or differences in annual cycles. Redbills are generally more terrestrial than Blackbills; 4 etc. Partial segregation of the two species within the same mixed group; 194. On Cap Vert, at one time, the two species seemed to be "out of phase" reproductively; 14.

M Bour flock; 445 et seq.

"Songs" are problematical. Sometimes Redbill and Blackbill vocalizations seem to overlap (almost) randomly; 20, 26, 30, 34, 38, etc., 52, 54, 58, 194, 495. At other times, they may alternate; 30, 193 (?). Perhaps alternation is an indication of low intensity?; 20.

Peculiar case. Juvenile Redbill attending breeding Blackbills; 7, 8, 34 (?), 35.

Relations with other Ceraciiforms Redbills ignore wood-hoopoes; 45, 58. Supplant wood-hoopoes; 362. Wood-hoopoe visits Redbill nest hole; 40. ♀ Redbill supplants Upupa (probably only because of trespassing); 50, 51. Redbills ignore Halcyon senegalensis; 23. Abyssinian attacks Redbills, not very successfully; 176, 172.

Relations with other birds. Ignore Crimifera; e.g. 11. Attack Corvinella 446. Supplanted by Corvinella; 446.

(14) Miscellaneous

Species is particularly noisy; 27. Particularly aggressive; 504. Presumably not as migratory as Blackbills.

Pairs and trios, fluid territorial arrangements, M. Bour; 494, 523. Not breeding M. Bour, January; 445. Still pairs Cap Vert; e.g. 497. Coming (back) into breeding condition (?) M. Bour, February; 501.

No AlCN's; 461. As in most ceraciiforms?

Purple skin patches under or at sides of base of bill in ♂s; 28, 492.

Tockus nasutus

① Habitats.

General comment: 16, 17. Wide overlap with Redbill on Cap Vert: 1, 2, 3, 17. Rarer in the Casamance: many references. Less "terrestrial" than Redbill; 4. Keeps apart from Redbill, usually, on Cap Vert: 3, 17. Not very active at earliest dawn: 9. Moved flocks, road to Joal, edge forest of Niaring: 16, 183. More frequently terrestrial than usual, road to Joal: 191.

Essentially a species of small trees (Gouldie Yellowbill, a species of large trees in forested areas, and Redbill, a species of large trees in semi-open areas).

② Food.

Both animal and vegetable. Both in trees and on ground (13, 14, 15, 21, 496, other references. "Nibbling" acacia leaves: 194. Coffee-bean-like berries: 526. Oil palm nut, presumably pulp, mutilated at length: 5. Oil palm nuts for young: 7, 8. Beetle: 28. Large insect (butterfly) or small lizard (for young): 1. Hairy caterpillars ("CCM"): 25, 30, 32, 33, 34, 39. Dragonfly: 24. Flycatching from trees (oil palm, baobab, etc.): 11, 13, 14, 39, 186. Flycatching to feed young: 11. Flycatching obviously in both animal and export. Feeding near M'Bour, Odotier: 186.

Feeding of young. Description: 6, 7, 8, 9, 10, 11, 12. Female may be less active than is male: 12, 14. Rate of feeding of nestlings may be determined more by availability of food than by the apparent hunger of the young to be fed: 17.

③ Intraspecific relations.

Disputes. Description: 14, 24, 31, 52, 499. Silent in flight: 14. Without loud sounds, for the moment: 52. Followed by single Notes, "Whoo"s: 52.

Blackbill.

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Insect disputes in flocks less common than among Redbills. Road to Jral Groups. Description: 2, 5 (6 inds); 14 (6-7 inds.); 499. Comment Tockers in general: 17. Most flocks unspecific on Cap Vert: 3. Tries common: many references, 138. Tries composed of 2 inds. with light facial skin patches and 1 individual with dark skin patches: 353. Is this a family group, or one male with two females? No real flocks on Cap Vert in February: 514.

Sexual relations. No copulations seen. Blackbills may breed earlier than Redbills. In pairs on Cap Vert in August: 5. Pairs and trios within mixed flock near Jral in October: 186. Male feeds female (before egg-laying??): 36. This does not lead to immediate nesting activity. While feeding young, the parents are amicable and polite to one another: 11. Breeding season possibly beginning again?; Cap Vert and Ill Beau: 498, 518, 519.

Chorusing. Not definitely established to exist as such. Possible examples 4, 5, 499. Hostile: 6. Semi-territorial: 6. Must be affected by acoustic interference from Grinifers: 1. Comment Tockers in general: 17. See notes on "Song". Adults silent when feeding young: 10, etc.

(4) Nesting

Not very much data available. In Barbab: 15, 31, 32. See also notes on A and B pairs for Oil Palms ("R"). Collecting of mud by ♀: e.g. 32. Peak of nesting on Cap Vert may be over by August 25: 31. See references for feeding of young.

(5) Roosting

Communal?: 26. Early?: 340. Sexes may sleep apart even when preparing nest: 36. General description: 499.

(6) Begging Notes of Young

"Kwee kwee kwee kwee...": 7, 9, 32, 41.

⑦ General Comments Vocal Repertory

Noisier than Redbill? : 2. No "greeting"s between mates: many references, e.g. 36. Perhaps no "real" communal displays: 37. Fewer vocalizations toward end of August than at beginning of month: 31.

⑧ "Song"

Description: 2, 4, 5, 6, 9, 14, 17, 19, 21, 22, 23, 24, 27, many references, 34, 37, 38, 239 (Casamance, October), 499, 500. Single-Double Notes in flight, without special movements: 240. See also Chirping. During non-breeding season: 173. General comment: 519. As advertisement: 530. During intraspecific fight: 21. See also interspecific relations. General comment, ♂ and ♀ usages 38. Full song by ♂ to ♀: 24. ♀'s with ♂'s tend to "join in" late: 34, 38. Abrupt high intensity performance by ♀ alone, apparently as reaction to strange conspecific (intruding ♂?): 37, 38; ♀ stops when mate appears, then ♂ does full "Song" after long "Wheee"s: 38.

"Wheee"s (Single Notes)

Lead, musical. Description: 1, 4, 9, 12, 12, 14, 17, 19, 20, 21, 23, 24, 27, many references, 34, 38, 499, 500, 518, 526. There may be two or more slightly different versions of the basic pattern: 42, 500.

Sometimes fully integrated into "Song": 2, 4, 9, 14, 499-500. Probably (largely) hostile in these circumstances. Before intraspecific swoop: 12. During intraspecific dispute: 21. After intraspecific dispute: 32. Conventional defense or advertisement: 46. Perhaps reaction to Redbills: 20. A peculiarly long hostile (?) version: 38.

Most long thin types may be used as "contact notes": many references, e.g. 343. Plain versions without OCB: 518.

With Oblique Posture: 518

"Doublets" (Multiple Notes)

Description: 2, 4, 5, 9, 14, 17, 19, 21, 22, 23, 24, 27, many references, 34, 499. During intraspecific dispute: 21.

Headflicks and Wingflicks with "Doublets".

Description: 2, 4, 5, 14, 21, 24, 27, 499, 500. During intraspecific dispute: 21.
Timing or coordination of different visual and acoustic elements is variable: 499.
Presumably (?) "Doublets" by a perched bird are always accompanied by some movements.

(9) Rattle.

During dispute, by aggressive ♀: 31. "Trill", modified "Whiceo" (?)
by ♀ in flight: 25

(10) Visual Signals.

Belly-fluffing and raising of head-plumes apparently absent.

HF presumably exists; but it must be very unritualized.

BW. As displacement by ♂ and ♀: 24. As displacement by opponents (?)

27. After dispute: 31

Gaping. Hostile signal?: 518.

Apparently no V's. Replaced by Oblique or Diagonal Posture?

Oblique described: 518. With "plaintive" "Whiceo"s: 518

Tail-raising not conspicuous. Perhaps because the animals are often in trees and comparatively rarely on the ground?

Glides and Rising Scares. During intraspecific dispute: 21. During disputes with *Alcyonids*: 184. Apparently unritualized.

(11) Interspecific Relations

With mammals. Ignores *Patas Monkeys*: 2.

With Redbill. This relationship obviously is complex. Blackbills may tend to treat Redbills as "inferior" or "remote" relatives of the same species. On Cap Vert in August, the two species often seemed to ignore one another: 3, 6, 7, 13, 17, 19, 23, 40, many other references, 42. Perhaps the two species generally try to

avoid one another, at least on Cap Vert: 35. Still, encounters and approaches seem to be inevitable. Blackbills may be generally, but not invariably, dominant over Redbills: 7. Blackbill displaces Redbill, silently: ⁵⁰²6. Blackbill swoops at Redbill, silently: 7, 13, 32. Blackbills may provoke redirection picking by Redbills: 53. Redbill "Whip"s at Blackbill: 33. Redbill "attends" nesting Blackbills: 6. Redbills regularly follow Blackbills road to Joal: 186. Blackbill may utter "Whooo"s as reaction to Redbills: 20. Redbills and Blackbills following one another: 37, 186. Both species nesting same *Baccharis*: e.g. 32. The two species overlap "songs": 20, 26, 34. Alternate "Songs": 30, 37(?), 52.

Road to Joal: 183 et seq., 190 et seq. Peaceful relations between Blackbill and Redbill. Still partially segregated: 194. General comment: 192, 194. Mixed groups III Bour: 476.

Relations with other Coraciiformes.

More complex than in the case of the Redbill? General comment, segregation of hornbills in the Casamance: 280. Relations with Yellowbills: 353, 354, 373. Blackbills and Yellowbills may tend to ignore one another: 527. May tend to avoid one another: 352. Yellowbill swoops at Blackbill: 543. Blackbills ignore wood-hoopoes: ⁵⁸355. Blackbills ignore *Halcyon senegalensis* (several references). Blackbill attacks *Coracias naevius*: 49. Blackbill attacks *Alcedo* spp., silently: 184. Blackbills ignored by Bluebellies: 280. Attacked by Bluebelly: 174. "Song" in response to Bluebellies: 270.

Relations with other birds.

Blackbills attack *Faperrings* (*Haplopterus sparceus*), God knows why!: 170, 172. Ignores *Phalacrocorax* kites: e.g. 7, 10, 50. Black-winged Kites are ignored by all coraciiformes, even though they must be serious competitors: 225. Blackbill chases Short-tailed Glossy Starling: 191. Cuckoos and Blackbills ignore one another: 1, 8, 11, 13, 14. Cuckoo swoops at Blackbill: 8. Blackbills ignore vireos: 49. Crow displaces Blackbill: 49.

Black bill

12

⑫ Miscellaneous.

♀ with yellow skin patches? : 30

Running (rather than hopping) is the fast gait? : 30

In flocks, Blackbills may be less aggressive than are Redbills. Why? See notes on road to Joal in October.

ADDITION.

Groups along road to Joal, edge forest of Nianning in October.

A. Six Abyssinians, 10-12 Blackbills, 2-3 Redbills

B. More Blackbills; 7 Redbills. Long-tailed Glossy Starlings: 190 at seq
Perhaps also Short-tailed Glossy Starlings and Papiacs.

See p. 392: Flycatching and sweep at Swamp Mixed flock of Yellowbill and Swamp

P. 415. Acrid display, Kilecia.

P. 416 Visitor, holes, January: 416

P. 418 Trills

P. 420 Encounter with squirrel.

OK 11/10

Ischnus camerunus

① Habitat

Forest in Gabon and Liberia. Apparently quite old forest. But I was, of course, working along "edges" of paths and roads. Inds. of the species seem to move below canopy. This may be a significant difference from Yellowbill.

② Feeding

Taking fruit (perhaps small figs?): 415-416. Obviously Bannerman (based upon Chapin?) is wrong when he says that the species is purely insectivorous: 420. But it certainly takes insects enough. Lots of gleaning of leaves, searching of bark, etc.: 415, 416, 417. Eating caterpillars: 415. Taking katydid type: 414. The species is supposed to follow army ants (Bannerman - Chapin again?): 421. Feeding associated with many BW movements: 417.

③ Intraspecific Arrangements

Usually in trios: e.g. 368, 415, 416, 423, 443. All members of trio adult? 423. See also interspecific relations. Presumably Dwarfed Redbills are inserted into mixed flocks as families - one family per flock?: 345.

④ Sexual Behavior

Male feeds female?: 415. (Note. My visit to Gabon was during dry season. Presumably the breeding season. Liberia also was fairly dry.)

⑤ Nesting

In unnate Plasutitennes (?) nests: 375. General note, competition for holes: 421, etc.

Dwarf Redbill.

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Just outside of "song": Dec. 217

⑥ "Song"

Basic Note or Singlet probably can be transcribed as "Kew": 404, 415, 417, 422. Perhaps sometimes "Wha"? : 378. Perhaps sometimes "Hoo": 382. Perhaps sometimes Whistles (like Halcyon badia)? : 387. Singlets sometimes alone: 417, 422.

Full "Song" is long series descending notes. Becoming bisyllabic toward (or perhaps at) end: 387, 378, 373, 416, 417, 423. No conspicuous OCB: 423.

No special movements during "Song": 417, ⁴²⁵ Head sometimes erect: 423. Sometimes lowered as phrase progresses: 423.

⑦ Contact Notes.

Perhaps real. Muffled version of "Kew" 443. Perhaps an adaptation to life in dense vegetation.

⑧ Interspecific Relations

Often with mixed flocks: 367, 368, 378, 387, 404, 423, 443, etc. (It may be a general rule that the largest and most diverse heterospecific assemblages occur in forest rather than in scrub or open country: 369. Occasionally individuals of the species do occur by themselves alone, without association of other species: 373.

Relations between Dwarf Redbills and Yellowbills may be somewhat specialized. Redbill ignores Yellowbill: 423. Redbills and Yellowbills alternate "Songs": 424, 437, etc., 442. Redbills fall silent when Yellowbills appear in neighborhood: several references, 417.

⑨ Miscellaneous

Species appears to be short and plump: 417.

Nesting in January.

Abundant in Liberia: 432.

Tockus hantlaubi

Habitat much the same as caninus. Perhaps more strictly confined to high old forest.

Has been seen with monkeys: 367. Probably less consistently than Whitecrest. Confirmed by Chapin? Usually in pairs and trees (E): 426. I never saw more than a single individual: 386, 387, 424. The last individual seen had red skin patches behind lower mandible: 425.

Certainly the species visits some trees also visited by Yellowbills: 386. Feeds on caterpillars: 424. On fruit?: 386.

E saw pair bringing food to nest: 393. Male brought insects; ♀ brought fruits. December 24. Young presumably well developed. Is hantlaubi more advanced than other species? Nest hole was 15 m. up in large tree in full forest: 394.

Species seems nervous and shy. WF's, perhaps TF's: 386.

I am not sure that I ever heard real "song".

8-10 "Kee" notes in flight: 424. Very much like weak Yellowbill.

While perched. Long but irregular series "Kee" Notes: 424. Again like Yellowbill. No trace Doublets or Triplets. Uttered in unritualized postures: 425. Do the small forest hornbills have few or no ritualized postures or movements because visibility is poor in dense vegetation?: 425.

Several times the series of "Kee" Notes were interrupted by 3 longer and higher "Kee ah" Notes: 425. PN's? Traces of Doublets? No ALLO's.

Tockus fasciatus - Sénégal

① Habitat

Djiboulher, Djibclor (Station Rizicole), Road to Niaguis, Road to Brui, Road to Orseu, Road to Cap Kiring, Halrouse, Boekots, etc.

A forest species. At least edges and top forest. General comment: 62. Preference for large trees such as *Ficus* and *Ceiba*: 62, 61. Canopy may not be continuous: 62. In area of low forest with Oil Palms: 71. In *Acacia* forest or scrub: 246 et seq. Can be seen flying over rice fields: 207.

② Feeding

Probing dead wood: 330. Extracting grubs from wood: 111. Probing palm frond bases, like wood-hoopoes: 317, 318, 324. Eats lizard: 61. Large beetle: 330. Caterpillar: 71. Grasshopper: 71, 541. Unidentified orthopteran 111. Dragonfly: 247. Flycatching: 81, 98, 111, 355. Chases *Morpho*-like butterfly: 61. "gleaning" leaves: 81. Feeding on ground: 219. Eats "ccm" with BW and pounding of bill: 81.

Eats fruit: 67, 238, 248 (Oil Palm), 529 (berries in tree), 532 (Oil Palm), 541 (something hard and fairly large). The species may be more frugivorous than smaller forms (?): 329. It is interesting that none of the local hornbills seems to eat mangos.

③ Interspecific Social Arrangements

Often in pairs: 62, 94. Trio of 1 ♀ and 2 ♂'s?: 111. Trio of 1 ♂ and 2 ♀'s?: 352. Not visible in large groups during daytime in February: 531. But perhaps still roosting communally: 531. Group flying to or from feeding grounds?: 74. Certainly there must be wider social links than simple pair bonds.

Some territories may be quite small ($\frac{1}{4}$ mile across?): 70. Territories (and ranges?) seem to be smaller than those of *Fistulata*. Territorial encounter with lots of "Pee" Notes (Whistles, Singlets): 69. Inhibited swoops by one bird on another: 67. "Touching base" by returning to hole: 542, 543

(4) Communal Displays or Chorusing.

Do such patterns exist?: 65. Possible examples: 246, 247. General calling during morning dispersal: 540.

(5) Communal Roasts

Many references, both coming and going: e.g. 72, 324, 330. Reciprocal reversals of movements: 330. Group of at least 10 inds.: 330.

(6) Sexual Behavior

September is early breeding season in Casamansa: 65, 78. Continuing in early November: 235. Over by February: 529. Or perhaps starting again?: 532, 533. The breeding cycle may be very long: 94.

General comment copulation: 64. Apparently successful copulation seen September 4th: 64. Repeated approaches by ♂, retreats by ♀: 63. Pre-cop behavior: 63. Wing-waving by ♂: 63. Submissive posture by ♀: 64. ♂ attempts to feed ♀: 74, 540. Either sex can follow the other in flight: 528, 539, 540. No mutual preening (apparently a difference from *Fistulata*): 548

(7) Nesting

Inspection of hole in fig tree by ♀: 73, 79. Description of hole: 74. Excavation (not drilling) by ♀: 73, 79. Inspection of hole during dispute: 541. Short-tailed young are supposed to appear in June around Katimang: 94. Presumed *Heliosciurus gambianus* going in and out of potential YB nesting hole: 80

⑧ Parental and Juvenile Behavior

Best seen in November near Ossouye. Description: 247. Parents feed Oil Palm nuts (apparently entire) to young: 248.

Begging Call. Best descriptions: 248, 329. By juvenile in flight ("Tee tee tee..."): 247. While perched: 247, 248. M & Q: 248, 329. No OCB (?): 329. Intergrading with Rasp(s): 248. Intergrading with "Pee" Whistles or Singlets?: 248. Begging certainly continues after young have left hole. Still heard in December: 352, 358.

⑨ General Comment Vocalizations

YB may be even more noisy than RB or BB: 70. Why?: 340 (After all, they should know their neighbors). Noisiness seems to be positively correlated with density of population: 105. Singlets of Tockers obviously are related to vocalizations of many other Ceracii forms: 248.

⑩ "Song"

Singlet-Triplet organization. Description: 60, 61, 62, 64, 68, 70, 73, 74, many references, 77, 78, 105, 110, 227, 230, 242, 246, 328, 330, 354, 351, 532, 540, 546. Still occurring in December: 352. By solitary individual: 60, 61. Songs by different inds. of same species often overlap one another: 352. Full song in ordinary flight: 547. Songs certainly uttered by both ♂'s and ♀'s: 352. Perhaps (?) ♀'s tend to sing less frequently than do ♂'s on the average, 73, but the difference probably is not great. Uttered by ♀ semi-alone: 531. By ♀ in presence of silent ♂: 533. Perhaps individuals tend to answer others of their own sex?: 333.

Used to "call in" mates?: 68. Proclamation of territory?: 73.

Singlets Called "Whistle"s, "Pee"s, etc. Quite variable within a limited range.

Description more or less conventional forms: 60, 61, 63, 64, 68, 69, 70, 73,

Yellowbill - Sénégal

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74, 77, 78, 104, 105, 110, 227, 230, 246, 328, 330, 528, 529, 530, 531, 532, 539, 540, 545, 546, 561, other references, 572. With few, little, or no bill movements: 70. Bill actually closed: 328. With Low Oblique or F: 70. In flight: 61, 68. Without special postures when perched: 61. With possibly ritualized (?) circular flight: 540.

Sometimes leading into Triplets: 531, 539. But the correlation is very far from perfect. Singlets of YB may be more "independent" than are the homologous patterns of the RB or BB.

uttered by apparently solitary bird: 561. Can be used as contact note? 561. As response to BB's: 572-573. Used in complicated and enigmatic interactions among different pairs: 67, 70. In territorial dispute: 40, 531. Series of Singlets alone may be more (nearly purely) hostile than full song: 573.

Lengths of individual notes, and tempo of series, are quite variable 527, 531, 539, 540.

Sometimes accelerated and abbreviated: 529, 542. Sometimes accelerating and strengthening: 238. Accelerated series during territorial encounter e.g. 63, 67, 70, 77?, 328, 542. Pragmatic series: 238, 242. Taking off in flight: 67. By ind. flying alone: 227.

Rising-falling series With F: 78. Hostile?: 78.

Triplets

— — — and — — — Description 60, 61, 67, 68, 70, 73, 74, 77, 105, 110, 227, 230, 246, 328, 330, 531, 532. With "Bowing" and perhaps some Bowing: 60, 68, 531-532. No wing movements: 60. Bill-up postures during high phase "Bowing", sketches: 60, "Vulturine" posture: 61. Not associated with overt territorial disputes: 70.

(11) Rattles

Description: 546. Comment: 542. During dispute: 541. During cop.

attempt: 64, possibly 222, 230

(12) Rasp.

By parent or young: 248.

(13) Visual Patterns

Glide, possibly ritualized: 246.

Circular flight with Lunglets: 540

Low-Oblique. Probably flight int. mov. With Lunglets: 70

F (Forward). Sketches: 78. With Rising-falling Lunglets: 78

Possibly not really distinguishable from Low-Oblique

(14) Interspecific Relations

With mammals. No interactions with Red Colobus: 330, 541, and other references. Presumed Helioscocus gambianus goes in and out of potential YB nesting hole: 80. Apparently occupies hole in the end: 224 YB's ignore alarm chatter of H. gambianus

With other hornbills

The various hornbills of the Casamance (including Fistulata) overlap geographically but they tend to be segregated socially: 280, 329, 352, 353, 354, 530, 545, many other references. YB's and BB's sometimes alternate "songs": 352, 356, other references. The inhibition is not perfect. YB "song" can be overlapped by BB lunglets: 357. There are occasional indications of overt hostility. YB utters Lunglets to BB's: 542-543. Silent attack by YB at BB: 543. Silent attack by BB on YB: 543. YB's tend to occur in larger trees than do BB's: 353. BB's are more often territorial than are YB's: 354. YB's may be dominant over BB's (and a fortiori over RB's): 352.

YB's ignored by Fistulatas: 290.

With other Ceraciiformes

Yellowbill - Senegal

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YB's are ignored by kingfishers and Abyssinians: 266, other references Bluebellies and wood-hoopoes ignore YB's: 328. YB ignores wood-hoopoes: 540. YB's ignore, and are ignored by, European Bee-eaters: 348. Bluebelly attacks YB: 271.

With other birds.

Little or no interaction with Cinnifers: many references, e.g. 329. Little or no interaction with toucans, Toucan persea: many references. One mild swoop by YB en persa: 80. YB's ignore vultures and crows: 48. One apparent dispute with small blackish hawk: 112.

(15). Miscellaneous

Flamingo bill shape: 48.

Sometimes nomadic?: 249.

Bathing (?) in drops of water from wet leaves: 529.

(Otherwise) no drinking seen.

Loekus fasciatus - Liberia (& some nests Abidjan)

① Habitats

Banco: 396. "Grand saison sèche" beginning early January, at Banco: 398. Dry season began Nimba about December 15: 403. But there were still occasional rains in January: 406. General comment habitat preferences: 408. Species of deep forest edge and mixed forest. See also Karr. Usually above canopy (this may be a distinction from camurus): 416.

② Feeding

ccm Banco: 399. ♂ brings "cricket" to ♀: 418. ♀ carries and eats red fruit: 422, 423. Another fruit taken, Nimba: 440. Gleaning leaves: 443.

③ Social Organization

Singles and pairs Nimba, January. Many references. Larger groups 4 inds. (family): 406. 10 inds, Nimba: 415. 13 inds. going to roost: 441. I say that species sometimes occurs in groups of 150-200: 415. Boundary dispute, many vocalizations: 407-408. Mild dispute with Singlets: 440. Real fight; silent, pecking and striking; ♂'s of adjacent pairs(?): 432. Intercept by one ind. upon another going to roost: 441.

④ Breeding

Birds apparently not in reproductive mood Banco Jan. 1: 398. Hornbills are supposed to finish breeding at Nimba around November 1 (word of mouth). My own observations do not entirely agree. Individual

Yellowbill - Liberia (+ Abidjan)

(23)

inspect holes, Numba: 407, 416. Are visits to holes a means of "touching base"? 409. ♂ feeds ♀, Jan. 10: 418. Cricket brought to hole: 418-419. Adult appears to bring food to nestling, Jan. 6, Numba: 408. Parents remain after brood has been destroyed: 423.

General comment: 408

(5) "Song"

Rare among Numba birds in January: 440. Not associated with overt fighting: 407, 433.

Singlets. Common everywhere.

Banco: 398, 399, 401. Numba (Grassfield - Ifeja): 402, 403, 407, 417, 418, 419, 420, 422, 423, 424, many references, 432, 433, 436, 440, 441, 443. Bill closed or almost closed: 415. Bill slightly open but no OCB: 418. With circular flight: 415. After fight: 433. One individual stimulates another: 440. Used to "reclaim" territory each morning: 442. Series of singlets more strongly or purely hostile than full "Song": 415.

Triplets

Developing from singlets: 398, 407, etc., 422.

(6) Lead Pull (= Rattle?)

Visiting hole, not carrying food: 424. By ♂, after bringing cricket to hole: 418-419. Before ♂ feeds ♀: 418. A modified "Pee" (singlet): 418. High intensity alarm or distress: 420.

(7) Visual Patterns

Erect postures, F's, etc., with singlets after fight: 433.

Circular flight by 2 inds. uttering singlets: 415.

(8) Interspecific Relations

With mammals. ♂ YB brings cricket to hole occupied by Anomalurops beecrofti (Beecroft's Flying Squirrel): 418-420. Nest destroyed? Later inspection by ♂: 422. Anomalurops still present: 441. Funisciurus inspect Anomalurops - YB hole: 422. Helosciurus rufobrachium in Funisciurus area by YB hole: 424. Note Enmons general comment on different species of squirrels using same holes: 421, 422. General comment relations between hornbills and squirrels: 420. Why don't hornbills attack? General comment competition for holes (Brosset etc.): 421.

With other hornbills. YB's monitor camurus (?): 432, 443 (correcting). Relations between the two species obviously variable. Sometimes YB and camurus seem to ignore one another: 423, 434. At other times, relations are more difficult. YB's and camurus may alternate vocalizations (the YB patterns are singletons): 424, 439, 442. YB may discourage or displace camurus: 404. Sds. of camurus in mixed flocks sometimes fall silent when YB appears: 417. YB does not deliver actual attacks upon camurus. YB's may monitor or escort Cerategymna?: 429.

With other birds. YB's do not seem to join mixed flocks purposefully: 404, 410. Discussion of shrikes: 436.

Trochus fasciatus — Gabon.

① Habitat.

High in tree tops: 371, 389, etc. Edge forest: 342.

② Feeding.

Flycatching: 371.

③ Intraspecific Organization.

Mostly pairs and trios: 377. Sometimes larger groups: 377. Birds apparently not breeding at this time (December): 388. Season is unusually humid, perhaps the birds are retarded: 367, 370.

④ "Song"

Full sequence not common. Definite examples: 383, 392, 396. Little OCB: 396. Note. In this form Triplets follow Singlets without much change in tone: 383. In contradiction to Senegalese birds which have noticeably thin and high Triplets: 386.

Singlets "Pee" notes (as usual). Description: 378, 379, 387, 389, 390, 392, 394. With circling flight: 391. Postures unritualized: 349. Sometimes notes are slow and prolonged: 378. Sometimes start slow and then accelerate: 378. Accelerated notes in flight are sharp: 379. Used to "call in" mate?: 389. As "greeting" between mates: 370.

⑤ Visual Patterns

Circling flight with Singlets: 391.

⑥ Interspecific Relations

Yellowbill - Gabon

(26)

All *Coraciiformes*. YB's may monitor canaries? : 393. They may (also) monitor sharps: 382. The two species may even tend to associate with one another: 379, 381. But overt interactions seem to be rare. Some exceptions. Joint flycatching: 391, 392. YB utters accelerated singlets possibly in reaction to sharps: 379. Hartlaub's may monitor YB's: 386.

(7) Miscellaneous.

Local YB seems to be heavily built: 342.

①

BYCANISTES — February, 1984

B. fistulator fistulator

① Habitats.

Forest: 258, 571, other references. Semi-open vegetation: 335. Open vegetation, low scrub, Boransa: 263.

② Feeding.

Gnawing wood: 286. Feeding on fruit: 526, 545. On figs: 542. Lots of BW: many references.

③ Intraspecific Organization

Large territories or ranges: 258, 280, 329. Sometimes occurs singly: e.g. 529. Often in pairs: 289, 316, 343, 526, 527, 542, 543. Group of 3: 547. Group of 4, perhaps a family, probably long sustained: 263, 273. Another group of 4 seems to be composed of 2 pairs: 547. Group of at least 6: 571. Group of 8: 280. Species sometimes seems to be less gregarious than YB: 258. But inds. of the species certainly are "contact" animals: 289, 548. Territorial dispute: 543. Visiting nest hole apparently to "touch base": 544.

④ Reproduction

Size difference between sexes is appreciable: 343. Not breeding in March: 529. ♀ invitations to Allopreening: 270, 548.

⑤ Vocalizations

General comment: 270. Remarkably roller-like. Buzzy and trawling. Singlets "Amh" Notes.

General description: 289, 290, 316, 343, 547, 548, 541. Single notes, sometimes irregularly repeated. Soft and muffled versions: 289, 290, 316. In flight: 541. Accelerated to form Chatters: 286, 527. Some of Chatters is the same as that of single notes: 289. Chatters are nasal, reminiscent of Bluebellies: 280.

Rattles ("Chattering Rattles") "Tukaturkatutuka..."

Description: 543, 544, 545, 547. Sounds very much like Green Woodhoopoe. In flight: 543, 541. With diagonal posture: 543. Hostile?: 543, 547. As "Greeting": 543. By both ♂ and ♀: 544.

At least one "Chattering" Rattle includes prolonged, slightly syllabic, notes: 544-545. This is reminiscent of "song" of *Tockus* spp.

Comment: These complex vocalizations would seem to be high intensity in *f. fistulator*. Higher intensity than the faint "Arrh" Notes. The situation may be rather different in *f. sharpii*. See below.

(6) Wingbeats

Usually quiet. Sometimes slightly noisy: 316. But never anything like *Ceratogymna* spp.

(7) Visual Patterns

CR. While gnawing wood: 286. Near Giant Kingfisher: 289.

"HF" Near Giant Kingfisher: 289

(8) Interspecific Relations

No interaction with Red Colobus

Social segregation among hornbills: 280, 329, 526, 527, 529, 545, 547. Ignore YB's?: 290. YB - *f. fistulator* relations seem to differ from YB - *f. sharpii* relations: 545.

Monitor Abyssinians: 286. May either ignore or monitor Bluebellies: 280. Utters "Chattering Rattles" in answer to Green Woodhoopoe: 544. Pays attention to Giant Kingfisher: 289.

Ignoree parsonius: 545.

Bycanistes f. sharpii

① Habitat

Edge forest: 367. Tall trees: 369, 388. Common Makhou region: 376.

② Feeding

Fruit: 377b. Flycatching: 391.

③ Predation

By Accipiter (Toussenellii or melanoleucus): 377b.

④ Intraspecific Organization

Most individuals not advanced in breeding cycle in December: 388. Sometimes single: 373, 377, 379(?), 384-385, 391, 395. Often in pairs: 369, 372, 377, 379, 380, 383, 390, 394. Groups of 3: 369, 373, 379. Group of 4: 391. Larger group: 367. Occasional (seasonal?) very large groups: 377. Territorial boundary dispute: 395-396. ♀ follows ♂ in flight: 379. ♂ carries fruit to ♀ or nest?: 377b.

There are "contact animals": 380, 394. Allopreening. Usually ♂ preening ♀: 380. Sometimes reciprocal: 394. CR during allopreening: 395.

⑤ "Song" and Related or Associated Patterns

"Aah" or "Aahh" Notes. Single notes, sometimes repeated: 372, 377. Series: 369, 377, 377b, 380, 388, 391, 392, 395. Later notes of series can become bristlabic. Like low intensity "Song": 395. Some notes become particularly long and mournful: 369-371. Could be transcribed as "Aaahh" or "Aaahh". Once these longer notes were also heard to become bristlabic, uttered by bird in flight: 385. Difference in sound between short and long can be fairly great: 370.

Certainly short monosyllabic notes are more common than long and/or bisyllabic notes. The typical notes could also be described as "grunts": 372. They also can be uttered in flight: 342, 343. Sometimes with diagonal posture when perched: 373. Perhaps purely hostile?: 395.

Typical short notes are sometimes accelerated into brief (descending) "chatter": 369. When one ind starts to land near another: 392.

There are more complex "operatic" performances. "Full Song". Descriptions: 383, 384, 386. Three phases. Beginning low, soft, short, wooden "Tuk" notes (or Tukatukatatukatatuk...). Getting louder and more resonant. Then bisyllabic "Aa-ah". Ending with series shorter descending notes. Diagram: 384. Diagonal posture second phase: 384. Whole sequence can be given by apparently solitary individuals: 384-385.

Incomplete performances may be only "Tuk" type notes: 384. These notes might, conceivably be lower intensity than "Aah"s: 384. Or more purely hostile?

Bisyllabic notes can also occur alone, without introductory or terminal phases: 373. Braying. No ritualized postures or movements.

Heard one another "Full Song" of a rather different form: 371. Beginning "Aah aah aah..." Then rising into doublets. Ending in descending, accelerated "chatter" of abbreviated notes.

Some "chatters" could be described as "Laughing".

(c) General Comment Vocalizations

Obviously, superioris is complex. Much more so than in Tockus.

Tonal quality differs between the two subspecies of frater later.

Notes of sharpii can be buzzy and twanging in some circumstances: 369.

But the sounds of sharpii usually are much less roller-like (or woodhoopee-like) than are those of the nominate subspecies: 383.

Bycanistes f. sharpei

(5)

(7) Visual patterns.

Alert V, crown feathers smooth: 375

CR seems to be relaxed or friendly, CS hostile: 376.

(8) Interspecific Relations

There may be some tending to associate with YB: 379, 381. But the two species do not usually interact overtly: 372, 379, 380. Exceptional case of the two species flycatching together: 391.

(9) Miscellaneous

Wing beats not (usually) noisy: 373.

There is considerable sexual dimorphism in size: 379.

December is supposed to be "petite saison sèche" at Makokou: 390.

But it was wet when I was there!

As of May 17, 1984.

Numbering not "main stream" ①

Malaya
Pelargopsis capensis - General

See Malaya notes.

Species is large. Size has consequences

Habitat. Territories seem to be comparatively large: 5, 17. My guide at Tiger Tops said that individuals are never very far from water. I have some data to support to support this. An ind. was seen flying up a creek: 13. An ind. was seen perched low over irrigation channel by rice fields: 3, 4, 6. What was probably the same ind. was seen perched on nearly electric wire on another occasion: 6. Various inds. were seen at various heights in trees by forest streams: 8, 9, 10, 11. Notes on feeding (below) also are relevant. But the species is quite willing to fly (for at least several hundred m.) over land: 17. Inds. may occur high in trees far from water as well as close to it: 8.

Feeding. Occurs only at rare intervals: 6, 11. This presumably is one of the important correlates of large size. In any case, the species seems to carry "roller-like watchfulness" to an extreme. Tiger Tops guide says that species always feeds from water: 31. The "Birds of Nepal" says (or implies) differently (e.g. it mentions lizards as food); but such data as I have suggest that the Tiger Tops man is correct. One ind. certainly perched low over water on repeated occasions: all Goa notes. An ind. was seen to do the same at Chitwan: 11. Two actual plunges into water were seen; one by Chyap, 12; one by me, 22.

General Comment. The species does seem to have a preference for forests or, at least, patches of woods. Less frequently seen in largely open country than the Whitethroat. Probably even less of a "marsh chasser" than the Whitethroat.

P. capensis - Summary

Question. Why are "chasseurs" less well developed in Asia than in Africa? Because southern Asia is (or was a few thons and years ago) more humid than Africa? But then what about New Guinea? (My impression is that the Papuan region is full of "chasseurs".) Is the distribution of "chasseurs" similar to that of shrikes?

General Comment. The Chituran birds seemed to be breeding in April, in full dry season. There must be advantages to breeding when water is low: 26. Fish must be concentrated. Probably also easily visible.

Intraspecific Social Arrangements. Inds. usually seen singly: 3, 4, 5, 6, 8, 9, 11, 12, 13, 17, 18, 22. That this is typical was confirmed by Tiger Tops guide: 31. Pair bonds, if any, must be long distance: 22. I have definite evidence of intraspecific hostility. Apparent supplant: 9. Apparently hostile chasing: 28. Long continued dispute, with much silent chasing back and forth, and many 4-note songs in interval: 9. Sometimes two individuals sing simultaneously: 10, 28. Only a few indications of non-hostile intraspecific relations. Two observed inds. may have been associating with one another: 13. One ind. was seen to follow another, apparently peacefully: 28.

Note. The "spaced out" distribution of the species may help to explain the relative infrequency of vocalizations: 22.

Interspecific Relations. Not very exciting. General comment: 13. Territory or range overlapping White-throat: 3, 4, 13, other references. Territory or range overlapping atthis: 4. Territory or range at least adjacent to Pied: 8. There may conceivably be some sort of "avoidance" between Whitethroat and Forkbill: 20; but I rather doubt it. Usually the two species seem to ignore one another: e.g. 4. Certainly the Forkbill

seems to ignore Whitethroat Chatters (many references) Only once did I hear a Forkbill singing in possible response to White throat songs.

11. Reactions to non-ceraciformes also tend to be rare or absent. (Presumably predators are a case apart). Again only once did I see a Forkbill supplant a drongo (the common open country species): 3. And this may have been "accidental".

General Comment Vocal Repertory. The species is quiet on the whole. Inds. are silent for long periods of time: 3, 4, 5, 6 (see also Tiger Japs notes). As noted above (and 22), the infrequency of vocalizations may be (partly) explained by dispersed distribution of inds. But there are occasional outbursts of noisiness. And these can be both conspicuous and elaborate. One such outburst is recorded on 9 and 10. Interestingly enough, when an ind. does vocalize, it may utter an appreciable diversity of sounds: 10, 15.

Doublets. Description: 11. Mentions in passing: 20, 22. Bill movements visible: 11. No Headbobs, Tailbobs, or Lateral Head-flicks: 11. Possibly an advertising or territorial display: 11. Possibly more hostile than full "songs": 15. But see comments below. Certainly uttered in a variety of physical circumstances. High in tree: 11. In flight, during pursuit, in association with Growls: 14. Doublets in flight succeeded by songs on landing: 14. With possible aerial display: 29. In the air, possibly comparable to Quadruplets of Whitethroat: 29.

Song. Doubtless the term should be in quotation marks. Good description: 9, 10. Mentions in passing: 19, 20, 26, 28. Bill opened, especially during second note: 10. Number of notes involved is variable. Some 2-note phrases are not necessarily "true" Doublets: 6. Descriptions 3-note phrases: 6, 8, 9, 16, 17, 28, (?) 29. 3-note phrases possibly inter-

jected in Aerial Display with Doublets: 29. Descriptions 4-note phrases: 9, 10, 11, 14, 17, 28, 29. 4-note phrases presumably are higher intensity than 3-note phrases: 9. 4-note phrases can be associated with (hostile?) chasing back and forth: 9. Descriptions 5-note phrases: 10, 14, 17, 21, 29, 31. With Carpal-raising in a hostile context: 28. During "dawn chorus": 21. Both 4- and 5-note phrases can be uttered at night: 29. 5-note phrases associated with Growling Chatter, possibly hostile: 28. Both social and physical circumstances are varied. Songs are often uttered by apparently single inds: 6, many other references. Two inds. can sing more or less simultaneously: 10, 28. One ind. was heard to sing after another left on aerial display: 29. Once an ind. uttered songs on landing after Doublets in flight: 14. These songs were introduced by Growling phrases: 14.

The functional difference(s) between songs and Doublets are by no means clear - on the evidence of my observations of capensis alone. Perhaps a critical comparison with vocalizations of other species might be illuminating. By the comparison of the Doublets of the Storkbill with the Quadruplets of the Whitethroat suggested above. It is conceivable (but perhaps not probable?) that full songs are less hostile than Doublets: 19. The night and dawn performances of songs might indicate that they are the "major" advertising or territorial display of the species: 30. Perhaps Doublets are essentially flight (or pre-flight) patterns?

Chatters. Good descriptions: 13, 18. Deep and hoarse (and wooden - much less "clanging" than homologous pattern of Whitethroat): e.g. 18. Five notes may be typical (Chyap): 14. Passing mentions: 20, 30. In flight: 13, 18. By one ind. flying away from another: 13. Probab-

P. capensis - Summary

(5)

ly not just an alarm call: 22.

"Growling Chatters" following 5-note songs in a hostile context: 28. Growls and Chatters may intergrade: 28.

Growls. In flight, during pursuit associated with Doublets: 14. As prelude to Songs after pursuits with Doublets: 14. Presumably strongly hostile, possibly aggressive, perhaps high intensity: 15

For relations with Chatter see above

Possible Aerial Display. With Doublets: 29. Perhaps also with a few 3-note songs: 29.

Carpal-raising. Silent in probably hostile context: 28. Silent with Bill-up in probably hostile context: 9. This sort of pattern (as distinguished from full Wingspread) may be characteristic of species without wing patches: 28.

Bill-up. Not exaggerated By supplanter after supplant, silent, with Carpal-raising: 9.

Lateral Head-flicks. Associated with Songs, Tailbobs, and Headbob, after apparent dispute: 10. Both during and between song phrases.

V-D Headbobs. By quiet bird, sitting by stream, apparently looking for fish: 11. Associated with Songs, Headflicks, Tailbobs, after apparent dispute: 10. Presumably the motivation involved varies in intensity.

V-D Tailbobs. By single bird sitting quietly: 6. Associated with Song, Headflicks, Headbob, in probably hostile context: see above (10).

Check use and definition of "Chatter". Vg comments on

cyanosentris. As far as I remember, "Chatters" of Starbills are
not conspicuously "descending".

as of May 22, 1984 (1)
Numbers are "main stream"

Halcyon cyaniventris - General

All observations February 1979. Probably no more than three individuals. One pair and an "intruder" (neighbor). The "third" individual almost certainly was not a "helper"; its appearance provoked overt hostility.

Area is side road off highway from Yogyakarta to Kaliwring. Village is called "Gentan" (phonetic spelling). Nearer to Yogyakarta than is Pedak.

Habitat. The area where the three birds were seen must be more or less typical of the species. But certainly not entirely natural. A sort of "gallery forest" by village along stream. "Forest" composed of cecropia, breadfruit, bamboo, and many small-leaved dicots: 140. Individuals were seen most frequently high in dead tree edge "forest": 136, 137, 138, 139, 147, other references. In this area, the local cyaniventris seem to be more attached to "forest" than are either the local chloris or the sumyrensis of Jamul Hadu: 138. Most often sides and top of "forest": 138. Not usually (never?) on wires: 140. Kingfishers seem to be generally rare in east-central Java: 140. Perhaps because there is too much silt in local waters?: 142. No "chasseurs" in this area or region: 142. Has east-central Java been semi-dry since Pleistocene?: 146.

Obviously cyaniventris is local representative of sumyrensis group. But it may, conceivably, occupy, viz à viz the local chloris, the same ecological role as the capensis of Nepal viz à viz the local sumyrensis. Not all Halcyon species play the same roles everywhere.

Feeding. Not much in the way of hard data. Feeding probab-

H. cyanoventris - Summary

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ly begins at dawn: 1417. Only prey identified was snake: 139. ♂ apparently feeds snake to ♀: 140. ♀ is not fed before copulation attempt: 144. BW presumably after feeding: 142.

Intraspecific Social Relations. Territories large?: 142.

Apparently hostile encounters. Most notably 136, 145, 149. Lots of visual signals: see below. No actual attacks - typically Halcyon-like (Kingfisher-like?) - in this respect: 149.

No "Greeting" between partners: 137, 138, 139

Copulation. Description: 143, 144. Silent approach by ♂. No Greeting. No feeding of ♀ by ♂. Extreme U-D Tailboobs by ♂. Whole procedure silent. Copulation perhaps not successful; ♀ not very cooperative. Afterwards, ♀ flies away with "Chatter".

Copulations are rare among Halcyon spp.: 144.

General Comment Vocal Repertory. Species (here) vocalizes less frequently than do the White-throats of India: 145, 150. Apparently hostile encounters are either quite silent, 145, or almost silent, 136, 149. (It should be noted, however, that I always was too far away from the birds to hear soft sounds such as growling.) There was one brief, stifled, Rattle at the beginning of one dispute. See also below.

Rattle. Presumably song. Often long, very reminiscent of White throat. Sometimes less loud and metallic: 137. Uttered by perched individual(s), without Intro: 139, 147. Possibly (?) with Intro: 137. Mention: 148. In (ordinary) flight, apparently hostile: 136. In (ritualized) flight display: 147. One brief, stifled, Rattle at beginning of dispute: 149. It is possible (probable?) that females do not utter Rattles, or do so much less frequently than males: 148 and earlier references.

The species does have abbreviated Rattle-like performances. Some are

H. cyanoventris - Summary

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Quadruplets. Uttered by perched individual, in association with Rattles: 139. Softer than Rattles: 139. Perhaps "only" low intensity versions of Rattles: 139. Most abbreviated versions are, however, much less standardized or stereotyped. Range from 1 to 8 notes. Interspersed among Rattles while perched: 147. In full flight display: 147. Doublets and Triplets while perched: 139. "Isset" or "Iscep" Notes. Uttered by perched individual, in association with Rattles and Quadruplets: 139. During aerial chase or pursuit, singly or in irregular jumbles: 137. Perhaps slowed-down version of Rattle (or Quadruplet) notes?: 137.

My comments on these notes should be treated with skepticism. Chatters. Must be careful of definitions. General comment: 138. "Kaa" or "Chak" notes: 136. Mentions in passing: 143, 150. 2-6 notes per burst: 137. Sometimes indistinguishable from White-throat: 140, 143. Sometimes less penetrating and abrupt: 137. Often in flight: 136, 137, 143, 148. At least once uttered by ind. perched in tree: 137. Presumably hostile: 136, 137. Alarm: 140. By retreating ♀, moving away from ♂ after copulation attempt: 144. Apparently as reaction to squirrel (striped, presumably Callosciurus sp.): 148.

General Comment Visual Repertory. The species seems to have a comparatively large number of visual displays and/or it uses them comparatively frequently: 149. Is this correlated with structure of habitat? See above. There are problems (one might have expected swynnensis to be even more visual).

Wing-spread, Wing-droop, Carpal-raising, Tail-spread, and Tail-raise presumably all closely related to one another: 149.

Aerial Performances. Not very ritualized chases: 137. Full (stereotyped) Flight Display: 147, 148. Circular, 40 ft. up. Ending in swoop, wings folded twice. With Rattles of varying lengths. Short (or) series perched.

H. cyanocentrus - Summary

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ominant. But apparently no "fixing" of, or preference for, Quadruplets.
BV (or Bill-up or St.). With Wing-spread, during hostile encounters
138, 149. Without Wing-spread but still apparently hostile: 136. On landing,
without Wing-spread.

Various types of "alert" ("U") postures are common, as usual.
many references

Head-bobs. Rare or absent?

Head-flaps. Rather irregular, during apparently hostile encounter:
143.

BW. After feeding: 142. During hostile encounter: 149. See also below.
After copulation: 144.

BD or PAG. With other hostile visual patterns: 149.

Carpal-raising. Chloris-like, with many other hostile patterns:
149.

Wing-spread. During apparently hostile encounters: 136, 145, 149.
With BV's during hostile encounters: 138, 145. With BV or in V: 149.
Without BV: 145. With BD or PAG, BW, Tail-up, and Tail-spread dur-
ing hostile encounter: 149.

Wing-droop. By apparent intruder, presumably hostile: 145.
With Tail-spread: 145. See also drawing.

WF's. After landing: 143, 147.

Tail-up. With Wing-spread, Tail-spread, BD or PAG, BW,
during hostile encounter: 149.

Tail-spread. With Wing-droop, by apparent intruder, presum-
ably hostile: 145. Without Wing-droop (?): 145. With Wing-spread,
Tail-up, BD or PAG, BW, during hostile encounter: 149.

Tailbobs (actually Tailwagging in this case) By ♂ before cop.

H. cyanoventris - Summary

(5)

relation attempt: 143. Basically a sexual pattern ???: 144.

Tailwagging and Tailpreening are shared with chloris.

Are they characteristic of many Oriental Alcyon spp.?: 146.

Add Front Royal

As of Apr. 13, 1985.
Pago mainstream (and reversed) ①

Halcyon c. cinchonina - General

Observations brief. All near NCS. 165 et seq.

Habitat. Remnant forest, modified, with Coconut Palms: 156. Species is rare and restricted on Guam now: 156. See also Jenkins (1983)

Appearance. Obviously close relative of chloris (Mayr, Fry, everyone agrees on this). Large, crude, coarse. Conspicuous sexual dimorphism in plumage. Is this correlated with the fact that there is only one species of the genus on Guam (contrast Belau)? : 156. And/or with the fact that the birds live in relatively dense forest? : 166. The effects can be curious. ♀ and ♂ look different when close together; similar when apart: 166. Supposed polymorphism: 157.

Interspecific relations. Micro and Chlor are supposed to overlap, at least narrowly on Belau; 157. Jenkins (1983) describes conflicts with starlings and white-eyes.

Feeding. Beetles in "burlap" in palms: 165-167. According to Wood (1968), also lizards, insects and small birds.

Intraspecific relations. Obviously pairs. Relations between mates close in at least one instance: 165-167.

Mates can feed close together (unlike most other Halcyon spp.). Good observations on pp. 165-167.

Beetles taken from burlap by sallying flights. Most sallies successful. Mates feed in rapid succession. Usually alternately. But sometimes ♂ makes 2 flights to the ♀'s one. Feeding more frequently by the ♂ than by the ♀ seems to be a usual Coraciiform character.

All sallies for feeding with sounds. See below.

No "greetings", no CO or Wingspread. But real Jenkins. No obviously "Scratching" notes. But again see below.
♂ leaves ♀ silently: 167

H. c. cinamomea - Summary

(2)

Nesting. According to Wood (1968), in small trees.

Vocalizations Generally quiet (Engbring). Adaptation to forest?: 157.

Sounds during feeding. Mates feeding close together. Sallying flights, more or less alternate (see above). Singlets, 2 notes out, 2 notes "back" (to same or different perch). "Kaa"s. Moderately harsh and hoarse. Some have definite rolling or rattling component "Kaaaa". Almost Rattles. P. 166.

Sounds in flight tend to be briefer and softer when a bird is going directly toward its partner than when it is going to land some distance away: 166.

On the other hand, pure "Kaa kaa"s are most common on way out. "Kaa kaaaa"s on way "back". Pp. 165-166

On longer flights (i.e. changing perches), an ind. may utter longer series up to 5-6 notes. "Kaa"s and "Kaaaa"s, jumbled together in no obvious order. Sometimes ^{mm} component is so strong that effect is hardly distinguishable from "pure" Rattle; 166. Does this suggest that the Rattles of other species are derived by segmentation of single notes rather than by acceleration and abbreviation of many notes???: 166. Is there a real difference?

Is the message during feeding "Keep out of my way!"?: 166. If so, it could be an adaptation to feeding together. There may be duplications for interpretation of the behavior of H. senegalensis: 167.

Squeaks. Again during feeding. But quite distinct. "cheep"?: 166. High pitched, clear, not very loud. Probably uttered by inds. of both sexes.

By birds nearing prey. Sometimes landing after a sally. After feeding decreases, by inds simply perched. Abbreviated Singlets?

Singlet-Doublet Series. By ♀, alone: 167. Two instances

3 loud, harsh "Kaa"s, followed immediately by at least 10 "Kawheeee" notes. The latter are relatively high and fairly clear, but with underlying rattle component. Become progressively softer and perhaps lower. Eventually become slightly trisyllabic. "Kaa-a-wheree" or "Kaa-wheree-

H. c. cinnamomina - Summary

(3)

a. " Little or no TF.

2 loud, harsh "Karo", followed immediately by at least 20 other notes, beginning as "Kawheero" and ending as "Kawheero-a"
^{min}

Again progressively softer and perhaps lower. Clear, tinny, metallic, despite their semi-rattling components.

Presumably, the ♀ was "calling in" her mate.

These Doublets (and semi-Triplets) could, perhaps, be related to the Scratchy Notes of H. chloris.

Note: Jenkins has some comments on vocalizations. He implies that there may be a real Rattle. Also mentions "a soft scratchy or raspy call". Uttered between paired birds close to one another. Given aggressively by 2 females. Nestlings also Rattle "apparently to beg for food" (sic!)

HB Not correlated with vocalizations: 167.

WF's and Wingshakes. Apparently not significant socially: 167.

TF ("Wagging") One instance, ♀ alone. Slight, continuous, no particular emphasis on either V or D. First with Doublets and "Triplets", continuing for a while after vocalization stops. P. 167.

Note. Jenkins mentions "threat" posture. Apparently ♂, "wings held back and away from the body", tail straight down.

Real Fight 2 males. Jenkins, p. 23.

Halcyon chloris - General

Species is very widespread. Habits are varied. My observations are incomplete.

All data cited below without geographical reference are either "general" or based upon studies in Malaya (essentially Kuala Selangor).

Habitat. Mangrove in Malaya: 68, 69, other references, 79. Often actually inside mangrove (contrast with Blackcap): 69. Description of mangrove vegetation at Kuala Selangor: 77. In garden of Raffles, Singapore: 151. Very coastal in Singapore as a whole: 154.

Occurs inland on Sumatra: 116. Not in pure, unbroken stretches of pure rice fields: 118. Apparently absent from heaviest forest also: 118. Seldom or never on wires: 117.

Garden-forest, edge rice fields, Java: 123, 126, 146. Open rice field niche does not seem to be fully occupied on this island. See also notes on cyanerontes.

In forest on Pulau: 154, etc. Also in semi-open area (and on wires) near laboratory, by beach.

Species diversa, is adaptable. But primarily coastal where strong competitors are present.

Feeding. Mostly crabs in mangrove at Kuala Selangor: 81, 84, 85, 88; in Java, 130. Small fish (?) by shallow diagonal dives: 75, 79, 81. Hunts more actively than does ♀ (probably typical of coraciiforms): 75. Feeding rhythm depends upon tide: 85. Rate can be high: 86. Could probing in mud explain black bill?: 86. Lateral headshakes after feeding: 85. Apparent attempt to steal food: 89.

Grasshopper taken from ground, Java: 127, 129. Frog (?) Java: 136. Crepuscular feeding at Pulau (because of frogs?): 159. Lizard, Pulau.

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H. chloris - Summary

163. Territories seem to be large at Belau, possibly because reserves of food are not dense: 161.

Interspecific relations. See above. Nothing very remarkable.

Supposed to overlap, at least narrowly, with cinnamomina at Belau:

157. I did not see any contacts myself.

Chlors and Black-caps adjoin or overlap at Kuala Belanger. Black-caps apparently do not take mangroves; they usually prefer fish: many references, 88. Black-caps probably do not go inside mangrove as frequently as do Chlors. The two species do not usually do not interact with one another visibly: 68, 69, many references, 84, 86. There may be some avoidance mechanism. If so, it is not perfect. I did see a Black-cap fly away from a Chlor:

175. Once, a Chlor supplanted a Black-cap: 80.

Chlors and White-throats seem to be almost allopatric in Malaya Singapore: 68, 69, other references, 155. No interactions were seen. (Again) perhaps avoidance?

Chlors seem to ignore Alcedo atthis: several references, e.g. 84

There were frequent associations or conjunctions of Chlors with (more numerous) Blue-tailed Bee-eaters, Merops philippinus, near Jogjakarta: e.g. 123, 126, 129, 133. Not necessarily truly social. The two species may simply prefer some of the same habitats in this region.

I did not see any contacts between Chlors and cyanoventris near Jogja.

Relations between Chlors and Butorides striatus are occasionally tense at Kuala Belanger. Usually the two species seem to ignore one another: 84. But once a Chlor attacked a single heron: 84. Several times, a Butorides: 85, 89. The critical factor must be competition for food rather than competition for nesting holes.

Obviously the different distributions of these (potentially) competing

Insert 1, p. 3, H. Aloris

attempt Malaya: 74, ♀ joins ♂. Singlets on landing ♀ does silent U-D
TF. ♂ continues "Kra"s, Quadruplets. Some fluttering about. ♀ stands
alert with CO.

A. chloris - Summary

(3)

Intraspecific relations.

Often solitary: 68, 71, 73, 123. Probably more often in pairs, probably everywhere: e.g. 68, 82, 128, 129, many other references. Pairs crowded at Kuala Belangor: 82, 89. The species may even be "semi-gregarious" in Java: 128. There may be some sexual dimorphism in appearance between ♂ and ♀: 133. "Greetings" between mates are at least rare, possibly absent: 84, 85, other references, 133, 160. Displays between mates become less frequent as bonds become stronger: 80. Tiedwing of one individual by another seems to be rare: ¹⁷⁵ 176. Only one case seen. With CO (by receiver), Wingspread and waving (by giver), apparently silent: 81.

Pairbonds can be strong without displays: 82.

Possible precopulatory patterns at Belau: 160. Hoarse, harsh Doublets, probably one Triplet, TF's (emphasis on down), Scratchy Doublets, extreme CO, then one BW. See also 161; i.e. soft Scratchy Doublets and Triplets. Possible

Breeding is supposed to occur twice a year in Sumatra: 117.

Comments on relations between neighbors: 84. Species not always crowded. Territories can be large on Belau: 161. Territorial advertisement (?) with V-D TF's: 73.

Vocalizations. General discussion: 83. Principal patterns are Singlets, Doublets and/or Triplets, and various harsh, scratchy, chattering and/or rattling noises. The basic coraciiform ingredients, with peculiarities, perhaps is not always the same in different areas. On the evidence available now, it is difficult to determine if heard differences are individual or racial. The species is noisy fairly frequently; more frequently than capensis. Most vocalizations do not seem to be provoked by alarm: 71. Vocalizations of different individuals often overlap. There seems to be little or nothing in the way of distinctive "song"; e.g. 130. Unless the Singlet-Doublet or Triplet series should be classified as such.

One remark. The Doublet and related vocalizations of chloris sound

remarkably like some of the sounds of Grackles here. Presumably convergent to the acoustic environments of beaches.

Singlets and Doublets (and/or Triplets +) are often associated with one another; but they can be independent on occasion: 73. See also below.

Singlets. General discussion: 83. Descriptions, "Kaa kaa kaa...": 68, 70, 72, 73, 74, 76, 79, 80, 89, Belau 163. Without doublets: 89. In flight: 89. As landing call: 74. With softer "Kuh" as Intro: 70. Descending "Kuh kuh kuh kuh...": 72. Rising and falling series as "Dawn Song": 83. Long and variable series: 83. Series of Singlets may be uttered in apparent response to Singlet. Doublet performances by mates: 89. Soft "Kaa kaa kaa..." Notes developing from Rattle in Sumatra: 119.

Hoarse "Kaa" Notes during presumably hostile aerial chase, Java: 128

Short Series With this begins a family of patterns. Difficult to distinguish sharply. All apparently multiples and/or modifications of basic Singlet "Kaa".

One multiple may be called "Short Series". Series 4-7 notes heard Sumatra and Java: 117, 131, 132, 133, 146, 147. Series 4-5 notes heard Belau: 158. Many series seem to be nothing more than repetitions of ordinary Singlets. Some are exceptional in being slightly peculiar or "structured". 4-7 note series descending but not accelerating: Sumatra: 117. On Belau, successive short series were heard to get progressively shorter, ending with conventional Doublet: 158. Series may not be stereotyped on Belau: 158. No. of notes in series, 4 or 5 vs. 6, may be real individual differences on Java: 146. Short series probably not high intensity on Java: 147. Perhaps typical short series are not uttered in presence of mate on Belau: 160. Presumed ♀ utters burst (10-12) short series after presumed ♂ leaves, Java: 133. This would seem to suggest that the short series of the *Chloris* of this region cannot be entirely hostile. Calling a mate? If so, the performance is rather different from the apparently equivalent performances of Micronesian Kingfishers.

H. chloris - Summary

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Doublets. Description: 70, 72, 73, 74, 75, 79, etc. In Singapore: 151, 154. On Java: many references, e.g. 133. On Belau: 158, 162. At least in Malaya, pattern could be written "Kaa kuh": 73. (God alone knows if this "Kuh" is the same as the "Kuh"s of some or all Intros.) Most frequently uttered in series with singlets - see below. By birds in flight as well as by perched birds. Good examples of Doublets (possibly alone) in flight: 117, 135. Probably many other references. Rhythm slows down as series continues: 77, 79(?), 82, 86. Possibly Doublets are lower intensity than Singlets?: 74. Possibly a primarily ♀ pattern?: 75. (Actually, I think that both of these suggestions probably are wrong.) Only uttered by one member of pair: 129

Most Doublets by perched birds are with U-D TF's: e.g. 73, 76, 77, 82, 86, many other references, ^{157 Belau} see also below. Doublets with U-D TF's without preceding singlets, definite: 130. One exceptional case. Doublets, associated with singlets, but without TF's: 73. Another exceptional case. Doublets without TF's on Belau: 115.

Series including Both Singlets and Doublets. The most characteristic vocalizations of the species. Given in flight and when perched. Singlets usually precede Doublets: 74, 75, 76, 79, many references, 81, 86, 87, 88, 89, 117, 119, 130, 135. In flight: 73, 76, 81, 82, 86, other references. As "greeting": 81. For call in mate: 87.

Some reversals: Doublets followed by singlets, Belau: 158.

More complex sequences. Alternating Singlets and Doublets beginning with singlets: 86. Alternating Doublets - singlets - Doublets - singlets - Doublets (slowing down): 82. Medley Singlets and Doublets, Belau: 159.

Triplets. Singapore, "Kee kuh kuh" — — — : 157. Belau, "Kee kuh kuh": 158, 161. Perhaps composed of singlet plus Doublet: 161. In flight, Belau: 161. Triplets by perched bird without TF's: 161. Singlet - Triplet series, Belau: 159, 161, 162. Triplet - Doublet series,

With TF's, Belau: 163

H. chloris - Summary

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Belau: 158, 162, 163. Doublet-Triplet series, Belau: 163

Triplets would seem to be particularly characteristic of Belau. An "eastern dialect"? See 161, 162, 163. Uttered by both sexes?

General Comment. Vocalizations may be more variable on Belau than on Java: 158. Just conceivably because there are more species on Java??

Quadruplets. Description — — : 74. Associated with possible copulation attempt: 74. As "Dawn song": 88. Hardly distinguishable from short series: 161. Associated with Triplets, Belau: 161.

Of course, Quadruplets could be described as series of Singlets, redoubled Doublets, extended Triplets, what have you. Do the various definitions or phrases (in words) mean anything?

"Kuk". Soft notes when individual joins mate. early reference: 88. (God alone if these notes differ from Intros or "Kuk"s of Doublets.)

"Muffled 'Chatter'". Soft, descending "Ka ka ka ..." or "Kra kra kra ...". Uttered by individual joining another at Belau: 159. Perhaps a form of "growling" or "Scratchy Notes"? Or related to the "Kuck"s cited by Engberg?

Scratchy Notes. Rather soft. Singlet forms, Belau: 160. "Kawheeee"^{uuuu} Doublets: 160, 161. Triplets "Kawheeee-ah": 161. Are all of these partly sexual? Scratchy notes are characteristic of Belau: 163. This does not mean that the local birds cannot also produce clear notes. See above.

Harsh Notes. During apparent disputes, Singlets and Doublets mixed together, Malaya: 46. Mixed together, Belau: 159. Harsh, loud, growling "Kuw-arr" during interspecific attack and dispute: 85.

"Chak" Notes ("Real Chatter"?), apparently absent: 159

Rattle. Apparently uttered as "Grating" when one individual joins another (mate?): 81. By intruder flying over pair: 86. Near Butorides: 89. Developing into soft, muffled "Kaa kaa kaa ...", Sumatra, as

H. chloris - Summary

(17)

"Greeting", Sumatra: 119.

The Question of a Flight Display. No special version as such: 77. But there is hostile chasing: 128. And, of course, many realizations by flying birds see above.

Visual Patterns. There is one elaborate, conspicuous performance. Otherwise the visual signals of the species are rare and/or only slightly ritualized (if at all). Perhaps only CO and V-D TF's are important.

Bill-up (St). With CO, Java: 127.

HB Presumably int. mov. of locomotion or changing position. Description, Malaya: 72. Rare in this region: 71, 72, 73. At Belau, more forward than upward: 160.

Yawning (Gaping). Description: 73, 74.

BW Possibly not ritualized: 72, 74, 80, 86, 130, other references. Perhaps displacement?: 80, 82. BW or PAG when mate returns: 84. When one bird joins another, Belau: 161.

Chin scratching. The movement. Possibly displacement, with soft Scratchy Notes, Belau: 160.

Leaning forward. With CO and Scratchy Notes, Belau: 162.

CO (Carpi Out). Non-courting(?): 90. By ind. after landing beside mate: 84. With BW, joining mate: 82. By mate receiving fish: 81. Silent as "greeting", Java: 132. Silent as "greeting", Belau: 160. With Scratchy Notes as "greeting", Belau: 162. Slight version by ind. landing alone, Belau: 162. With Bill-up, Java: 162. With V-D TF's and Double etc.: 76, 132 (possibly other instances?).

Wings drooped, not spread, during CO: 85. This exposes bright blue rump.

Wingspread. Not nearly as common in chlor as in some other Halcyon spp. Obviously closely related to CO. I saw at least one intermediate perform-

H. chloris - Summary

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are. Partial Wingspread as "greeting": 81. All other performances complete or even extreme. After attack on conspecific: 85. After attack on Butorides: 84. Landing by Butorides: 89. Silent spread as "greeting" between mates: 90.

U-D TF's. Obviously hostile: 89; on Belau, 1517. Once seen in flight: 89. Usually when perched. Usually with Doublets. But perhaps (???) not at Belau. Some examples typical performances: 173, 175, 176, 177, 82, 86, 89, 128, 130, 132, 135. In alert posture with doublets: 82. With CO: 176, 132. Tail feathers spread during downstroke, during performance with Doublets: 176. Tail feathers not spread: 86 (by bird alone), 89 (next to mate), 127.

At least one silent performance, Java: 126.

TF's may (?) begin with last singlets of elaborate Singlet-Doublet series: 176.

Typical TF's can occur with (presumably typical) Triplets on Belau 164. But they were not seen with Scratch Doublets and Triplets: 167.

Tail up. This may not be very different from TF. Perhaps a hostile signal (?): 88.