

## A FURTHER CONTRIBUTION TO OUR OOLOGICAL KNOWLEDGE OF THE ISLAND OF JAVA (INDONESIA)

by

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The present authors independently from one another studied oological material from Java. The results of their studies are combined in the present paper. Hellebrekers deals with three collections, held by the Rijksmuseum van Natuurlijke Historie at Leiden, brought together (a) by M. E. G. Bartels and his sons (4770 shells), (b) by J. G. Kooiman (280 shells), and (c) by H. J. V. Sody (175 shells). Of these collections those made by Bartels and Sody consist almost exclusively of eggs from West Java, while that made by Kooiman originates from East Java. Hoogerwerf gives details of 1020 shells of his own collection, almost all of which originate from West Java. These were obtained after the appearance in 1949 of a paper in which he published the colour descriptions and measurements of 5680 Javanese eggs which, however, were not weighed (Hoogerwerf, 1949). In the present paper the weights of 2200 of these previously discussed shells are published by Hoogerwerf. The remainder of the 1949 material (including the Bouma collection from Central Java) is in the Zoological Museum at Bogor, Indonesia, and therefore could not be weighed for the present study. In total, below are published the measurements of 6245 and the weights of 8240 shells. A large number of eggs of the families Phalacrocoracidae, Ardeidae, Ciconiidae, Threskiornithidae and Plataleidae of which Hoogerwerf gives details here, were not collected, but put back into the nests after being measured, as this was done also with part of the material reported by him in 1949.

In Hoogerwerf's part it often happens that the number of measured shells is not in accordance with that of the weighed ones. This is caused by the fact that weights of previously examined shells — of which the measurements are not included in the present paper — are added; also the measurements given below, including the extremes and the maximum variations in length within the same clutch, only refer to the supplementary 1020 shells of the Hoogerwerf collection. These particulars, together with all breeding dates, must be considered additions to Hoogerwerf's 1949 paper.

Since the authors employed different methods to obtain their data, their results are given separately under each species. First the results obtained by Hellebrekers are given, to be followed by those of Hoogerwerf.

In the paragraphs listing the material the name of the collection (here indicated as Bartels, Hoogerwerf, Kooiman, or Sody) is followed by the number of studied clutches:  $\frac{1}{3}$  means one clutch of three eggs, etc. As odd shells are indicated eggs that do not belong to a known clutch, or single eggs found in nests of birds known to have clutches of two or more eggs. Next are indicated the months of collecting followed in parentheses by the number of clutches found in each month. The indication of the month is followed by the locality. With common species only the general area (West Java, East Java, etc.) is given, in the case of rare species more exact localities are specified. The figures in parentheses after "Measurements" and "Weight" indicate the number of shells measured (in mm) and weighed (in grammes) respectively. The indication of the average (abbreviated av.) is followed in parentheses by that of the extremes. Of the Hoogerwerf collection usually the largest egg and the maximal variation in length and weight within the same clutch are also given. In the paragraph "Description" the eggs are described with special emphasis on the characters of the markings and the colour, while remarks, if any, are given a special paragraph.

Hellebrekers weighed his eggs with a normal precision balance, giving the weight to a hundredth of a gramme; the large shells were weighed individually by him, otherwise the weight of the complete clutches was established. Originally Hellebrekers measured all eggs of the material at his disposal, later he restricted himself to 50 specimens of each species, making sure that the largest and smallest eggs were included in these 50 so that the maxima and minima indicated are those of the complete material. From the Kooiman and Sody collections Hellebrekers measured and weighed only the eggs of those species which are not or poorly represented in the Bartels collection. Hoogerwerf weighed all shells in the clutch individually with an electric analytic Mettler-balance to a milligramme. The measurements of both authors are to a tenth of a millimeter. Hellebreker's description of the eggs gives his personal impression of the colours, while Hoogerwerf described his material by comparison with Ridgway's (1912) "Color Standards and Color Nomenclature".

Each author is responsible only for his own part of the text, but the second author is also responsible for the scientific names which agree with those used in his first paper (Hoogerwerf, 1949), except for some alterations made in accordance with more moderate views so far as acceptable in the author's opinion. The sequence of species below is the same as used in that previous paper. The English names are almost exclusively copied from Chasen's Handlist (1935).

We have almost exactly followed M. Bartels Jr. and E. Stresemann (1929) when selecting the species breeding in Java. Although in a number of cases breeding is not sufficiently certain so far as our knowledge goes, we included such species too in order to focus attention on them. There also is a possibility that the Bartels collection of birdskins contains indications towards the necessary certainty which induced Bartels to include such doubtful breeding species into his list, but we did not study that collection when compiling the present synopsis.

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#### PODICIPEDIDAE

##### 1. *Podiceps novaehollandiae javanicus* Mayr - Little Grebe

Bartels: 1/1, 1/2, 1/3, 1/4; January (3), March (1); West Java. Measurements (10): av. 35.1 (33.5-37.5)  $\times$  24 (23.1-24.6). Weight (9): av. 0.90 (0.82-1.02).

Description. — The colour is chalky white, nearly always soiled.

Hoogerwerf: 1/4; October; Central Java. Measurements (4): av. 34.73 (34-35.6)  $\times$  23.85 (23.4-24.4); largest egg: 35.6  $\times$  24.4. Weight (1/4): av. 0.909 (0.823-0.970). For five previously recorded breeding dates and nine earlier measured eggs see Hoogerwerf (1949: 5).

Description. — The eggs are almost perfectly ellipsoid, generally obtuse at the ends. The colour is almost pure white, nearly always dirty, perhaps principally caused by external influences. When held up against the light the shell in freshly blown eggs is sea-green.

#### PHAETONTIDAE

##### 2. *Phaeton lepturus* Daudin subsp. — White-tailed Tropic Bird

Bartels: 1; July; Rongkob, south coast of Central Java. Measurements: 52.8  $\times$  40.6. Weight: 3.65.

Description. — The shape is normal, the texture is lustreless, the ground is white with a purplish tinge densely covered with small dark purplish-brown spots, especially at the pointed end where they form a cap.

Hoogerwerf: No material available. The species is very rare in Java.

Remarks. — For pictures of three eggs of *Phaeton rubricauda westralis* Mathews, which are much like those of the present species, see Hoogerwerf (1949: pl. I fig. 1-3) and for a description of the shells of *P. rubricauda* see Van Bemmél & Hoogerwerf (1940: 452).

#### PHALACROCORACIDAE

3. **Phalacrocorax s. sulcirostris** (Brandt) — Little Black Cormorant  
Bartels: No material available.

Hoogerwerf: 3/2, 8/3, 11/4, 4/5, 8 odd shells; February (2), March (12), May (5), June (8), July (1), December (2); Birdsanctuary Pulau Dua, West Java. Measurements (102): av. 51.68 (46.9-57.8) × 33.15 (30.3-35.8); largest egg: 57.8 × 34.5; maximal variation in length in the same clutch: 4.4 (51.7-56.1). Weight (30): av. 2.907 (2.295-3.542); maximal variation in the same clutch: 0.914 (2.628-3.542). For five previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 6, pl. I fig. 4).

Description. — The eggs are regularly elongate-oval with equal or almost equal ends; the texture is fairly rough. The colour is Niagara- or sea-green, covered with a thick chalky layer which becomes soiled during incubation.

Remarks. — There is no material of this cormorant in the Bartels collection as is neither the case with *Nycticorax caledonicus* (no. 17), *Plegadis falcinellus* (no. 23), *Platalea leucorodia* (no. 24<sup>a</sup>), *Esacus magnirostris* (no. 73), and *Sterna albifrons* (no. 74). All these species were not yet known as breeding birds from Java at the time the eggs of the Bartels collection were obtained. *Nycticorax caledonicus*, *Platalea leucorodia* and the present species were even not yet known to occur on Java.

4. **Phalacrocorax pygmaeus niger** (Vieillot) — Little Cormorant

Bartels: 1/3, 1/4; March; West Java. Measurements (7): av. 43.8 (39.6-46) × 28.2 (27.3-29.1). Weight (7): av. 1.59.

Description. — The eggs are pale green, almost invariably covered with a chalky layer.

Hoogerwerf: 3/3, 1/4, 2 odd shells; February (1), March (3); West Java. Measurements (13): av. 44.65 (42.3-47.8) × 27.62 (26.3-28); largest egg: 47.8 × 26.3; maximal variation in length in the same clutch: 3.8 (42.6-46.4). Weight (3/3, 1/4, 2 odd shells): av. 1.484 (1.353-1.656); maximal variation in

the same clutch: 0.233 (1.400-1.633). For 39 previously recorded breeding dates and 117 earlier measured eggs see Hoogerwerf (1949:7, pl. 1 fig. 5).

Description. — Most eggs are elliptical oval, often compressed towards the ends, in texture and colour resembling those of the preceding species, but generally lighter.

5. **Anhinga rufa melanogaster** Pennant — Darter or Snake Bird.

Bartels: 1/1, 1/2; April; Sedari, northcoast of West Java. Measurements (3): av. 51.1 × 33.4. Weight (3): av. 3.10.

Description. — The colour is light greenish white, often soiled.

Hoogerwerf: For eight previously recorded breeding dates and two earlier measured eggs see Hoogerwerf (1949:8).

Description. — The eggs we have seen do not differ from those of *Phalacrocorax sulcirostris* (no. 3).

Remarks. — The eggs of the Bartels collection, originating from West Java are considerably smaller than the few shells examined by me obtained from East Java.

ARDEIDAE

6. **Ardea s. sumatrana** Raffles — Dusky-gray Heron

Bartels: No material available.

Hoogerwerf: No material available. This heron may be considered a very rare breeding species in Java. For some particulars compiled from literature see Hoogerwerf (1949:8-9).

7. **Ardea cinerea rectirostris** Gould — Common Heron

Bartels: 2/1, 2/2, 1/3, 1/4; May; West Java. Measurements (13): av. 57 (53.2-61.8) × 42 (39.2-44.1). Weight (13): av. 3.88 (3.47-4.60).

Description. — The colour is greenish blue.

Hoogerwerf: 4/3, 3/4, 4 odd shells; October (5), December (6); West Java. Measurements (28): av. 56.21 (51.5-59.5) × 42.11 (38.8-44.8); largest egg: 59.5 × 42.3; maximal variation in length in the same clutch: 7.1 (51.5-58.6). Weight (2/4, 4 odd shells): av. 3.902 (3.237-4.381); maximal variation in the same clutch: 0.630 (3.705-4.335). For 27 previously recorded breeding dates and 61 earlier measured eggs see Hoogerwerf (1949:9).

Description. — Resembling the eggs of the European subspecies: varying tints of bluish green, becoming lighter during incubation and usually soiled, often by excrements.

8. ***Ardea purpurea manilensis*** Meyen — Purple Heron

Bartels: 2/1, 1/2, 1/3, 1/4; February (4), May (1); West Java. Measurements (11): av. 56.5 (54.2-59.2) × 41.2 (39.6-44). Weight (11): av. 3.30 (3.20-3.40).

Description. — The colour is greenish blue.

Hoogerwerf: 7/2, 6/3; March (2), December (11); West Java. Measurements (32): av. 59.13 (52.5-61.9) × 41.31 (38.7-42.9); largest egg: 61.9 × 40.3; maximal variation in length in the same clutch: 7.0 (52.5-59.5). Weight (2/2, 2/3): av. 3.442 (3.134-3.762); maximal variation in the same clutch: 0.272 (3.490-3.762). For 36 previously recorded breeding dates and 52 earlier measured eggs see Hoogerwerf (1949:10).

Description. — Very similar to the eggs of *Ardea cinerea* (no. 7), perhaps averaging somewhat finer grained and paler in colour.

9. ***Egretta alba modesta*** (Gray) — Larger Egret

Bartels: 1/2, 2/3, 1/4, 1/5; March; West Java. Measurements (17): av. 54.2 (51.6-57) × 38.2 (36.8-39.9). Weight (17): av. 2.97 (2.63-3.47).

Description. — The eggs are greenish blue in colour.

Hoogerwerf: 1/2, 1/4; February, December; West Java. Measurements (6): av. 53.22 (51.8-54.2) × 38.58 (36.9-40.3); largest egg: 54.2 × 40.3; maximal variation in length in the same clutch: 2.4 (51.8-54.2). Weight (1/2, 1/4): av. 3.045 (2.497-3.378); maximal variation in the same clutch: 0.230 (3.148-3.378). For 34 previously recorded breeding dates and 61 earlier measured eggs see Hoogerwerf (1949:10-11).

Description. — Rather similar to the eggs of the preceding species but the texture averages finer, often very dirty.

10. ***Egretta i. intermedia*** (Wagler) — Smaller Egret

Bartels: 3/2, 2/3; June (1), July (3), August (1); West Java. Measurements (12): av. 47 (44.2-49.3) × 33.8 (32.1-35). Weight (12): av. 1.78 (1.58-1.90).

Description. — The colour is pale greenish blue, almost white with a greenish blue tinge.

Remarks. — Schönwetter's measurements for 145 eggs were: 47.2 (42.5-52.5) × 35 (31-38.4). Weight: 2.15 (1.87-2.60). These measurements agree fairly well with those as found for the material of the Bartels collection, but the average weight differs considerably.

Hoogerwerf: 1/2, 2/3, 1/4; March (2), December (2); West Java. Measurements (12): av. 49.1 (45.5-52.6) × 36 (33.7-37.5); largest egg: 52.6 × 37.2;

maximal variation in length in the same clutch: 2.5 (45.5-48). Weight (1/2, 2/3, 1/4): av. 2.302 (1.786-2.709); maximal variation in the same clutch: 0.181 (1.786-1.967). For 42 previously recorded breeding dates and 75 earlier measured eggs see Hoogerwerf (1949:11).

Description. — Much like the eggs of the next species, but usually soiled to a smaller degree.

Remarks. — The average measurements of these 12 eggs are considerably greater than those published by me in 1949 after measuring 75 eggs, though in both cases the identity of all eggs examined by me is doubtlessly correct. The discrepancies may be caused by the considerable difference in quantity of the examined material. Though measurements and weight of my material fairly well agree with those given by Schönwetter, the average and extreme weights and measurements as found by me, differ considerably from those established for the shells of the Bartels collection. Therefore it may be not excluded that some eggs of the latter collection are wrongly identified and in fact originate from *Egretta garzetta* (no. 11).

#### 11. *Egretta garzetta nigripes* (Temminck) — Little Egret

Bartels: 1/2, 2/3, 1/4, 1/5; July; West Java. Measurements (17): av. 42.2 (37.5-47) × 31.2 (30.1-32.5). Weight (17): av. 1.42 (1.33-1.57).

Description. — The eggs strongly resemble those of the preceding species, but are somewhat darker.

Remarks. — Schönwetter's measurements for 100 eggs are: 46 (40-48.5) × 33.5 (29-35.5). Weight: 1.96 (1.50-2.20). Even if the eggs of Schönwetter are collected outside Java, it seems not likely that the difference in length (9%), in width (7%) and weight (36%) could be so large. I suppose therefore that a mistake in identification has been made by either Bartels or Schönwetter.

Hoogerwerf: 2/3; February; West Java. Measurements (6): av. 43.53 (41.5-45.3) × 30.93 (30-31.7); largest egg: 45.3 × 30; maximal variation in length in the same clutch: 1.2 (41.5-42.7). Weight (2/3): av. 1.301 (1.220-1.360); maximal variation in the same clutch: 0.089 (1.220-1.309). For 49 previously recorded breeding dates and 108 earlier measured eggs see Hoogerwerf (1949:12, pl. 1 fig. 6).

Description. — The eggs vary much in shape, they are usually perfect- or broad-oval, often almost equal at both ends; the texture is fine-grained, inclined to be glossy. The colour is bluish green, often paler than the eggs of the larger heron species discussed above, most strongly resembling those of *Bubulcus ibis* (no. 13), usually very dirty. As is the case with all heron

species mentioned above, the original colour of the shells turns paler at long storage.

Remarks. — There seems no reason to doubt the identity of the eggs originating from the Bartels collection because the measurements of the many shells found by me as published above and recorded previously, agree fairly well with those of Bartels. The same holds good for the weight of the few eggs weighed by me. The average size as published by Schönwetter is too large for shells of the Javanese subspecies and the weight considerably too great. Because the exact localities of origin of the eggs examined by Schönwetter is not mentioned, it is of no use to compare his data with those of material from Java.

12. **Egretta s. sacra** (Gmelin) — Reef Heron

Bartels: 1/3; June; West Java. Measurements (3): av. 44.2 × 33.6. Weight (3): av. 1.70 (large holes).

Description. — The shells are white with a bluish tinge.

Hoogerwerf: For four previously recorded breeding dates and some earlier measured eggs see Hoogerwerf (1949: 12, pl. 1 fig. 7).

Description. — The few eggs we have seen are rather similar to those of the following species, perhaps averaging a trifle darker. The shells examined were very dirty.

13. **Bubulcus ibis coromandus** (Boddaert). — Cattle Egret

Bartels: 1/1, 4/2, 2/3; July; West Java. Measurements (15): av. 44.4 (41.2-46.6) × 33 (32.3-33.9). Weight (15): av. 1.65 (1.50-1.80).

Description. — The colour is white with a greenish tinge.

Hoogerwerf: For 68 previously recorded breeding dates and 148 earlier measured eggs see Hoogerwerf (1949: 13).

Description. — The eggs are generally broad- to perfect-oval with only slightly differing ends, the texture is smooth and fine. Because of their paler tint they differ rather strikingly in colour from those of nearly all other heron species; many shells are almost white though usually very dirty.

14. **Ardeola ralloides speciosa** (Horsfield) — Pond Heron

Bartels: 1/1, 1/2, 1/3; May (1); June (2); West Java. Measurements (6): av. 38.5 (36.6-40.2) × 27.9 (26.1-29.6). Weight (6): av. 0.87 (0.82-0.95).

Description. — The colour is very pale greenish or bluish white, almost white.



Hoogerwerf: 3/3; February, March; West Java. Measurements (9): av. 37.6 (35.8-40.9)  $\times$  28.34 (27.8-29.4); largest egg: 40.9  $\times$  28.6; maximal variation in length in the same clutch: 2.3 (38.6-40.9). Weight (3/3): av. 0.939 (0.880-1.050); maximal variation in the same clutch: 0.107 (0.943-1.050). For 128 previously recorded breeding dates and 121 earlier measured eggs see Hoogerwerf (1949: 14, pl. 1 fig. 8).

Description. — Much like the eggs of the Little Egret (no. 11), but averaging a trifle broader oval and the texture is still finer.

15. **Butoridus striatus javanicus** (Horsfield) — Little Green Heron

Bartels: 2/1, 3/2, 3/3; March (6), May (2); West Java. Measurements (17): av. 36.3 (33-40.2)  $\times$  27.4 (25.9-29). Weight (17): av. 0.79 (0.70-0.87).

Description. — The eggs are pale greenish blue.

Hoogerwerf: 1/2; May; West Java. Measurements (2): 37.7  $\times$  27.7, 36.8  $\times$  27.1. Weight (2/2): av. 0.780 (0.716-0.863); maximal variation in the same clutch: 0.147 (0.716-0.863). For 12 previously recorded breeding dates and four earlier measured eggs see Hoogerwerf (1949: 14, pl. 1 fig. 9).

Description. — Very similar to the eggs of the preceding species, but averaging perhaps longer oval; often almost equal at both ends.

16. **Nycticorax n. nycticorax** (L.) — Night Heron

Bartels: 3/2, 6/3; June (6), July (3); West Java. Measurements (24): av. 49.8 (43.5-52.2)  $\times$  35.4 (31.8-38.3). Weight (24): av. 2.10 (1.72-2.54).

Description. — The colour is pale greenish blue.

Hoogerwerf: 2/3; March; West Java. Measurements (6): av. 48.6 (46.8-54)  $\times$  34.37 (32.2-36); largest egg: 54  $\times$  32.2; maximal variation in length in the same clutch: 6.6 (47.4-54). Weight (2/3): av. 1.935 (1.648-2.142); maximal variation in the same clutch: 0.336 (1.648-1.984). For 47 previously recorded breeding dates and 90 earlier measured eggs see Hoogerwerf (1949: 15, pl. 1 fig. 10).

Description. — Rather similar in shape and colour to the eggs of *Egretta garzetta* (no. 11), generally normal or elongate oval, often almost equal at both ends; the texture is usually not so fine.

17. **Nycticorax caledonicus** (Gmelin) subsp. — Nankeen Heron

Bartels: No material available.

Hoogerwerf: For five previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 16).

Description. — Except in size equal to the eggs of the preceding species.  
 Remarks. — See remark under species no. 3.

18. ***Ixobrychus c. cinnamomeus*** (Gmelin) — Chestnut Bittern

Bartels: 6/2, 13/3, 11/4, 1/5; January (4), February (3), March (14), April (1), June (1), August (1), September (2), October (1), November (2), December (2); West Java. Measurements (90): av. 33.6 (30.5-37.4) × 26.3 (24.5-28.3). Weight (71): av. 0.66 (0.60-0.74).

Description. — The shells are chalky white, some with a greenish or bluish tint.

Hoogerwerf: 1/3; July; West Java. Measurements (3): av. 33.03 (32.2-33.6) × 26 (26); largest egg: 33.6 × 26. Weight (94): av. 0.630 (0.523-0.747); maximal variation in the same clutch: 0.166 (0.540-0.706). For 62 previously recorded breeding dates and 102 earlier measured eggs see Hoogerwerf (1949: 17, pl. 1 fig. 11).

Description. — The eggs vary much in shape with usually not or hardly differing obtuse ends; often with a fairly rough texture and very light in colour, much like the shells of the Cattle Egret (no. 13), becoming soiled as incubation progresses.

19. ***Dupetor f. flavicollis*** (Latham) — Black Bittern

Bartels: 1/3; May; Rawah Tangerang, West Java. Measurements (3): av. 42.8 × 31.7. Weight (3): av. 1.09 (large holes).

Description. — The colour is white with a very slight bluish tint.

Hoogerwerf: 1/4; April; New Guinea (subsp. *gouldi* (Bonaparte)). Measurements (4): av. 41.5 (40.8-42.2) × 31.88 (31.5-32.1); largest egg: 42.2 × 32.1. Weight (1/4): av. 1.225 (1.171-1.265). For one previously measured egg from Java (subsp. *flavicollis* (Latham)) see Hoogerwerf (1949: 17).

Description. — The very few eggs examined are in texture and colour much like those of the preceding species. They are broad-, sometimes perfect-oval, generally with almost equal ends; the texture is fine-grained or fairly rough, inclined to be glossy. The colour is chalky white, almost unsoiled when freshly laid, becoming stained as incubation proceeds.

CICONIIDAE

20. ***Ciconia e. episcopus*** (Boddaert) — White-headed Stork

Bartels: No material available.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 18). Almost nothing is known about the breeding of this species in Java.

21. **Leptoptilos javanicus** (Horsfield) — Lesser Adjutant Bird

Bartels: 9/1; March; West Java. Measurements (9): av. 75 (70.6-80.3) × 54.2 (52.2-57.3). Weight (9): av. 12.17 (10.80-14.50).

Description. — The colour is white with a greenish or bluish tint.

Hoogerwerf: For six previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 18-19).

Description. — Except in size the eggs are rather similar to those of the following species but they are broader oval, usually more pointed at the smaller end; the texture averages more porous, somewhat like the shells of certain birds of prey; surface often much stained because of dirt.

Remarks. — The eggs of the Bartels collection are considerably larger than those previously measured by me and it is rather strange that all clutches in this collection are said to contain only one egg, which certainly is not the normal clutch.

22. **Ibis cinereus** (Raffles) — Southern Painted Stork

Bartels: 8/3; May (5), July (3); West Java. Measurements (24): av. 64.8 (62-68.2) × 45.4 (43.3-47.9). Weight (24): av. 7.07 (6.35-7.70).

Description. — White with a greenish or bluish tint.

Hoogerwerf: 1/3; March; West Java. Measurements (3): av. 63.3 (62.7-64.1) × 45.07 (43.9-45.7); largest egg: 64.1 × 45.6. Weight (1/3): av. 6.864 (6.330-7.144). For 17 previously recorded breeding dates and 44 earlier measured eggs see Hoogerwerf (1949: 19).

Description. — Much like the eggs of *Threskiornis aethiopica* (no. 24), averaging perhaps broader oval with little difference between the two ends; fairly rough surface which is chalky white, slightly bluish green when held up against the light, sometimes unsoiled but usually very dirty.

THRESKIORNITHIDAE

23. **Plegadis falcinellus peregrinus** (Bonaparte) — Glossy Ibis

Bartels: No material available.

Hoogerwerf: 16/2, 21/3, 2/4, 7 odd shells; May (16), July (23), August (3), September (3); Birdsanctuary Pulau Dua, West Java. Measurements (110): av. 50.32 (43.2-56.1) × 34.55 (31-36.8); largest egg: 56.1 × 35.6;

maximal variation in length in the same clutch: 6.4 (43.8-50.2). Weight (32): av. 2.325 (1.677-2.914); maximal variation in the same clutch: 0.580 (1.844-2.424). For four previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 20).

Description. — Very beautiful eggs, regular- or almost perfect-oval, usually distinctly pointed towards one end, with a smooth texture which is dull or faintly glossy; the colour is clear bluish green, becoming stained and lighter during incubation.

Remarks. — See remark under species no. 3.

24. **Threskiornis aethiopica melanocephala** (Latham) — White Ibis

Bartels: 2/3, 4/2; August; West Java. Measurements (14): av. 62.9 (58-68) × 42.6 (41.1-44.6). Weight (14): av. 5.40 (5.00-6.20).

Description. — The colour is white with a greenish tint, it is usually stained.

Hoogerwerf: 1/2, 2/3, 3 odd shells; May (4), July (1), August (1); West Java. Measurements (11): av. 62.31 (59.4-65.1) × 41.43 (39.2-44.2); largest egg: 65.1 × 40.5; maximal variation in length in the same clutch: 4.3 (60.8-65.1). Weight (1/2, 1/3): av. 5.073 (4.651-5.467); maximal variation in the same clutch: 0.816 (4.651-5.467). For 20 previously recorded breeding dates and 41 earlier measured eggs see Hoogerwerf (1949: 21, pl. 2 fig. 12).

Description. — Resembling the eggs of *Ibis cinereus* (no. 22), but usually narrower oval with often almost equal ends and a smoother surface; the colour is almost white or somewhat bluish green, but generally very soiled though clean shells are no exceptions in freshly laid eggs.

PLATALEIDAE

24a. **Platalea leucorodia regia** Gould — Spoonbill

Bartels: No material available.

Hoogerwerf: 2/4, 1/5, 5 odd shells; March (1), April (1), May (3), July (1), September (1); Birdsanctuary Pulau Dua, West Java. Measurements (18): av. 63.63 (58.5-69.6) × 43.33 (40.1-44.9); largest egg: 69.6 × 42.6; maximal variation in length in the same clutch: 4.0 (60.5-64.5). Weight (3 odd shells): av. 5.854 (5.608-6.478). Not previously recorded from Indonesia.

Description. — Similar to the eggs of the European Spoonbill and when soiled, as often is the case, almost indistinguishable from those of the

preceding species, though usually perhaps a stronger difference between the two ends.

Remarks. — See remark under species no. 3.

#### ANATIDAE

25. **Dendrocygna a. arcuata** (Horsfield) — Wandering Whistling Teal  
Bartels: No material available.

Hoogerwerf: 4 odd shells; March; New Guinea (near Merauke).  
Measurements (4): av. 50.9 (49.8-52.3) × 38.05 (36.8-39.7); largest egg:  
52.3 × 36.8. Weight (4): av. 4.807 (4.462-5.072). Not previously recorded  
from Indonesia; almost nothing is known about the breeding of this species  
in Java. For some particulars derived from the literature see Hoogerwerf  
(1949: 21-22).

Description. — The eggs are broad-, sometimes perfect-oval with  
generally almost equal ends; the texture is fine-grained or fairly rough,  
inclined to be glossy increasing during incubation. The colour is chalky  
white, almost unsoiled when freshly laid, becoming stained as incubation  
progresses.

26. **Dendrocygna javanica** (Horsfield) — Javanese Whistling Teal

Bartels: 2/1; February; Muara Puding, Rantja Daon, West Java.  
Measurements (2): av. 48.9 × 37.5. Weight (2): av. 3.27.

Description. — The colour is white with a greenish tint.

Remarks. — In the Kooiman collection there is one doubtful egg:  
47.1 × 38.1; weight: 2.25; no further particulars are available; the  
ground colour is lustreless white. Schönwetter's average weight for 160 eggs  
of this species is 3.70 g.

Hoogerwerf: For six previously recorded breeding dates and ten earlier  
measured eggs, originating from the Tjitarum Estuary near Djakarta, see  
Hoogerwerf (1949: 22).

Description. — The eggs are perfect- or broad-oval, almost equal at both  
ends; the texture is smooth and close-grained, inclined to be glossy. The  
colour is almost white or creamy white, often stained making the impression  
of natural markings.

27. **Anas superciliosa rogersi** Mathews — Australian Wild Duck

Bartels: No material available.

Hoogerwerf: For three previously measured eggs from the island of  
Buru (Moluccas) see Hoogerwerf (1949: 22). There are no reliable  
records about the breeding of this large duck in Java.

Description. — The very few eggs examined are broad-oval showing only slightly differing ends; the texture is smooth and faintly glossy, the colour light olive tinged chamois or pale buff, slightly stained.

28. **Anas g. gibberifrons** S. Müller — Wood Teal

Bartels: 1/10; April; Muara Gembong near Djakarta. Measurements (9): av. 47.5 (46.3-49.5) × 34.3 (33.3-35.5). Weight (9): av. 2.84.

Description. — The colour is creamy like the eggs of *Anas querquedula* L.

Hoogerwerf: For eight previously recorded breeding dates and three earlier measured eggs originating from a coral island in Djakarta Bay, West Java, see Hoogerwerf (1949: 23).

Description. — Much like the eggs of the European Garganey; they vary considerably in shape, but there is generally little difference between both ends; the texture is smooth, dull or slightly glossy. The colour is dirty cream, slightly stained.

29. **Aythya a. australis** (Eyton) — Australian White-Eye

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from literature see Hoogerwerf (1949: 23-24). The only known breeding records are from the Yang Highland in East Java.

Remarks. — The subspecific name *ledeboeri* (Bartels & Franck) for representatives of this rare species living in Java cannot be upheld.

30. **Nettapus c. coromandelianus** (Gmelin) — Cotton Teal

Bartels: No material available.

Hoogerwerf: No material available. For some particulars derived from literature see Hoogerwerf (1949: 24). There are no reliable particulars available about the breeding of this extremely rare species in Java.

31. **Cairina scutulata** (Müller) — White-winged Wood-Duck

Bartels: No material available.

Hoogerwerf: For five previously recorded breeding dates and two earlier measured eggs originating from South Sumatra see Hoogerwerf (1949: 24-25). Nothing is known about the breeding of this very rare duck in Java.

Description. — The only two eggs examined show some resemblance to those of *Pavo muticus* (no. 56), though the texture is finer grained, dull

or slightly glossy. They are elongate-oval, pointed at the smaller end, though obtuse. The colour is dirty cream but stained, apparently caused by dirt.

## ACCIPITRIDAE

32. **Elanus caeruleus hypoleucus** Gould — Black-winged Kite

Bartels: 3/1, 3/2, 3/3, 1/4; March (1), June (2), July (2), August (3), September (2); West Java. Measurements (22): av. 40.8 (38.9-43.5) × 31.8 (30.8-32.7). Weight (19): av. 1.60 (1.50-1.80).

Description. — The eggs resemble those of *Falco tinnunculus* Linnaeus but show more of the white ground.

Hoogerwerf: 1/2; July; West Java. Measurements (2): 43.2 × 31.5, 41.9 × 31.2. Weight (2/2, 1/4): av. 1.538 (1.359-1.757); maximal variation in the same clutch: 0.092 (1.359-1.451). For 11 previously recorded breeding dates and 12 earlier measured eggs see Hoogerwerf (1949: 25, pl. 2 fig. 13, 14).

Description. — The eggs resemble those of the European Kestrel; they are perfect- or broad-oval with slightly differing ends; the texture is smooth without or with very little gloss. The colour is chalky white, greenish when held up against the light, often almost completely covered with a varying number of irregular cloudy markings of chestnut, chocolate or olive brown, sometimes almost black.

33. **Pernis p. ptilorhyncus** (Temminck) — Honey-Buzzard

Bartels: 1/1; October; Situ Gunung near Sukabumi, West Java. Measurements: 56.2 × 42.5. Weight: 4.40.

Description. — This egg resembles those of most birds of prey, being rather globular in shape; the texture is fairly smooth and white, rather densely and uniformly marked with small purplish brown spots and striking purplish shell-marks, especially at the blunt end.

Hoogerwerf: No material available. For some previously published particulars of the species from continental Asia see Hoogerwerf (1949: 26-27).

34. **Haliastur indus intermedius** Blyth — Brahminy Kite

Bartels: 4/1, 12/2, 3/3; April (1), May (4), June (5), July (5), August (4); West Java. Measurements (37): av. 53 (49-57.5) × 41.9 (39.4-45.6). Weight (34): av. 4.15 (3.70-4.80).

Description. — The eggs are white, normally not or poorly marked; two

eggs, however, are very distinctly marked resembling those of *Pernis apivorus* (L.).

Hoogerwerf: 1 egg, no further particulars. Measurements:  $51 \times 40.6$ . Weight (2/2, 2 odd shells): av. 4.112 (3.341-4.593); maximal variation in the same clutch: 0.412 (4.181-4.593). For 37 previously recorded breeding dates and 32 earlier measured eggs see Hoogerwerf (1949: 27, pl. 2 fig. 15-18).

Description. — The eggs are perfect- or broad-oval, almost equal at both ends with a rough surface, which is dull or faintly glossy. The colour is white, slightly tinged with green or greyish green, covered by a varying number of dots, stains and blotches of which the primary ones in some specimens are brown or sepia, sometimes tinged with olive, being almost black in others. The secondary markings are greyish lavender, buffy, vinaceous grey or lilac. In certain eggs the primary mottling fails almost completely, and sometimes there are hardly any markings at all.

35. **Accipiter t. trivirgatus** (Temminck) — Crested Goshawk

Bartels: 3/1, 5/2; February (1), April (2), October (1), November (1), December (3); West Java. Measurements (13): av.  $45.1 (42.1-49.4) \times 36.4 (35.1-38.2)$ . Weight (13): av. 2.40 (2.20-2.80).

Description. — The eggs are bluish white, some have brownish smears, presumably caused by nest-dirt.

Hoogerwerf: 1/2, without further particulars. Measurements (2):  $44.8 \times 35, 44.6 \times 37$ . Weight (2/2, 1/3): av. 2.460 (2.290-2.883); maximal variation in the same clutch: 0.545 (2.338-2.883). For five previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 28-29, pl. 3 fig. 19).

Description. — The eggs resemble those of *Ixobrychus cinnamomeus* (no. 18), they are perfect- to broad-oval, slightly compressed towards one end; the texture is smooth or rather rough, dull or slightly glossy. The colour is white or greenish white, covered with thin cloudy markings which are brownish, buffy or tawny, apparently largely caused by external influences (fermentation of the leaves lining the nest).

36. **Accipiter v. virgatus** (Temminck) — Small Sparrow-Hawk

Bartels: 1/1, 3/2; April (1), May (2), June (1); West Java. Measurements (7): av.  $36.8 (35.8-38.4) \times 29.7 (28.6-30.8)$ . Weight (7): av. 1.20 (1.10-1.30).



Kooiman: 1/3; Idjen Highland, East Java. Measurements:  $35.8 \times 28.3$ . Weight: 1.21.

Description. — The eggs are similar to those of *Accipiter trivirgatus* (no. 35).

Hoogerwerf: 2/2; April, June; West Java. Measurements (4): av.  $36.58$  ( $35.5-37.8$ )  $\times$   $29.43$  ( $29-29.7$ ); largest egg:  $37.8 \times 29.7$ ; maximal variation in length in the same clutch: 0.7 ( $37.1-37.8$ ). Weight (3/2): av. 1.329 (1.131-1.428); maximal variation in the same clutch: 0.131 (1.131-1.262). For three previously recorded breeding dates and two earlier measured eggs see Hoogerwerf (1949: 29).

Description. — Except in size the eggs are much like those of the preceding species.

37. **Butastur liventer** (Temminck) — Fulvous-winged Buzzard-Eagle

Bartels: 1/2, 1/3; May, August; Pamanukan, eastern part of West Java. Measurements (2): av.  $48.5 \times 39.9$ . Weight: 3.80 (spotted and blotched). Measurements (3): av.  $48.1 \times 39.0$ . Weight: 2.80 (unmarked). See below under remarks.

Kooiman: 1/3; Dampar, East Java. Measurements (3): av.  $41.5 \times 33$ . Weight (3): av. 1.95.

Description. — The eggs of the 2-set are sparingly, but evenly marked with small yellowish brown spots; in the eggs of the 3-set the texture is rather rough and dull, the colour is white and there are no markings. The eggs from the Kooiman collection are lustreless white with a creamy tint.

Remarks. — Schönwetter gave the following measurements for 16 eggs of unknown origin:  $46.3 \times 37.9$ . Weight: 2.63 (2.40-2.90). He remarked: "selten besser gezeichnet". Because of these discrepancies the identity of the 2-set of the Bartels collection may be considered doubtful. On account of the very small size and low weight, the eggs of the Kooiman collection are certainly wrongly identified.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 30).

Remarks. — Because there is no certainty that Schönwetter's material indeed is of this species, which is extremely rare in Java, there is no reason to doubt the identity of Bartels' 2-clutch with an average weight of 0.90 g higher than Schönwetter's maximum. However, because of the very small dimensions and weight of Kooiman's 3-set, the identity of this material must be strongly doubted.

38. **Spizaetus cirrhatus limnaeetus** (Horsfield) — Changeable Hawk-Eagle

Bartels: 15/1; April (1), May (2), June (7), July (4), August (1); West Java. Measurements (15): av. 65.9 (60.1-71.6) × 51.2 (48.8-54.1). Weight (15): av. 8.10 (6.40-9.70).

Description. — The eggs are white or handsomely clouded with different shades of brown.

Hoogerwerf: 4/1; May (1), June (2), July (1); West Java. Measurements (4): av. 64.63 (61.7-67.5) × 50.78 (49.8-53.2); largest egg: 67.5 × 53.2. Weight (4): av. 8.435 (7.428-9.452). For 16 previously recorded breeding dates and ten earlier measured eggs see Hoogerwerf (1949: 31).

Description. — The eggs vary considerably in shape, they are perhaps most often perfect- or broad-oval, generally distinctly compressed towards one end, with a rough surface without or with very little gloss. The colour is white or dirty white, pale green or sea-green when held up against the light. Some eggs have no or hardly any markings, but more commonly they are well covered with various types of stains which are russet, brown, buff or sepia, sometimes almost black. This mottling may be partly the result of dirt or caused by fermentation of the nest material.

39. **Spizaetus nipalensis bartelsi** Stresemann — Blyth's Hawk-Eagle

Bartels: 1/1; April; Tji Kahuripan near Sukabumi, West Java. Measurements: 58.6 × 48.7. Weight: 6.15.

Description. — This egg is fairly globular with a rather rough texture; the colour is white, sparingly marked with small brownish spots, but stained with large yellowish brown smears.

Hoogerwerf: No material available. For four previously recorded breeding dates and some particulars of the nominate subspecies from continental Asia see Hoogerwerf (1949: 32).

40. **Hieraaetus kienerii formosus** Stresemann — Rufous-bellied Hawk-Eagle

Bartels: No material available.

Hoogerwerf: No material available. For some particulars of the subspecies living in India see Hoogerwerf (1949: 33). No reliable breeding records of this very rare bird are known to me.

41. **Ictinaetus m. malayensis** (Temminck) — Black Eagle

Bartels: 1/1, 2/2; April (2), June (1); West Java. Measurements (5):

av. 58.7 (55.1-62.2)  $\times$  49 (47.1-50.5). Weight (5): av. 5.40 (4.05-6.76).

Description. — The ground colour is white, rather densely marked with fairly small yellowish brown spots, resembling some types of *Buteo buteo* (L.).

Hoogerwerf: The egg indicated previously (Hoogerwerf, 1949: 33, pl. 2 fig. 20) as belonging to this species was perhaps incorrectly identified. It most probably is of *Spizaetus cirrhatus limnaeetus* (no. 38).

42. **Haliaeetus leucogaster** (Gmelin) — White-bellied Sea-Eagle

Bartels: 1/1; March; West Java. Measurements: 75  $\times$  56.2. Weight: 12.60.

Description. — The egg is white, unmarked.

Hoogerwerf: For four previously recorded breeding dates and two earlier measured eggs see Hoogerwerf (1949: 34).

Description. — Except in size the few eggs examined resemble those of *Spizaetus cirrhatus limnaeetus* (no. 38). The colour is white or greenish white with the membrane dark green, almost completely covered with fairly transparent markings of light sepia or dirty brown, partly caused by dirt.

43. **Ichthyophaga i. ichthyaetus** (Horsfield) — Larger Fishing-Eagle

Bartels: 1/1, 1/2; March, May; Muara Wettan near Djakarta, West Java. Measurements (3): av. 67.3 (65.2-71)  $\times$  51.7 (51-52). Weight (3): av. 8.90 (8.10-9.50).

Description. — The eggs are white and unmarked.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 35).

44. **Spilornis cheela bido** (Horsfield) — Serpent Eagle

Bartels: 3/1; February (2), March (1); West Java. Measurements (3): av. 61.3 (59.6-63.1)  $\times$  49.7 (48.1-51.6). Weight (3): av. 6.30 (5.75-6.65).

Kooiman: 3/1; East Java. Measurements (2): av. 65.8  $\times$  51.8. Weight: av. 7.61. Measurements (1): 61.4  $\times$  47.6. Weight: 4.25 (probably an error or a pigmy egg).

Sody: 1/1; June; Java. Measurements: 62.5  $\times$  47.3. Weight: 7.32.

Description. — The eggs are very variable: the colour is dirty white, which may be very sparingly or more densely marked with ill-defined spots and blotches, in one egg these are found mainly at the blunt end. One egg in the Kooiman collection on a very clear ground is much more strongly and handsomely mottled with well-defined dark brown blotches and striking purplish shell-marks.

Remarks. — The Sody collection contains one egg of *S. c. bassus* (Forster) from Deli, Sumatra, collected in February. The measurements of this egg are:  $60.5 \times 49.3$ , its weight is 5.38. The egg is completely unmarked.

Hoogerwerf: Weight (3/1): av. 6.667 (6.038-7.005). For ten previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949 : 35, pl. 3 fig. 21, 22).

Description. — On account of the considerable degree of variation in shape, markings and in the colour of the latter, it is very difficult to produce a satisfactory description. The eggs are perfect- or broad-oval, often with distinctly differing ends; the texture is rough, dull or very faintly glossy. The colour is white or greenish white. Besides specimens which are almost stainless, there are others showing very heavy primary markings which are brown, sepia, bistre or almost black, or shells with only underlying stains, which are smoke-grey to dirty violet grey. Some eggs examined show a distinct concentration of the mottling on one of the ends.

#### PANDIONIDAE

##### 45. *Pandion haliaetus melvillensis* Mathews — Osprey

Bartels: No material available.

Hoogerwerf: No material available. The Osprey may be considered an extremely rare breeding bird in Java. For some particulars compiled from the literature on representatives of the species living in Australia, see Hoogerwerf (1949 : 36-37).

#### FALCONIDAE

##### 46. *Microhierax caerulescens fringillarius* (Drapiez) — Falconet

Bartels: 1/1; March; Rawa Kalong, Preanger, West Java. Measurements:  $28.8 \times 20.4$ . Weight: 0.44.

Description. — The egg is unmarked yellowish white.

Hoogerwerf: Weight (1/4): av. 0.481 (0.439-0.516). For 14 previously recorded breeding dates and 36 earlier measured eggs of the Bouma collection originating from the teakwoods near Semarang, Central Java, see Hoogerwerf (1949 : 37, pl. 3 fig. 23).

Description. — The eggs are different from those of all other Falconidae known to me. They are usually broad-oval with only slightly differing ends or equal at both ends. The texture is fine-grained or fairly rough and dull or with only very little gloss. The shell is thin when compared with the eggs of most other raptorial birds and light creamy or yellowish white, covered with a layer of different tints of orange yellow, sometimes brown or chestnut

with a few darker markings on it, apparently only partly caused by external influences.

47. **Falco peregrinus ernesti** Sharpe — Peregrine

Bartels: 2/2; July; Mount Pangerango, West Java. Measurements (4): av. 53.8 (51.3-54.6)  $\times$  41.3 (40.6-42.3). Weight (4): av. 4.58.

Description. — The eggs are very similar to those of the European Peregrine. Three eggs are uniformly marked with light chestnut brown, the fourth is densely marked with purplish brown spots, almost entirely covering the whitish ground.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 38, pl. 3 fig. 24).

48. **Falco s. severus** Horsfield — Horsfield's Hobby

Bartels: 4/2, 1/3; April (2), May (3); West Java. Measurements (11): av. 38.9 (37.5-40.5)  $\times$  32 (31.4-32.3). Weight (11): av. 1.66 (1.60-1.77).

Description. — Similar to the eggs of *Falco subbuteo* L.

Hoogerwerf: Weight (1/4): av. 1.370 (1.339-1.417). For one previously recorded breeding date and five earlier measured eggs see Hoogerwerf (1949: 38-39).

Description. — Much like the eggs of the European *Falco subbuteo* L. When compared with those of the following species the markings — which are tawny olive, different shades of brown, bistre and sepia, sometimes even almost black — are less numerous. They show more of the white, creamy or brownish white ground than is the case in most eggs of the latter species.

49. **Falco moluccensis javensis** Mayr — Moluccan Kestrel

Bartels: 1/3, 1/4; June, October; West Java. Measurements (7); av. 38.7 (36.9-40.7)  $\times$  32.1 (31.3-33.7). Weight (7): av. 1.65 (1.57-1.71).

Description. — Similar to the eggs of *Falco tinnunculus* L.

Hoogerwerf: Weight (1/4): av. 1.614 (1.551-1.675). For seven previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 39, pl. 3 fig. 25).

Description. — Much resembling the eggs of the European *Falco tinnunculus* L., also not much different in shape and colour from those of *Falco severus* (no. 48) or *Elanus caeruleus* (no. 32), but usually more heavily stained than the shells of *Falco severus*.

## MEGAPODIIDAE

50. **Megapodius freycinet reinwardt** Dumont — Megapode

Bartels: No material available

Hoogerwerf: 1 odd shell; July; Flores, Lesser Sunda Islands. Measurements:  $88 \times 51.6$ . Weight: 8.718. Four eggs of the subspecies *duperreyii* Lesson & Garnot; December, near Merauke, New Guinea. Measurements (4): av.  $88.33$  ( $84.6-91.6$ )  $\times$   $52.03$  ( $50.2-52.8$ ); largest egg:  $91.6 \times 52.3$ . Weight (4): av. 8.862 ( $8.234-10.370$ ). For one previously recorded breeding date of *M. f. reinwardt* from the Kangean Archipelago and measurements of two eggs from Sumba (Lesser Sunda Islands), see Hoogerwerf (1949: 40, pl. 3 fig. 26).

Description. — The comparatively very large eggs are elliptical, almost equal at both (obtuse) ends. The shell is rough, though fairly fine-grained and extremely thin and there is no gloss. The colour is white, usually almost completely covered with a very uniform yellowish, buffy or brown layer, which in many cases can be easily scratched away.

Remarks. — The species is not known from Java itself, but in this synopsis we have also included species which are known to breed at the satellite islands of Java.

## PHASIANIDAE

51. **Coturnix chinensis palmeri** (Riley) — Blue-breasted Button-Quail

Bartels: 1/3, 1/4, 3/5, 2/6; February (1), March (3), June (1), July (1), December (1); West Java. Measurements (28): av.  $24.9$  ( $23.3-26.8$ )  $\times$   $19.2$  ( $18.6-19.6$ ). Weight (28): av. 0.34 ( $0.32-0.41$ ).

Description. — The eggs are rather light olive brown, marked with small dark reddish brown spots and small blotches.

Hoogerwerf: Weight (1 egg from a damaged clutch of five; no further particulars available): 0.330. For 38 previously recorded breeding dates and 43 earlier measured eggs see Hoogerwerf (1949: 41, pl. 3 fig. 27).

Description. — The eggs are broad-oval generally compressed towards the smaller end with a smooth and glossy surface. The colour is light to dark olive buff, usually rather uniformly marked with a varying number of well defined points, small speckles and dots of olive brown, darker brown or sepia, often almost black. Most eggs have no or hardly any secondary mottling.

52. **Arborophila brunneopectus orientalis** (Horsfield) — Horsfield's Tree-Partridge

Bartels and Hoogerwerf: No material or particulars available.

53. **Arborophila j. javanica** (Gmelin) — Brown-breasted Tree-Partridge

Bartels: 1/1, 6/4; January (1), February (1), March (1), April (1), July (1), August (1), October (1); West Java. Measurements (25): av. 40.3 (38-43.1) × 31.2 (30-32.4). Weight (24): av. 2.35 (2.10-2.60).

Description. — The colour is white with a moderate gloss.

Hoogerwerf: 1/2, 1/3, 2 odd shells; May (1), August (1), September (1), November (1); West Java. Measurements (7): av. 40.04 (38.7-41) × 30.45 (29.8-31.2); largest egg: 41 × 30.5; maximal variation in length in the same clutch: 2.1 (38.7-40.8). Weight (24): av. 2.310 (1.876-2.837); maximal variation in the same clutch: 0.228 (2.316-2.544). For 14 previously recorded breeding dates and 23 earlier measured eggs see Hoogerwerf (1949: 42, pl. 3 fig. 28).

Description. — The eggs are broad-oval, generally with quite different ends and a smooth though rather porous surface, which is dull or moderately glossy. The colour is chalky white or slightly creamy tinged white, with rusty or with yellowish brown stains, apparently caused by dirt.

54. **Gallus gallus bankiva** Temminck — Red Jungle-Fowl

Bartels: 1/1, 1/3, 2/4; May (1), June (1), August (1), September (1); West Java. Measurements (12): av. 45.3 (43.6-48.7) × 34.7 (33-36). Weight (12): av. 2.55 (2.43-2.76).

Description. — The eggs are of a moderately glossy, brownish cream colour.

Hoogerwerf: 2/4, 1/5, 1 odd shell; September (1), October (1), December (1); West Java. Measurements (14): av. 46.85 (42.6-51) × 35.09 (32.5-36.8); largest egg: 51 × 36; maximal variation in length in the same clutch: 4.6 (46.4-51). Weight (1/2, 1/4, 1/5, 1 odd shell): av. 2.811 (2.418-3.249); maximal variation in the same clutch: 0.747 (2.502-3.249). For 18 previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: :43, pl. 3 fig. 29).

Description. — The eggs are perfect- or broad-oval with slightly different ends. Though fairly porous, the shell is smooth and glossy in most eggs. The colour is brownish cream or buff, sometimes mixed with some pinkish; the shells are often much stained, perhaps exclusively caused by external influences.

Remarks. — These eggs and those previously measured average larger than those of the Bartels collection and the 12 weighed eggs average distinctly

heavier than those of the latter collection. They almost exclusively originate from a locality from where the breeding of the following species is unknown, making confusion nearly impossible.

55. **Gallus varius** (Shaw & Nodder) — Green Jungle-Fowl

Bartels: 1/2, 1/3, 4/4; March (1), May (1), June (2), October (1), November (1); West Java. Measurements (21): av. 45.2 (43.5-46.5) × 36 (34.5-37.7). Weight (18): av. 2.83 (2.70-3.18).

Kooiman: 1/2, 2/3, 1/4; East Java. Measurements (12): av. 47 (44.7-49.8) × 35.5 (34-37.2). Weight (12): av. 2.80 (2.72-2.89).

Sody: West Java. Measurements (2 pigmy eggs): 35.7 × 29.7 and 37.7 × 30.2. Weight (2): 2.14 respectively 2.35.

Description. — The eggs are light brown ("café au lait"), being more glossy than in the eggs of *G. g. bankiva*. Some eggs in the Kooiman collection are darker brown, but not uniformly so; perhaps this darkening is caused by external influences.

Hoogerwerf: For 16 previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 44).

Description. — The eggs do not differ from those of the preceding species.

56. **Pavo m. muticus** Linnaeus — Javanese Peafowl

Bartels: 1/2; October; Gundih, Djuworo, Central Java. Measurements (2): av. 68.5 × 50. Weight: 11.04 and 12.77.

Description. — The eggs are white, faintly glossy, stained and with deep pores.

Remarks. — One egg in the Sody collection (June; Punjab, India) measures 74.2 × 53.5, and weighs: 13.35. The eggs in the Bartels collection thus are relatively small and light. Considering the texture there is no reason to doubt the identity. For 43 eggs Schönwetter gave the following data: Measurements: av. 73.2 (65-79.3) × 53.8 (51-56.1). Weight: av. 13 (11-15.5).

Hoogerwerf: 2/2; September; East- and West Java. Measurements (4): av. 76.13 (74.5-79) × 53.53 (52.5-54.8); largest egg: 79 × 53; maximal variation in length in the same clutch: 2.5 (76.5-79). Weight (2/2, 1/4): av. 14.655 (13.162-15.870); maximal variation in the same clutch: 1.980 (13.508-15.488). For 18 previously recorded breeding dates and ten earlier measured eggs from the game sanctuary Udjung Kulon, West Java, see Hoogerwerf (1949: 45, pl. 4 fig. 30).

Description. — Very variable in shape, with quite or hardly different ends and a distinctly porous surface, but nearly always glossy. The colour is dirty



cream or buff, fairly regularly covered with small brownish speckles, often accentuating the porous character of the shell. The eggs use to be thinly stained with brown or sepia coloured dots and blotches, apparently caused by dirt.

Remarks. — When compared with the eggs of the Bartels collection mine are much larger and heavier.

#### TURNICIDAE

##### 57. *Turnix sylvatica bartelsorum* Neumann — Little Bustard-Quail

Bartels: 2/1, 1/2, 6/3, 1/4; February (2), March (5), July (1), September (1), November (1); West Java. Measurements (23): av. 23 (21.9-24.3) × 17.7 (16.8-18.5). Weight (23): av. 0.24 (0.20-0.25).

Description. — The eggs are yellowish clay, sometimes with a creamy tint, usually densely marked with small and larger spots and blotches of a dark red brown colour. As a rule they are warmer tinged than the eggs of the following species.

Hoogerwerf: 1/4, 2 odd shells; Central Java, without further particulars. Measurements (6): av. 21.97 (21.2-22.8) × 18.23 (16.7-19); largest egg: 22.8 × 19; maximal variation in length in the same clutch: 1.4 (21.4-22.8). Weight (27): av. 0.236 (0.160-0.293); maximal variation in the same clutch: 0.046 (0.187-0.233). For ten previously recorded breeding dates and 34 earlier measured eggs see Hoogerwerf (1949: 45-46, pl. 3 fig. 31).

Description. — Except in size the eggs are much like certain ones of *Turnix suscitator*, but they average darker and show coarser stains. They are broad-oval, generally showing distinctly different ends; the texture is smooth with a moderate gloss or inclined to be glossy. The colour is olive cream or yellowish clay, usually almost completely covered with many markings, which vary considerably in size, and are dark olive brown or sepia, often almost black, with underlying speckles and dots of olive buffy, olive brown or Isabella and greyish. Sometimes most markings are on the blunt end.

##### 58. *Turnix s. suscitator* (Gmelin) — Bustard Quail

Bartels: 20/2, 25/3, 8/4; February (4), March (6), April (3), May (11), June (5), July (3), August (2), September (3), October (12), November (3), December (1), some sets undated; West Java. Measurements (145): av. 24.9 (20-29.2) × 19.7 (17.4-22.2). Weight (131): av. 0.34 (0.29-0.43).

Description. — In colour the present shells are strongly varying from greyish white to yellowish brown; they are finely as well as coarsely marked

with greyish brown to blackish brown spots and blotches. In this species finely marked eggs are more common than in those of the preceding species and they are less warm in tinge.

Remarks. — I have not included two very light sets (weight averaging 0.21 and 0.24) which may originate from the preceding species.

Hoogerwerf: 3/2, 5/3, 18 odd shells; principally from Central Java, without further particulars. Measurements (39): av. 25.02 (22.9-26.5) × 19.72 (18.3-21.2); largest egg: 26.5 × 19.6; maximal variation in length in the same clutch: 1.3 (22.9-24.2). Weight (70): av. 0.343 (0.224-0.408); maximal variation in the same clutch: 0.060 (0.282-0.342). For 364 previously recorded breeding dates and 71 earlier measured eggs see Hoogerwerf (1949: 46-47, pl. 3 fig. 32, 33).

Description. — The eggs are broad-, sometimes perfect-oval, generally with an appreciable difference between the two ends; the texture is smooth and glossy or inclined to be so. The colour is olive- or brown tinged buff, but a minority of the eggs is greenish- or greyish white, sometimes very light. This ground colour is often almost entirely covered with many speckles, dots and blotches varying much in shape and size, of a darker buff or Isabella and ashy tint. In many eggs these secondary markings are partly covered again with a much darker, sharply defined mottling of brown or sepia, often almost black. In certain eggs most markings are concentrated at the blunt end.

In an abnormal clutch the eggs are white, mixed with bluish green with the not very abundant primary and denser underlying ashy markings sharply defined and most concentrated on the larger end, leaving much of the ground uncovered, however.

#### RALLIDAE

##### 59. **Rallus striatus gularis** Horsfield — Blue-breasted Banded Rail

Bartels: 4/5, 2/6, 1/7; January (1), February (2), March (2), June (1), December (1); West Java. Measurements (39): av. 33.5 (29.3-36.1) × 26.2 (24-31.6). Weight (39): av. 0.81 (0.66-0.90).

Description. — The shells of most clutches have a white ground; two sets, however, are warm cream, marked with redbrown blotches, handsomely contrasting with the ground.

Hoogerwerf: Weight (102): av. 0.858 (0.701-0.989); maximal variation in the same clutch: 0.155 (0.834-0.989). For 245 previously recorded breeding dates and 152 earlier measured eggs see Hoogerwerf (1949: 48, pl. 4 fig. 34, 35).

Description. — Though varying considerably in shape, most eggs are broad-oval, usually almost equal at both ends. The texture is smooth and glossy in many cases and the colour varies from creamy white to buff but is sometimes almost pure white. The mostly well defined primary markings are brown, varying much in tone as is the case with the less numerous underlying greyish ones. Most mottling may be concentrated on the blunt end, but even then much of the ground remains uncovered. A minority of the shells shows some similarity to those of *Porzana fusca* (no. 61) or *Amaurornis phoenicurus* (no. 63) because of the less distinctly defined and more densely scattered markings. Many eggs are soiled, apparently a result of nest dirt.

60. **Rallina fasciata** (Raffles) — Malay Banded Crake

Bartels: 1/4, 2/5; March; West Java. Measurements (14): av. 32.7 (30.7-34.8) × 24.5 (23.5-25.6). Weight (14): av. 0.61 (0.54-0.69).

Sody: 1/4; March; Bogor, West Java. Measurements: av. 34.7 × 27.1. Weight: av. 0.68.

Description. — The eggs are of a rather glossy white colour.

Hoogerwerf: 1/4, 1/5, 2 odd shells; Central Java, without further details. Measurements (11): av. 31.75 (29.8-34) × 23.99 (23.2-25); largest egg: 34 × 23.5; maximal variation in length in the same clutch: 1.8 (32.2-34). Weight (11): av. 0.615 (0.477-0.724); maximal variation in the same clutch: 0.108 (0.559-0.667). For five previously recorded breeding dates and 21 earlier measured eggs see Hoogerwerf (1949: 49, pl. 4 fig. 36).

Description. — Except in size the eggs resemble those of *Arborophila javanica* (no. 53); they are perfect- or broad-oval with well or hardly different ends and a smooth, slightly or distinctly glossy surface. The colour is white or almost white, sometimes with some very small dark speckles and very often soiled, increasing as incubation progresses.

Remarks. — The four eggs of the Sody collection average a trifle longer and considerably broader than those obtained by Bartels and also when compared with the 32 shells measured by me. They average moreover fairly heavy in weight, which makes their identity rather doubtful.

61. **Porzana fusca rubiginosa** (Temminck) — Ruddy Crake

Bartels: 1/3, 1/5; October, December; West Java. Measurements (8): av. 30.7 (30-31.6) × 22.8 (21.5-23.5). Weight (8): av. 0.52 (0.51-0.53).

Description. — The eggs are sand coloured, finely marked with yellowish brown spots.

Hoogerwerf: 1/5 and 3 odd shells; May (1/5); Central Java. Measurements (8): av. 29.69 (28.7-30.4) × 22.68 (21.8-23.7); largest egg: 30.4 × 23; maximal variation in length in the same clutch: 1.7 (28.7-30.4). Weight (1/4, 2/5, 3 odd shells): av. 0.489 (0.402-0.551); maximal variation in the same clutch: 0.058 (0.466-0.524). One pigmy egg: 25.6 × 19.1; weight: 0.281. For ten previously recorded breeding dates and 34 earlier measured eggs see Hoogerwerf (1949: 50, pl. 4 fig. 37).

Description. — Certain eggs show some similarity to those of the following, others more to those of the preceding species and to the shells of *Amaurornis phoenicurus* (no. 63). They are regular- or broad-oval, generally almost equal at both ends with a smooth texture, showing a varying degree of gloss. The colour varies from creamy white to various tints of cream, marked with irregular, usually well defined, fairly coarse speckles, dots and blotches (which may be concentrated at the blunt end) of various tints of brown, turning to olive sepia where the primary markings cover the underlying ones, which are greyish lavender to mouse-grey.

62. **Porzana c. cinerea** (Vieillot) — Grey-bellied Crake

Bartels: No material available.

Hoogerwerf: *Porzana cinerea leucophrys* Gould from near Merauke, New Guinea: 1/2, 2/5, 1/6; January (2), February (1), December (1). Measurements (18): av. 28.16 (27-30) × 21.44 (20.6-22); largest egg: 30 × 22; maximal variation in length in the same clutch: 2.0 (28-30). Weight (1/2, 1/4, 1/5, 1/6): av. 0.423 (0.323-0.490); maximal variation in the same clutch: 0.034 (0.456-0.490). For four previously recorded breeding dates and 13 earlier measured eggs of *P. c. cinerea* from Java see Hoogerwerf (1949: 51, pl. 4 fig. 38).

Description (of the eggs of the nominate subspecies). — The eggs showing heavy markings are rather similar to the finest marked ones of *Porzana fusca*, but generally the mottling is much more numerous and finer than in those of the latter species. They have almost equal ends which may be rather compressed distally. The texture is smooth, though not or only faintly glossy. The colour is dirty to brownish cream or olive buff, in certain eggs almost completely covered with fairly dull, fine markings, changing the ground into a more or less uniform tawny olive, partly covered again with a varying quantity of much darker brownish mottles, sometimes concentrated in a cap on the blunt end. Other shells are more like those of the preceding species; the markings are then scarcer and more sharply defined, leaving much of the ground uncovered. They show different shades of olive and

chestnut with distinct and well defined underlying markings of a varying degree of greyish lavender or vinaceous grey, often almost as dark as the primary mottling. The shells are often soiled, apparently becoming more so as incubation progresses.

Remarks. — It is rather strange that no eggs of this common crane are present in the Bartels collection.

63. **Amaurornis phoenicurus javanicus** (Horsfield) — White-breasted Water-Hen

Bartels: 1/1, 1/2, 7/4, 1/5, 1/6; January (1), February (1), March (1), May (1), June (1), July (2), August (2), September (1), December (1); West Java. Measurements (42): av. 38 (35.2-41) × 28.6 (27.1-29.9). Weight (42): av. 1.20 (1.00-1.30).

Description. — The eggs are white to creamy, densely marked with yellowish brown or reddish brown spots and blotches, generally more yellowish than in the eggs of the European *Rallus aquaticus* L.

Hoogerwerf: Weight (1/3): av. 1.064 (1.018-1.101). For 60 previously recorded breeding dates and 66 earlier measured eggs see Hoogerwerf (1949: 52, pl. 4 fig. 39).

Description. — Except in size the eggs may show some similarity to certain shells of *Porzana fusca* (no. 61) and others to those of the preceding species; the ends are not much different and the surface is smooth, dull or slightly glossy. The colour is creamy white or more brownish cream, uniformly covered with irregular, often fairly pale markings, which are tawny brown and brownish olive, often ranging to chocolate brown or chestnut with an underlying mottling of various tints of grey. Sometimes all markings are of secondary significance because they are very pale and poorly defined. Many eggs are soiled by nest dirt.

64. **Gallinula chloropus orientalis** Horsfield — Moor-Hen

Bartels: 3/2, 1/3, 2/4, 1/7, 2/8; January (4), February (1), March (1), April (2), June (1); West Java. Measurements (40): av. 40.7 (38-45.2) × 29.6 (28-31). Weight (26): av. 1.60 (1.47-1.75).

Description. — Similar to the eggs of the European subspecies.

Hoogerwerf: Weight (1/5, 1 odd shell): av. 1.548 (1.145-1.879). For 22 previously recorded breeding dates and 30 earlier measured eggs see Hoogerwerf (1949: 53-54, pl. 5 fig. 40).

Description. — Except perhaps in size the eggs do not differ from those of the nominate race living in Europe. They vary much in shape but they

use to be perfect- or narrow-oval with quite different ends and a smooth, not or faintly glossy surface. They are pale ochreous buff to brownish cream or light "café au lait". The rather many primary, well defined markings vary from Vandijke brown to dark chestnut and blackish brown or quite black. Generally there are hardly any underlying markings, but when present they are fairly well defined and dark, varying in colour from light ashy to greyish lavender or mouse-grey. Much of the ground remains uncovered though often obscured by dirty stains.

65. **Porphyrio porphyrio indicus** Horsfield — Purple Moor-Hen

Bartels: 2/1, 2/2, 1/3, 1/4; February (3), June (2), July (1); West Java. Measurements (13): av. 46.9 (44.9-48.6) × 33.1 (30.3-34.2). Weight (8): av. 1.82 (1.75-1.92).

Description. — Very similar to the eggs of *Gallinula chloropus* (Linnaeus), but not so densely marked.

Hoogerwerf: Weight (1/5): av. 1.654 (1.604-1.743). For ten previously recorded breeding dates and 13 earlier measured eggs see Hoogerwerf (1949: 54-55, pl. 5 fig. 41).

Description. — Except in size the eggs are rather similar to those of the preceding species, but they average perhaps paler and show less numerous markings with a more predominating, better defined secondary mottling. The primary blotches vary from hazel, or vinaceous brown to chestnut or chocolate brown, not seldom they are almost black. In many shells the secondary markings are also well pronounced; they are smoke- or vinaceous grey, in some rare cases vinaceous purple. They are often soiled by nest dirt.

Remarks. — Though the eggs of the Bartels collection do not differ in size, they average heavier when compared with mine.

66. **Fulica atra lugubris** Müller — Coot

Bartels: No material available.

Hoogerwerf: For seven previously recorded breeding dates and two earlier measured eggs originating from the Yang Highland, East Java (which is the only known breeding locality), see Hoogerwerf (1949: 55-56, pl. 5 fig. 42; 1949a: 372-375).

Description. — Except perhaps in size the eggs are much like those of the European nominate subspecies; the white or creamy white shell is rather uniformly covered with very numerous small points and speckles of which the largest ones are generally not much larger than a pin's head. The primary ones are almost black or brownish black, the secondary greyish. In the eggs

examined much of the ground remains uncovered though the colour may be obscured by cloudy stains, probably caused by incubation.

## JACANIDAE

67. **Metopidius indicus** (Latham) — Bronze-winged Jacana

Bartels: No material available.

Hoogerwerf: 1/3; June; West Java. Measurements (3): av. 34.43 (34-34.9) × 25.3 (25.1-25.5); largest egg: 34.9 × 25.1. Weight (1/3): av. 0.729 (0.717-0.741). For two previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 56-57, pl. 5 fig. 43).

Description. — The very handsome eggs are perfect- or somewhat narrower oval, distinctly compressed towards the smaller end. The surface is smooth and highly glossy as if it were polished; the colour is olive tinged Isabella, densely covered with intertwining, sharply defined, coarse scribbles and streaks, which are pure black, brownish tinged black or sepia. The underlying markings, almost similar in appearance though not very strikingly present, are light ashy. Most markings run in a longitudinal direction, uniformly scattered all over the shell.

## ROSTRATULIDAE

68. **Rostratula b. benghalensis** (Linnaeus) — Painted Snipe

Bartels: 2/4; January; West Java. Measurements (8): av. 36.2 (35.5-37) × 26.8 (25.7-27.4). Weight (8): av. 0.99 (0.94-1.05).

Sody: 1/3; Tjikadjang near Garut, West Java. Measurements: av. 35.6 × 25.9. Weight: av. 1.01.

Description. — The eggs are light brownish yellow, heavily marked with large, almost black blotches.

Hoogerwerf: Weight (1/4): av. 1.008 (0.972-1.046). For 38 previously recorded breeding dates and 54 earlier measured eggs see Hoogerwerf (1949: 57-58, pl. 5 fig. 44).

Description. — Except in size the eggs show some resemblance to those of the following species and of *Himantopus himantopus* (no. 72), but the ground averages lighter. They are perfect- to broad-, sometimes a trifle more narrow-oval with generally distinctly different ends and a smooth surface which is dull or faintly glossy. The colour may be Isabella tinged cream or chamois, also ochreous buff, covered with irregular, well defined speckles and blotches, which are black or almost black, sometimes mixed with olive or sepia. The much less pronounced underlying markings are ashy. Though the shells use to be heavily marked, much of the ground remains uncovered.

## CHARADRIIDAE

69. **Xiphidiopterus tricolor** (Horsfield) — Black-thighed Wattled Lapwing

Bartels: 4/1, 1/2, 1/4; May (1), June (5); Rawah Tangerang (1), Tjombang Bungin (5), West Java. Measurements (10): av. 45.3 (43-47.5) × 32.3 (31.4-33.7). Weight (10): av. 1.64 (1.61-1.73).

Description. — The eggs are light yellowish brown, heavily marked with almost black blotches, resembling certain eggs of the European *Vanellus vanellus* (L.).

Hoogerwerf: 1/2; June; Tjitarum estuary, near Djakarta, West Java. Measurements (2): 47.2 × 30.6, 47.8 × 31.8. Weight (1): 1.709. For two previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 58-59).

Description. — Except in size the eggs are much like those of *Himantopus himantopus leucocephalus* Gould (no. 72). They are regular- or elongate-oval with distinctly different ends and a smooth texture without or with only a faint gloss. The colour is Isabella or olive buff, uniformly covered with numerous irregular though well defined, very coarse primary speckles, dots and blotches of olive or brown tinged black, often almost pure black. The lavender to dark olive grey secondary markings are smaller and less strikingly present.

70. **Charadrius alexandrinus javanicus** Chasen — Kentish Plover

Bartels: 2/2, 3/3; May (4), July (1); West Java. Measurements (13): av. 30.8 (29.6-32) × 22.5 (21.7-23.2). Weight (11): av. 0.49 (0.43-0.52).

Description. — The eggs are light brownish with a greenish tint, rather densely marked with almost black spots and hair-lines.

Hoogerwerf: 1/2; September; Kangean Archipelago. Measurements (2): 29 × 21.7, 30.6 × 21.8. Weight (1/2): 0.509, 0.515. For three previously recorded breeding dates and 13 earlier measured eggs see Hoogerwerf (1949: 59, pl. 5 fig. 45).

Description. — The eggs are much like those of the European nominate subspecies. They are perfect- or broad-oval with distinctly different ends and a smooth texture without or with only a very weak gloss. The colour is Isabella to dark olive cream with upon it numerous very irregular, usually well defined markings — sometimes more concentrated on the blunt end — partly showing hieroglyphic characters and black or almost black in colour, often mixed with a greyish or sepia tint. The underlying greyish markings



are less numerous and finer, sometimes partly well defined, resembling the primary ones. Though the markings use to be densely scattered all over the surface, the ground is never completely concealed.

## SCOLOPACIDAE

71. **Scolopax s. saturata** Horsfield — Woodcock

Bartels: 3/2; March (2), April (1); Mount Pangerango, Preanger, West Java. Measurements (6): av. 42.8 (41.7-43.4) × 33.6 (33.2-34.2). Weight (6): av. 1.63 (1.55-1.68) (the eggs have large holes).

Description. — The eggs have a rather glossy surface. There is little difference between the two ends. One set is almost white, being sparingly marked with very small brown spots, but showing striking shell-marks. A second set is white with a creamy tint, somewhat better marked, while the shells of a third clutch show a warm creamy colour and are still more distinctly mottled with warm brown spots (resembling some eggs of the Rallidae).

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 60).

## RECURVIROSTRIDAE

72. **Himantopus himantopus leucocephalus** Gould — Black-winged Stilt

Bartels: No material available.

Hoogerwerf: For five previously recorded breeding dates and seven earlier measured eggs from the neighbourhood of Cheribon, West Java see Hoogerwerf (1949: 61, pl. 5 fig. 46).

Description. — Very similar to the eggs of the European nominate subspecies and also not or hardly distinguishable from those of *Xiphidiopterus tricolor* (no. 69). They have a smooth surface, not or faintly glossy. On an Isabella or olive buffy brown ground the surface is covered with numerous very irregular, well defined speckles, dots and blotches, which are dark olive brown to black and a few underlying, hardly observable markings of lavender to dark olive tinged grey.

## BURHINIDAE

73. **Esacus magnirostris** (Vieillot) — Stone Plover

Bartels: No material available.

Hoogerwerf: 1/1; September; Princes Island, Sunda Strait, West Java. Measurements:  $64.6 \times 46.2$ . Weight (2/1): 5.012, 5.240. For five previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 61, pl. 5 fig. 47).

Description. — The eggs are perfect-oval with moderately different ends and a smooth texture without or with only little gloss. On a sand coloured or dirty buff ground they are covered with numerous very irregular, generally well defined coarse primary markings. These are very dark ashy to black, with many finer speckles and dots between them of a similar tint and less distinct ones of different shades of olive brown. The obvious, less numerous, still deeper lying secondary mottling is light ashy.

Though the markings are usually rather densely scattered all over the shell, the ground remains clearly visible. Some eggs examined were soiled by nest dirt.

Remarks. — See under species no. 3.

#### LARIDAE

74. **Sterna albifrons** Pallas subsp. — Little Tern or Ternlet

Bartels: No material available.

Hoogerwerf: 1/2, 1 odd shell; September; Coastal area near Tandjung Priok (Djakarta), West Java. Measurements (3): av.  $34.73 (34.2-35.5) \times 24.8 (23-25.8)$ ; largest egg:  $35.5 \times 25.8$ ; maximal variation in length in the same clutch: 1.0 (34.5-35.5). Weight (1/2, 2/3): av. 0.488 (0.468-0.505); maximal variation in the same clutch: 0.037 (0.468-0.505). For four previously recorded breeding dates and 16 earlier measured eggs see Hoogerwerf (1949: 62, pl. 5 fig. 48).

Description. — Very similar to the eggs of the European nominate subspecies. The colour varies from creamy white to very light "café au lait" covered with numerous, very irregular, sharply defined speckles, dots and blotches, ranging from olive sepia to very dark sepia or brown, almost black. Sometimes the mottling has the character of smears, showing a dark centre and brownish edges. The underlying markings, in certain eggs also well defined, vary from light grey to dark mouse-grey. Generally the eggs are uniformly mottled all over the shell.

Remarks. — These eggs are considerably larger than the 16 previously measured shells though they originate unmistakably from this species. See also remark under species no. 3.

75. ***Sterna s. sumatrana*** Raffles — Black-naped Tern

Bartels: 2/1, 11/2; May (1), June (2), August (8), September (2); West Java. Measurements (24): av. 37.7 (35.4-40) × 28 (25.8-29.5). Weight (22): av. 0.97 (0.86-1.09).

Kooiman: 2/1, 4/2; September; East Java. Measurements (8): av. 39.5 (37.8-40.2) × 26.8 (26-28.1). Weight (8): av. 1.05 (0.90-1.13).

Description. — The ground colour of the eggs is greyish to creamy, marked with small and larger brown spots, some eggs show very large dark brown smears and underlying shell-marks.

Hoogerwerf: 9/2, 5 odd shells; May (2: Sunda Strait, West Java), July (7: small islands near Bawean Island, East Java). Measurements (21): av. 39.85 (35.9-42.4) × 27.7 (26.2-29); largest egg: 42.4 × 26.5; maximal variation in length in the same clutch: 3.0 (38.9-41.9). Weight (6/2, 6 odd shells): av. 1.006 (0.843-1.245); maximal variation in the same clutch: 0.144 (1.101-1.245). Abnormal clutch: 33.1 × 27, 37.1 × 27.3; weight: 0.831, 0.834. For five previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 63, pl. 6 fig. 49, 50).

Description. — The eggs have a smooth surface which is hardly or not at all glossy. They are creamy or dirty white covered with very irregular, sharply defined primary markings, which are sepia to blackish brown and pure black. The generally also well defined underlying mottles vary from light to dark lavender grey and smoke-grey, ranging to a slate purple. In this species too the markings may look as if they were smeared in a longitudinal direction.

Remarks. — In measurements as well as in weight the eggs examined by me are closer to those obtained by Kooiman than to the shells of the Bartels collection.

76. ***Sterna dougalli bangsi*** Mathews — Roseate Tern

Bartels: 1/1; May; Pulau Dapur, Djakarta Bay, West Java. Measurements: 37.5 × 28.4. Weight: 1.03.

Description. — This egg is greyish with dark brown spots, smears and underlying shell-marks.

Hoogerwerf: 1 odd shell; West Java, no further particulars available. Measurements: 40 × 29.9. Weight (1/2, 1 odd shell): av. 0.971 (0.813-1.179); maximal variation in the same clutch: 0.107 (0.813-0.920). For two previously recorded breeding dates and four earlier measured eggs originating from the same locality as those of the Bartels collection, see Hoogerwerf (1949: 64, pl. 6 fig. 51).

Description. — The eggs are very similar to those of the preceding species, but the markings may average coarser on a darker ground, showing various tints of olive cream. The many primary dots and blotches are warm to dark sepia changing into black, almost black or dark umberbrown with some lighter, olive sepia coloured ones among them. The less numerous secondary markings vary from lavender- to dirty mouse-grey; they may be well defined too, showing a primary character.

77. ***Sterna a. anaethetus*** Scopoli — Bridled Tern

Bartels: 7/1; August; Tji Batu Nungal, West Java. Measurements (5): av. 46.1 (43.7-50.3) × 32.6 (31.4-33.5). Weight (3): av. 1.63 (1.46-1.81).

Description. — The eggs are light creamy with a pinkish tint, marked with reddish brown spots, and underlying shell-marks.

Hoogerwerf: 40/1; May (9: Billiton Island), July (11: Karimundjawa Islands, and 20: small islands near Bawean Island). Measurements (39): av. 46.89 (43-51.4) × 33.13 (30.2-35.6); largest egg: 51.4 × 34.2. Weight (19): av. 1.762 (1.400-2.211). Abnormal egg: 32.3 × 22.1. For seven previously recorded breeding dates and eight earlier measured eggs from Gunung Api in the Banda Sea (Moluccas), see Hoogerwerf (1949: 65, pl. 6 fig. 52, 53).

Description. — Because of the lighter and often less pronounced mottling the eggs differ rather strikingly from those of most other tern-species we know from this area; they resemble closest the eggs of both *Anous* species, discussed below. They are perfect- to elongate-, sometimes broad-oval with distinctly different ends, in most cases with a fairly rough texture, which is dull or with a faint gloss. The colour is light to brownish cream or "café au lait", occasionally almost white. The many, very irregular dots and blotches with smaller speckles and dots in between, vary in colour from chestnut and chocolate brown to very dark sepia, often almost black. Perhaps more than in the eggs of all other tern-species we know, they have the character of smears, showing a dark centre and hazelbrown edges. The usually obvious secondary markings — often dark and well defined — vary in different shades of grey. Generally the mottling is uniformly spread all over the surface, but concentrations on the blunt end are no exceptions and in certain eggs there are hardly any markings on the remaining half of the shell.

78. ***Sterna bergii cristata*** Stephens — Large Crested Tern

Bartels: 1/1; May; Karimundjawa Islands, Central Java. Measurements: 55.2 × 40.1. Weight: 3.40.

Description. — This egg has the ground white with a pinkish tint, marked with reddish purple spots and hair-lines.

Hoogerwerf: 1 odd shell; May; Karimundjawa Islands, Central Java. Measurements:  $60.3 \times 39.7$ . Weight (1/3, 1 odd shell): av. 3.303 (2.985-3.530); maximal variation in the same clutch: 0.545 (2.985-3.530). For two previously recorded breeding dates and one earlier measured egg see Hoogerwerf (1949: 66-67, pl. 6 fig. 54); Hoogerwerf's (1949) picture has been copied from the literature and differs a good deal from the eggs studied.

Description. — The few eggs examined are finer mottled than those of most other terns discussed here. They are perfect- or somewhat more narrow-oval with distinctly different ends and a fairly rough texture, not or only faintly glossy. The colour is creamy white or almost white, covered with not very many well defined irregular speckles and dots which are light brown to sepia or bistre, but largely black or almost black, often with narrow, light sepia coloured edges. The greyish lavender or ashy underlying markings are less numerous but very coarse, well defined and dark in many cases.

Remarks. — Though this species is not known as a breeding bird in Java, it is, together with both following species of terns, included in this synopsis, because it breeds on some of the satellite islands of Java.

**79. *Anous stolidus pileatus* (Scopoli) — Noddy**

Bartels: No material available.

Hoogerwerf: 8/1; May (6: Billiton Island), July (2: Karimundjawa Islands). Measurements (7): av. 52.83 (49.4-56)  $\times$  35.73 (34.6-37.4); largest egg:  $56 \times 34.9$ . Weight (7): av. 2.496 (2.379-2.581). Abnormal egg:  $45 \times 32.9$ ; weight: 1.609. For three previously recorded breeding dates and 12 earlier measured eggs from Gunung Api in the Banda Sea, see Hoogerwerf (1949: 67-68, pl. 6 fig. 55-57).

Description. — The eggs show some resemblance to those of *Sterna anaethetus* (no. 77), but they are larger, still less densely marked and with a rougher surface. They have a smooth or fairly rough texture without or with hardly any gloss. The colour is almost white in many eggs, creamy white in others, not very densely covered with a varying number of very irregular, chiefly well defined speckles and dots which vary in colour from light to dark maroon and warm sepia, sometimes almost black; certain markings are much like the smears found on the eggs of *Sterna anaethetus*. The well pronounced underlying mottling is light to dark mouse- or ashy grey. In most eggs examined the markings are concentrated on the blunt

end, occasionally forming an open cap or zone. Many shells are soiled, apparently by dirt.

Remarks. — See remark under species no. 78.

80. **Anous tenuirostris worcesteri** (McGregor) — White-capped Noddy

Bartels: No material available.

Hoogerwerf: For 26 previously recorded breeding dates and 25 earlier measured eggs from Billiton Island, see Hoogerwerf (1949: 68-69).

Description. — Except in size the eggs are very similar to those of the preceding species, but the primary markings may average darker and are still more sharply defined, while the secondary ones are less conspicuous and the texture is apparently a trifle rougher still than in the eggs of *Anous stolidus*. The ground is dirty white to creamy white, not very abundantly covered with irregular, sharply defined primary speckles and dots, which are often almost round and Vandijke brown to black, nearly pure black in many eggs. The underlying, generally also well defined markings vary in having different tints of grey, most often mouse- or purple grey. Most mottling is usually on the blunt end, though the presence of a cap or zone is rare.

Remarks. — See remark under species no. 78.

#### COLUMBIDAE

81. **Treron oxyura** (Temminck) — Pintail Pigeon.

Bartels: 1/1; June; Mount Pangerango, West Java. Measurements: 29.2 × 21.9. Weight: 0.46.

Description. — The colour of the eggs is white.

Hoogerwerf: No material or particulars available.

82. **Treron korthalsi** Bonaparte — Wedge-tailed Pigeon

Bartels: 1/1; October; Gunung (= Mt.) Raung, East Java (3000 m). Measurements: 33.4 × 23.2. Weight: 0.58.

Kooiman: 1/1; Mount Raung, East Java, no further data. Measurements: 32.9 × 24.9. Weight: 0.56 (large hole).

Description. — The colour is white.

Hoogerwerf: For one previously recorded breeding date and one earlier measured egg see Hoogerwerf (1949: 70).

Description. — The only egg examined is much like those of *Ptilinopus melanospila* (no. 90); it is narrow-oval, almost equal at both rather obtuse ends with a smooth and glossy surface. The colour is pure white.

83. **Treron c. capellei** (Temminck) — Larger Thick-billed Green Pigeon

Bartels: No material available.

Hoogerwerf: No material available. The species is extremely rare in Java. For some particulars compiled from the literature see Hoogerwerf (1949: 70).

84. **Treron griseicauda pulverulenta** Wallace — Pompadour Green Pigeon

Bartels: 4/1, 4/2; April (1), May (2), June (4), August (1); West Java. Measurements (12): av. 27.8 (25-30.4) × 21.3 (20.5-22.1). Weight (11): av. 0.38 (0.30-0.41).

Kooiman: East Java. Measurements (10): av. 29 (27.8-31.2) × 22.3 (20.8-23). Weight (8): av. 0.43 (0.365-0.485).

Description. — The colour is white.

Remarks. — The eggs of the Bartels collection are much lighter in weight than those obtained by Kooiman. Schönwetter gave for 10 eggs the following measurements: 27.8 × 21.6 and as weight: 0.37 (0.32-0.39).

Hoogerwerf: Weight (1/2): 0.439, 0.501. For 17 previously recorded breeding dates and ten earlier measured eggs see Hoogerwerf (1949: 70-71).

Description. — The eggs are regular- to broad-oval with equal or almost equal ends, generally somewhat compressed towards both ends. They have a smooth and glossy surface which is white, sometimes stained, apparently by dirt, though the stains may look like natural markings.

Remarks. — The few shells examined by me show more similarity in weight to those of the Kooiman collection than to the shells obtained by Bartels or those mentioned by Schönwetter. Comparison with material of the species mentioned by the latter, however, is of hardly any importance as long as its origin is not exactly known. This also holds good for all other cases where Schönwetter's material is mentioned here for purposes of comparison.

85. **Treron olax** (Temminck) — Little Green Pigeon

Bartels: No material available.

Hoogerwerf: No material available. The species is very rare in Java. For some particulars derived from the literature see Hoogerwerf (1949: 71).

86. **Treron bicincta javana** Robinson & Kloss — Orange-breasted Green Pigeon

Bartels: No material available.

Hoogerwerf: No material available. This pigeon too is a rare bird in Java. For some particulars compiled from the literature see Hoogerwerf (1949: 71-72).

87. **Treron vernans griseicapilla** Schlegel — Pink-necked Green Pigeon

Bartels: 4/1; February (1), April (1), May (1), October (1); West Java. Measurements (4): av. 26.5 (25.5-27.3) × 20.5 (19.6-21.3). Weight (4): av. 0.34 (0.30-0.36).

Description. — The colour is white.

Remarks. — The original labels of the Bartels specimens give the names *Osmotreron vernans* (L.) and *Treron purpurea* (Gmelin) for this material. Hoogerwerf supposes, however, that all these eggs belong to the West Java subspecies *T. v. griseicapilla*.

Hoogerwerf: 2/2; July, September; West Java. Measurements (4): av. 26.48 (24.8-28.1) × 21.48 (21.2-21.7); largest egg: 28.1 × 21.6; maximal variation in length in the same clutch: 1.2 (24.8-26). Weight (1/2): 0.356, 0.372. For 20 previously recorded breeding dates and two earlier measured eggs of *T. v. purpurea* (Gmelin), see Hoogerwerf (1949: 72).

Description. — The eggs examined are indistinguishable from those of *Treron griseicauda pulverulenta* (no. 84).

88. **Ptilinopus porphyreus** (Temminck) — Sunda Island Fruit-Dove

Bartels and Hoogerwerf: No material or particulars available, although the species is not at all rare in many mountainous areas in Java we know.

89. **Ptilinopus jambu** (Gmelin) — Pink-headed Fruit-Dove

Bartels and Hoogerwerf: No material or particulars available. The species is very rare in Java.

90. **Ptilinopus melanospila melanauchen** (Salvadori) — Black-naped Fruit-Dove

Bartels: 9/1; April (1), May (6), June (1), August (1); West Java. Measurements (9): av. 30.3 (28.5-31.8) × 21.3 (20.6-22.1). Weight (6): av. 0.37 (0.33-0.41).

Description. — The colour is white.

Hoogerwerf: 1/1; July; West Java. Measurements: 29.3 × 20.9. Weight (6/1): av. 0.367 (0.323-0.405). For 22 previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 73).

Description. — The eggs are much like those of the *Treron* species discussed above, averaging perhaps more narrow-oval. They vary considerably



in shape, but generally the shells are regular- to narrow-oval with almost equal, fairly pointed ends with a smooth, dull or faintly glossy surface. The colour is pure white, sometimes very slightly mixed with cream, but only rarely stained by dirt.

91. **Ducula aenea polia** (Oberholser) — Green Imperial Pigeon

Bartels: No material available.

Hoogerwerf: 2/1; October, November; game sanctuary Udjung Kulon, West Java. Measurements:  $43.2 \times 32.2$ ,  $45.4 \times 32.6$ . Weight: 1.511, 1.528. Not previously recorded for Java. For some particulars derived from the literature see Hoogerwerf (1949: 73-74).

Description. — Both eggs examined are perfect- to narrow-oval with not much different ends and a fairly strong, but smooth and faintly glossy surface. The colour is pure white, soiled by some dirt.

Remarks. — It is rather strange that no material of this pigeon is present in the Bartels collection.

92. **Ducula bicolor** (Scopoli) — Pied Imperial Pigeon

Bartels: No material available.

Hoogerwerf: 1/1; June; Bawean Island, East Java. Measurements:  $42.3 \times 29.9$ . Weight: This egg could not be weighed because it is heavily damaged, but an earlier described egg has a weight of 1.424. For one previously recorded breeding date and the measurements of the latter egg see Hoogerwerf (1949: 74), with the remark, however, that these measurements must be changed into  $43.4 \times 30.4$ .

Description. — The only two shells examined are indistinguishable from those of the preceding species.

Remarks. — In this case too it is noteworthy that there is no material in the Bartels collection.

93. **Ducula r. rosacea** (Temminck) — Island Imperial Pigeon

Bartels and Hoogerwerf: No material or particulars available of this pigeon, which is only restricted to small islands and is perhaps nowhere of common appearance.

94. **Ducula b. badia** (Raffles) — Mountain Imperial Pigeon

Bartels: No eggs available.

Description. — The colour of the shells mentioned below is white.

Remarks. — The Sody collection contains: 2/1; January, April; Deli, Sumatra. Measurements (2):  $39.8 \times 33.1$  and  $42.2 \times 33$ . Weight: 1.30 and 1.32.

Hoogerwerf: No material available. The species is apparently very rare in Java. For some particulars compiled from the literature see Hoogerwerf (1949: 74).

95. **Ducula l. lacernulata** (Temminck) — Mountain Imperial Pigeon  
Bartels: 4/1; March (1), October (2), November (1); Pasir Telingit, Pasir Datar, Mount Pangerango, West Java. Measurements (4): av.  $44.1 (42.2-46.6) \times 30.8 (28.2-32.3)$ . Weight (4): av. 1.37 (1.21-1.56).

Description. — The colour is white.

Hoogerwerf: Weight (1/1): 1.353. For five previously recorded breeding dates and two earlier measured eggs see Hoogerwerf (1949: 75).

Description. — The eggs examined do not allow the enumeration of distinct differences when compared with those of both other species of Imperial Pigeons discussed above.

96. **Macropygia phasianella emiliana** Bonaparte — Sunda Island Cuckoo-Dove

Bartels: 8/1; January (1), February (2), April (1), June (1), August (1), December (2); West Java. Measurements (8): av.  $31.7 (30.4-32.6) \times 23.3 (21.9-24.1)$ . Weight (8): av. 0.52 (0.45-0.57).

Description. — The colour is white with a creamy tint.

Hoogerwerf: 1/1; Gundih (near Semarang), Central Java, without further particulars. Measurements:  $34.4 \times 22.9$ . Weight (3): av. 0.525 (0.500-0.540). For 46 previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 75, pl. 6 fig. 58).

Description. — The eggs vary considerably in shape, but usually they have almost equal, rather obtuse ends. Some specimens are more distinctly pointed towards one end. The texture is smooth, dull or faintly glossy. The colour is never pure white but creamy or buffy white or ivory, sometimes stained by dirt.

Remarks. — The egg indicated above is considerably larger (2.4 mm) than the maximum found in six previously measured eggs and also when compared with eight shells in the Bartels collection, though the weight matches.

97. **Macropygia r. ruficeps** (Temminck) — Small Cuckoo-Dove

Bartels: 3/1; April (1), November (1), one not dated; West Java.

Measurements (3): av. 28.7 (27.7-30.3)  $\times$  20.4 (19.7-21.1). Weight (3): av. 0.325 (0.300-0.350).

Description. — The colour is white with a yellowish tint.

Hoogerwerf: Weight (7/1): av. 0.350 (0.309-0.380). For ten previously recorded breeding dates and the measurements of these seven eggs see Hoogerwerf (1949: 76, pl. 6 fig. 59).

Description. — Except in size the eggs are much like those of the preceding species, but they average narrower oval and a trifle lighter in colour.

98. **Macropygia u. unchall** (Wagler) — Large Cuckoo-Dove

Bartels: 17/1; February (1), March (1), April (2), May (2), June (3), August (1), September (3), October (1), November (1), December (2); West Java. Measurements (17): av. 33.1 (31.7-35.9)  $\times$  23.9 (23-25.5). Weight (17): av. 0.58 (0.49-0.68).

Description. — The colour is white.

Hoogerwerf: 3/1; April, October (2); West Java. Measurements (3): av. 31.5 (30.8-32.2)  $\times$  22.8 (22.3-23.1); largest egg: 32.2  $\times$  23.1. Weight (27): av. 0.552 (0.465-0.640). For 46 previously recorded breeding dates and 25 earlier measured eggs see Hoogerwerf (1949: 76-77, pl. 6 fig. 60).

Description. — Except in size the eggs do not differ distinctly from those of *M. phasianella* (no. 96), though some may have the surface a trifle rougher.

Remarks. — These three eggs average considerably smaller than the 17 of the Bartels collection, but except for one egg, they are within the range as previously published (30.3-34.6  $\times$  22.8-24.5). There are no important differences in weight.

99. **Geopelia s. striata** (Linnaeus) — Barred Ground-Dove

Bartels: 4/1, 16/2; March (1), April (4), May (4), June (9), August (1), October (1); West Java. Measurements (32): av. 23.3 (21-24.5)  $\times$  17.7 (16.4-18.6). Weight (28): av. 0.23 (0.19-0.26).

Description. — The colour is white.

Hoogerwerf: For 204 previously recorded breeding dates and 29 earlier measured eggs see Hoogerwerf (1949: 77, pl. 6 fig. 61).

Description. — Generally the eggs are regular- to narrow-oval with often almost equal obtuse ends, but in certain specimens more pointed. The shell is smooth, dull or faintly glossy and white, but often stained, apparently caused by nest dirt.

100. **Streptopelia b. bitorquata** (Temminck) — Island Turtle-Dove

Bartels: 1/1, 2/2; May; West Java. Measurements (5): av. 30 (28.2-32.5) × 23.2 (22.3-23.9). Weight (5): av. 0.50 (0.47-0.54).

Kooiman: East Java. Measurements (4): 28.6 (27-29.8) × 21.8 (21-22.1). Weight (4): av. 0.40 (0.39-0.41).

Description. — The colour is white.

Hoogerwerf: Weight (1): 0.411. For 63 previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 78).

Description. — The eggs are very variable in shape, but they are more often regular- or elongate- than broad-oval, with almost equal, generally obtuse ends and a smooth texture which is moderately or intensely glossy. The colour is white or almost white, often stained by dirt.

Remarks. — The eight shells previously measured by me are closer in size to those of the Bartels collection than to the eggs obtained by Kooiman, though the single shell weighed by me is lighter than any of the eggs of Bartels.

101. **Streptopelia chinensis tigrina** (Temminck) — Spotted Dove

Bartels: 1/1, 6/2; February (1), May (2), June (1), July (3); West Java. Measurements (13): av. 28.6 (26.6-31.4) × 21.6 (20.5-22.2). Weight (13): av. 0.39 (0.34-0.44).

Description. — The colour is white.

Hoogerwerf: 3/2, 3 odd shells; April (1), May (2), June (1); West Java. Measurements (9): av. 28.67 (27.2-30.1) × 21.86 (21-22.7); largest egg: 30.1 × 22; maximal variation in length in the same clutch: 1.0 (28-29). Weight (44): av. 0.421 (0.348-0.489); maximal variation in the same clutch: 0.049 (0.381-0.430). For 379 previously recorded breeding dates and 64 earlier measured eggs see Hoogerwerf (1949: 78-79, pl. 7 fig. 62).

Description. — We fail to see any real difference between these eggs and those of the preceding species, although they may average a trifle smaller.

102. **Chalcophaps i. indica** (Linnaeus) — Emerald Dove

Bartels: 1/1, 3/2; February (1), April (2), August (1); West Java. Measurements (7): av. 26.4 (25.5-27) × 20.5 (19.8-20.9). Weight (7): av. 0.34 (0.32-0.37).

Kooiman: Measurements (4): av. 28.3 (26.8-29.6) × 21.1 (20.5-22). Weight (4): av. 0.36 (0.32-0.40).

Description. — The colour is greenish cream.

Remarks. — The eggs of the Bartels collection are somewhat smaller than those secured by Kooiman.

Hoogerwerf: 1 odd shell; June; Central Java. Measurements:  $27.8 \times 20.5$ . Weight: 0.334. For seven previously recorded breeding dates and 15 earlier measured eggs see Hoogerwerf (1949: 79, pl. 7 fig. 63).

Description. — The eggs are normal- to broad-oval with only slightly different, fairly obtuse ends, though sometimes distinctly pointed towards the smaller end. They have a smooth texture which is glossy or inclined to be so; the colour is of a uniform creamy ivory or brownish cream, often soiled by dirt.

103. **Caloenas n. nicobarica** (Linnaeus) — Nicobar Pigeon

Bartels: 1/1; August; Pulau Bokor, Djakarta Bay, West Java. Measurements:  $49.4 \times 33.7$ . Weight: 1.91.

Description. — The colour is white.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 80).

#### PSITTACIDAE

104. **Psittacula a. alexandri** (Linnaeus) — Red-breasted Paroquet

Bartels: 3/2, 4/3; January (2), February (1), March (1), May (1), November (2); West Java. Measurements (18): av.  $30.4 (29-34.1) \times 25 (24-25.8)$ . Weight (15): av. 0.68 (0.56-0.86).

Description. — The colour is white.

Hoogerwerf: Weight (1/2, 1/3): av. 0.608 (0.558-0.631); maximal variation in the same clutch: 0.045 (0.558-0.603). For 26 previously recorded breeding dates and 24 earlier measured eggs see Hoogerwerf (1949: 80, pl. 7 fig. 64).

Description. — The eggs show some similarity to those of the kingfisher *Halcyon chloris* (no. 151) but the texture averages rougher; they are broad-, sometimes normal-oval with equal or slightly different ends without or with hardly any gloss. The colour is chalky white, often so heavily soiled that the basic colour is almost completely concealed, as is often the case with the eggs of species nesting in hollows.

105. **Loriculus vernalis pusillus** Schlegel — Indian Loriquet

Bartels: 1/1, 2/2; April (1), May (2); West Java. Measurements (5): av.  $19.3 (18.3-20.7) \times 15.2 (15-15.6)$ . Weight (5): av. 0.14.

Description. — The colour is white.

Hoogerwerf: Weight (1/2): 0.141, 0.144. For one previously recorded breeding date and the measurements of both these eggs see Hoogerwerf (1949: 81, pl. 7 fig. 65).

Description. — The eggs are much like those of the smaller kingfishers, but the texture averages rougher. The two eggs examined are broad-oval with almost equal ends and a fairly rough surface without gloss. They are chalky white almost completely covered with dirty stains, perhaps because of fermentation of the leaf-fragments on which they were laid.

## CUCULIDAE

106. **Cuculus f. fagax** Horsfield — Malayan Hawk Cuckoo

Bartels: No material available.

Hoogerwerf: No material available. For some very few particulars compiled from the literature see Hoogerwerf (1949: 82).

Remarks. — It must be strongly doubted that this very rare cuckoo is a breeding species in Java.

107. **Cuculus micropterus concretus** S. Müller — Indian Cuckoo

Bartels: 1/1; December; Gunung (= Mt.) Masigit, West Java. Measurements:  $23.6 \times 17.7$ . Weight: 0.23. Host: *Dicrurus paradiseus formosus* (Cabanis) (no. 342).

Description. — The ground colour of this egg is pale salmon, densely but vaguely marked with small reddish brown spots and freckles, with underlying shell-marks.

Hoogerwerf: Weight (2): 0.152, 0.192. For four previously published records and the measurements of these two eggs, originating from Tjibodas (Mount Pangerango), West Java, see Hoogerwerf (1949: 82, pl. 7 fig. 66-69).

Description. — Both these eggs are broad-oval with almost equal ends and a smooth texture without or with a very faint gloss. The colour is creamy white or salmon-pink, covered with rather many irregular, well defined though pale markings, which are rusty or rusty vinaceous. The more numerous underlying speckles and dots show various tinges of vinaceous grey. Though most mottling is concentrated on the blunt end, it does not form a cap or zone.

Remarks. — As previously indicated (Hoogerwerf, 1949: 82), we are not quite sure about the identity of both these eggs of which the largest one is just within the measurements and weight of the host, *Dicrurus leucophaeus* Vieillot, whereas the second one is distinctly smaller and lighter in weight. In colour and markings both shells do differ strikingly from those of this drongo (compare Hoogerwerf, 1949: pl. 7 fig. 69, and pl. 18 fig. 296).

There were no other eggs in both nests of which one gave the impression of being deserted.

108. **Cuculus poliocephalus lepidus** S. Müller — Small Cuckoo

Bartels: 5; February (1), May (2), September (1), October (1); West Java. Measurements (5): av. 21.2 (20-23)  $\times$  13.7 (13-14). Weight (5): av. 0.100 (0.090-0.120). Hosts: *Phylloscopus trivirgatus* (4), *Seicercus grammiceps* (1).

Description. — The eggs are long-oval, lustreless, on an almost white ground marked with small greyish brown spots forming a zone around the blunt end (cf. *Cacomantis variolosus*, no. 111).

Hoogerwerf: 1; May; Tjibodas, West Java. Measurements: 20.6  $\times$  13.5. Weight (3): 0.115, 0.118, 0.119. Host: *Phylloscopus trivirgatus*. For seven previously published records and the size of three earlier measured eggs see Hoogerwerf (1949: 83, pl. 7 fig. 70-72).

Description. — The few eggs examined are much like certain ones of *Cacomantis variolosus* (no. 111), but they average more elongate-oval and have the markings less numerous, in any case less clearly pronounced. They are normal- to elongate-oval with almost equal, fairly obtuse ends and a smooth texture which is dull or faintly glossy. The colour is creamy white to warm cream, covered with a varying quantity of very fine, rusty brown points and speckles, usually not well defined and pale. The underlying mottling showing the same character, is greyish lavender. The shells are most densely mottled at the blunt end, forming a zone or being inclined to do so.

Remarks. — Previously Bartels (1925, 1929) mentioned also *Rhipidura phoenicura* and *Enicurus velatus* as hosts of this cuckoo species. As remarked under no. 111 there is also a possibility that the six cuckoo eggs obtained by Bartels from the nests of *Cettia fortipes* originate from this cuckoo, which may be considered a much more regular visitor to the habitat of this warbler than *Cacomantis variolosus*.

109. **Cacomantis sonneratii musicus** (Ljungh) — Banded Bay-Cuckoo

Bartels: 3 of which 2 are doubtful; June, Tjisaruwa, Preanger, West Java. Measurements (1): 17.6  $\times$  13.3. Weight: 0.080. Host: *Aegithina tiphia*. The two doubtful eggs fully resemble the normal type of eggs of *Aegithina tiphia* and cannot be distinguished from the two host eggs with which they were found; the four eggs have the following measurements: 17.6  $\times$  13.3, 17.6  $\times$  13, 17.6  $\times$  13.6 and 17.3  $\times$  14.1, and weights of 0.080, 0.095, 0.085 and 0.085 respectively.

Description. — The egg is normal-oval, lustreless and white with a somewhat greyish tint, sparingly marked with small greyish brown spots, mainly at the blunt end with striking small shell-marks.

Hoogerwerf: No certain eggs available. For nine previously recorded finds, principally derived from observations of young birds fed by the fosterparents, *Aegithina tiphia*, see Hoogerwerf (1949: 85), also for some other particulars compiled from the literature.

Remarks. — With a view on the fact that the feeding of young *Cacomantis sonneratii* by the Common Iora has been repeatedly observed, it is fairly strange that apparently no certain egg of this cuckoo is present among the almost 40 eggs of this *Aegithina* examined by me.

Bartels (1925) described the only certain egg known to him as closely resembling those of the host, showing however a rougher texture.

110. **Cacomantis merulinus lanceolatus** (S. Müller) — Brain-fever Bird

Bartels: 4; April (2), May (2); West Java. Measurements (4): av. 17.4 (16.6-18.2) × 12.4 (12-12.7). Weight (4): av. 0.082 (0.080-0.090). Host: *Orthotomus sepium*.

Kooiman: 1; East Java. Measurements: 17.1 × 12.9. Weight: 0.080. Same host.

Description. — The eggs show a dimorphism: 3 shells are light creamy, spotted reddish brown, the fourth is much like the eggs of *Cettia fortipes* (no. 257).

Remarks. — Schönwetter gave the following measurements for 4 eggs: 18.2 × 13.2, and an average weight of 0.110. The great weight of these eggs makes their identity doubtful.

Hoogerwerf: Weight (1): 0.074. For 17 previously published records and the size of three earlier measured eggs see Hoogerwerf (1949: 86, pl. 7 fig. 73-76).

Description. — There are three different types of eggs, viz., one showing some resemblance to those of *Cisticola juncides* (no. 260), a second resembling certain shells of *Orthotomus sepium* (no. 272) and a third type showing much similarity to the eggs of *Prinia flaviventris* (no. 263). All these species are known as foster-parents of this small cuckoo.

Eggs of the *Orthotomus* type are white or slightly creamy white, covered with numerous brownish primary and vinaceous greyish secondary points and small speckles, mostly concentrated at the blunt end. When compared with the eggs of the host — which are much smaller — they are paler and perhaps also not so densely marked.



The shells of the *Cisticola* type differ at a glance from the just described ones because of their pale bluish green colour. Except in size they are much like the eggs of the host. In one of both eggs examined the majority of the primary speckles is much coarser than on those of the *Orthotomus* type; the colour of these markings varies from light rusty to dark redbrown, whereas the underlying mottling is greyish lavender or dirty lilac. Most markings are at the blunt end, but many finer ones are scattered beyond this area. There are only very few, not very well pronounced fine markings on the second shell of this type, rather uniformly distributed; they are dark sepia and there are no or hardly any underlying markings.

Eggs belonging to the third type do not differ much in colour and mottling from those of *Prinia flaviventris*. I have not seen eggs of this type but Bartels (1925) mentioned it and spoke of a perfect resemblance to the uniformly mahogany coloured shells of the host, which are described under no. 263 of this synopsis.

Remarks. — On account of the very great weight indicated by Schönwetter, the identity of his material mentioned above may be strongly doubted. In any case it seems useless to compare measurements and weights of the four shells examined by him with material originating from Java.

### III. *Cacomantis variolosus sepulcralis* (S. Müller) — Fan-tailed Cuckoo

Bartels: 39; February (2), March (5), April (8), May (9), June (5), July (3), September (4), October (1), November (2); West Java. Measurements (39): av. 19.8 (18.3-22)  $\times$  14.7 (13.6-15.5). Weight (39): av. 0.120 (0.105-0.140). Hosts: *Lanius schach* (4), *Enicurus velatus* (4), *Saxicola caprata* (2), *Megalurus palustris* (11), *Rhipidura phoenicura* (3), *R. javanica* (2), *Culicicapa ceylonensis* (1), *Muscicapa banyumas* (9), *M. hyperythra* (3). Eight doubtful eggs: av. 20.5 (19-21.5)  $\times$  14.8 (13.7-15.1). Weight: av. 0.108 (0.095-0.125). Hosts of these eggs: *Cettia fortipes* (6), *Rhipidura phoenicura* (1), *Enicurus velatus* (1).

Kooiman: 8. Measurements (8): av. 19.6 (18.5-20.5)  $\times$  14.6 (13.9-15.5). Weight: av. 0.115 (0.100-0.140). Hosts: *Lanius schach* (3), *Pycnonotus aurigaster* (1), *P. goiavier* (3), *Saxicola caprata* (1). Six doubtful eggs: Measurements: av. 19.8 (18.5-21.4)  $\times$  14.4 (13.9-14.9). Weight: av. 0.117 (0.100-0.135). Hosts: *Lanius schach* (4), *Pycnonotus goiavier* (2).

Description. — As a rule the eggs are short oval, moderately glossy, with the ground light or somewhat darker creamy, marked with small, reddish brown spots, mainly at the blunt end, forming a zone there. Generally the

eggs of *Cuculus poliocephalus* are somewhat longer, with a whiter ground and more evenly distributed spots.

Hoogerwerf: 4; March (1), August (1); West and Central Java. Measurements (4): av. 20 (19.6-20.5) × 15.13 (14.5-16); largest egg: 20.5 × 15.5 Weight (22): av. 0.130 (0.104-0.157). Hosts: *Lanius schach* (2), *Enicurus velatus* (1), unknown (1). For 80 previously published records and the size of 61 earlier measured eggs see Hoogerwerf (1949: 87-88, pl. 7, 8 fig. 77-94).

Description. — There are three different types of eggs of this Cuckoo, viz., a neutral type, much like the eggs of *Cuculus poliocephalus* (no. 108) and some of them rather similar to those of *Myiomela diana* (no. 220) or *Muscicapa indigo* (no. 278); a second type showing more resemblance to those of *Rhipidura phoenicura* (no. 274) or *R. euryura* (no. 275), and a third type of which the eggs are much like the shells of *Lanius schach* (no. 203). The neutral type is perhaps the most common one in West Java, whereas the third type may be the most usual one in Central Java and perhaps also in East Java.

Neutral type: The eggs are normal- to broad-, sometimes more elongate-oval with clearly or little different ends. The surface is smooth, dull or slightly glossy. The colour is chalky white or cream, covered with a variable quantity of fairly pale yellowish brown or rusty points and small speckles, generally much smaller than a pin's head and forming an indistinct cap at the blunt end, rather sparsely scattered elsewhere. The still finer underlying markings are often hardly visible but sometimes predominating, they vary from ashy or lavender-grey to violet-grey.

*Rhipidura* type: These eggs differ from those of the neutral type because of the coarser and usually better defined speckles and dots which are buffy olive to dark olive or olive sepia. The underlying, usually also well defined mottling is greyish olive or greyish lavender. On most eggs the markings are principally concentrated in an open zone at the blunt end.

*Lanius schach* type: Except in size, eggs of this type show a striking resemblance to those of *Lanius schach*, distinctly differing from both other types. They vary considerably in shape, but broad-oval ones occur most regularly, with only slightly differing ends and a smooth or somewhat rougher surface, which is dull or faintly glossy. The colour is greenish- or greyish cream, covered with a varying quantity of very irregular coarse, well or moderately defined speckles, dots and blotches which are buffy or brownish olive. The generally well defined sometimes even predominating secondary stains of the same type vary from light lavender grey to dirty ash. Usually most markings are at the blunt end, forming an open zone or

cap; in many eggs they fail almost completely on the remaining part of the shell.

Remarks. — As remarked under no. 108, it may be doubted whether the six eggs found in the nests of *Cettia fortipes* do originate indeed from this cuckoo and not from *Cuculus poliocephalus*, a species which is certainly much more common in the habitat of this warbler than is *Cacomantis variolosus*.

It is the first time that the fruit consuming bulbuls *Pycnonotus aurigaster* and *P. goiavier* are mentioned as hosts of this cuckoo.

112. **Chrysococcyx x. xanthorhynchus** (Horsfield) — Violet Cuckoo

Bartels: 1; February; locality unknown. Measurements: 18.1 × 12.9. Weight: 0.087. Host: *Prinia flaviventris*.

Description. — The egg is much like those of the host species.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 91).

Remarks. — The egg mentioned above is perhaps the same as previously indicated by Bartels (1925) as to belong to *Cacomantis merulinus lanceolatus* (see no. 110).

113. **Chrysococcyx malayanus albifrons** Junge — Malay Cuckoo

Bartels: 2; March; Sedari near Djakarta. Measurements (2): 20 × 13.7 and 20.6 × 13. Weight (2): av. 0.086. Host: *Gerygone sulphurea*.

Description. — The eggs are olive bronze resembling those of the European *Luscinia megarhyncha* Brehm.

Hoogerwerf: 1 (of the nominate race); September; Flores (Lesser Sunda Islands). Host: *Gerygone sulphurea*. Measurements: 21 × 14. Weight: 0.107. For some particulars derived from the literature see Hoogerwerf (1949: 91-92).

Description. — The only egg examined is narrow-oval with moderately different ends and a smooth, well glossed surface. The colour is dark greyish olive or olive brown without any markings. The shell is much like those of *Brachypteryx leucophrys* (no. 222), but it averages still darker; besides in size it differs very conspicuously from those of *Gerygone sulphurea* (no. 255), which is the only known host in Java.

114. **Surniculus l. lugubris** (Horsfield) — Black Drongo Cuckoo

Bartels: 25; January (2), February (2), March (1), April (5), May (8), July (1), September (2), November (1), December (2); West Java. Measurements (25): av. 20.7 (18.6-23) × 15.4 (14.4-16.2). Weight (25): av. 0.134 (0.110-0.160). Hosts: *Trichastoma sepiarium* (16), *Macronous flavi-*

*collis* (two in one nest), *Stachyris melanothorax* (6), one of unknown host.

Description. — The ground is pinkish grey, with reddish brown hair-lines and small spots (penumbrae) chiefly at the blunt end. The eggs are almost indistinguishable from those of *Trichastoma sepiarium*, but generally they are somewhat smaller, and have the ground tinged less red and more pinkish.

Hoogerwerf: 1; October; West Java. Measurements:  $21.2 \times 15.2$ . Weight (5): av. 0.141 (0.130-0.149). Host: *Trichastoma sepiarium*. For 24 previously published records and the size of 12 earlier measured eggs see Hoogerwerf (1949: 92, pl. 8 fig. 95-99).

Description. — Most eggs are much like those of the most common host of the species in West Java, *Trichastoma sepiarium* (no. 238), from which many shells differ in size only. They vary considerably in shape, but broad-oval ones are perhaps most common with usually distinctly differing ends and a smooth surface, moderately or strongly glossy. The colour is fleshy or pale salmon-pink, covered with an ill-defined cloudy mottling and smaller secondary markings, often rather densely scattered all over the surface; they are brownish vinaceous, purplish brown or ashy. Finally there are some very conspicuous primary scribbles and scratches, sometimes mixed with a few small speckles, of very dark mahogany-brown, passing into almost purplish black. In certain eggs the markings are concentrated at the blunt end.

#### 115. **Eudynamys scolopacea malayana** Cabanis & Heine — Koel

Bartels: 6; August; West Java. Measurements (6): av.  $34.5 \times 25.1$ . Weight: av. 0.84. Host: *Corvus macrorhynchos*.

Kooiman: 2; East Java. Measurements:  $36.4 \times 26.4$  and  $35.6 \times 26.1$ . Weight: 0.93 and 0.99. Host: *Corvus enca*.

Description. — The eggs are greyish blue with small black spots.

Hoogerwerf: Weight (2): 0.791, 0.941. For 22 previously published records and the size of 31 earlier measured eggs see Hoogerwerf (1949: 93-94, pl. 8, 9 fig. 100, 101).

Description. — Except in size most eggs examined are much like those of *Corvus enca* (no. 350), which — together with *Corvus macrorhynchos* (no. 349) — may be considered the most common host of this large cuckoo in West Java. A minority of the eggs examined resembles more closely those of the latter crowspecies. The eggs are normal- or broad-oval with distinctly different ends and a smooth or a trifle rougher texture without or with only little gloss. The colour varies from yellowish- to dirty olive-green, abundantly covered with fairly regular, well defined small speckles and dots, uniformly scattered all over the surface. This mottling varies in colour

from different shades of olive to olive sepia, sometimes almost black. The mouse- or violet grey underlying markings are hardly distinguishable from the primary ones.

The eggs of the *Corvus macrorhynchos* type have a dirty bluish green colour whereas the more irregular and coarser primary markings are light sepia and not so sharply defined than in those of the *Corvus enca* type; the not very strikingly present secondary markings are dirty lilac-greyish.

116. **Phaenicophaeus j. javanicus** (Horsfield) — Red-billed Malcoha  
Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 95). Judging from my experience the species is rare in Java.

117. **Phaenicophaeus c. curvirostris** (Shaw) — Chestnut-breasted Malcoha

Bartels: 2/1, 14/2, 6/3; February (1), March (4), April (10), May (6), June (1); West Java. Measurements (48): av. 37.6 (35-41.2) × 30 (28.2-34.5). Weight (46): av. 1.33 (1.15-1.54).

Description. — The eggs are white, several are stained by dirt.

Hoogerwerf: 1 odd shell; Central Java. Measurements: 39.7 × 28.4. Weight (5): av. 1.364 (1.139-1.715). For five previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 95-96, pl. 9 fig. 102).

Description. — The eggs are normal- to broad-oval, more elongate-oval in some rare cases, with equal or almost equal ends and a rather rough surface with little or no gloss. The colour is chalky white without natural markings but generally the shells are soiled, the more so as incubation progresses.

118. **Centropus sinensis bubutus** Horsfield. — Crow-Pheasant or Coucal

Bartels: 2/2, 3/3; January (2), October (1), November (1), December (1); West Java. Measurements (13): av. 38.3 (35.3-42.7) × 29.6 (26.7-31.1). Weight (13): av. 1.80 (1.55-1.96).

Description. — The colour is white.

Remarks. — The measurements given by Hoogerwerf are smaller, viz., 34.76 × 29.5 for 11 eggs.

Hoogerwerf: Weight (1/3): av. 1.175 (1.152-1.195). For four previously recorded breeding dates and 11 earlier measured eggs see Hoogerwerf (1949: 96, pl. 9 fig. 103).

Description. — The eggs examined do not differ from those of the preceding species, but certain specimens are partly or completely encrusted with a dirty creamy or brownish chalky covering, making the surface rather rough. Most eggs are soiled by nest dirt.

Remarks. — The shells in the Bartels collection average distinctly larger and heavier than the present three and the 11 eggs earlier measured by me, also when compared with those described by Bernstein and Coomans de Ruiter (Hoogerwerf, 1949: 96).

119. **Centropus nigrorufus** (Cuvier) — Sunda Island Crow-Pheasant

Bartels: 1/1, 1/2, 1/3; March (1), June (2); Tjabang Bungin, Telar Tjilesung (both near Djakarta), West Java. Measurements (6): av. 39 (37-41.5) × 30.9 (29.7-31.9). Weight (6): av. 1.78 (1.61-2.02).

Description. — The eggs are white.

Hoogerwerf: No material or particulars available.

120. **Centropus bengalensis javanensis** (Dumont) — Lesser Crown-Pheasant or Coucal.

Bartels: 2/1, 6/2, 5/3; February (1), April (3), May (6), June (2), August (1); West Java. Measurements (29): av. 30.1 (26.1-34.8) × 23.9 (21.5-27.1). Weight (29): av. 0.69 (0.50-0.89).

Description. — The colour is white.

Remarks. — The eggs vary considerably in shape, from almost round (26 × 22.6) to elongate-oval (32.5 × 23); average variation in length 29%, in breadth 25%.

Hoogerwerf: 1/3, 1 odd shell; November (1/3), February (1); West Java. Measurements (4): av. 27.63 (27.2-27.9) × 23.78 (23.1-24.2); largest egg: 27.9 × 24.2; maximal variation in length in the same clutch: 0.7 (27.2-27.9). Weight (1/2, 3/3, 1 odd shell): av. 0.568 (0.452-0.699); maximal variation in the same clutch: 0.109 (0.452-0.561). For 22 previously recorded breeding dates and 16 earlier measured eggs see Hoogerwerf (1949: 97-98, pl. 9 fig. 104).

Description. — Except in size the eggs resemble those of *Centropus sinensis* (no. 118), but they average much broader oval, they are sometimes almost round, though there are rather many exceptions. The smooth, occasionally rougher texture is not or only faintly glossy; the colour is chalky white though very often so heavily soiled that the ground is almost completely concealed. As is the case with the eggs of the larger Coucal.

certain specimens show some black or almost black speckles, incidentally coarse and brownish, which are much like natural markings.

Remarks. — As seems to be the case in *Centropus sinensis*, there is apparently rather much difference in the average measurements and weights of the eggs of this small Coucal, as is evident when the above and previously described eggs of my collection and those measured by Coomans de Ruiter and van Heyst (Hoogerwerf, 1949: 97) are compared with those of the Bartels collection. In both cases the latter specimens are largest and heaviest.

#### TYTONIDAE

##### 121. *Tyto alba javanica* (Gmelin) — Barn Owl

Bartels: 1/4; July; West Java. Measurements (4): av.  $39.4 \times 33.1$ . No weight is taken as the holes are very large.

Kooiman: 4; East Java. Measurements: av.  $42.1 \times 33.7$ . Specimens with large holes.

Description. — The colour is white.

Hoogerwerf: For seven previously recorded breeding dates and ten earlier measured eggs see Hoogerwerf (1949: 98).

Description. — Perhaps not differing from the eggs of the European subspecies, also fairly similar to those of *Arborophila javanica* (no. 53). They are normal- or broad-oval, distinctly compressed towards the smaller end though certain eggs have almost equal ends; they have a rather rough or smooth surface without or with hardly any gloss. Generally the chalky white basic colour is almost completely covered with a transparent soily layer, often giving the impression of natural markings, but most probably exclusively originating from incubation.

Remarks. — When compared with the eggs examined by me and the four of the Kooiman collection, those present in the Bartels collection are very small.

#### STRIGIDAE

##### 122. *Phodilus b. badius* (Horsfield) — Bay Owl

Bartels: 2/2; March, July; Karang Tengah (Preanger), Tji Bungur (Preanger), West Java. Measurements (4): av.  $39 (38-40.6) \times 30.7 (30.2-31.1)$ . Weight (2): 1.45 and 1.57.

Description. — The colour is white.

Remarks. — Schönwetter gave the following data for 33 eggs of *Phodilus saturatus*: Measurements:  $34.8 \times 30$ . Weight: 1.25. Consequently his eggs are much smaller and lighter. Perhaps Bartels made a mistake.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 99).

Remarks. — I do not think it justifiable to doubt the identity of both clutches of the Bartels collection on account of Schönwetter's statement as referred to above.

123. **Otus r. rufescens** (Horsfield) — Reddish Scops Owl

Bartels: No material available.

Hoogerwerf: No material available, nor any particulars either. The species is apparently rare in Java.

124. **Otus spilocephalus angelinae** (Finsch) — Mountain Scops Owl

Bartels: No material available.

Hoogerwerf: No material available; the species is very rare in Java. For some particulars derived from the literature see Hoogerwerf (1949: 99).

125. **Otus bakkamoena lempiji** (Horsfield) — Collared Scops Owl

Bartels: 4/1, 7/2; February (2), March (3), April (2), May (3), June (1); West Java. Measurements (18): av. 33.5 (31.1-36.5) × 28.8 (27.2-29.5). Weight (18): av. 0.97 (0.92-1.09).

Description. — The colour is white.

Hoogerwerf: 1/2; West Java. Measurements (2): 33.2 × 28.6, 34 × 28.9. Weight (2/2): av. 0.946 (0.904-1.003); maximal variation in the same clutch: 0.074 (0.929-1.003). For 26 previously recorded breeding dates and 18 earlier measured eggs see Hoogerwerf (1949: 100).

Description. — The eggs are broad-oval, often almost round with equal or slightly different ends with a smooth texture, dull or with some gloss and pure white, though obscured by nest dirt.

126. **Otus brookii solokensis** (Hartert) — Rajah's Scops Owl

Bartels: No material available.

Hoogerwerf: No material or particulars available. This Scops Owl too is apparently very rare in Java.

127. **Bubo sumatranus strepitans** (Temminck) — Eagle Owl

Bartels: 1/1; April; West Java. Measurements: 59.8 × 47.9. Weight: 5.62.

Description. — The colour is white.



Hoogerwerf: Weight (1/1): 6.183. For three previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 101).

Description. — Very broad-oval eggs with equal or almost equal ends and a smooth, though porous texture which is dull or slightly glossy. The texture may be partly rough on account of some small chalky swellings.

128. **Bubo k. ketupu** (Horsfield) — Fish Owl

Bartels: 8/1; February (2), April (2), May (1), June (1), July (2); West Java. Measurements (7): av. 57.4 (56.8-58) × 47 (45.7-48.3). Weight (7): av. 5.04 (4.52-5.75).

Description. — The colour is white.

Remarks. — One very light egg (measurements: 53.2 × 47.8; weight: 3.73) is of doubtful identity.

Hoogerwerf: Weight (2/1): 4.182, 5.286. For 16 previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 101, pl. 9 fig. 105).

Description. — Much like the eggs of the preceding species, but considerably smaller. They have a smooth though rather porous surface, which is dull or moderately glossy. In most eggs the white colour is soiled by a transparent brownish layer, most probably caused by dirt or fermentation of the nest material, but certain secondary markings which are greyish lavender or dirty-mauve, are much like natural mottling.

Remarks. — Because of the important variation in length and width (48.3-59.1 and 42.7-48.6) in the only six shells examined by me, the identity of the fairly small egg in the Bartels collection, indicated above, needs not to be doubted.

129. **Glaucidium cuculoides castanopterum** (Horsfield) — Barred Owlet

Bartels: 4/2; February (2), March (1), April (1); Tji Karang, and Rawa Kalong (both in Preanger district), West Java. Measurements (8): av. 33.5 (31.5-34.7) × 29.5 (28.6-30). Weight (8): av. 1.09 (0.90-1.22).

Description. — The colour is white.

Hoogerwerf: Weight (1/2): 1.032, 1.051. For one previously recorded breeding date and the measurements of both these eggs originating from Gundih, near Semarang, Central Java, see Hoogerwerf (1949: 102). This owl is very rare in Java.

Description. — Much like the eggs of *Otus bakkamoena* (no. 125) though perhaps averaging duller, whereas the white colour shows a tendency towards a bluish or greenish tone in freshly laid eggs.

130. **Ninox scutulata javanensis** Stresemann — Hawk Owl

Bartels: 1/2; May; Gundih, Central Java. Measurements (2): av.  $36.9 \times 29$ . Weight (2): av. 1.11.

Description. — The colour is white.

Remarks. — Schönwetter gave for 6 eggs: Measurements:  $37.4 \times 29.4$ . Weight: 1.44. The measurements agree with those given here, but the weight is very high. One egg in the Sody collection collected in April in Deli, Sumatra measures  $39.5 \times 32$  and weighs 0.98.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 103).

Remarks. — Since nothing is known about the exact origin of Schönwetter's material, comparison with eggs from Java does not justify any conclusion.

131. **Strix seloputo malayana** Cabanis & Heine — Wood Owl

Bartels: No eggs available.

Kooiman: 2; Dampar, East Java. Measurements (2): av.  $50 \times 43$ . Weight (2): av. 3.35.

Description. — The colour is white.

Hoogerwerf: Weight (1/1): 3.172. For five previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 103, pl. 9 fig. 106).

Description. — Except in size the eggs are much like those of *Bubo ketupu* (no. 128), though they may average a trifle smoother. Generally they are much soiled and certain eggs show some well defined sepia or almost black points, which perhaps do not originate from nest dirt; such points are found in many other white eggs.

Remarks. — It is strange that the Bartels collection does not contain any material of this large owl, one of the most common representatives of the family.

132. **Strix leptogrammica bartelsi** (Finsch) — Malayan Wood-Owl

Bartels: No material available.

Hoogerwerf: No material or particulars available. The species is perhaps very rare in Java.

## PODARGIDAE

133. **Batrachostomus j. javensis** (Horsfield) — Horsfield's Frogmouth

Bartels: 2/1; February, April; Tjimapag, Palabuan and Tjiparaj, Preanger,

West Java. Measurements (2): av. 28.1 × 18.9. Weight (2): av. 0.30.

Description. — The eggs are oval and of a lustreless white colour.

Hoogerwerf: No material available. For three previously recorded breeding dates (from Borneo), eight earlier measured eggs and a description of the eggs by Bernstein and Coomans de Ruiter, see Hoogerwerf (1949: 104). This is not a common bird in Java.

#### CAPRIMULGIDAE

##### 134. *Caprimulgus m. macrurus* Horsfield — Long-tailed Nightjar

Bartels: 1/1, 2/2; October (2), December (1); West Java. Measurements (5): av. 29.5 (28.5-30.5) × 21.8 (21.1-22.4). Weight (5): av. 0.46 (0.43-0.48).

Kooiman (East Java) and Sody (West Java): 6/1, 7/2: February (1), September (2), no further details. Measurements (20): av. 29.6 (28.1-31.7) × 21.5 (20.8-22.2). Weight (18): av. 0.465 (0.42-0.48). The measurements and weights of the five shells from West Java of the Sody collection and the fifteen from East Java of the Kooiman collection are almost exactly the same.

Description. — The ground colour is whitish to creamy, very vaguely marked with blotches of the same, somewhat darker tint; the underlying shell-marks are much more distinct.

Hoogerwerf: Weight (2/2): av. 0.426 (0.393-0.451); maximal variation in the same clutch: 0.058 (0.393-0.451). For 30 previously recorded breeding dates and 23 earlier measured eggs see Hoogerwerf (1949: 104-105, pl. 10 fig. 107).

Description. — On account of the lighter ground, the very pale and less numerous markings, the eggs differ rather strikingly from those of the smaller *Caprimulgus affinis* (no. 135). Generally they are elongate- or regular-oval with equal ends or sometimes slightly pointed towards the smaller end, with a smooth texture with little or a strong gloss. The colour is ivory to brownish cream, covered with fairly numerous, very irregular, ill-defined, pale dots and blotches of a marbled character, which are light vinaceous grey. On this predominating mottling may be found some darker primary ones, rusty brown or sepia in colour. Though most eggs are of this type there are some in which finer, well defined primary brown or sepia coloured markings predominate over the underlying ones. Generally the marbling is uniformly scattered over the shell.

##### 135. *Caprimulgus a. affinis* Horsfield — Allied Nightjar

Bartels: 1/1, 10/2; March (1), April (3), May (2), June (3), August (1),

October (1); West Java. Measurements (21): av. 28.1 (25.8-29.5) × 20.7 (19.3-21.7). Weight (21): av. 0.43 (0.38-0.46).

Kooiman: 7; East Java. Measurements (7): av. 28.2 (27.1-29.6) × 20.2 (19.6-20.5). Weight (7): av. 0.41 (0.35-0.46).

Description. — The ground is yellowish grey to clay coloured, densely marked with different shades of brown.

Hoogerwerf: 1/2; West Java. Measurements (2): 26.7 × 19.9, 27 × 20.5. Weight (2): 0.385, 0.396. For 12 previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 106, pl. 10 fig. 108, 109).

Description. — On account of their smaller size and darker, better defined mottling, the eggs differ distinctly from those of the preceding species. They are olive buff or brownish cream, covered with many irregular and coarse primary speckles, dots and occasionally scratches, generally well defined, though very pale. The colour of these markings varies from light sepia and brownish olive to dark sepia, often almost black and the underlying mottling, often showing a cloudy or marbled character, is smoke-grey. Though the eggs are almost without exception densely marked, the ground remains clearly visible.

136. **Caprimulgus pulchellus bartelsi** Finsch — Salvadori's Nightjar

Bartels: 1/1; 4 April 1932; near Tjilidong, Tjibuma near Bandung, West Java, altitude 4500 feet, under tea-bush. Measurements: 29 × 21.5. Weight: 0.43.

Description. — The egg is long-oval, rather glossy, and white; it is unmarked.

Hoogerwerf: No material or particulars available. The species is certainly not common in Java. The above mentioned egg is the first and only one known to science from the Indonesian area.

APODIDAE

137. **Collocalia gigas** Hartert & Butler — Giant Swiftlet

Bartels: 7/1; October (2), November (2), December (3); West Java. Measurements (7): av. 28.5 (26-31.5) × 18 (17.8-18.1). Weight (7): av. 0.29 (0.27-0.33).

Description. — The colour of the eggs is lustreless white.

Hoogerwerf: 1/1; West Java. Measurements: 27 × 17.7. Weight (3/1): av. 0.276 (0.243-0.320). For two previously recorded breeding dates and two

earlier measured eggs from Tjibodas (Mount Pangerango), West Java, see Hoogerwerf (1949: 107, pl. 10 fig. 110).

Description. — The eggs are narrow-oval with moderately different ends and a fairly rough surface, dull without gloss, sometimes looking sallow on account of dirt.

138. **Collocalia brevirostris vulcanorum** Stresemann — Low's Swiftlet

Bartels and Hoogerwerf: No material or particulars available. Though this swiftlet is breeding in the neighbourhood of the crater of the volcano Mount Gede — a locality very familiar both to Bartels and to me (Hoogerwerf) — we did not succeed in obtaining the eggs because of the inaccessibility of its nesting locality.

139. **Collocalia s. salangana** Streubel — Brown-rumped Swiftlet

Bartels: 4/2 under the name *Collocalia fuciphaga*; 2/1, 8/2 without species name, but on account of their similarity in measurements and weight considered by me (Hellebrekers) as belonging to this species; January (2), June (8), December (4); Tji Tjareuh (8) and Mount Masigit (1), Preanger, West Java. Measurements (26): av. 21.5 (20-22.6) × 13.9 (13.5-14.4). Weight (26): av. 0.110 (0.100-0.120).

Description. — The colour is lustreless white.

Hoogerwerf: For the measurements of six previously measured eggs under the name *C. fuciphaga* (Thunberg) see Hoogerwerf (1949: 108).

Description. — Except in size the eggs do not distinctly differ from those of the other *Collocalia* species known to me. They are narrow-oval, often rather regularly elliptic, with distinctly different or almost equal obtuse ends with a smooth texture, dull or slightly glossy. They are white, sometimes soiled.

Remarks. — According to Lord Medway (1966) the correct name of the present species previously indicated with the name *Collocalia fuciphaga*, is *Collocalia salangana*, while the name *C. fuciphaga* must be used for the next species, formerly known as *C. inexpectata*. The present species differs from the next according to the same author in that its nests are not edible. Although we do not feel competent to express a definite opinion on this matter, we have followed the nomenclature proposed by Medway.

140. **Collocalia fuciphaga vestita** (Lesson) — Thunberg's Swiftlet

Bartels: No material available.

Hoogerwerf: For four previously recorded breeding dates and 12 earlier

measured eggs (under the name *Collocalia inexpectata bartelsi* Stresemann) see Hoogerwerf (1949: 108).

Description. — Except in size the eggs do not seem to differ from those of the preceding species.

Remarks. — Lord Medway (1964, 1966) considered the name *Collocalia fuciphaga* applicable to the species previously known as *C. inexpectata* Hume (= *C. francica* (Gmelin)), which produces edible nests, almost exclusively made of saliva.

The absence of eggs of such a common swiftlet in the Bartels collection is noteworthy.

141. **Collocalia esculenta linchi** Horsfield & Moore. — White-bellied Swiftlet

Bartels: 3/1, 23/2; March (2), April (3), May (4), June (5), July (4), August (3), September (1), October (2), November (2); West Java. Measurements (46): av. 17.4 (16.1-18.5) × 11.4 (10.6-12.1). Weight (46): av. 0.060 (0.050-0.070).

Description. — The colour is white.

Hoogerwerf: 10/2, 3 odd shells; September; West Java. Measurements (23): av. 17.46 (16.5-18.8) × 10.99 (10.4-11.5); largest egg: 18.8 × 11; maximal variation in length in the same clutch: 1.3 (16.5-17.8). Weight (23): av. 0.059 (0.049-0.064); maximal variation in the same clutch: 0.008 (0.055-0.063). For 106 previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 109, pl. 10 fig. 111).

Description. — Except in size the eggs are much like those of the preceding species, in any case I failed to find reliable points of difference.

Remarks. — The nests of this small Swiftlet are inedible and chiefly made of vegetable matter.

142. **Chaetura c. cochinchinensis** Oustalet — White-throated Spinetail Swift

Bartels: No material available.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 110).

143. **Chaetura g. gigantea** (Temminck) — Spinetail Swift

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 110).

144. **Chaetura leucopygialis** (Blyth) — Grey-rumped Spinetail Swift  
Bartels and Hoogerwerf: No material or particulars available. The species is perhaps very rare in Java.

145. **Apus affinis subfurcatus** (Blyth) — House Swift

Bartels: 2/2, 1/3; September; West Java. Measurements (7): av. 24.5 (23.1-25.8) × 15.7 (15.2-16). Weight (7): av. 0.177 (0.170-0.185).

Description. — The colour is white.

Hoogerwerf: Weight (1/3): av. 0.169 (0.160-0.176). For six previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 111).

Description. — The eggs are fairly normal- or narrow-oval, with distinctly or slightly different obtuse ends and a smooth texture, not or only faintly glossy. The colour is pure white, often stained by dirt.

146. **Cypsiurus parvus infumatus** (Sclater) — Palm Swift

Bartels: 3/2; July, August, October; West Java. Measurements (6): av. 17.8 (17.2-18.6) × 11.8 (11.4-12.3). Weight (6): av. 0.065 (0.060-0.070).

Description. — The eggs are lustreless white.

Hoogerwerf: 1/1; September; West Java. Measurements: 17.3 × 11.4. Weight (2/1, 2/2): av. 0.066 (0.062-0.072). For 12 previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 111-112, pl. 10 fig. 112).

Description. — The eggs average in having a more normal-oval shape with more distinctly different ends than those of the smaller *Collocalia* species discussed above, though also elongate-oval eggs with almost equal ends are no exceptions. They have a smooth texture which is dull or moderately glossy and white, often creamy tinged, most probably caused by dirt.

#### HEMIPROCNIIDAE

147. **Hemiprocne l. longipennis** (Rafinesque) — Crested Tree Swift

Bartels: 7/1; March (1), May (3), June (2), September (1); West Java. Measurements (7): av. 24.8 (23.7-26.2) × 18.2 (17.8-19). Weight (7): av. 0.23 (0.20-0.25).

Kooiman and Sody: 7/1; February, April, May, June; West Java. Kooiman did not mention particulars about the eggs from East Java. Measurements (7): av. 24.8 (24.1-26.1) × 18 (17.4-18.2). Weight (7): av. 0.23.

Description. — The eggs are absolutely lustreless bluish white.

Remarks. — Measurements and weights are almost exactly the same in the four shells from West Java of the Sody collection and the three from the Kooiman collection, originating from East Java.

Hoogerwerf: 2/1; September; West Java. Measurements (2):  $24 \times 18$ ,  $24 \times 18.3$ . Weight (2/1): 0.237, 0.268. For 17 previously recorded breeding dates and two earlier measured eggs see Hoogerwerf (1949: 112, pl. 10 fig. 113).

Description. — The eggs are fairly regular-oval with equal or almost equal obtuse ends, being sometimes more elliptic; they have a smooth texture without or with only a very weak gloss. The colour is white with a bluish or bluish green shade; there are no markings, except those caused by dirt.

#### TROGONIDAE

148. **Harpactes o. oreskios** (Temminck) — Orange-breasted Trogon

Bartels: 3/2; May, June, October; West Java. Measurements (6): av.  $26.7 (25-29) \times 21.7 (21.4-22.3)$ . Weight (6): av. 0.44 (0.40-0.50).

Description. — The colour is grey with an olive tinge.

Hoogerwerf: Weight (2/2): av. 0.441 (0.405-0.485); maximal variation in the same clutch: 0.080 (0.405-0.485). For three previously recorded breeding dates and the measurements of these four eggs originating from Mount Pangerango and Mount Salak, West Java, see Hoogerwerf (1949: 113, pl. 10 fig. 114).

Description. — The eggs are broad-oval with distinctly or moderately different ends and a smooth surface which is glossy, sometimes strongly so. The colour is dirty ivory or pale olive buff without any markings, though sometimes stained by dirt.

149. **Harpactes r. reinwardtii** (Temminck) — Reinwardt's Trogon

Bartels: 6/1; April (2), May (1), June (1), October (1), December (1); West Java. Measurements (6): av.  $31.2 (30.1-32.8) \times 24.9 (23.3-26.1)$ . Weight (6): av. 0.70 (0.62-0.79).

Description. — The colour is greyish.

Hoogerwerf: Weight (1/1): 0.735. For one previously recorded breeding date and the measurements of this egg, originating from Tjibodas (Mount Pangerango), West Java, see Hoogerwerf (1949: 113, pl. 10 fig. 115).

Description. — The eggs are normal- to broad-oval with similar or almost equal obtuse ends and a smooth surface, showing no or only a weak gloss.



The colour is chalky white, often obscured by a dirty layer, apparently exclusively caused by dirt.

## ALCEDINIDAE

150. **Lacedo p. pulchella** (Horsfield) — Banded Kingfisher

Bartels: No material available.

Hoogerwerf: For one previously recorded breeding date and two earlier measured eggs originating from Gundih (near Semarang), Central Java, see Hoogerwerf (1949: 114, pl. 10 fig. 116). The species is rare in Java.

Description. — Except in size the eggs are much like those of *Halcyon cyanoventris* (no. 153). The only two eggs examined are very broad-oval with perfectly equal ends, so that they are almost round. They have a smooth and glossy surface which is pure white, almost entirely covered with brownish stains, probably caused by dirt.

151. **Halcyon chloris palmeri** (Oberholser) — White-collared Kingfisher

Bartels: 1/1, 2/2, 8/3, 5/4; April (1), May (3), June (1), July (1), August (3), September (2), October (4), November (1); West Java. Measurements (49): av. 30.1 (27.5-32.5) × 24.8 (23.2-25.9). Weight (42): av. 0.59 (0.53-0.66).

Description. — The colour is glossy white.

Hoogerwerf: 1/4, 1 odd shell; April; West Java. Measurements (5): av. 29.24 (27.6-30.6) × 23.8 (23.2-24.8); largest egg: 30.6 × 24.8; maximal variation in length in the same clutch: 1.9 (27.6-29.5). Weight (2/3, 1/4, 2 odd shells): av. 0.572 (0.492-0.672); maximal variation in the same clutch: 0.113 (0.518-0.631). For 25 previously recorded breeding dates and 29 earlier measured eggs see Hoogerwerf (1949: 114-115).

Description. — The eggs are much like those of *Halcyon cyanoventris* (no. 153) though the ends may average more distinctly different; the surface is less smooth and not so glossy. They are broad-oval with almost equal or also clearly different ends, with a smooth or somewhat rougher texture which is dull or slightly glossy. The colour is white, usually stained by nest dirt.

152. **Halcyon coromanda minor** Temminck & Schlegel — Ruddy Kingfisher

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the

literature see Hoogerwerf (1949: 115-116). The species may be considered rare in all the many suitable localities visited by me in Java.

153. **Halcyon cyanoventris** (Vieillot) — Javan Kingfisher

Bartels: 2/1, 4/2, 4/3, 3/4, 1/5; February (1), March (1), April (3), May (5), August (2), October (2); West Java. Measurements (38): av. 30.5 (27.9-34.9) × 26.6 (24.8-32.2). Weight (38): av. 0.64 (0.59-0.73).

Description. — The colour is glossy white.

Hoogerwerf: 1/4; March; West Java. Measurements (4): av. 32.18 (30.7-33.2) × 27.05 (26.4-28.1). Weight (2/3, 1/4): av. 0.670 (0.580-0.792); maximal variation in the same clutch: 0.196 (0.596-0.792). For 28 previously recorded breeding dates and 57 earlier measured eggs see Hoogerwerf (1949: 116, pl. 10 fig. 117).

Description. — The eggs are broad-oval with almost or perfectly equal ends, giving them sometimes a nearly globular shape. They have a smooth, almost transparent surface, almost invariably with a deep gloss. The colour is white or a beautiful milky white, but the shell is nearly without exception obscured by a thin layer of brownish stains, caused by the earth of the nesthole. As is the case in many white eggs there may be some very dark points or speckles on the shells, most probably also caused after the eggs were laid.

154. **Pelargopsis c. capensis** (Linnaeus) — Stork-billed Kingfisher

Bartels: No material available.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 117).

Remarks. — Though the species is fairly common in Java, eggs are rare in collections.

155. **Alcedo m. meninting** Horsfield — Deep-blue Kingfisher

Bartels: 1/1, 1/3, 2/4, 3/5; January (2), March (1), April (1), May (3); West Java. Measurements (27): av. 20.5 (19-22.1) × 17.8 (16.6-18.2). Weight (27): av. 0.17 (0.15-0.19).

Description. — The colour is glossy white.

Hoogerwerf: For 13 previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 117, pl. 10 fig. 118).

Description. — Except in size the eggs are much like those of *Halcyon cyanoventris* (no. 153) because of their very smooth and highly glossy texture. In this case too the shells are often almost entirely covered with nest dirt.

156. **Alcedo e. euryzona** Temminck — Broad-zoned Kingfisher

Bartels: 1/3; March; Tji Kahuripan (Preanger), West Java. Measurements (3): av.  $26.7 \times 22.3$ . Weight (3): av. 0.34.

Description. — The colour is glossy white.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 118). This kingfisher too is certainly not a common species in Java.

157. **Alcedo caerulescens** Vieillot — Small Blue Kingfisher

Bartels: 3/4, 1/5, 2/6, 1/7; May (6), August (1); West Java. Measurements (36): av.  $18.6 (17.6-19.6) \times 15.8 (15.3-16.3)$ . Weight (36): av. 0.13 (0.12-0.14).

Description. — The eggs are glossy white.

Hoogerwerf: Weight (1/5): av. 0.126 (0.122-0.129). For seven previously recorded breeding dates and 12 earlier measured eggs see Hoogerwerf (1949: 118, pl. 10 fig. 119).

Description. — Except in size the eggs are indistinguishable from those of *Alcedo meninting*.

158. **Ceyx erithacus rufidorsus** Strickland — Red-backed Three-toed Kingfisher

Bartels: 1/2, 2/3; February, April, December; West Java. Measurements (8): av.  $19.4 (19-20) \times 16.8 (16-17.3)$ . Weight (8): av. 0.145 (0.140-0.155).

Description. — The eggs are glossy white.

Hoogerwerf: Weight (1/3): av. 0.138 (0.135-0.143). For seven previously recorded breeding dates and 13 earlier measured eggs see Hoogerwerf (1949: 119).

Description. — Except in size the eggs do not differ from those of the preceding species.

## MEROPIDAE

159. **Merops leschenaulti quinticolor** Vieillot — Bay-headed Bee-eater

Bartels: 1/2, 4/3; May (1), July (2), August (1), September (1); West Java. Measurements (13): av.  $22.3 (21.2-23.1) \times 18.8 (17.7-20)$ . Weight (13): av. 0.245 (0.21-0.26).

Kooiman: 3/2, 9/3; East Java. Measurements (33): av. 22 (20.3-23.8)  $\times$  18.9 (17.2-19.6). Weight (30): av. 0.23 (0.21-0.28).

Description. — The eggs are glossy white.

Hoogerwerf: 1/3, 1 odd shell; May, July; West Java. Measurements (4): av. 22.2 (21.7-23) × 18.25 (17.9-18.7); largest egg: 23 × 18.7; maximal variation in length in the same clutch: 1.3 (21.7-23). Weight (4): av. 0.238 (0.224-0.259). For four previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 119-120).

Description. — Except in size the eggs are much like those of *Alcedo meninting* (no. 155). They are broad-oval, sometimes almost globular because of their equal or almost equal ends. The texture is smooth and glossy. The colour is white, almost without exception stained by nest dirt which may change the tint into a uniform cream or buffy white. When freshly obtained, many eggs are sprinkled with sand or earth, very firmly attached to the shell.

160. **Merops v. viridis** Linnaeus — Chestnut-headed Bee-eater

Bartels: 1/2, 2/3; May; West Java. Measurements (8): av. 23.8 (23.2-25.1) × 20.4 (20-21.4). Weight (8): av. 0.34 (0.33-0.36).

Description. — The eggs are glossy white.

Hoogerwerf: 1/3; September; West Java. Measurements (3): av. 23.83 (23.7-24) × 20.7 (20.5-20.8); largest egg: 24 × 20.8. Weight (2/3): av. 0.358 (0.341-0.378); maximal variation in the same clutch: 0.023 (0.355-0.378). For three previously recorded breeding dates and 12 earlier measured eggs see Hoogerwerf (1949: 120-121, pl. 10 fig. 120).

Description. — Except in size the eggs are indistinguishable from those of the preceding species.

CORACIIDAE

161. **Eurystomus orientalis cyanicollis** Vieillot — Broad-billed Roller

Bartels: 1/2; June; Mount Pangerango, Preanger, West Java. Measurements (2): av. 34.1 × 27.9. Weight (2): av. 1.04.

Description. — The colour is white.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 121).

BUCEROTIDAE

162. **Aceros u. undulatus** (Shaw) — Malaysian Wreathed Hornbill

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 121-122).

163. **Anthracoceros convexus** (Temminck) — Pied Hornbill

Bartels: No material available.

Hoogerwerf: Weight (1): 2.938. For one previously recorded breeding date and two earlier measured eggs see Hoogerwerf (1949: 122, pl. 11 fig. 121).

Description. — The only two eggs examined are fairly normal- to narrow-oval with distinctly different ends and a smooth, fairly strong shell, which is dull or faintly glossy. The chalky white primary colour is almost entirely covered by many dirty greyish or lavender stains, partly forming well defined clouds. Though they strongly resemble natural markings they may be caused by dirt from the nest or from the bird's bill.

164. **Buceros rhinoceros silvestris** Vieillot — Rhinoceros Hornbill

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 123).

## CAPITONIDAE

165. **Megalaima zeylanica lineata** (Vieillot) — Dull Barbet

Bartels: 3/1, 1/2, 1/3; April (1), May (1), October (2), December (1); West Java. Measurements (8): av. 30.5 (28-31.8) × 22.7 (22.2-23). Weight (5): av. 0.44 (0.410-0.465).

Description. — The colour is white.

Hoogerwerf: Weight (2/3): av. 0.440 (0.432-0.451); maximal variation in the same clutch: 0.019 (0.432-0.451). For four previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 123-124).

Description. — The eggs vary considerably in shape but generally they show clearly different ends and a dull or moderately glossy surface, which is white, often stained by nest dirt.

166. **Megalaima corvina** (Temminck) — Brown-throated Barbet

Bartels: 1/1, 1/2; June (1), September (1); West Java. Measurements (3): av. 35.6 (34.1-36.5) × 25.3 (24.9-25.5). Weight (3): av. 0.60.

Description. — The colour is white.

Hoogerwerf: Weight (1/2): 0.539, 0.618. For six previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 124, pl. 11 fig. 122).

Description. — Except in size the eggs are almost indistinguishable from those of the preceding species; certain eggs examined have a fairly rough texture.

Remarks. — When compared with the three eggs of the Bartels collection mine average considerably smaller, though less conspicuously lighter in weight.

167. **Megalaima javanensis** (Horsfield) — Black-banded Barbet

Bartels: 2/1, 1/2, 1/4; May (3), June (1); West Java. Measurements (8): av. 28.9 (26.4-32.1) × 21.8 (20.3-23.5). Weight (8): av. 0.355 (0.33-0.40).

Description. — The colour is white.

Hoogerwerf: 1/3; April; Central Java. Measurements (3): av. 29.43 (28.9-30) × 22.57 (22-23); largest egg: 30 × 22. Weight (1/3): av. 0.382 (0.372-0.395). For two previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 125).

Description. — Except because of their smaller size, the eggs are not essentially different from those of both preceding species.

168. **Megalaima a. armillaris** (Temminck) — Yellow-headed Barbet

Bartels: 3/1, 7/2; April (3), May (2), June (2), September (2), December (1); West Java. Measurements (17): av. 27.5 (26.4-30.6) × 20.7 (19.7-21.5). Weight (17): av. 0.315 (0.285-0.355).

Description. — The colour is white.

Hoogerwerf: Weight (3/2): av. 0.320 (0.309-0.345); maximal variation in the same clutch: 0.024 (0.321-0.345). For four previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 125-126, pl. 11 fig. 123).

Description. — Generally the eggs average more narrow-oval than those of the preceding species, though they vary fairly considerably in shape. The texture is smooth, dull or faintly glossy; the colour is white, often obscured by nest dirt and there are some small very dark points and speckles on certain shells as found in many other white eggs.

Remarks. — The eight eggs measured by me average distinctly larger (more elongate-oval) than the 17 in the Bartels collection, though the weights almost match.

169. **Megalaima a. australis** (Horsfield) — Little Barbet

Bartels: 7/2; March (1), May (6); West Java. Measurements (14): av. 25.3 (23.8-27.8) × 17.7 (17.2-18.1). Weight (14): av. 0.215 (0.20-0.24).

Description. — The colour is white.

Hoogerwerf: Weight (1/2): 0.210, 0.224. For one previously recorded breeding date and the measurements of both these eggs see Hoogerwerf (1949: 126, pl. 11 fig. 124).

Description. — The shape of the shells shows more similarity to those of the preceding species than to the eggs of the larger barbets, though they may average still more narrow-oval than those of *Megalaima armillaris*. The ends are distinctly different, but almost equal ends are no exception and there is no or very little gloss on the white surface, often soiled by nest dirt.

170. **Megalaima haemacephala rosea** (Dumont) — Coppersmith Barbet  
Bartels: 4/2; April, May, June, July; West Java. Measurements (8): av. 26.4 (25.3-27.1) × 17.5 (17.2-17.9). Weight (8): av. 0.20 (0.195-0.220).  
Kooiman: East Java. Measurements (8): av. 26.6 (26-27.5) × 17.5 (17-18.5). Weight (8): av. 0.22 (0.20-0.23).

Description. — The colour is white.

Hoogerwerf: For 16 previously recorded breeding dates and 13 earlier measured eggs see Hoogerwerf (1949: 127).

Description. — The eggs are much like those of the preceding species, but they average perhaps still narrower, approaching an elliptical shape because of their almost equal ends.

#### PICIDAE

171. **Sasia a. abnormis** (Temminck). — Malaysian Rufous Piculet

Bartels: No material available.

Remarks. — In the Sody collection is a 1/3 set from Deli, Sumatra; April. Measurements (3): av. 20.3 × 16.1. Weight: 0.205. Measurements given by Hoogerwerf (1949: 128) are much smaller, viz. 15.75 × 12.5.

Description. — The colour is white with a moderate gloss.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 128). This piculet is rare in Java.

Remarks. — Because of their very large size the identity of the above mentioned clutch indicated by Sody as originating from this species must be considered with much suspicion.

172. **Picus v. vittatus** Vieillot — Bambu Green Woodpecker

Bartels: 1/2; June; West Java. On account of a note on the label the identity of these eggs must be considered doubtful. Measurements (2): av. 28.6 × 20.8. Weight: av. 0.56.

Description. — The eggs are glossy white.

Remarks. — Schönwetter gave the following measurements: (7): 27 (26.9-28.4) × 20.5 (20.3-21.7), no weights are recorded by him. These measurements check well with those of the above specimens of the Bartels collection.

Hoogerwerf: For three previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 128, pl. 11 fig. 125).

Description. — When compared with the eggs of the barbets, woodpecker eggs average in having the texture smoother, often inclined to be transparent, with much gloss as in many kingfisher eggs which, however, average rounder. The shells of the present species are normal- to broad-oval with distinctly different ends and with a fairly smooth, highly glossy surface. The pure white colour is almost entirely covered by dirty stains having nothing to do with natural markings.

Remarks. — Most probably Schönwetter's measurements are partly copied from mine (Hoogerwerf, 1949: 128) because the extremes mentioned by him are exactly the same as those previously published by me.

173. **Picus p. puniceus** Horsfield — Crimson-winged Woodpecker

Bartels: 1/2; August; West Java. Measurements (2): av. 26.7 × 17.9. Weight (2): av. 0.28.

Description. — The eggs are glossy white.

Remarks. — Schönwetter gave the following data for this species. Measurements: 27.4 (26.4-28) × 18.2 (16.7-21). Weight: 0.37. His material thus is considerably heavier than ours.

Hoogerwerf: For one previously recorded breeding date and two earlier measured eggs see Hoogerwerf (1949: 129).

Description. — The very few eggs examined are fairly narrow-oval with equal or almost equal obtuse ends and a very smooth, deeply glossy texture. In colour they do not differ from the preceding and following species.

Remarks. — Schönwetter's minima of length and width are apparently copied, because they are exactly similar to those found by me (Hoogerwerf, 1949: 129).

174. **Picus m. mentalis** Temminck — Chequered-throated Woodpecker

Bartels: 1/3; August; West Java. Measurements (3): av. 27.2 (25.2-28.4) × 19.6 (18.4-20.6). Weight (3): av. 0.39.

Description. — The eggs are glossy white.

Remarks. — The data mentioned by Schönwetter for this subspecies are:



Measurements: (1):  $27.4 \times 21.6$ . No weight is given by him.

Hoogerwerf: For one previously recorded breeding date and one earlier measured egg see Hoogerwerf (1949: 129).

Description. — The only egg examined does not essentially differ from those of the preceding species.

Remarks. — The measurements of the only shell mentioned by Schönwetter are undoubtedly copied from my previous paper (Hoogerwerf, 1949: 129).

175. **Picus m. miniaceus** Pennant — Banded Red Woodpecker

Bartels: 1/2; April; Tji Hea, Preanger, West Java. Measurements:  $27.2 \times 19$ ,  $26.8 \times 19.3$ . Weight: 0.37, 0.34. The second egg with a large hole.

Description. — The eggs are glossy white.

Remarks. — The measurements mentioned by Schönwetter for this subspecies are  $26.7 (26-27) \times 20 (16-21)$ . No weight is given by him.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 130). This is not a common species in Java.

Remarks. — In this case too Schönwetter's measurements are exactly copied from my previous paper (Hoogerwerf, 1949: 130), although he forgot to point to the fact that my measurements refer to two different subspecies.

176. **Micropternus b. brachyurus** (Vieillot) — Rufous Woodpecker

Bartels: No material available.

Hoogerwerf: Weight (1): 0.310. For two previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 130, pl. 11 fig. 126). This woodpecker is rare in Java.

Description. — The few eggs examined are broad-oval with slightly, though distinctly different ends. They differ from those of the other members of the family that we have seen in their fairly uniform buffy colour, though this phenomenon is perhaps caused by fermentation or nest dirt.

177. **Dendrocopos macei analis** (Bonaparte) — Spotted-breasted Pied Woodpecker

Bartels: 1/1, 7/2, 3/3; March (2), April (1), May (5), June (1), July (2); West Java. Measurements (24): av.  $21.2 (20-22.1) \times 16 (14.9-16.8)$ . Weight (22): av. 0.21 (0.185-0.235).

Sody: 2/3, 8/2; January (1), April (1), May (4), June (3); West Java Measurements (22): av. 21 (18.1-26.1) × 15.8 (14.3-16.8). Weight (19): av. 0.215 (0.200-0.240).

Description. — The eggs are glossy white.

Hoogerwerf: 4/2, 4 odd shells; Central Java. Measurements (12): av. 21.09 (19.8-23.5) × 15.87 (15.2-16.7); largest egg: 23.5 × 16.7; maximal variation in length in the same clutch: 1.8 (20.3-22.1). Weight (39): av. 0.221 (0.192-0.253); maximal variation in the same clutch: 0.031 (0.205-0.236). Pigmy egg: 15.9 × 12; weight: 0.105. For 75 previously recorded breeding dates and 71 earlier measured eggs see Hoogerwerf (1949: 131, pl. 11 fig. 127).

Description. — The eggs are normal- to narrow-oval, though rather broad-oval specimens are no exception; generally they have almost equal ends, but also distinctly different ends occur. The texture is smooth and glossy and the colour is pure white or passing into milky white, usually not heavily soiled.

178. **Dendrocopos m. moluccensis** (Gmelin) — Lesser Pigmy Woodpecker

Bartels: 1/2; May; West Java. Measurements (2): av. 17 × 13.8. Weight (2): av. 0.12.

Kooiman: East Java. Measurements (11): av. 18.5 (17.4-19.1) × 13.9 (13.5-14.2). Weight (10): av. 0.125 (0.107-0.143).

Description. — The eggs are glossy white.

Remarks. — The data mentioned by Schönwetter for this subspecies are: Measurements: (15): 18.4 (16.5-20.3) × 14.1 (13.2-15). Weight: 0.11 (0.10-0.12).

Hoogerwerf: For seven previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 132).

Description. — Except in size, the eggs are much like those of the preceding species. They are usually normal- to broad-oval with distinctly different ends and a smooth and quite glossy texture.

179. **Meiglyptes t. tristis** (Horsfield) — Fulvous-rumped Barred Woodpecker

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 133). So far as my experience goes this woodpecker is a very rare bird in Java.

180. **Hemicircus c. concretus** (Temminck) — Grey and Buff Woodpecker

Bartels: 2/1; May, June; Mount Pangerango, Preanger, West Java. Measurements (2): av.  $22 \times 16.8$ . Weight (2): av. 0.24.

Description. — The eggs are glossy white.

Hoogerwerf: No material or particulars available. Apparently the species is very rare in Java.

181. **Dinopium j. javanense** (Ljungh) — Golden-Backed Three-toed Woodpecker

Bartels: 1/2; May; West Java. Measurements (2): av.  $26 \times 19$ . Weight (2): av. 0.35.

Sody: 1/3; May; West Java. Measurements (3): av.  $23.2 \times 18.4$ . Due to the large holes in the eggs no weights are taken.

Description. — The colour is white with a moderate gloss.

Remarks. — The eggs of the Sody collection are much smaller than those of the Bartels collection. The Sody collection contains also two sets from Deli, Sumatra (2/2; May, June). The measurements of the first of these Sumatran sets are:  $26.1 \times 17.7$  and  $25.1 \times 17.1$ . Weight: av. 0.34. These eggs thus are more elongate-oval than those obtained by Sody in Java, moreover they are almost lustreless. It is not certain therefore that their identification is exact. The data of the second Sumatran set are: Measurements:  $25.8 \times 18.5$  and  $19.1 \times 15$ . Weight: 0.34 and 0.20 (the second egg of this set probably is a pigmy egg). These eggs have the normal gloss of those of the Picidae. The measurements given by Schönwetter for this subspecies are:  $26.3 (25-29.9) \times 19 (17.8-20.7)$ ; no weight is given by him.

Hoogerwerf: For eight previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 133, pl. 11 fig. 128).

Description. — The eggs vary considerably in shape; they are perhaps most often normal- or narrow-oval with moderately different ends. In texture and colour they resemble those of most other representatives of the family, discussed in this paper.

Remarks. — The Sumatran eggs of the Sody collection may indeed originate from this species, but there is no doubt that the 3-set from West Java mentioned above was wrongly identified. It perhaps belongs to *Dendrocopos macei*. Schönwetter's measurements average very small, but his maxima in length and width were apparently copied from my previous paper (Hoogerwerf, 1949: 133).

182. **Dryocopus j. javensis** (Horsfield) — Great Black Woodpecker

Bartels: No material available.

Hoogerwerf: Weight (1/1): 0.847. For two previously recorded breeding dates and the measurements of this egg originating from the Houwing collection, see Hoogerwerf (1949: 134).

Description. — The only egg examined is broad-oval with clearly different ends and a smooth and very glossy surface; the pure white colour is obscured by dirty stains.

Remarks. — This is a rare woodpecker in Java.

183. **Muelleripicus p. pulverulentus** (Temminck) — Great Slaty Woodpecker

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 134-135). The species is fairly rare in Java.

184. **Chrysocolaptes lucides strictus** (Horsfield) — Golden-backed Four-toed Woodpecker

Bartels: 1/2; May; Tji Odeng, Preanger, West Java. Measurements (2): av.  $28.5 \times 20.7$ . Weight (2): av. 0.55.

Description. — The colour is glossy white.

Remarks. — Schönwetter's measurements for four eggs are:  $30.5 (27.3-33.4) \times 19.9 (19.4-20.2)$ ; weight: 0.40.

Hoogerwerf: Weight (1): 0.476. For two previously recorded breeding dates and three earlier measured eggs from the Bouma collection, see Hoogerwerf (1949: 135, pl. 11 fig. 129).

Description. — The only three eggs examined are normal- to very narrow-oval with clearly different ends, giving one egg a more elliptical shape. They show a smooth or somewhat rougher texture, which is slightly or very glossy. The white surface is obscured by a transparent dirty layer.

185. **Chrysocolaptes v. validus** (Temminck)

Bartels: 1/1; February; Mount Masigit, Preanger, West Java. Measurements:  $33.7 \times 22.2$ . Weight: 0.74.

Description. — The eggs are glossy white.

Remarks. — According to Hoogerwerf the eggs of the subspecies *C. v. xanthopygius* Finsch measure  $25.25$  and  $26.5 \times 20$ .

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 136). Judging by my experience this large woodpecker is a rare species in Java.

## EURYLAIMIDAE

186. *Eurylaimus j. javanicus* Horsfield — Banded Broadbill

Bartels: 1/2, 1/3; April, December; Mount Masigit and Mount Pangerango, West Java. Measurements (5): av. 28 (27.6-29)  $\times$  21.2 (20.7-22.2). Weight (5): av. 0.300 (rather large holes) and 0.375.

Description. — The ground colour of the three-set is pinkish clay, densely marked with brown spots and small clouds, and with underlying shell-marks. The set of two eggs has the ground nearly white, sparingly marked with small, light brownish spots.

Hoogerwerf: 1/2; June; Mount Salak, West Java. Measurements: 31.2  $\times$  20.2, 31.5  $\times$  20.1. Weight (2): 0.364, 0.391. Not previously recorded by me. For some earlier published particulars derived from the literature see Hoogerwerf (1949: 136). The species is rare in Java.

Description. — The eggs are narrow-oval with almost equal ends, though slightly compressed towards one end; they have a smooth, faintly glossy surface. The colour is dirty or greyish cream, fairly densely covered with irregular, small and rather pale markings of which the primary ones are dull rusty brown and the secondary, which are a trifle paler still, lavender-grey. There is some concentration of mottling at the blunt end, where the secondary markings predominate.

Remarks. — These eggs are larger and heavier than those of the Bartels collection, yet they unquestionably originate from this species.

## PITTIDAE

187. *Pitta guajana affinis* (Horsfield) — Banded Pitta

Bartels: 17/2, 26/3, 10/4, 1/5; January (7), February (15), March (12), April (10), May (9), June (1); West Java. Measurements (50): av. 26.4 (24-28.9)  $\times$  21.6 (20-23). Weight (50): av. 0.335 (0.28-0.36).

Description. — The colour is dull white without gloss, sparingly and rather finely marked with purplish black spots and small blotches, sometimes with hair-lines, mainly at the blunt end, and with underlying shell-marks. One set has light brownish blotches. The eggs slightly resemble those of the Oriolidae except the gloss.

Hoogerwerf: Weight (1/2, 2 odd shells): av. 0.352 (0.338-0.370) and one

abnormal shell: 0.481. For 35 previously recorded breeding dates and 47 earlier measured eggs see Hoogerwerf (1949: 136-137, pl. 11 fig. 130-132).

Description. — The shells differ from those of the following species in the less numerous, but better defined markings, not or hardly showing the character of hieroglyphics or scribbles. Generally the eggs are broad-oval with distinctly or slightly different ends and a smooth surface which is dull or faintly glossy. The colour is white or creamy white, covered with usually not very many, well defined irregular and not extremely coarse speckles and dots which are sepia to black, with the latter often predominating. The underlying mottling, in certain eggs predominating over the primary one, vary from light lavender-grey to dark ashy. On most eggs the markings are concentrated at the blunt end, forming an open cap or zone. In some rare cases the markings are very pale or fail almost completely.

188. ***Pitta sordida javana*** Kloss — Green-breasted Pitta

Bartels: 1/3; December; West Java. Measurements (3): av. 25 × 20.3. Weight (3): av. 0.26.

Description. — The colour is glossy white, marked with purplish brown spots and hair-lines, uniformly distributed over the whole surface.

Hoogerwerf: 2/3; May; Central Java. Measurements (6): av. 25.45 (23.6-26.8) × 19.82 (19-21.3); largest egg: 26.8 × 19.7; maximal variation in length in the same clutch: 1.7 (23.6-25.3). Weight (19): av. 0.302 (0.266-0.354); maximal variation in the same clutch: 0.086 (0.268-0.354). For seven previously recorded breeding dates and 33 earlier measured eggs see Hoogerwerf (1949: 138, pl. 12 fig. 133-135).

Description. — The eggs are generally more densely and much paler marked than those of the preceding species. The colour is white or creamy white, covered with a varying quantity of not very large speckles, scribbles etc., often showing the character of hieroglyphics, which are sepia to almost or really black. The underlying, often predominating and well defined markings are greyish lavender and vinaceous grey to mouse-grey. In many eggs the secondary mottling may be almost the exclusive one with only very few primary fine speckles and dots of vinaceous brown to black. In a third type the eggs show some similarity to those of the preceding species although they are more densely marked. In most of the shells examined there are more markings at the blunt end than on the remaining surface.

ALAUDIDAE

189. ***Mirafra j. javanica*** Horsfield — Bush-Lark

Bartels: 3/2, 7/3; May (1), June (1), July (3), August (2), September

(2); undated (1). West Java. Measurements (27): av. 20.3 (18.9-22.5) × 15.2 (14.1-16.4). Weight (27): av. 0.14 (0.11-0.15).

Description. — The colour is very variable; it may be (a) greenish-white, densely marked with small greenish brown spots and small blotches, (b) as (a) but with the spots and blotches larger and showing more of the ground, (c) greyish white with small darker greyish to greyish brown spots, as found in one set, and (d) whitish with a reddish tinge with fairly large brown spots and blotches, showing much of the ground.

Hoogerwerf: 1/3; Central Java, without further particulars. Measurements (3): av. 20.20 (20-20.6) × 14.97 (14.7-15.2); largest egg: 20.6 × 15.2. Weight (1/3): av. 0.145 (0.135-0.150). For 152 previously recorded breeding dates and 12 earlier measured eggs see Hoogerwerf (1949: 139, pl. 12 fig. 136).

Description. — The eggs are much like those of *Anthus novaeseelandiae* (no. 192) and they also show some resemblance to those of *Pellorneum capistratum* (no. 236). They are normal- to broad-oval with well differing ends and a glossy texture. The colour is white or a trifle greyish tinged white, generally densely covered with irregular well defined fine speckles and dots of which the darkest are sepia, often mixed with olive brown, the lighter ones ranging to brownish olive. There is a varying quantity of underlying markings, often showing a primary and predominating character, which are light to dark ashy or dark slate. Usually the mottling is fairly regularly scattered all over the shell, but sometimes partly concentrated at the blunt end, inclined to form an open zone.

#### HIRUNDINIDAE

##### 190. *Hirundo tahitica javanica* Sparrman — Coast-Swallow

Bartels: 2/2, 2/3, 1/4; April (3), May (2); West Java. Measurements (13): av. 17.8 (16.8-19.2) × 12.8 (12.4-13.3). Weight (13): av. 0.074.

Sody: 4/2, 1/4; February (1), April (1), July (2), December (1); West Java. Measurements (12): av. 18.6 (16.2-21.8) × 13.2 (12.5-13.6). Weights (12): av. 0.073 (0.068-0.076).

Description. — The shape varies considerably, from almost round (16.2 × 13.4) to pointed oval (21.8 × 12.5), without gloss; ground dirty white, marked with reddish brown, sometimes more purplish brown, spots and blotches, mainly at the blunt end and often forming a zone.

Remarks. — The Sody collection contains two sets of three eggs from Deli, Sumatra, collected in June and May respectively. Measurements (6): av. 17.7 (16.8-18.6) × 12.9 (12.6-13.1). Weight (6): av. 0.066.

Hoogerwerf: 2/2, 1/3; June, July; West Java. Measurements (7): av. 17.07 (16.7-17.6)  $\times$  12.49 (11.8-13.5); largest egg: 17.6  $\times$  11.8; maximal variation in length in the same clutch: 0.7 (16.9-17.6). Weight (20): av. 0.075 (0.062-0.088); maximal variation in the same clutch: 0.011 (0.077-0.088). For 32 previously recorded breeding dates and 24 earlier measured eggs see Hoogerwerf (1949: 140, pl. 12 fig. 137).

Description. — The eggs, which vary considerably in shape, have a dull or slightly glossy texture. The colour is chalky- or brownish white, covered with a varying amount, but usually rather numerous, irregular and well defined, fine markings which are olive Vandijke brown and sepia, sometimes almost black. The underlying mottling, often well defined too, varies from light to dark violet- or mouse-grey. Certain eggs are rather uniformly marked all over the shell, but a concentration of the markings at the blunt end, often forming a cap or zone, is more common.

191. **Hirundo daurica striolata** Temminck & Schlegel — Striated Swallow

Bartels: 4/2, 1/3; May (1), June (4); West Java. Measurements (11): av. 22.8 (22-23.5)  $\times$  15.7 (14.8-16.6). Weight (8): av. 0.145 (0.135-0.165).

Description. — The colour is white without or with little gloss.

Hoogerwerf: 1 odd shell; April; West Java. Measurements: 23.5  $\times$  15.8. Weight (1/2, 1/3, 1 odd shell): av. 0.147 (0.137-0.155); maximal variation in the same clutch: 0.018 (0.137-0.155). For 21 previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 141).

Description. — Except in size, the eggs are much like those of *Apus affinis* (no. 145); they have a smooth, sometimes a trifle rougher texture, which is dull or faintly glossy. The colour is white without markings, but not rarely soiled.

#### MOTACILLIDAE

192. **Anthus novaeseelandiae malayensis** Eyton — Richard's Pipit

Bartels: 1/3; May; West Java. Measurements (3): av. 20.5  $\times$  15.5. Weight (3): av. 0.14.

Description. — The ground colour is bluish white, marked with greyish brown spots, and with underlying shell-marks.

Hoogerwerf: 1/3; July; Central Java. Measurements (3): av. 21.73 (21.5-21.9)  $\times$  15.93 (15.8-16); largest egg: 21.9  $\times$  16. Weight (3): av. 0.147 (0.145-0.149). For two previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 142, pl. 12 fig. 138).



Description. — Except in size, the eggs are much like those of *Mirafra javanica* (no. 189); certain specimens are indistinguishable. They have a dull or faintly glossy texture, which is white or almost white, generally densely covered with numerous irregular, well defined fairly fine markings, varying from light sepia to almost black, often mixed with olive brown. The less numerous secondary mottling — partly also well defined — is light to dark ashy. Usually most markings are at the blunt end, forming a zone.

## CAMPEPHAGIDAE

193. **Tephrodornis g. gularis** (Raffles) — Wood-Shrike

Bartels: 1/2; March; Mount Masigit, Preanger, West Java. Measurements (2): 21.6 × 15.7, 21.9 × 16.5. Weight (2): av. 0.16.

Description. — The eggs are rather distinctly oval, the ground colour is white with a reddish tinge, marked with small reddish brown spots, larger blotches and fine purplish grey shell-marks. The eggs give a very "clear" impression.

Hoogerwerf: 1/2; March; Mount Salak (near Bogor), West Java. Measurements: 21.4 × 15.6, 21.7 × 16.4. For some previously published particulars see Hoogerwerf (1949: 143). This is not a common bird in Java.

Description. — The only two eggs examined are broad-oval with distinctly differing ends and a smooth surface without gloss. The colour is white or creamy white, covered with fairly numerous, coarse speckles and dots, which are sharply defined and somewhat concentrated at about the central part of the shell. The tint of the primary markings is light to dark brown, sometimes passing into umberbrown and the fairly conspicuous secondary ones are ashy or mud-grey.

194. **Coracina novaehollandiae javensis** (Horsfield) — Javan Cuckoo-Shrike

Bartels: 3/1; February, March, April; Tji Bening, West Java. Measurements (3): av. 31.4 (30.6-32.1) × 22 (21.5-22.3). Weight (3): av. 0.44 (0.42-0.47).

Kooiman: 6/2; East Java. Measurements (12): av. 30.2 (28.8-31.9) × 22.3 (20.8-23.1). Weight (12): av. 0.42 (0.38-0.45).

Description. — The eggs are greyish sand coloured, marked with small brown blotches, and have striking shell-marks.

Hoogerwerf: (1/2): 0.380, 0.432. For one previously recorded breeding date and the measurements of these two eggs from Bantam, West Java, see Hoogerwerf (1949: 144, pl. 12 fig. 139).

Description. — The few eggs examined are fairly broad-oval with clearly different ends and a smooth surface without or with very little gloss. The colour is olive buff, not very densely marked with irregular, well defined small speckles and dots of olive brown to sepia. The underlying markings, largely also well defined, are mouse- to slate-grey. Although most mottling is at the blunt end there is no distinct cap or zone.

Remarks. — In size and weight these eggs agree better with those of the Kooiman collection than with the shells of the Bartels collection.

195. **Coracina l. larvata** (S. Müller) — Timor Cuckoo-Shrike

Bartels: 7/1; January (1), March (1), April (2), May (1), June (1), November (1); West Java. Measurements (7): av. 32.6 (30-35.7) × 21.8 (20.5-23). Weight (7): av. 0.43 (0.35-0.47).

Description. — The ground colour is bluish, marked with umberbrown, somewhat resembling the eggs of the European *Coloeus monedula* (L.).

Hoogerwerf: Weight (2/1): 0.423, 0.436. For two previously recorded breeding dates and the measurements of both these eggs, see Hoogerwerf (1949: 144-145, pl. 12 fig. 140).

Description. — The eggs are greener and less densely marked than in averaging *C. novaehollandiae*. They are normal-oval with clearly different ends and a smooth shell which is slightly glossy. The colour is light to moderate sea-green, marked with not very numerous, largely fairly coarse markings of buffy olive, olive brown, sometimes almost black. The also well pronounced secondary markings are mouse-grey, mixed with some lavender. There is some concentration of mottles on the larger end without forming a cap or zone.

Remarks. — It is noteworthy that the average weight of seven eggs of this species of the Bartels collection is smaller than that of three shells of *Coracina novaehollandiae*, present in the same collection, though the latter eggs average smaller in size.

196. **Coracina f. fimbriata** (Temminck) — Small Grey Guckoo-Shrike

Bartels: 3/1, 1/2; April (1), May (2), June (1); West Java. Measurements (5): av. 22.6 (22-22.8) × 16.6 (16-17). Weight (5): av. 0.16 (0.15-0.17).

Description. — These eggs show no or little difference from those of *Lalaga nigra* (no. 198).

Hoogerwerf: Weight (2/2): av. 0.160 (0.148-0.183); maximal variation in the same clutch: 0.033 (0.150-0.183). For three previously recorded breeding dates and the measurements of these four eggs see Hoogerwerf (1949: 145, pl. 12 fig. 141).

Description. — Except in size the eggs show much resemblance to those of *Copsychus saularis* (no. 223). They are normal- to broad-oval with clearly different ends, without or with only little gloss. The colour is very light bluish green, covered with many irregular points and speckles, which are light to dark olive brown, changing into dark sepia at the blunt end. The underlying mottling, showing a primary character, is olive- or vinaceous grey or more ashy. Certain shells are so densely mottled that the ground is hardly visible, most conspicuously at the blunt end where may be a cap or zone, often well pronounced.

197. **Hemipus hirundinaceus** (Temminck) — Black-winged Pied Shrike

Bartels: 10/2; April (1), May (3), June (4), August (2); West Java. Measurements (20): av. 17.3 (15.7-18.5) × 13 (12.4-13.8). Weight (20): av. 0.082 (0.070-0.090).

Kooiman: East Java. Measurements (6): av. 16.7 (16-17.7) × 13.1 (12.8-13.3). Weight (6): av. 0.072 (0.070-0.075).

Description. — The eggs are whitish, rather heavily marked with umber brown, two specimens show a zone.

Hoogerwerf: Weight (2/2): av. 0.075 (0.067-0.082); maximal variation in the same clutch: 0.004 (0.067-0.071). For six previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 146, pl. 12 fig. 142).

Description. — The few eggs examined are broad-oval with moderately different ends and a faintly glossy surface. The colour is chalky- or greenish white, densely marked with well defined points and small speckles which vary from buffy- to olive brown, ranging to Vandijke brown and sepia in the darkest ones. The less conspicuous secondary markings are greyish. Most mottling is at the blunt end or somewhat lower, forming a distinct zone.

Remarks. — In the measurements and weight these eggs agree better with those of the Kooiman collection than with the shells of the Bartels collection.

198. **Lalaga n. nigra** (Forster) — Pied Cuckoo-Shrike

Bartels: 6/1, 18/2; March (1), April (3), May (13), June (6), July (1); West Java. Measurements (40): av. 21.2 (19.5-22.8) × 15.9 (15-16.6). Weight (33): av. 0.14 (0.11-0.16).

Description. — The ground colour is light greenish, densely marked with brown spots and blotches. The eggs of an aberrant clutch show a black cap with the pointed end unmarked.

Hoogerwerf: Weight (1/2): 0.132, 0.136. For 58 previously recorded breeding dates and 12 earlier measured eggs see Hoogerwerf (1949: 147, pl. 12 fig. 143, 144).

Description. — The eggs have a dull or faintly glossy texture, which is greenish white or very light green. The surface is rather densely covered with many irregular, usually not too well defined markings, often looking like longitudinal smears, which are olive brown or sepia, the lightest passing into buffy olive. The not very conspicuous secondary mottling is dirty ashy or purplish grey. Generally there is no distinct concentration of mottling. A minority of the shells examined show rather much resemblance to those of *Coracina fimbriata* (no. 196) because the markings do not show the character of smears.

199. **Lalaga s. sueurii** (Vieillot) — Pied Cuckoo Shrike of East Java

Bartels and Hoogerwerf: No material or particulars available. This species is only known from East Java and apparently fairly rare.

200. **Pericrocotus cinnamomeus saturatus** Baker — Small Minivet

Bartels: 5/2, 2/3; April (1), May (2), June (2), July (2); West Java. Measurements (16): av. 17.4 (16.8-18.2) × 13.3 (12.9-14.1). Weight (16): av. 0.092 (0.075-0.105).

Kooiman: East Java. Measurements (7): av. 17.3 (16.3-18.1) × 13.3 (12.7-13.6). Weight (5): av. 0.090 (0.085-0.095).

Description. — The eggs are clear light blue, rather densely marked with small, purplish or reddish brown spots, forming an indistinct zone.

Hoogerwerf: Weight (2/2): av. 0.098 (0.093-0.105); maximal variation in the same clutch: 0.008 (0.097-0.105). For 10 previously recorded breeding dates and 14 earlier measured eggs see Hoogerwerf (1949: 148-149, pl. 12 fig. 145).

Description. — The eggs have a smooth surface, which is dull or faintly glossy. The colour is very light bluish green or greenish white with a varying, but usually not very large number of small, well defined, fine speckles and dots of various tints ranging from vinaceous brown to Indian red, sometimes to almost black. The underlying, not very conspicuous markings are greyish lavender or vinaceous grey. Though most mottling is at the blunt end, it does not form a distinct cap or zone.

201. **Pericrocotus m. miniatus** (Temminck) — Sunda Minivet

Bartels: 1/1, 4/2; May (3), July (1), December (1); West Java. Measurements (9): av. 20 (19.1-20.2) × 15.3 (14.5-15.5). Weight (9): av. 0.143 (0.130-0.150).

Description. — The colour is clear light blue, marked with well defined fairly coarse purplish brown blotches, partly forming a zone.

Hoogerwerf: Weight (3/2): av. 0.127 (0.122-0.133); maximal variation in the same clutch: 0.007 (0.123-0.130). For three previously recorded breeding dates and the measurements of these six eggs, see Hoogerwerf (1949: 149, pl. 12 fig. 146).

Description. — The eggs show some resemblance to those of the preceding species but the basic colour is lighter and the markings much coarser. The colour is white, sometimes tinged slightly greenish, covered with rather many sharply defined, irregular coarse speckles and dots, which are brownish to very dark Indian red or Corinthian purple, even almost black. The underlying markings may be well defined and dark; they are lavender grey or mouse-grey. The shells are uniformly marked all over the surface or the markings are slightly concentrated at the larger end.

Remarks. — My six shells are somewhat lighter in weight than those of the Bartels collection though my previously published measurements agree fairly well.

202. **Pericrocotus flammeus siebersi** Rensch — Scarlet Minivet

Bartels: 8/2; February (1), April (1), May (2), June (4); Tji Hea (1), Mount Pangerango (4), Kebon Salam (2), Tji Kolawang (1), all Preanger, West Java. Measurements (15): av. 20.7 (19.1-21.4) × 15.3 (14.5-16.6). Weight (14): av. 0.13 (0.120-0.155).

Kooiman: 1/2; East Java; no further data. Measurements: 20.6 × 15.1, 20.7 × 14.8. Weight (2): av. 0.112.

Description. — The colour is greenish- or bluish white, finely, or occasionally more coarsely, marked with redbrown spots and small blotches, often somewhat concentrated near the blunt end.

Hoogerwerf: Weight (2/2): av. 0.132 (0.120-0.144); maximal variation in the same clutch: 0.010 (0.120-0.130). For two previously recorded breeding dates and the measurements of these four eggs originating from Tjibodas, Mount Pangerango, West Java, see Hoogerwerf (1949: 150, pl. 12 fig. 147).

Description. — The few eggs examined do rather strikingly differ from those of both preceding species. They have a dull or faintly glossy texture, which is light bluish green, rather densely covered — especially at the larger end — with very irregular, not extremely well defined speckles and dots, partly smear- or fibre-like. They are rusty brown or vinaceous brown, some of them sepia tinged brown. The less conspicuous secondary mottling, often showing a cloudy character, is greyish lavender. Generally most

markings are at the blunt end, though a distinct zone or cap is rarely present.

Remarks. — We consider the populations of this minivet living in West and East Java to belong to the same subspecies.

#### LANIIDAE

##### 203. *Lanius schach bentet* Horsfield — Grey-backed Shrike

Bartels: 7 $\frac{1}{2}$ , 5 $\frac{1}{3}$ ; January (4), February (10), March (13), April (21), May (33), June (28), July (9), August (3), October (1); West Java. Measurements (50): av. 23.6 (21.5-26.1)  $\times$  17.6 (16.5-18.8). Weight (50): av. 0.20 (0.170-0.225).

Description. — The eggs are typical for those of the family, they are very pale greenish, handsomely marked with light brown and amber brown blotches, mainly at the blunt end, showing the underlying shell-marks very strikingly. One egg is white, almost unmarked.

Hoogerwerf: 1 $\frac{1}{4}$ , 1 odd egg; May, July; West Java. Measurements (5): av. 23.38 (21.5-24.2)  $\times$  17.32 (16.5-18.6); largest egg: 24.2  $\times$  16.5; maximal variation in length in the same clutch: 1.7 (21.5-23.2). Weight (209): av. 0.201 (0.162-0.262); maximal variation in the same clutch: 0.046 (0.216-0.262). Pigmy egg: 20.5  $\times$  16; weight: 0.173. For 316 previously recorded breeding dates and 282 earlier measured eggs, see Hoogerwerf (1949: 151, pl. 7 and 8 fig. 82-87, pl. 12 fig. 148).

Description. — Although the eggs vary considerably in size, shape and markings, there is generally little difficulty to fix their identity. They may be more often normal- or broad-, than narrow-oval, and have almost invariably conspicuously or moderately different ends and a smooth texture, usually dull but sometimes faintly glossy. Their colour is white, tinged slightly greenish, generally not very clear, marked with not too many very irregular, well or moderately defined coarse speckles, dots and blotches varying in colour from light- or buffy- to dark brownish olive or dark brown, occasionally dark olive sepia, almost black. The underlying markings which usually are also conspicuous, vary from light lavender- and vinaceous grey to dark mouse-grey.

In certain eggs the markings are smaller and of a more regular shape and in still others the mottling is ill-defined and pale. A majority of the shells examined is most densely marked at the blunt end and rather thinly beyond this area without forming a distinct zone or cap. A small minority of the examined material is most densely mottled around the smaller end and in some very rare cases there are hardly any markings at all.

## ARTAMIDAE

204. **Artamus leucorhynchus amydrus** Oberholser— Swallow Shrike

Bartels: 1/1, 4/2, 5/3, 2/4; May (7), June (5); West Java. Measurements (32): av. 23.5 (22-25.9)  $\times$  16.9 (16.1-17.5). Weight (21): av. 0.20 (0.18-0.21).

Description. — The eggs are much like those of the Laniidae, they are light creamy, almost white, marked with a zone of yellowish brown blotches and ashy shell-marks.

Hoogerwerf: 1/3, 2 odd shells; July (1); Central and West Java. Measurements (5): av. 22.28 (21.5-23.1)  $\times$  16.78 (16.5-17); largest egg: 23.1  $\times$  16.9; maximal variation in length in the same clutch: 0.9 (21.5-22.4). Weight (3/2, 1/3, 3 odd shells): av. 0.196 (0.163-0.225); maximal variation in the same clutch: 0.019 (0.163-0.182). For 33 previously recorded breeding dates and 47 earlier measured eggs see Hoogerwerf (1949: 152-153, pl. 12 fig. 149, 150).

Description. — The eggs show some resemblance to those of the preceding species though the colour of the markings is distinctly different. They show no or only little gloss and the colour varies from creamy white to brownish cream, covered with usually not many very irregular well or moderately defined, fairly coarse speckles and dots, varying from hazel or Brussel's brown to sepia, though the lightest may be Isabella coloured. The secondary mottling, usually fairly well defined and dark, is greyish, most often mouse-grey and vinaceous- or lavender grey. Certain eggs show much paler markings which are dull rusty brown. Almost without exception the shells are most densely marked on the larger end, forming a distinct though usually open zone, and very thinly scattered on the remaining surface.

## CHLOROPSEIDAE

205. **Aegithina tiphia scapularis** (Horsfield) — Common Iora

Bartels: 3/1, 13/2; April (2), May (7), June (5), July (2); West Java. Measurements (28): av. 17.5 (16-19.1)  $\times$  13.6 (12.9-14.2). Weight (26): av. 0.087 (0.80-0.092).

Description. — The colour is white often with a greyish or pinkish tint, rather sparingly marked with small greyish or dark brown spots, mainly at the blunt end, the underlying shell-marks are often very handsome and coarse; in one set the shells are longitudinally streaked with light brown and grey.

Hoogerwerf: 1/2, 1 odd shell; April, May; Central and West Java. Measurements (3): av. 17.17 (16.8-17.9)  $\times$  13.9 (13.7-14.2); largest egg:

17.9 × 13.7. Weight (3/2, 3 odd shells): av. 0.09 (0.076-0.104); maximal variation in the same clutch: 0.014 (0.077-0.091). For 45 previously recorded breeding dates and 35 earlier measured eggs see Hoogerwerf (1949: 154, pl. 12 fig. 151-153).

Description. — The eggs are dull or faintly glossy. The colour is chalky- or fleshy white, rather densely marked with very irregular ill-defined speckles, dots and blotches, largely looking as if they were smeared in a longitudinal direction. They are vinaceous- or olive brown, sometimes almost black. The secondary mottling of the same type, often showing a primary character and predominating over the primary one, varies from greyish lavender and vinaceous grey to violet grey. On the eggs with a fleshy ground the markings average paler. Generally the eggs are most densely marked at the blunt end or towards the central part of the shell, forming a zone.

To another type belong the eggs on which the markings are more regular in shape, principally consisting of sharply defined very small points and speckles, showing about the same colour as in those described above or distinctly darker. On these shells too the underlying markings may be rather conspicuously present, especially at the larger end where they — together with the primary mottling — may form an open zone.

Remarks. — It is fairly strange that eggs of the latter type, in my collection much less common than the first described type, are represented apparently by 15 of the 16 examined sets in the Bartels collection.

206. ***Chloropsis s. sonnerati*** Jardine & Selby — Malochite-shouldered Leaf-Bird

Bartels: 1/2; April; Tji Hea, Preanger, West Java. Measurements (2): av. 23.1 × 16.6. Weight (2): av. 0.16.

Description. — The colour is dull white, salmon tinged, rather densely and uniformly marked with small reddish brown spots and small blotches.

Hoogerwerf: No material or particulars available. The species is perhaps not rare but fairly seldom met with.

207. ***Chloropsis cochinchinensis nigricollis*** (Vieillot) — Green Leaf-Bird

Bartels: 1/1, 6/2; April (1), June (3), July (2), October (1); West Java. Measurements (12): av. 21.3 (20.3-23) × 15.1 (14.6-15.8). Weight (12): av. 0.12 (0.11-0.13).

Description. — The eggs are light yellowish cream, marked with almost black hair-lines forming a zone at the blunt end, while there are no markings at the smaller end.



Hoogerwerf: Weight (1/2): 0.102, 0.116. For four previously recorded breeding dates and four earlier measured eggs see Hoogerwerf (1949: 155, pl. 13 fig. 154).

Description. — The few shells examined have a smooth surface which is dull or slightly glossy. The colour is creamy white or light cream, also light olive buff, marked with not very numerous, but extremely conspicuous scribbles and filament-like speckles, which are black or almost black and very sharply defined. The secondary markings are of the same type and they all together are almost exclusively concentrated around the larger end, forming a distinct zone. Beyond this area the surface is only very thinly marked with small speckles.

#### PYCNONOTIDAE

##### 208. *Irena puella turcosa* Walden — Fairy Bluebird

Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 156-157). This species too is not exactly rare but confined to a rapidly decreasing number of localities in today's Java.

##### 209. *Pycnonotus a. atriceps* (Temminck) — Black-headed Bulbul

Bartels: 1/1; May; West Java. Measurements: 21.1 × 15.2. Weight: 0.11.

Sody: 1/2; May; Java. Measurements (2): av. 21.1 × 15.2. Weight (2): av. 0.105.

Description. — The eggs are white, vaguely marked with light brownish and greyish clouds, almost exclusively near the blunt end.

Hoogerwerf: 2 odd shells; Central Java. Measurements: 20.6 × 15.5, 22 × 14.4. Weight (5/2, 2 odd shells): av. 0.109 (0.099-0.117); maximal variation in the same clutch: 0.009 (0.099-0.108). For seven previously recorded breeding dates and 15 earlier measured eggs see Hoogerwerf (1949: 157, pl. 13 fig. 155, 156).

Description. — Except in size certain eggs resemble the pale coloured ones of *Myiomela diana* (no. 220), others show some similarity to the heavily mottled ones of *Pitta sordida* (no. 188). They have a smooth and quite glossy texture.

There are two different types among the eggs examined; those belonging to the first type are of a salmon pinky buff colour, marked with hardly observable pale russet or greyish speckles and a faded zone around the larger end of lavender grey, causing some resemblance to certain eggs of

*Criniger bres* (no. 218) or *Myiomela diana*. Shells of the second type are purplish white or pale fleshy and show a more distinct zone of better defined speckles, dots and clouds of vinaceous grey and a few of vinaceous brown; they resemble somewhat certain eggs of *Pitta sordida*. On the eggs of both types the mottling is almost exclusively concentrated at the larger end, forming a fairly distinct zone, but the markings are always of a faded character.

Remarks. — It is strange again that only one egg of this common bird is present in the Bartels collection.

210. ***Pycnonotus d. dispar*** (Horsfield) — Ruby-throated Bulbul

Bartels: No material available.

Hoogerwerf: Weight (1): 0.125. For one previously recorded breeding date and five earlier measured eggs see Hoogerwerf (1949: 158, pl. 13 fig. 157-159).

Description. — As is evident from the few eggs examined the individual variation is very important. They have a dull or only slightly glossy surface.

One egg is fairly similar to those of *Hypsipetes virescens* (no. 219); the colour is almost white, covered with many irregular points and small speckles which are brown, ochreous red and umber brown with some underlying fairly inconspicuous ashy spots. They are uniformly scattered all over the shell and so densely that the colour of the ground is hardly visible.

Another clutch contains eggs on which the mottling is scarcer and coarser, leaving more of the rose white ground uncovered and varying from Indian red to vinaceous brown in the primary ones, whereas the striking underlying markings are greyish lavender; most mottling is at the larger end. These shells show some resemblance to those of *Pycnonotus aurigaster* (no. 212) or *P. goiavier* (no. 215).

Shells of a third clutch are so densely marked with points, speckles, coarse dots and cloudy blotches — all fairly ill-defined — that the ground is completely invisible. These markings are ochreous red to umber brown and the hardly observable underlying ones are vinaceous grey giving a vinaceous shade to those primary markings. Without showing a cap or zone, the eggs are most densely marked at the larger end.

Remarks. — Although this bird too is fairly common in Java, the Bartels collection does not contain eggs of it.

211. ***Pycnonotus s. squamatus*** (Temminck) — Scaly-breasted Bulbul

Bartels and Hoogerwerf: No material or particulars available. This again is a very rare species in Java so far as my experience goes (Hoogerwerf).

212. **Pycnonotus a. aurigaster** (Vieillot) — Golden-vented Bulbul

Bartels: 22/1, 104/2, 19/3; January (2), February (10), March (17), April (17), May (25), June (34), July (4), August (23), September (4), October (6), November (1), December (2); West Java. Measurements (94): av. 22.5 (19.9-26.5)  $\times$  16.4 (15-17.7). Weight (92): av. 0.155 (0.115-0.190).

Description. — The eggs are white, sometimes with a purplish tint, handsomely marked with purplish brown, occasionally more reddish brown blotches. The eggs of one set are purplish, marked with large, dark purple blotches forming a zone. One aberrant egg is pure white, showing no markings at all.

Hoogerwerf: 1/2, 1/3, 1 odd shell; March, April, May; West Java. Measurements (6): av. 23.15 (21.6-24)  $\times$  16.83 (16.5-17.5); largest egg: 24  $\times$  16.5; maximal variation in length in the same clutch: 1.7 (21.6-23.3). Weight (69): av. 0.163 (0.134-0.209); maximal variation in the same clutch: 0.040 (0.143-0.183). For 235 previously recorded breeding dates and 94 earlier measured eggs see Hoogerwerf (1949: 159, pl. 13 fig. 160, 161).

Description. — The eggs may vary considerably, even when originating from the same clutch. The texture is most often dull or only faintly glossy; the colour is white, also rose or purplish white, often almost entirely covered with numerous fine, usually not too well defined markings. But shells with coarser, sharply defined and dark markings, leaving the ground well visible, are not rare. They vary from Indian red to chocolate- or vinaceous brown, sometimes ranging to black. The underlying markings, fairly conspicuous in certain eggs, are greyish lavender to mouse-grey. Many shells are most densely mottled at the larger end, where may be a distinct zone.

Remarks. — Although there is hardly any difference in measurements between my 94 previously measured eggs (22.86  $\times$  16.46) and those of the 94 shells of the Bartels collection (22.5  $\times$  16.4), the average of 69 shells weighed by me (0.163) is considerably greater than that of the 92 of the Bartels collection (0.155).

213. **Pycnonotus zeylanicus** (Gmelin) — Yellow-crowned Bulbul

Bartels: No material available.

Remarks. — The Sody collection contains a set of two eggs: March; Deli, Sumatra. Measurements (2): av. 25.7 (24.9-26.5)  $\times$  18.9. Weight (2): 0.240. These eggs are pale purplish, rather densely marked with fairly small purplish brown spots, and show some underlying shell-marks. The smaller egg is much more densely marked than the bigger one, in it the ground colour is almost entirely obscured.

Hoogerwerf: For two previously measured eggs, apparently belonging to this species, see Hoogerwerf (1949: 160, pl. 13 fig. 162).

Description. — Both these eggs are broad-oval with clearly different ends and a faintly glossy surface. The ground is white tinged with rosa and rather uniformly covered with largely well defined, coarse speckles and dots varying from light to dark brownish red and a fairly conspicuous underlying mottling of ashy to purplish grey. Most markings are at the larger end forming an open zone.

Remarks. — With a view on the similarity in measurements and colour both eggs in the Bogor Museum, previously indicated as doubtful (Hoogerwerf, 1949: 160, pl. 13 fig. 162), may be considered as to originate from this Bulbul. This very lovely singing bird may be considered a fairly rare species in today's Java.

214. **Pycnonotus bimaculatus barat** Robinson & Kloss — Orange-spotted Bulbul

Bartels: 11/1, 82/2; January (4), February (6), March (13), April (13), May (26), June (6), July (2), August (2), September (5), October (13), November (1), December (2); West Java. Measurements (50): av. 23.2 (20.2-26.3) × 16.7 (15.6-17.6). Weight (50): av. 0.16 (0.14-0.18).

Description. — The eggs are white with a purplish or reddish tint, marked with purplish brown blotches, sometimes concealing the ground, but also frequently leaving it partly uncovered; in many eggs the markings form a zone. The eggs of one set have a purplish grey ground with a few purplish black blotches.

Hoogerwerf: 1/2, 1 odd shell; March, May; West and Central Java. Measurements (3): av. 23.03 (22.4-23.7) × 16.87 (16.8-16.9); largest egg: 23.7 × 16.8; maximal variation in length in the same clutch: 0.7 (23-23.7). Weight (3/2, 6 odd shells): av. 0.167 (0.145-0.178); no variation in the same clutch. For seven previously recorded breeding dates and nine earlier measured eggs see Hoogerwerf (1949: 161, pl. 13 fig. 163-166).

Description. — As is the case with those of the other species of bulbuls known to me, the eggs of this species show a considerable degree of variation. The eggs examined can be divided into four different types, viz. (1) those which are uniformly covered with very fine markings, not or hardly concentrated at the larger end, (2) as (1) but most concentrated at the blunt end, forming a cap or zone, or inclined to do so, (3) as (1) but showing the markings much coarser and very irregular, and (4) as (3) but showing a cap or zone.

The shells have a smooth texture, usually without or with very little gloss, though with rather much in certain specimens. The colour is white or rose- or purplish white, covered with many fairly well defined speckles, dots, etc., which often are so densely distributed all over the surface that the ground is hardly visible, in other specimens these dots are far fewer, most of them at the larger end. This mottling is light to dark vinaceous brown, partly changing into chocolate-brown or brownish red; it is mixed with numerous underlying markings, greyish lavender and mouse-grey in colour and often rather coarse, and well defined, making them conspicuous.

215. **Pycnonotus goiavier analis** (Horsfield) — Yellow-vented Bulbul

Bartels: 26/1, 82/2; January (6), February (30), March (4), April (17), May (16), June (13), July (7), August (9), September (3), October (3); West Java. Measurements (50): av. 22.9 (20.4-25.1)  $\times$  16.4 (14.5-17.3). Weight (50): av. 0.145 (0.110-0.165).

Description. — The colour is white with a purplish or reddish tint, marked with purplish brown or reddish brown blotches. In most cases the ground is clearly visible, but in certain eggs it is entirely covered, most often so in specimens with redbrown blotches.

Hoogerwerf: 1/1; January; West Java. Measurements: 24.8  $\times$  17.3. Weight (7/2, 3 odd shells): av. 0.160 (0.138-0.176); maximal variation in the same clutch: 0.015 (0.152-0.167). For 51 previously recorded breeding dates and 28 earlier measured eggs see Hoogerwerf (1949: 162, pl. 13 fig. 167-169).

Description. — The eggs are just as variable in shape and in character and colour of the markings as those of the preceding species. I did not succeed in distinguishing the eggs of the present species from those of *Pycnonotus aurigaster* though their markings may average a trifle paler.

216. **Pycnonotus p. plumosus** Blyth — Large Olive Bulbul

Bartels: No material available.

Sody: 1/2; May; Bogor, West Java. Measurements (2): 23  $\times$  16.6, 22.4  $\times$  16.3. Weight (2): av. 0.135.

Description. — The eggs are purplish white, marked with small and larger purplish brown blotches, mainly at the blunt end.

Remarks. — The Sody collection contains 2/2; June, July; Deli, Sumatra. Measurements (4): av. 21.7 (21-22.4)  $\times$  15.8. Weight (4): av. 0.127.

Hoogerwerf: 2/2, 1 odd shell; May (1); Central and West Java. Measurements (5): av. 21.82 (21.6-22.4)  $\times$  16.1 (15.6-16.8); largest egg. 22.4  $\times$

16.8; maximal variation in length in the same clutch: 0.1 (21.6-21.7). Weight (2/2, 2 odd shells): av. 0.138 (0.123-0.161); maximal variation in the same clutch: 0.004 (0.123-0.127). For seven previously recorded breeding dates and ten earlier measured eggs see Hoogerwerf (1949: 163-164, pl. 13 fig. 170, 171).

Description. — Generally the eggs are distinguishable from those of the other *Pycnonotus* species known to me because of the coarse, sharply defined markings, though in shape, texture and in the colour of the ground they do not differ. Usually this light ground remains well visible because of the not too dense mottling, consisting of irregular, most often coarse and sharply defined speckles and dots with numerous very small ones in between. The darkest markings are reddish brown changing into chocolate- or vinaceous brown, even Corinthian red, whereas the lighter ones are more yellowish- or cocoa-brown. The underlying mottling is of the same type, often showing a primary character, because it is sharply defined and fairly dark in colour, varying from different tints of ashy, mouse-grey, greyish lavender to slate violet. Generally most markings are at the larger end where they may form an open zone.

In a minority of the eggs the mottling is less sharply defined and fairly pale, light reddish brown and rusty red with the underlying one greyish lavender; these eggs show some resemblance to certain shells of *Cacomantis variolosus* (no. 111).

Remarks. — As is the case with nos. 209 and 210, it is noteworthy that the Bartels collection does not contain eggs of this fairly common species. It seems possible that the shells of all these species were mixed up with those of the other Pycnonotidae.

217. ***Pycnonotus simplex prillwitzii*** Hartert — Moore's Olive Bulbul

Bartels and Hoogerwerf: No material or particulars available. This species, although fairly precariously distributed, is not exactly rare in Java, so that it is strange again that the Bartels collection should not contain any shell of this bulbul.

218. ***Criniger bres xanthizurus*** (Oberholser) — Scrub Bulbul

Bartels: 1/1, 1/2; February, May; West Java. Measurements (3): av. 25.4 (22.5-25.7) × 17.4 (17.2-17.8). Weight (3): av. 0.18.

Sody: 1/1, 4/2; July, August, September, November, December; West Java. Measurements (9): av. 24.2 (22-25.7) × 17.3 (16.5-18.1). Weight (8): av. 0.17 (0.150-0.180).

Description. — The eggs are salmon coloured, rather uniformly, though vaguely marked with reddish brown spots and clouds.

Hoogerwerf: 1/2; April; West Java. Measurements (2):  $27 \times 18.5$ ,  $27 \times 18.7$ . Weight (5/2, 1 odd shell): av. 0.204 (0.182-0.247); maximal variation in the same clutch: 0.044 (0.203-0.247). For 25 previously recorded breeding dates and 13 earlier measured eggs see Hoogerwerf (1949: 165, pl. 13 fig. 172).

Description. — These eggs clearly differ from those of all other Pycnonotidae known to me. It is very difficult to produce a satisfying description of the shells; most of them give the impression as if purplish grey and vinaceous redbrown colours are smeared criss-cross all over the shell, forming transparent or somewhat thicker smears. The texture is smooth, generally very glossy, sometimes as if it were polished. The ground is light fleshy salmon, often with a purplish grey shade on account of faded cloudy markings. Besides there are some better defined points, speckles and smear-like dots of a darker purplish grey and rusty or chestnut. Finally there are some primary, well defined points, speckles and scribbles of dark chestnut to warm sepia or even almost black. Usually the mottling is uniformly scattered all over the surface, but in some rare cases there is some concentration at the blunt end.

Certain eggs are quite different from those described above because of numerous fine and small, ill-defined reddish brown points and speckles, uniformly covering the entire shell.

Remarks. — When compared with the eggs of the Bartels and Sody collections, mine average larger and heavier.

219. **Hypsipetes v. virescens** (Temminck) — Java Streaked Bulbul

Bartels: No material available.

Hoogerwerf: Weight (1): 0.140. For two previously recorded breeding dates and the measurements of this egg see Hoogerwerf (1949: 166, pl. 13 fig. 173).

Description. — The only egg examined is much like the very densely marked eggs of *Pycnonotus aurigaster* and *P. bimaculatus*. It has a smooth surface showing a slight gloss. The colour is white or rose tinged white, almost entirely concealed by irregular, fine speckles which are light to dark vinaceous brown and clear chestnut with numerous similar underlying markings of greyish lavender to mouse-grey. Most mottling is at the larger end, forming an open zone.

Remarks. — As remarked already under no. 209, 210, 216 and 217, the absence of any material in the Bartels collection may surprise because this species too is certainly not rare in Java and was breeding most probably in the immediate neighbourhood of Bartels' home.

## MUSCICAPIDAE

### Turdinae

220. **Myiomela d. diana** (Lesson) — Sunda Island Blue Robin

Bartels: 4/1, 52/2, 1/3(?); January (2), February (4), March (13), April (7), May (1), September (5), October (12), November (8), December (5); West Java. Measurements (50): av. 23.2 (21.1-25.7) × 16.4 (15.3-17.3). Weight (50): av. 0.16 (0.14-0.19).

Description. — The eggs are white, almost entirely covered with small yellowish- or reddish brown spots (resembling the eggs of the European *Erithacus rubecula* (L.)). In some sets the ground is better visible.

Remarks. — Two eggs of the set of three are immaculate white, fairly glossy, making the identity rather uncertain.

Hoogerwerf: 5/2, 1 odd shell; February (1), April (3), October (2); West Java. Measurements (11): av. 22.95 (21.4-23.8) × 16.15 (14.9-16.7); largest egg: 23.8 × 16; maximal variation in length in the same clutch: 0.8 (21.4-22.2). Weight (51): av. 0.160 (0.138-0.185); maximal variation in the same clutch: 0.012 (0.158-0.170). For 23 previously recorded breeding dates and 41 earlier measured eggs see Hoogerwerf (1949: 166-167, pl. 13 fig. 174).

Description. — Rather variable in shape but most eggs have almost equal or slightly different ends and a smooth texture which is dull or faintly glossy. The ground is pale salmon to salmon- or rose buff.

There are two somewhat different types; to the most common of these belong the eggs which apparently do not show any mottling or which are so densely mottled that no separate markings are observable, giving the shell a uniform salmon- or rose buffy tint, darkest at the larger end, forming a faded cap or zone.

Eggs of the second type are covered with numerous rusty brown and purplish- or lavender greyish points and fine speckles, which are rather distinctly defined, though also very pale; they are concentrated at the larger end, forming a pale cap or zone, being much thinner scattered beyond this area. These eggs show some similarity to those of *Muscicapa indigo* (no. 278).



**221. *Brachypteryx m. montana* Horsfield** — Greater Short-wing

Bartels: 3/2; February (1), March (2); West Java. Measurements (6): av. 25.1 (24-26) × 16.5 (16.1-16.9). Weight (6): av. 0.16.

Description. — The eggs are long-oval, white with little or no gloss.

Hoogerwerf: Weight (21): av. 0.163 (0.138-0.183); maximal variation in the same clutch: 0.022 (0.147-0.169). An abnormal egg: 28.7 × 15.3; weight: 0.167. For 12 previously recorded breeding dates and 22 earlier measured eggs see Hoogerwerf (1949: 168, pl. 13 fig. 175).

Description. — The eggs are regular- to elongate-oval with slightly or well different ends, though specimens with equal ends are no exception. They have a smooth surface which is dull or faintly glossy and pure or dirty white, sometimes mixed with some cream but showing no markings.

**222. *Brachypteryx l. leucophrys* (Temminck)** — Lesser Short-wing

Bartels: 5/1, 31/2, 1/3; January (2), February (4), March (7), April (5), May (2), September (4), October (5), November (7), December (1); West Java. Measurements (50): av. 20.5 (19.2-22.2) × 14.8 (13.7-15.6). Weight (50): av. 0.12 (0.105-0.135).

Description. — The ground colour is greenish blue, as a rule entirely covered with small brown spots and clouds, giving an olive impression (resembling the European *Luscinia megarhyncha* Brehm), only in some sets the ground is better visible. One set has a greenish blue colour with brownish clouds, mainly at the blunt end.

Hoogerwerf: 2/2, 1 odd shell; February, March, October; West Java. Measurements (5): av. 20.06 (19.4-20.8) × 14.72 (14.2-15.1); largest egg: 20.8 × 15.1; maximal variation in length in the same clutch: 0.8 (20-20.8). Weight (52): av. 0.125 (0.101-0.147); maximal variation in the same clutch: 0.011 (0.126-0.137). Abnormal egg: 24 × 15.8; weight: 0.147. For 35 previously recorded breeding dates and 54 earlier measured eggs see Hoogerwerf (1949: 168, pl. 13 fig. 176).

Description. — The eggs vary a good deal in shape, but they have a smooth surface which is dull or faintly glossy, showing a light to medium pistache green colour. As in *Myiomela diana* (no. 220) there are two different types of eggs. Those of the first type — the most common perhaps — are not mottled or give that impression because of the very densely scattered fine and pale markings. They have a uniform pistache green, light olive brown or deeper olive tinge, darkest in a cap or zone at the larger end. Shells of the second type show numerous fairly well defined, though also pale, points and

speckles of almost the same colour as in the first type, also most plentiful at the blunt end, forming a not very distinct cap or zone.

223. **Copsychus saularis javensis** Chasen & Kloss — Straits Robin

Bartels: 6/1, 15/2, 4/3; February (1), April (7), May (7), June (4), July (4), August (1); West Java. Measurements (47): av. 23.6 (21.8-26.8) × 17.3 (16.2-18.9). Weight (47): av. 0.225 (0.175-0.265).

Sody: 8/2, 6/3; February (1), March (1), April (4), May (3), June (3), July (2); Java. Measurements (32): av. 23.7 (21.1-26.3) × 17.2 (16.2-18.7). Weight (32): av. 0.23 (0.185-0.260).

Description. — The colour is greenish, densely and often coarsely marked with yellowish brown blotches and clouds; one egg is blue with a few dark brown, fairly large blotches.

Hoogerwerf: 1/2; May; West Java. Measurements (2): 23.4 × 17.6, 24.1 × 17.5. Weight (3/2, 2/3, 1 odd shell): av. 0.225 (0.206-0.240); maximal variation in the same clutch: 0.020 (0.220-0.240). For 113 previously recorded breeding dates and 54 earlier measured eggs see Hoogerwerf (1949: 169, pl. 13 and 14 fig. 177-179).

Description. — Most eggs are normal- to broad-oval with clearly different ends with a smooth and glossy surface. The colour is clear or somewhat duller light bluish green, fairly densely covered with well or moderately well defined points, speckles and dots, accidentally showing the character of smears. Most mottling is concentrated at the larger end often forming a well pronounced cap. The tint is light to dark olive chestnut mixed with some lighter markings of a buff or Isabella colour. The underlying markings are not very conspicuous, they are dirty ashy or mouse-grey, the lightest passing into lavender grey.

223a. **Copsychus saularis amoenus** (Horsfield) — Straits Robin of East Java

Bartels: No material available.

Hoogerwerf: 1/2, 1/3; April (1); Central Java. Measurements (5): av. 25.44 (24.9-27.3) × 17.28 (16.5-17.7); largest egg: 27.3 × 17.6; maximal variation in length in the same clutch: 2.3 (25-27.3). Weight (1/2, 2/3): av. 0.240 (0.213-0.291); maximal variation in the same clutch: 0.059 (0.232-0.291). For 44 previously recorded breeding dates and 21 earlier measured eggs see Hoogerwerf (1949: 170, pl. 8 fig. 99, pl. 14 fig. 180).

Description. — The eggs examined do not allow the enumeration of constant differences between those of the present and of the preceding subspecies.

Remarks. — These eggs average decidedly heavier than those of the subspecies *javensis*.

224. **Copsychus malabaricus javanus** (Kloss) — Shama of Central- and East Java

Bartels: No material available.

Hoogerwerf: Weight (1/3): av. 0.158 (0.148-0.166). For two previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 171, pl. 14 fig. 181, 182).

Description. — Except in size the eggs are much like those of the preceding species, but they may average more densely and finer mottled, giving the shells a darker appearance. They have a smooth, glossy surface which is very light bluish green or pale green. Generally this colour is hardly observable because of the very numerous mottling and smears of olive brown and the ashy- and violet grey underlying markings. Most eggs examined are rather uniformly marked, only slightly more concentrated at the larger end in some rare cases.

Remarks. — Comparing the measurements of five previously examined eggs and the weight of those three mentioned above with the size and weight of the 14 shells of *C. m. tricolor* of the Bartels collection, the eggs of the West Javan subspecies *C. m. tricolor* seem larger and heavier.

224a. **Copsychus malabaricus tricolor** (Vieillot) — Shama

Bartels: 1/2, 4/3; January (2), February (1), March (1), December (1); West Java. Measurements (14): av. 23.4 (22.1-24.9) × 16.7 (16.4-17.1). Weight (14): av. 0.185 (0.170-0.210).

Description. — The shells have a greenish ground, densely marked with brownish clouds.

Hoogerwerf: No material or particulars available.

225. **Enicurus l. leschenaulti** (Vieillot) — White-crowned Forktail

Bartels: 5/1, 49/2, 2/3; January (5), February (8), March (11), April (17), May (4), June (1), September (1), October (2), November (1), December (6); West Java. Measurements (50): av. 25.7 (23.5-27.4) × 18.1 (17.2-19.5). Weight (50): av. 0.205 (0.175-0.235).

Description. — The ground is yellowish green or white with a greenish tint, some sets are finely and densely marked, others are more sparingly mottled with coarse brown blotches, one egg is more or less erythristic.

Hoogerwerf: 3/2; March, April (2); West Java. Measurements (6): av. 26.43 (26-26.7)  $\times$  18.27 (18-18.6); largest egg: 26.7  $\times$  18; maximal variation in length in the same clutch: 0.7 (26-26.7). Weight (46): av. 0.203 (0.186-0.241); maximal variation in the same clutch: 0.017 (0.191-0.208). For 26 previously recorded breeding dates and 45 earlier measured eggs see Hoogerwerf (1949: 171-172, pl. 14 fig. 183).

Description. — The eggs have a smooth, dull or faintly glossy surface, nearly always greyish green or greenish white, occasionally creamy and in some rare cases clear light blue green. The shell is covered with fairly numerous not too coarse markings, largely well defined, which are rusty brown, often mixed with olive, changing into dark chestnut, sepia or almost black. Generally the lavender- or vinaceous grey secondary markings are very numerous too, often almost entirely covering the ground and predominating over the primary ones on the larger end. Not exactly uncommon are eggs showing some similarity to the pale ones of *Geokichla citrina* (no. 231) in which hardly any primary markings do occur.

226. **Enicurus v. velatus** Temminck — Small Forktail

Bartels: 21/2; January (2), February (1), March (6), April (3), May (4), June (5); West Java. Measurements (36): av. 21.7 (19.5-22.8)  $\times$  15.1 (14.5-15.9). Weight (36): av. 0.12 (0.11-0.14).

Description. — The colour is clear pale blue, rather sparingly marked with fairly light brown blotches, mainly at the blunt end; shell-marks are present.

Remarks. — One egg measuring 20.3  $\times$  14.8, and weighing 0.120, is light blue with some very fine black spots around the blunt end; it is possible that this egg is of a cuckoo (see also no. 111).

Hoogerwerf: 1/1; March; West Java. Measurements: 20.7  $\times$  15.8. Weight (4/2, 1 odd shell): av. 0.130 (0.123-0.136); maximal variation in the same clutch: 0.010 (0.123-0.133). For eight previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 173, pl. 14 fig. 184).

Description. — On account of the brighter ground and coarser and more sharply defined primary markings, the eggs differ conspicuously from those of the preceding species, which also average much larger. The colour is light greenish white, not very densely covered with fairly coarse, generally well defined primary markings and less numerous secondary ones. The primary mottling is rather clear reddish brown or tawny rusty, ranging to dark chestnut, even burnt sienna in the darkest ones. The secondary markings are dull lavender or vinaceous grey, occasionally dark mouse-grey; a majority of the shells is most densely marked on the larger end, usually without

forming a distinct cap or zone. In some rare cases there may be some resemblance to certain eggs of *Geokichla citrina* (no. 231) because of the very pale mottling.

227. **Saxicola caprata fruticola** Horsfield — Black Stone-Chat

Bartels: 3/1, 7/2, 5/3; March (1), June (3), July (7), August (2), September (1), October (1); West Java. Measurements (31): av. 18.3 (16.4-20.1) × 14.1 (13.2-15.1). Weight (22): av. 0.090 (0.085-0.110).

Kooiman: 1/2, 4/3; East Java. Measurements (14): av. 18.7 (17.5-20) × 14.5 (14.1-15.1). Weight (14): av. 0.103 (0.100-0.107).

Description. — The eggs are very pale blue, marked with reddish brown spots and clouds, forming a cap or zone; one egg is white, being almost unmarked.

Remarks: The weight of an exceptionally light egg is only 0.060. Two sets contain an egg of *Cacomantis variolosus sepulcralis* (no. 111).

Hoogerwerf: 1/2; Central Java. Measurements: 19 × 14, 19.6 × 14.3. Weight (1/2, 2/3): av. 0.112 (0.100-0.123); maximal variation in the same clutch: 0.011 (0.112-0.123). For 58 previously recorded breeding dates and 25 earlier measured eggs see Hoogerwerf (1949: 174, pl. 8 fig. 89, pl. 14 fig. 185, 186).

Description. — Except in size the eggs show some resemblance to certain specimens of *Geokichla citrina* (no. 231). They have a dull or faintly glossy texture which is greenish white, covered with numerous, very irregular points, speckles and dots, generally not sharply defined and varying in colour from rusty brown to dark chestnut. The secondary, not very conspicuous mottling is light to dark violet grey or mouse-grey. Usually the shells are most densely marked at the larger end, sometimes showing a cap or zone.

228. **Turdus poliocephalus fumidus** S. Müller — Horsfield's Thrush

Bartels: 3/1, 3/2; February (2), June (3), September (1); West Java. Measurements (9): av. 29.8 (28-31.9) × 21.2 (20.1-22). Weight (8): av. 0.36 (0.31-0.41).

Description. — The eggs are clear greenish blue, coarsely marked with brown and reddish brown blotches, mainly at the blunt end (resembling coarsely marked eggs of the European *Turdus merula* (L.)).

Remarks. — Two eggs are very large: 33.1 × 21.9, 33.5 × 22.2; their average weight is 0.42; the identification seems doubtful, though the description matches.

Hoogerwerf: Weight (1/2, 3 odd shells): av. 0.363 (0.342-0.402); maximal variation in the same clutch: 0.016 (0.342-0.358). For eight previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 175, pl. 14 fig. 187, 188).

Description. — The eggs differ rather strikingly from those of all other thrushes from Java known to me. They vary considerably in shape, usually showing clearly different ends and a smooth texture which is dull or with a weak gloss. The colour is clear light bluish green, covered with a varying number of fairly coarse, mostly sharply defined points, speckles and dots, which are light to dark chestnut- or mahogany brown, partly very dark changing into warm sepia and almost black. The secondary markings may be very conspicuously present, they are light to dark vinaceous grey, but occasionally they are very scarce, hardly observable. Generally most mottling is at the larger end, not rarely forming a cap or zone. Perhaps less common are shells showing paler, ill-defined markings of rusty- or Brussel's brown with many underlying ones of light vinaceous purple and some very scarce black points and scribbles as the only primary mottling.

228a. **Turdus poliocephalus stresemanni** (Bartels) — Horsfield's Thrush from East Java

Bartels: 2/2; June; Mount Lawu, Central Java. Measurements (3): av. 28 (27.5-29.5) × 21.3 (20.9-21.7). Weight (3): av. 0.36 (0.35-0.41).

Description. — The eggs are pale blue, one set is sparingly, a second more densely marked with yellowish brown blotches.

Hoogerwerf: No material or particulars available.

229. **Zoothera andromedae** (Temminck) — Temminck's Thrush

Bartels: 7/1, 26/2, 11/3; January (3), February (2), March (6), April (11), May (1), September (1), October (8), November (7), December (5); West Java. Measurements (50): av. 31.4 (27.7-35) × 22.4 (18.2-23). Weight (50): av. 0.37 (0.30-0.40).

Description. — The colour is greenish, as a rule rather densely marked with fine or more coarse blotches, resembling the eggs of *Turdus merula* L.

Hoogerwerf: 1/3; January; West Java. Measurements (3): av. 29.77 (29.6-29.9) × 21.7 (21.6-21.8); largest egg: 29.9 × 21.8; (this clutch was not weighed because the shells were heavily damaged). Weight (1/2, 1/3, 1 odd shell): av. 0.360 (0.315-0.385); maximal variation in the same clutch: 0.007 (0.378-0.385). For five previously recorded breeding dates and the measurements of these six eggs see Hoogerwerf (1949: 176, pl. 14 fig. 189).

Description. — The eggs show some resemblance to those of certain specimens of *Geokichla citrina* (no. 231); they have a smooth surface, faintly to deeply glossy, which is so densely mottled that the ground is very difficult to discover, but this is most probably greenish white. This mottling consists of fine, ill-defined points and speckles which are dull rusty brown. The inconspicuously present underlying markings are greyish lavender. The shell is uniformly mottled, giving it a smooth rusty brown tint, generally slightly more concentrated at the larger end, however, without forming a cap or zone.

230. **Zoothera dauma horsfieldi** (Bonaparte) — Mountain Thrush

Bartels: 1/1, 3/2; September (3), November (1); West Java. Measurements (7): av. 34.4 (32.8-36.5) × 22.8 (22.1-23.6). Weight (7): av. 0.45 (0.39-0.51).

Description. — The colour is greenish- or yellowish white, faintly marked with pale brown spots and clouds.

Hoogerwerf: Weight (2/2): av. 0.433 (0.417-0.446); maximal variation in the same clutch: 0.029 (0.417-0.446). For two previously recorded breeding dates and the measurements of these four eggs see Hoogerwerf (1949: 177, pl. 14 fig. 190).

Description. — The shells are much like those of the preceding species, to a smaller degree they resemble certain eggs of *Geokichla citrina* (no. 231). The ground is white or very light green or bluish green, almost completely concealed by numerous irregular pale points and small speckles of rusty brown, clearest — more or less vinaceous brown — at the blunt end. The secondary markings, occasionally predominating over the primary ones, are lavender- or vinaceous grey. Generally most mottling is at the larger end where it may form an indistinct cap.

Remarks. — These eggs average considerably smaller than those of the Bartels collection, although the average weights are almost the same.

231. **Geokichla citrina rubecula** Gould — Grey and Orange Ground-Thrush

Bartels: 4/1, 67/2, 36/3, 3/4; January (15), February (14), March (29), April (22), May (8), October (4), November (11), December (7); West Java. Measurements (50): av. 25 (22.8-28.3) × 18.8 (16.9-20.1). Weight (50): av. 0.23 (0.185-0.270).

Description. — The ground is pale bluish, rather sparingly marked with brown blotches and clouds, mainly at the blunt end.

Hoogerwerf: 1/2, 1 odd shell; January, March; West Java. Measurements (3): av. 25.9 (25.6-26.2) × 20.2 (20-20.5); largest egg: 26.2 × 20.5. Weight (49): av. 0.231 (0.198-0.275); maximal variation in the same clutch: 0.012 (0.236-0.248). For 87 previously recorded breeding dates and 67 earlier measured eggs see Hoogerwerf (1949: 178, pl. 14, 15 fig. 191, 192).

Description. — There is a considerable degree of variation in the eggs of this thrush, not only so far as the measurements and shape are concerned but also in the character and colour of the markings. Many eggs show some resemblance to those of both the preceding species. Generally both ends are clearly different, whereas the texture is smooth with a moderate or high gloss. The colour is almost white, usually greenish- or bluish green white, covered with numerous irregular, not very sharply defined speckles and dots, sometimes looking like smears. The mottling may be so densely scattered that the basic colour is almost completely covered, but it also happens that most markings are at the larger end, being more scarcely distributed outside that area. They vary in colour from light rusty brown to dark chestnut or warm sepia, whereas the underlying markings, often almost inseparable from the primary ones and predominating at the larger end, are greyish lavender. In certain eggs the mottling is rather sharply defined though never so well pronounced as in *Turdus poliocephalus* (no. 228).

232. **Geokichla i. interpres** (Temminck) — Temminck's Ground-Thrush

Bartels: No material available.

Hoogerwerf: 2/2; March, July; Trouwers Island (= Pulau Tindjil), West Java. Measurements (4): av. 23.78 (23.5-23.9) × 17.85 (17.7-18.1); largest egg: 23.9 × 18.1; maximal variation in length in the same clutch: 0.3 (23.5-23.8). Weight (4): av. 0.198 (0.192-0.203); maximal variation in the same clutch: 0.011 (0.192-0.203). For two previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 179, pl. 14 fig. 193).

Description. — Except in size the eggs are much like those of the preceding species. The greenish white ground is almost completely covered with fine, not well defined rusty brown markings and much less conspicuous secondary ones of purplish- or lavender grey, generally most densely present at the larger end. In certain eggs all mottling is rather pale, showing very little difference between primary and secondary markings.

Remarks. — Though this thrush is not exactly common in Java, it is strange that the Bartels collection does not contain eggs of the species.



233. **Myophonus caeruleus flavirostris** (Horsfield) — Larger Whistling Thrush

Bartels: 1/1, 7/2, 3/3; February (2), March (3), April (2), May (1), June (1), October (1), December (1); West Java. Measurements (24): av. 39 (35.7-44) × 26.9 (25.8-28). Weight (24): av. 0.76 (0.67-0.83).

Description. — The ground is very pale greyish or bluish grey, almost invisibly spotted with brownish.

Hoogerwerf: 1/2; October; West Java. Measurements: 39.3 × 26.5, 39.5 × 27. Weight (1/2, 1/3, 1 odd shell): av. 0.823 (0.699-0.901); maximal variation in the same clutch: 0.123 (0.699-0.822). For ten previously recorded breeding dates and ten earlier measured eggs see Hoogerwerf (1949: 180, pl. 14 fig. 194).

Description. — The eggs are distinctly different from those of all other thrushes from Java we know. They are normal- to elongate-oval with clearly different ends and a fairly rough texture, which is dull or slightly glossy. The ground is white, faintly tinged with greyish and marked with a small number of very small ill-defined points and small speckles which are pale dirty brownish and most numerous at the blunt end, forming a very faded, sometimes hardly visible cap. The underlying mottling is greyish lavender, also most densely scattered at the larger end. In almost all eggs examined the markings show a secondary character and they are sometimes hardly visible.

234. **Myophonus g. glaucinus** (Temminck) — Javan Whistling Thrush

Bartels: 3/1, 10/2; January (1), March (2), September (2), October (7), November (1); West Java. Measurements (23): av. 36.1 (32.5-39.3) × 23.9 (22.2-28.7). Weight (23): av. 0.510 (0.435-0.520).

Description. — The ground is white with a bluish or creamy tint, sparingly marked with small brownish spots and clouds. In four eggs a cap is noticeable.

Hoogerwerf: Weight (1/2, 1 odd shell): av. 0.479 (0.464-0.495); maximal variation in the same clutch: 0.031 (0.464-0.495). For three previously recorded breeding dates and four earlier measured eggs see Hoogerwerf (1949: 181, pl. 14 fig. 195).

Description. — Because of their smaller size and better defined markings the eggs are distinctly different from those of the preceding species. They show well or moderately different ends and a smooth texture, which is faintly or distinctly glossy. The colour is greenish white or light greyish green, usually densely covered with numerous irregular ill-defined points

and speckles of tawny rusty brown and underlying markings of rusty vinaceous. Still deeper may be observable some lavender greyish cloudy mottling, on certain shells somewhat more conspicuous at the larger end, where it may form an indistinct zone.

235. **Cochoa a. azurea** (Temminck) — Blue Thrush

Bartels 1/2; December; Mount Pangerango, Preanger, West Java. Measurements (2): av. 26 × 20.8. Weight (2): av. 0.26.

Description. — The ground is pale blue, rather densely marked with reddish brown spots and clouds like in the European *Turdus merula* (L).

Hoogerwerf: No material or particulars at hand. The species may certainly not be called common.

Timaliinae

236. **Pellorneum c. capistratum** (Temminck) — Black-capped Babbler

Bartels: 5/2; April (1), September (1), November (1), December (2); West Java. Measurements (10): av. 22.2 (21.8-22.8) × 16.2 (16-16.5). Weight (10): av. 0.16 (0.15-0.17).

Description. — The ground is greyish white with a yellowish or brownish tint, rather densely marked with brownish, occasionally purplish brown spots and clouds.

Hoogerwerf: Weight (1/2): 0.143, 0.150. For eight previously recorded breeding dates and four earlier measured eggs see Hoogerwerf (1949: 182, pl. 15 fig. 196).

Description. — The eggs show some resemblance to those of certain specimens of *Megalurus palustris* (no. 259) and of *Timalia pileata* (no. 249). They have a smooth and glossy texture which is white slightly tinged with greenish, densely marked with well defined rather coarse points and speckles which are olive brown or light to a trifle darker sepia. The less numerous but fairly conspicuous underlying mottling is mouse-grey, occasionally almost black. Though the eggs are rather uniformly marked there is a concentration at the blunt end, forming a distinct cap or zone in which the secondary mottling may predominate.

237. **Trichastoma p. pyrrhogenys** (Temminck) — Temminck's Babbler

Bartels: 2/2; May; December; Mount Masigit, Preanger, West Java. Measurements (4): av. 20.5 × 15. Weight (av.): 0.125.

Description. — The ground is pale blue, finely and densely marked with brown spots.

Hoogerwerf: No material or particulars available. The species is rare in Java.

238. **Trichastoma s. sepiarium** (Horsfield) — Horsfield's Brown Babbler

Bartels: 9/1, 88/2, 1/3; January (4), February (4), March (3), April (7), May (10), July (1), August (6), September (10), October (30), November (16), December (7); West Java. Measurements (50): av. 22.4 (20.4-26.8) × 15.8 (14.4-16.8). Weight (50): av. 0.155 (0.135-0.190).

Description. — The ground is pinkish white to darker salmon, marked with small brownish and purplish brown spots, streaks and hair-lines; underlying shell-marks are present.

Hoogerwerf: Weight (20): av. 0.159 (0.145-0.191); maximal variation in the same clutch: 0.016 (0.175-0.191). For 64 previously recorded breeding dates and 45 earlier measured eggs see Hoogerwerf (1949: 183, pl. 8 fig. 95-97, pl. 15 fig. 197, 198).

Description. — The eggs vary considerably in shape, but invariably they have a smooth surface which is dull or glossy. The colour is purplish fleshy, almost completely covered with very irregular, pale and ill-defined stains and cloudy markings which are brown vinaceous with a purplish shade on which are scattered some slightly darker ashy speckles and scribbles. Very conspicuous and sharply defined are a few dark points and speckles, together with some scribbles and vein-like lines of a dark mahogany brown colour, often almost black with a shade of purple in it. In a few rare cases the primary markings are restricted to some fine points and speckles.

Though this is not common, certain eggs may be most densely mottled at the larger or smaller end, forming a distinct brownish cap.

238a. **Trichastoma sepiarium minor** (Meyer) — Horsfield's Brown Babbler from East Java

Bartels: No material available.

Kooiman: 1/2; East Java, no further data. Measurements (2): av. 22 × 15.8. The shells were not weighed, because they were too strongly damaged.

Description. — The ground is pale purplish creamy, rather sparingly marked with ill-defined sepia brown spots and hair-lines.

Hoogerwerf: No material or particulars available.

239. **Malacopteron cinereum rufifrons** Cabanis — Smaller Red-headed Tree Babbler

Bartels: 1/1, 3/2; April, May, June, December; Mount Masigit (2), Mount Tangkuban Prahū (2), West Java. Measurements (7): av. 20.6 (20-21.2) × 14.2 (14-14.5). Weight (6): av. 0.115 (0.10-0.12).

Description. — Three types of coloration can be distinguished, (a) the eggs are white, almost immaculate, (b) they are very pale cream, vaguely marked with reddish brown clouds, shell-marks present, making an erythristic impression, (c) the colour is yellowish white, marked with small greyish brown spots, mainly at the blunt end; shell-marks are present.

Hoogerwerf: 1/2; October; Game sanctuary Udjung Kulon, West Java. Measurements: 18.5 × 14, 19 × 13.8. Weight: 0.096, 0.101. Not previously recorded by me.

Description. — The only two eggs examined are normal-oval with distinctly differing ends and a smooth, slightly glossy texture, which is chalky white. There are only a few not too conspicuous, fairly ill-defined points and small speckles of a pale rusty or brownish tint, almost exclusively scattered at the blunt end, but by no means enough to form a zone.

240. **Pomatorhinus m. montanus** Horsfield — Chestnut-backed Scimitar Babbler

Bartels: 28/2, 40/3, 1/5; January (3), February (6), March (15), April (5), May (8), June (4), July (1), September (2), October (7), November (9), December (9); West Java. Measurements (50): av. 25.8 (23.7-29.5) × 18.9 (17.5-20). Weight (50): av. 0.27 (0.24-0.30).

Description. — The eggs are of a white colour.

Hoogerwerf: 2/2, 1/3, 1 odd shell; January (2), June, December; West Java. Measurements (6): av. 25.55 (24.9-26.3) × 18.6 (18.2-18.9); largest egg: 26.3 × 18.9; maximal variation in length in the same clutch: 0.7 (24.9-25.6). Weight (54): av. 0.279 (0.235-0.302); maximal variation in the same clutch: 0.042 (0.235-0.277). For 21 previously recorded breeding dates and 59 earlier measured eggs see Hoogerwerf (1949: 185, pl. 15 fig. 199).

Description. — The eggs are normal- to elongate-oval with distinctly or slightly different ends and a smooth well glossy texture, which is clear white or chalky white, often almost milky white on account of a bluish shade. The eggs are not marked, but may be soiled, in some rare cases this changes the colour into a uniform creamy white.

241. **Napothera macrodactyla lepidopleura** (Bonaparte) — Large-footed Babbler

Bartels: 1/1, 8/2; January (1), February (4), April (1), December (3); West Java. Measurements (17): av. 25.6 (24.5-28)  $\times$  18.9 (18.2-19.5). Weight (17): av. 0.24 (0.205-0.265).

Description. — The colour is white, occasionally with a very faint purplish tint, marked with purplish brown spots and hair-lines, mainly at the blunt end.

Hoogerwerf: Weight (2/2): av. 0.238 (0.225-0.251); maximal variation in the same clutch: 0.026 (0.225-0.251). For three previously recorded breeding dates and the measurements of these four eggs see Hoogerwerf (1949: 185, pl. 15 fig. 200).

Description. — Except in size the eggs are much like those of certain specimens of *Alcippe poioicephala* (no. 253). The few shells examined are normal- to somewhat more broad-oval with distinctly different ends and a smooth, glossy surface. The colour is white, tinged light fleshy or slightly purplish, almost entirely covered with fairly numerous pale and ill-defined points, speckles and dots, partly showing a filament-like character. These markings are vinaceous grey and light vinaceous brown. Upon these faded markings there are a few small, sharper defined mottles, sometimes scribbles, varying from darker vinaceous- to dark chestnut brown, almost black in some rare cases. In the eggs examined there is no or hardly any concentration at the larger end.

242. **Napothera e. epilepidota** (Temminck) — Small Wren-Babbler

Bartels: 7/2; March (1), October (2), November (3), December (1); West Java. Measurements (14): av. 21.6 (19.8-22.2)  $\times$  15.6 (15-16.2). Weight (14): av. 0.135 (0.105-0.155).

Description. — The ground is white, densely marked with small brownish, occasionally purplish brown spots. Some eggs have a zone or cap of these spots.

Hoogerwerf: 2/2; December (1); West Java. Measurements (4): av. 21.63 (20.6-23.2)  $\times$  16.43 (15.6-17.2); largest egg: 23.2  $\times$  17.1; maximal variation in length in the same clutch: 1.2 (22-23.2). Weight (3/2): av. 0.144 (0.129-0.165); maximal variation in the same clutch: 0.008 (0.157-0.165). For one previously recorded breeding date and two earlier measured eggs see Hoogerwerf (1949: 186, pl. 15 fig. 201, 202).

Description. — Except in size the few eggs I have seen show some resemblance to the only one I have examined of *Hypsipetes virescens* (no. 219) and still more to those of *Tesia superciliaris* (no. 256) and some aberrant ones of *Alcippe poioicephala* (no. 253). They have a smooth, dull

or faintly glossy surface which is chalky white or almost white. The shell is densely marked with numerous very fine fairly pale, not very sharply defined points and speckles, light to dark vinaceous brown in colour, ranging to mahogany or chestnut in the darkest ones. There are fairly many much less conspicuous underlying markings of the same type, which are mouse-grey and may predominate at the blunt end, where generally most mottling is concentrated without forming a distinct zone or cap.

243. **Microura pusilla rufa** (Sharpe) — Scaly-breasted Wren

Bartels: 46/2; January (4), February (3), March (7), April (5), September (1), October (7), November (9), December (10); West Java. Measurements (50): av. 19.6 (18.2-20.7) × 14.8 (14.1-15.2). Weight (50): av. 0.11 (0.100-0.125).

Description. — The eggs are white with little gloss.

Hoogerwerf: 5/2, 4 odd shells; January (2), February (3); March (1), April (1), August (1), October (1); West Java. Measurements (14): av. 19.62 (17.7-21.5) × 14.06 (13.6-15.5); largest egg: 21.5 × 14; maximal variation in length in the same clutch: 1.8 (19.4-21.2). Weight (136): av. 0.110 (0.089-0.129); maximal variation in the same clutch: 0.017 (0.095-0.112). For 75 previously recorded breeding dates and 121 earlier measured eggs see Hoogerwerf (1949: 187, pl. 15 fig. 203).

Description. — Except in size the eggs are much like those of *Muscicapa hypertythra* (no. 282) and of *Phylloscopus trivirgatus* (no. 267). They vary considerably in shape, also within the same clutch, but normal- to broad-oval ones with distinctly or moderately different ends seem to be most common. They have a smooth texture, dull or only faintly glossy and have a delicate white colour, sometimes creamy white, perhaps on account of dirt.

244. **Macronous f. flavicollis** (Bonaparte) — Bonaparte's Yellow-breasted Babbler

Bartels: 2/1, 3/2; February (1), April (1), May (1), December (2); West Java. Measurements (8): av. 18 (17.3-18.6) × 13.4 (13-13.6). Weight (8): av. 0.080 (0.070-0.085).

Description. — The ground is white, marked with brownish spots, resembling the eggs of Paridae.

Hoogerwerf: Weight (2/2): av. 0.079 (0.075-0.083); maximal variation in the same clutch: 0.005 (0.078-0.083). For two previously recorded breeding dates and the measurements of these four eggs see Hoogerwerf (1949: 188, pl. 15 fig. 204).

Description. — The few eggs examined are normal- to elongate-oval with distinctly different ends and a smooth, glossy surface. The colour is white or almost white, marked with rather many mostly fine, sharply defined points and small speckles of vinaceous- or liver coloured brown to chestnut, the darkest ones ranging to black. The fairly many, but much less conspicuous secondary markings of the same type are greyish lavender to mouse-grey; they are almost completely lacking outside the blunt end where the primary mottling is most densely scattered too.

245. **Macronous gularis javanica** (Cabanis) — Yellow-breasted Babbler

Bartels: No material available.

Hoogerwerf: For four previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 188-189, pl. 15 fig. 205).

Description. — Because of the scarcer, coarser and less sharply defined markings the eggs differ from those of the preceding species, showing more resemblance to certain shells of *Hypothymis azurea* (no. 287). They are white or almost white, marked with rather few fine and some coarser speckles which are vinaceous- or liver coloured brown to chestnut. The secondary markings of the same type are greyish lavender to vinaceous grey, in some cases predominating over the primary ones at the blunt end, where they may be dark and well defined. Generally most mottling is at the larger end, forming an open zone.

Remarks. — Because this bird is certainly not a rare species in Java, it is strange again that the Bartels collection does not contain material of it.

246. **Stachyris grammiceps** (Temminck) — Javan White-breasted Babbler

Bartels and Hoogerwerf: No material or particulars are available of this very rare bird.

247. **Stachyris t. thoracica** (Temminck) — White-collared Babbler

Bartels: 2/2, 1/3; January, October, December; West Java. Measurements (7): av. 26.8 (25.2-28.5) × 18 (17.5-18.6). Weight (7): av. 0.255 (0.245-0.265).

Description. — The colour is white.

Hoogerwerf: 1/2; West Java, without further particulars. Measurements: 24.5 × 17.8, 25 × 17.7. Weight (1/2, 1/3): av. 0.236 (0.230-0.243); maximal variation in the same clutch: 0.013 (0.230-0.243). For two previously recorded breeding dates and five earlier measured eggs see Hoogerwerf (1949: 190).

Description. — The eggs are much like those of *Pomatorhinus montanus* (no. 240), certain specimens are indistinguishable. They are normal- to broad-oval with distinctly different ends and a smooth, glossy surface which is pure white without any markings.

Remarks. — These eggs and the five previously measured ones average considerably smaller in size and lighter in weight than the seven shells of the Bartels collection, which may be mixed with material of *Pomatorhinus montanus*.

248. **Stachyris m. melanothorax** (Temminck) — Pearl-cheeked Babbler

Bartels: 49/2, 4/3, 1/4; January (5), February (3), March (2), April (10), May (3), June (2), August (2), September (4), October (10), November (10), December (3); West Java. Measurements (50): av. 18.1 (16.3-20.2) × 13.4 (12.7-14.5). Weight (50): av. 0.085 (0.080-0.105).

Description. — The colour is white with a moderate gloss. Some sets are marked with small greyish brown spots.

Hoogerwerf: Weight (30): av. 0.087 (0.075-0.099); maximal variation in the same clutch: 0.010 (0.089-0.099). For 24 previously recorded breeding dates and 37 earlier measured eggs see Hoogerwerf (1949: 190, pl. 8 fig. 98, pl. 15 fig. 206).

Description. — The eggs vary considerably in shape, but they have a smooth and glossy surface which is white or white with a bluish green tint. Most eggs examined have no or hardly any markings, but there may be some fine, very pale rusty brown points and speckles, most numerous at the blunt end, occasionally forming a very indistinct open zone. In some rare cases the eggs may show some more resemblance to those of *Macronous flavicollis* (no. 244) because of the more numerous, sharply defined reddish brown primary markings and some greyish underlying ones.

249. **Timalia p. pileata** Horsfield — Red-capped Babbler

Bartels: 3/2, 3/3; February (1), March (1), May (1), June (2), August (1); West Java. Measurements (15): av. 20 (18.6-20.3) × 15 (14.6-15.4). Weight (12): av. 0.115 (0.090-0.130).

Description. — The ground is white, densely marked with purplish brown spots, somewhat more at the blunt end.

Hoogerwerf: 1/2; May; Central Java. Measurements: 18.8 × 14.8, 19 × 14.8. Weight (4/2): av. 0.131 (0.117-0.141); maximal variation in the same clutch: 0.007 (0.129-0.136). For nine previously recorded breeding dates and seven earlier measured eggs see Hoogerwerf (1949: 191, pl. 15 fig. 207).



Description. — Except in size the eggs show some similarity to those of certain shells of *Pellorneum capistratum* (no. 236) or of *Megalurus palustris* (no. 259). They have a smooth and glossy surface, which is white or almost white, densely marked with fairly well defined dark points and fine speckles of warm sepia to Vandijke brown, sometimes ranging to almost black, but in certain eggs the predominating tint is lighter brown. The less numerous but partly well defined underlying markings are of the same type and they are purplish grey or a trifle darker mouse-grey. Generally the shell is uniformly marked with a slight concentration at the blunt end, though a more pronounced concentration is not too rare.

250. **Garrulax r. rufifrons** Lesson — Plain-brown Laughing Thrush  
Bartels: 2/2, 1/3; November (2), December (1); West Java. Measurements (7): av. 30.3 (29.5-31.3) × 21.3 (20.7-21.8). Weight (7): av. 0.410 (0.375-0.435).

Description. — The eggs are of a dark, dull blue colour.

Hoogerwerf: 1/2; November; West Java. Measurements: 29.9 × 21, 31.5 × 21.5. Weight (2/2, 4/3, 2 odd shells): av. 0.386 (0.336-0.448); maximal variation in the same clutch: 0.048 (0.372-0.420). For eight previously recorded breeding dates and 16 earlier measured eggs see Hoogerwerf (1949: 192, pl. 15 fig. 208).

Description. — Except in size the eggs show some similarity to those of *Acridotheres fuscus* (no. 323) or *Sturnus contra* (no. 321); they average in having a stronger shell and they show somewhat more gloss and a darker colour. They have a smooth or faintly rough, almost dull or well glossy surface, which is of a uniform bluish green, varying in tone from pale to darker Nile blue or Niagara blue, sometimes soiled by dirt, but without natural markings.

251. **Pteruthius f. flaviscapis** (Temminck) — Greater Shrike-Babbler  
Bartels: 1/1; May; Mount Pangerango, Preanger, West Java. Measurements: 22.4 × 16. Weight: 0.175.

Description. — The ground is pale greenish, densely marked with purplish brown spots.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 193).

252. **Pteruthius a. aenobarbus** (Temminck) — Lesser Shrike-Babbler  
Bartels: 1/2; June; West Java. Measurements (2): av. 17.7 × 13.7. Weight (2): av. 0.090.

Description. — The colour is white, marked with small purplish spots, mainly at the blunt end.

Hoogerwerf: Weight (1/2): 0.078, 0.079. For two previously recorded breeding dates and the measurements of both these eggs see Hoogerwerf (1949: 193, pl. 15 fig. 209).

Description. — Except in size the only two eggs examined show some resemblance to certain ones of *Pellorneum capistratum* (no. 236). They are broad oval with slightly different ends and a smooth, faintly glossy texture. The colour is chalky white, marked with rather numerous irregular, not very sharply defined points, speckles and dots; they are partly fairly coarse and have a brownish- to Chaetura grey colour. The underlying mottling of the same type is pale violet grey to light mouse-grey and most conspicuously present at the larger end, forming a distinct zone.

253. **Alcippe poiocephala pyrrhoptera** (Bonaparte) — Indian Nun-Thrush

Bartels: 8/1, 181/2, 1/3; January (2), February (7), March (9), April (40), May (38), June (23), July (2), August (1), September (11), October (40), November (15), December (2); West Java. Measurements (50): av. 20.1 (17.6-22) × 15 (14-16). Weight (50): av. 0.120 (0.105-0.150).

Description. — Two types of coloration can be recognized: (a) white, sparingly marked with dark brown spots and hair-lines, and (b) pinkish white to salmon coloured with purplish brown and purplish black spots and hair-lines (occasionally in the form of penumbrae). In the eggs of the latter type the ground is more densely covered than in those of type (a) and gives an erythristic impression.

Remarks. — The above listed set of three eggs contains a pigmy egg, which in my opinion does not originate from a cuckoo.

Hoogerwerf: 10/2, 3 odd shells; February (1), March (1), April (7), June (4); West Java. Measurements (23): av. 19.6 (18-21.2) × 14.75 (14-15.6); largest egg: 21.2 × 15; maximal variation in length in the same clutch: 1.5 (18.6-20.1). Weight (164): av. 0.125 (0.088-0.149); maximal variation in the same clutch: 0.039 (0.088-0.127). For 79 previously recorded breeding dates and 140 earlier measured eggs see Hoogerwerf (1949: 194, pl. 15 fig. 210-213).

Description. — The eggs vary considerably, though they are almost without exception recognizable as belonging to this species. They show some resemblance to those of *Trichastoma sepiarium* (no. 238) but the ground averages lighter with the markings more pronounced; others are more like

the shells of *Napothera macrodactyla* (no. 241). They vary much in shape but they are perhaps most often broad-oval with strongly or less distinctly different ends and a smooth, dull or faintly glossy texture. The colour is almost white, often with a rose or purplish shade, generally almost completely covered with numerous, pale, ill-defined speckles and cloudy stains of brownish vinaceous to vinaceous brown on still deeper lying secondary points and speckles of lavender- or mouse-grey. Less numerous are the much darker primary markings consisting of sharply defined points, speckles and scribbles of very dark redbrown or Indian red, often almost purplish black. Usually most mottling is on the larger end, which may cause a not very dark cap or zone.

Certain eggs are almost exclusively mottled at the blunt end with some scarcely scattered speckles elsewhere, and others again are much like those of *Napothera macrodactyla* because of a uniform brownish vinaceous tint with only a very few primary markings.

Among the 90 clutches examined are two aberrant ones which are quite different from those described above because they show much resemblance to the shells of *Tesia superciliaris* (no. 256). The light ground is densely marked with pale and fine points and speckles of light rusty vinaceous brown mixed with underlying coarser ones of greyish lavender, most concentrated at the larger end.

254. **Crocias guttatus** Temminck — Spotted Shrike

Bartels: 2/1, 3/2; April (2), May (2), June (1); West Java. Measurements (8): av. 23.8 (22.4-25.6)  $\times$  17.7 (16.9-18.1). Weight (7): av. 0.20 (0.19-0.22).

Description. — The eggs are pale blue, rather sparingly and finely marked with black hair-lines and spots.

Hoogerwerf: 1/2; March; West Java. Measurements: 23.2  $\times$  18.2, 23.9  $\times$  18.1. Weight (2/2): av. 0.227 (0.210-0.242); maximal variation in the same clutch: 0.013 (0.210-0.223). For two previously recorded breeding dates and two earlier measured eggs see Hoogerwerf (1949: 196, pl. 15 fig. 214).

Description. — The few eggs examined do fairly conspicuously differ from all other Javan eggs seen by me. They are normal- to elongate-oval with distinctly different ends and a smooth texture, which is moderately or distinctly glossy. The colour is light turquoise green or pale Nile-blue, marked with a fair number of very irregular sharply defined points, speckles, dots and scribbles, varying from dark chestnut, partly with a purplish shade to almost black. The underlying markings of the same type, though paler, are

fairly striking too and they have a light to medium vinaceous- or purplish grey colour. There is no or only a slight concentration at the blunt end.

### Sylviinae

#### 255. *Gerygone fusca sulphurea* Wallace — Fly-eater

Bartels: 1/1, 1/2; March, October; West Java. Measurements (3): av. 15.9 (15.3-16.6) × 11.4 (10.7-12). Weight (3): av. 0.055.

Description. — The eggs are white, marked with small, pale reddish brown spots, mainly at the blunt end.

Hoogerwerf: 1/2, 1/3; March, September; (Flores, same subspecies). Measurements (5): av. 16.06 (15.1-16.8) × 11.62 (11.5-11.8); largest egg: 16.8 × 11.5; maximal variation in length in the same clutch: 0.5 (15.1-15.6). Weight (2/3, 1/2): av. 0.056 (0.052-0.061); maximal variation in the same clutch: 0.002 (0.059-0.061). For two previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 196-197, pl. 15 fig. 215).

Description. — The eggs have a smooth texture with only little or no gloss. The colour is chalky white, marked with numerous very fine, fairly well defined points of brownish vinaceous and light to dark chestnut or Brussel's brown. Most mottling is concentrated at the larger end, forming a distinct zone in which the mottling is no longer separated and where a very few secondary, greyish markings may be observable. There are other eggs in which the stains are considerably coarser, more densely scattered all over the surface, showing the zone less distinctly.

#### 256. *Tesia superciliaris* (Bonaparte) — Slaty-bellied Wren

Bartels: 3/2; May (2), December (1); West Java. Measurements (6): av. 18.8 (18.1-19.5) × 13.8 (13.5-14). Weight (6): av. 0.090.

Description. — There are two types of coloration. In the first the eggs are white to salmon, but almost entirely covered with darker salmon spots and clouds. In the second they are white, marked with purplish brown spots, mainly at the blunt end, forming a cap.

Hoogerwerf: 1/2; April; West Java. Measurements: 18.7 × 14.2, 20 × 14. Weight (4/2, 1 odd shell): av. 0.097 (0.092-0.105); maximal variation in the same clutch: 0.013 (0.092-0.105). For eight previously recorded breeding dates and 13 earlier measured eggs see Hoogerwerf (1949: 197, pl. 16 fig. 216).

Description. — Except in size the eggs show some resemblance to certain ones of *Myiomela diana* (no. 220) and of *Napothera epilepidota*, (no. 242)

also to the aberrant ones of *Alcippe poioicephala* (no. 253). They have a smooth, dull or slightly glossy surface. The colour is white, tinged with rose or purplish to light salmon, almost entirely covered with numerous irregular points and small speckles, which sometimes show partly a filament-like character, and are rather pale and ill-defined. They are light to a trifle darker terracotta brown, changing into purplish on account of the less numerous purplish- or violet greyish underlying markings of the same type. The shells are most thickly marked at the larger end, sometimes forming an indistinct cap or zone, where the colour is darkest, often with a purplish shade because of the well pronounced underlying markings.

257. **Cettia fortipes vulcania** (Blyth) — Bush-Warbler

Bartels: 9/1, 34/2; January (1), February (15), March (3), April (6), May (8), June (8), July (1), September (1); West Java. Measurements (76): av. 19.5 (17.5-20.3) × 13.4 (12.8-14.1). Weight (76): av. 0.088 (0.085-0.095).

Description. — The eggs are moderately glossy, very uniformly mahogany brown, but forming a cap at the blunt end. In some sets, however, the markings are more distinct, whereas others are pale greyish purple with small purplish brown spots, also with a slight cap.

Remarks. — Six clutches contain an egg of a Cuckoo, perhaps *Cacomantis variolosus* (no. 111).

Hoogerwerf: Weight (2/2): av. 0.087 (0.082-0.097); maximal variation in the same clutch: 0.011 (0.086-0.097). For four previously recorded breeding dates and the measurements of these four eggs see Hoogerwerf (1949: 198, pl. 16 fig. 217).

Description. — Except in size the few eggs examined show some resemblance to those of *Prinia flaviventris* (no. 263), but they average more distinctly marked and less glossy. It is very difficult to establish the basic colour, which is perhaps most often light to medium ochreous red, though certain eggs are much lighter, ranging to fleshy or purplish fleshy. The mostly numerous primary stains consist of very pale, ill-defined points and small speckles, sometimes almost failing or invisible beyond a faded cap or zone at the blunt end. The colour of these shady markings is dark brown or warm sepia, sometimes almost black at the larger end, lighter sepia beyond this area. The underlying markings are purplish grey and most conspicuously present at the blunt end, producing a dahlia-purplish shade. As is evident from the description of the many more eggs of the Bartels collection, as published above, there may be fairly much variation in the colour of the ground and mottling.

Remarks. — See note under no. III.

258. **Bradypterus m. montis** (Hartert) — Doherty's Warbler

Bartels: No material available.

Hoogerwerf: No material or particulars available. The species is only known from East Java, and apparently very rare.

259. **Megalurus p. palustris** Horsfield — Striated Marsh-Warbler

Bartels: 21/2, 4/3; February (1), March (5), April (2), May (4), June (9), July (2), September (1), November (1); West Java. Measurements (50): av. 23.6 (22.5-25.2) × 17.2 (16.4-18.1). Weight (50): av. 0.170 (0.155-0.205).

Description. — The eggs are white with a purplish tint, rather densely marked with small, greyish purple spots, forming a light cap or zone.

Hoogerwerf: 2/2, 1 odd shell; January, February, April; West Java. Measurements (5): av. 23.26 (22.1-24.2) × 17 (16.2-17.8); largest egg: 24.2 × 17.2; maximal variation in length in the same clutch: 0.3 (22.1-22.4). Weight (51): av. 0.169 (0.145-0.192); maximal variation in the same clutch: 0.033 (0.152-0.185). For 42 previously recorded breeding dates and 72 earlier measured eggs see Hoogerwerf (1949: 199-200, pl. 7 fig. 77-80, pl. 8 fig. 91-94, pl. 16 fig. 218-220).

Description. — The eggs may vary considerably; except in size most of them show some resemblance to certain eggs of *Pycnonotus aurigaster* (no. 212) or *P. goiavier* (no. 215), others are more like those of *Pellorneum capistratum* (no. 236) or *Passer montanus* (no. 325). They have a smooth surface which is dull or faintly glossy and almost white or tinged with some rose, usually densely marked with numerous, fairly well defined, very irregular fine or somewhat coarser points, speckles and dots, partly showing a filament-like character. They vary in colour from different shades of brown to sepia and almost black and may be so thickly scattered that the ground is hardly visible. The underlying markings of about the same type — generally not very conspicuous — are greyish lavender or mouse-grey. In most shells examined the mottling is uniformly distributed all over the surface, but concentrations at the larger end are of fairly common appearance, though usually not forming a distinct cap or zone.

260. **Cisticola juncides malaya** Lynes — Streaked Fantail Warbler

Bartels: 6/2, 15/3, 16/4; January (2), March (4), April (11), May (9), July (3), December (8); West Java. Measurements (50): av. 15.2 (14.2-16.6) × 11.5 (11-12). Weight (50): av. 0.050 (0.048-0.055).

Description. — The eggs are of two types. Those of the first type are blue, in most cases immaculate, but occasionally finely marked with brown spots. Those of the second type are white, immaculate, but occasionally with brown spots.

Hoogerwerf: 1/3, 3 odd shells; Central Java, without further particulars. Measurements (6): av. 14.98 (14.5-15.3) × 11.07 (10.8-11.5); largest egg: 15.3 × 10.8; maximal variation in length in the same clutch: 0.3 (15-15.3). Weight (2/2, 2/3, 1/4, 5 odd shells): av. 0.052 (0.042-0.061); maximal variation in the same clutch: 0.009 (0.042-0.051). For 648 previously recorded breeding dates and 35 earlier measured eggs see Hoogerwerf (1949: 201, pl. 7 fig. 73, 74, pl. 16 fig. 221-223).

Description. — The eggs may vary considerably; certain ones show some similarity to the shells of *Zosterops palpebrosa* (no. 315) but others are more like the eggs of *Prinia familiaris* (no. 264) or *Orthotomus sepium* (no. 272). They have a smooth, faintly or better glossy texture. The colour is light blue green or blue greenish white, sometimes almost pure white, in certain eggs without or with only a very few points and speckles, but rather densely mottled in others. The markings may be fairly coarse and sharply defined, showing a vinaceous brown colour, ranging to dark sepia and almost black in the darkest ones. The generally rather inconspicuous underlying stains may be strikingly present in well defined speckles of greyish lavender. Many eggs of this type are most densely marked at the larger end, forming an open zone, resembling those of *Prinia familiaris*.

Quite different are the shells, resembling those of *Orthotomus sepium*, which are uniformly and densely mottled with very small pale brownish points and small speckles, which are fairly well defined and usually not concentrated at the blunt end. Eggs of this type and those showing no or hardly any markings are the most common ones in the series examined by me.

261. **Cisticola exilis lineocapilla** Gould — Red-headed Fantail Warbler

Bartels: 1/2, 1/3; March; West Java. Measurements (5): av. 13.8 (13-14.2) × 10.7 (10.2-10.8). Weight (5): av. 0.043.

Description. — The eggs are moderately glossy, of a rather deep blue.

Hoogerwerf: 1/3; September; Flores (same subspecies). Measurements (3): av. 15.2 (15-15.4) × 11.3 (11.2-11.4); largest egg: 15.4 × 11.2. Weight (3): av. 0.050 (0.050-0.051). For one breeding date from Java and some particulars compiled from the literature, see Hoogerwerf (1949: 202, pl. 16 fig. 224).

Description. — The very few eggs from Java I have seen were almost indistinguishable from the unmarked ones of the preceding species, but the

three shells obtained from Flores do more resemble the heavily mottled ones of this species. They have a smooth, moderately glossy texture which is a trifle deeper bluish green than the average ones of *Cisticola juncides*. There are rather many, very irregular, mostly coarse and sharply defined speckles and dots with some smaller light vinaceous brown stains and points in between, which are mixed with very little, hardly visible secondary greyish mottling. The eggs are most heavily marked at the larger end, however, without forming a cap or zone.

Remarks. — The much larger size and heavier weight of the eggs originating from Flores may form an indication towards a subspecific difference between the populations from Java and Flores though they are considered identical.

262. ***Prinia inornata blythi*** (Bonaparte) — Wren-Warbler

Bartels: 9/2, 18/3, 24/4, 5/5; February (6), March (8), April (12), May (19), June (5), August (3), September (2), November (1); West Java. Measurements (50): av. 16.2 (14.4-17.2) × 11.7 (10.9-12.4). Weight (50): av. 0.070 (0.060-0.080).

Description. — The eggs are moderately glossy, pale blue, handsomely marked with large, roundish sepia- and mahogany brown blotches.

Hoogerwerf: Weight (26): av. 0.067 (0.057-0.079); maximal variation in the same clutch: 0.004 (0.065-0.069). For 315 previously recorded breeding dates and 76 earlier measured eggs see Hoogerwerf (1949: 203, pl. 16 fig. 225-227).

Description. — Though individually the eggs may vary considerably, they are always distinguishable from those of the other three representatives of the genus living in Java, because of the large, almost circular and well pronounced blotches. They have a smooth, glossy surface varying in different tinges of bluish green, rarely creamy, generally covered with numerous, sharply defined coarse dots and blotches, mixed with some smaller ones. They are almost circular in shape and light to dark burnt sienna, mahogany red or chestnut, nearly black in some cases. Though less distinct and not so numerous, the also fairly conspicuous underlying mottling of the same type has a brownish vinaceous or greyish lavender colour. In most eggs examined the markings are uniformly scattered all over the shell, but on certain specimens there is hardly any mottling beyond a uniformly coloured dark cap at the blunt end. In other exceptional cases all markings are very pale, though well defined.

263. ***Prinia flaviventris rafflesi*** Tweeddale — Yellow-bellied Wren-Warbler



Bartels: 1/2, 4/3; February (2), April (1), May (1), June (1); West Java. Measurements (14): av. 15.2 (14.2-15.7)  $\times$  11.5 (11.3-11.9). Weight (14): av. 0.062.

Description. — The eggs are glossy, the ground is fairly pale sepia brown with a reddish tint, the blunt end is somewhat darker.

Remarks. — Sody collection from Deli, Sumatra: 3/2, 2/3. Measurements (12): av. 14.9 (14.3-15.4)  $\times$  11.7 (11.3-12). Weight (12): av. 0.060 (0.055-0.65).

Hoogerwerf: For 22 previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 204, pl. 16 fig. 228).

Description. — Because of their uniform dark brown colour the eggs differ greatly from those of all other *Prinia* species living in Java. They have a smooth, highly glossy surface, often as if it were polished. The colour is a uniform clear burnt sienna, generally without markings except at the larger end where may be found a dark, but rather dull and inconspicuous cap of chestnut or sepia.

264. ***Prinia familiaris olivacea*** (Raffles) — Bar-winged Wren-Warbler

Bartels: 1/1, 56/2, 55/3, 5/4; January (3), February (15), March (10), April (27), May (33), June (11), July (2), August (1), September (2), October (7), November (6); West Java. Measurements (50): av. 17.6 (16-19.5)  $\times$  12.7 (11.5-13.6). Weight (50): av. 0.077 (0.070-0.090).

Description. — The colour is pale blue, rather finely marked with brownish spots, sometimes more densely marked. The eggs resemble those of the European *Erythacus rubecula* (L.).

Hoogerwerf: 1/3, 1 odd shell; March (1); West Java. Measurements (4): av. 17.32 (17-18.5)  $\times$  12.3 (11.9-12.6); largest egg: 18.5  $\times$  11.9; maximal variation in length in the same clutch: 0.1 (17-17.1). Weight (115): av. 0.074 (0.060-0.093); maximal variation in the same clutch: 0.010 (0.065-0.075). For 295 previously recorded breeding dates and 107 earlier measured eggs see Hoogerwerf (1949: 205, pl. 16 fig. 229-232).

Description. — It is very difficult to produce a satisfying description of these eggs; partly they show some resemblance to the much smaller eggs of *Cisticola juncides* (no. 260), others are almost indistinguishable from those of *Prinia polychroa* (no. 265). There are two somewhat different types, one with a pale to somewhat darker Niagara-green ground and a second one in which the colour is closer to pale Nile-blue. Eggs belonging to the first type are marked with numerous, not very well defined, fairly pale rusty brown points and small speckles, often most concentrated at the larger end, forming a well pronounced zone, almost of the same type as found in eggs of *Prinia*

*polychroa*. The greyish lavender secondary mottling on these shells is hardly worth to be mentioned.

In the eggs with a clearer, pale Nile-blue surface the mottling averages less centred at the blunt end, sometimes forming an open zone or cap and considerably less numerous present beyond this area. These markings are light to dark vinaceous brown or Vandijke brown with some hardly observable secondary ones of vinaceous grey. Except in size certain specimens of the eggs of this type are much like those of *Cisticola juncides*.

265. **Prinia p. polychroa** (Temminck) — Javan Wren-Warbler

Bartels: 19/2, 39/3, 5/4; January (3), February (4), March (4), April (9), May (12), June (12), July (1), September (2), October (6), November (6), December (4); West Java. Measurements (62): av. 18 (15.5-19.4) × 13.1 (12.1-14.2). Weight (62): av. 0.078 (0.067-0.093).

Description. — The eggs are less blue than those of *Prinia familiaris*, more greenish; the mottling is very fine and vague, as a rule with a striking zone.

Hoogerwerf: 1/2, 1 odd shell; May, July; West Java. Measurements (3): av. 17.2 (16.8-18) × 13.17 (13.-13.3); largest egg 18 × 13.3; maximal variation in length in the same clutch: 1.2 (16.8-18). Weight (1/2, 1/3, 3 odd shells): av. 0.082 (0.072-0.088); maximal variation in the same clutch: 0.013 (0.072-0.085). For 18 previously recorded breeding dates and 19 earlier measured eggs see Hoogerwerf (1949: 206-207, pl. 16 fig. 233).

Description: Generally the eggs differ from those of the preceding species because of the paler ground, the very distinct cap around the larger end and the uniform fine markings beyond this cap. The colour is pale blue green, usually pale sea-green, almost without exception densely covered with very numerous fine points and small speckles, dull and poorly defined, forming a very conspicuous cap in which no separate markings are recognizable. They are rusty brown or rusty vinaceous ranging to chestnut in the zone where may be a purplish- or lavender greyish shade, perhaps caused by the very inconspicuous secondary mottling.

266. **Acrocephalus arundinaceus siebersi** Salomonson — Great Reed-Warbler

Bartels: 2/3, 1/4; March, May, June; West Java. Measurements (10): av. 20.2 (19.2-21.2) × 14.8 (14.2-15.7). Weight (10): av. 0.125 (0.113-0.133).

Description. — The shells are pale bluish or greenish, rather boldly marked with almost black or dark greenish brown blotches, resembling the European *Acrocephalus arundinaceus*.

Hoogerwerf: Weight (1/4): av. 0.109 (0.104-0.118). For 14 previously recorded breeding dates and ten earlier measured eggs see Hoogerwerf (1949: 207-208, pl. 16 fig. 234, 235).

Description. — The eggs are much like those of the European Great Reed Warbler. They show a smooth, dull or faintly glossy surface, which is slightly greenish tinged white, rather densely marked with very irregular points, speckles and small dots, generally most concentrated at the larger end without forming a distinct zone or cap. They are sharply or moderately well defined and vary in colour from light yellowish olive to deep olive and olive dark sepia, often almost black. Though less numerous, the secondary mottling may be fairly conspicuous, most distinctly present at the blunt end, varying from light to a very dark ashy- or purplish grey. Some of the examined eggs show some transparent, dirty yellowish clouds, most probably caused by dirt.

267. **Phylloscopus t. trivirgatus** Strickland — Green Flycatcher-Warbler

Bartels: 3/1, 11/2, 3/3; January (1), February (2), March (1), April (2), May (1), June (3), July (3), August (2), October (1), December (1); West Java. Measurements (33): av. 16.3 (15.5-17.9) × 12.4 (11.7-12.8). Weight (33): av. 0.058 (0.053-0.065).

Description: — The colour is pure white.

Hoogerwerf: 1/2, 2 odd shells; April, May, October; West Java. Measurements (4): av. 16.85 (16.4-17.4) × 11.93 (11.6-12.1); largest egg: 17.4 × 12. Weight (23): av. 0.062 (0.046-0.072); maximal variation in the same clutch: 0.007 (0.055-0.062). For 14 previously recorded breeding dates and 24 earlier measured eggs see Hoogerwerf (1949: 208-209, pl. 7 fig. 70, 72 and pl. 16 fig. 236).

Description. — Except in size the eggs are much like those of *Muscicapa hyperythra* (no. 282), but they may average more normal oval; when compared with those of the following species they average more elongate-oval. They have a smooth, dull or faintly glossy texture, which is pure white without markings.

268. **Seicercus g. grammiceps** (Strickland) — Sunda Island Flycatcher-Warbler

Bartels: 5/2, 1/3; May (1), June (3), September (1), October (1); West Java. Measurements (13): av. 14.6 (13-16.6) × 11.2 (10.5-12.3). Weight (13): av. 0.040 (0.035-0.055).

Description. — The shells are pure white.

Hoogerwerf: Weight (5/2, 2/3, 3 odd shells): av. 0.042 (0.033-0.53); maximal variation in the same clutch: 0.006 (0.039-0.045). For ten previously recorded breeding dates and 22 earlier measured eggs see Hoogerwerf (1949: 209, pl. 7 fig. 71 and pl. 16 fig. 237).

Description. — Except in size and in averaging broader oval the eggs are inseparable from those of the preceding species.

269. **Abroscopus superciliaris vordermani** (Büttikofer) — Bamboo Flycatcher-Warbler

Bartels: No material available.

Hoogerwerf: Weight (1/3): av. 0.049 (0.048-0.049). For one previously recorded breeding date and the measurements of these three eggs see Hoogerwerf (1949: 210, pl. 17 fig. 238).

Description. — Except in size the eggs show some similarity to those of *Psaltria exilis* (no. 292), but they are heavier mottled. The only three eggs examined are broad-oval with distinctly different ends and a smooth, dull or faintly glossy surface. They are white or almost white, fairly densely marked with numerous very fine, not very sharply defined, dull points and speckles partly of a filament-like character, varying in colour from vinaceous brown to Corinthian red. The fairly numerous underlying mottling is light vinaceous grey and may predominate at the blunt end where the shells are most densely and darkest marked, forming a distinct cap.

270. **Orthotomus c. cuculatus** Temminck — Ashy-naped Warbler

Bartels: 2/2; July, October; Mount Pangerango, Preanger, West-Java. Measurements (4): av. 15.9 (15.6-16.1) × 11.9. Weight (4): av. 0.050.

Description. — The shells are pinkish, almost invisibly marked with small reddish brown spots, somewhat denser at the blunt end.

Hoogerwerf: Weight (1): 0.048. For one previously recorded breeding date and two earlier measured eggs originating from Tjibodas, Mount Pangerango, West Java, see Hoogerwerf (1949: 210, pl. 17 fig. 239).

Description. — Except in size the eggs show some similarity to certain eggs of *Pycnonotus atriceps* (no. 209). The very few eggs examined are normal-to broad-oval with clearly different ends and a smooth, glossy texture. The colour is dirty- or purplish fleshy, thickly covered with numerous very fine points and speckles, dull and very poorly defined, which are light russet vinaceous, mixed with hardly distinguishable secondary markings of the same type of vinaceous grey. The shells are most densely mottled at the larger end, sometimes forming a distinct, though very pale cap.

271. **Orthotomus sutorius edela** Temminck — Long-tailed Tailor-Bird

Bartels: 2/2, 3/3; February (3), April (1), November (1); West Java. Measurements (13): av. 15.1 (14.3-15.9) × 11.1 (10.7-11.6). Weight (12): av. 0.050.

Kooiman: 2/1, 3/2; East Java. Measurements (8): av. 15.7 (14.3-16.3) × 10.9 (10.3-11.6). Weight (8): av. 0.050.

Description. — The colour of the eggs is clear pale blue, sparingly, but rather coarsely, marked with pale brown spots and clouds, mainly at the blunt end. As a rule the eggs are more distinctly marked than in *Orthotomus sepium* (no. 272).

Hoogerwerf: Weight (1/2, 1/3, 1 old shell): av. 0.052 (0.049-0.056); maximal variation in the same clutch: 0.005 (0.049-0.054). For 14 previously recorded breeding dates and 12 earlier measured eggs see Hoogerwerf (1949: 211, pl. 17 fig. 240).

Description. — Because of the greenish ground and coarse mottling most eggs differ conspicuously from those of the other representatives of the genus, known from Java. They have a smooth, dull or glossy texture. The colour is light blue green, marked with not too many sharply defined primary speckles and dots, largely fairly coarse, which are brownish vinaceous, partly ranging to purple or sepia. The underlying mottling of almost the same type and colour, though more purplish tinged, is less numerous, but fairly conspicuous; in certain eggs all stains have such a secondary character. Generally most mottling is at the blunt end, forming an open zone or cap, fairly scarce beyond this area.

272. **Orthotomus s. sepium** Horsfield — Ashy Tailor-Bird

Bartels: 3/1, 19/2, 1/3; January (2), February (2), April (4), May (7), June (4), August (1), October (3); West Java. Measurements (40): av. 16.3 (14.3-17.2) × 11.2 (10.7-11.6). Weight (40): av. 0.052 (0.050-0.065).

Description. — The eggs are just as variable as those of the European *Phylloscopus trochilus*: white, some sets are pale creamy, rather sparingly marked with reddish brown, occasionally purplish brown spots and larger blotches. The shells of a few sets have a cap or zone; those of one set are white and unmarked.

Hoogerwerf: Weight (4/2, 2 odd shells): av. 0.053 (0.046-0.060); maximal variation in the same clutch: 0.005 (0.048-0.053). For 36 previously recorded breeding dates and 32 earlier measured eggs see Hoogerwerf (1949: 212, pl. 7 fig. 75, 76 and pl. 17 fig. 241-245).

Description. — The shells are very variable; the finely mottled ones resemble certain eggs of *Cisticola juncides* (no. 260), others are more like those of *Aethopyga mystacalis* (no. 309) or *Parus major* (no. 291). They have a smooth surface which is faintly to rather intensively glossy and white or slightly creamy tinged white. The eggs belonging to the first type are densely marked with numerous fine and dull points and speckles, sometimes like scribbles, which are light to dark vinaceous brown, darkest — ranging to Vandijke brown or sepia — at the blunt end where they may form a cap or zone, together with the less conspicuous secondary ones, varying from greyish lavender to heliothrope grey.

In the shells of the second type most mottling averages much coarser and is sharply defined and rusty- to terracotta brown. The underlying stains of the same type are greyish lavender; in these eggs too most markings are at the larger end where may be found an open zone or cap.

273. **Orthotomus r. ruficeps** (Lesson) — Coastal Tailor Bird  
Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 214-215, pl. 17 fig. 246). For some taxonomical particulars of *Orthotomus sepium* and *O. ruficeps* see Hoogerwerf (1962: 147-154).

#### Muscicapinae

274. **Rhipidura phoenicura** (Müller) — Javan Mountain Fantail Flycatcher

Bartels: 3/1, 18/2; February (1), March (1), April (2), May (5), June (7), July (1), August (2), October (1), December (1); West Java. Measurements (39): av. 18.2 (17.1-20) × 13.3 (12.7-14). Weight (39): av. 0.078 (0.070-0.085).

Description. — The colour is yellowish- or greenish white with a handsome zone of dark brown blotches, resembling the eggs of the Laniidae.

Remarks. — Four sets contain an egg of *Cacomantis variolosus* (no. 111).

Hoogerwerf: Weight (6/2, 1 odd shell): av. 0.077 (0.070-0.084); maximal variation in the same clutch: 0.004 (0.073-0.077). For nine previously recorded breeding dates and 11 earlier measured eggs see Hoogerwerf (1949: 215, pl. 8 fig. 88 and pl. 17 fig. 247).

Description. — The eggs show some similarity to those of *Rhipidura javanica* (no. 276) but they average in having the markings darker and better defined showing more resemblance to those of *Rh. euryura* (no. 275). They have a smooth, dull or faintly glossy texture, which is almost white,

usually creamy- or chamois tinged white, mottled with fairly numerous irregular and not sharply defined speckles and dots, varying from buffy- or olive brown to very dark, often olive tinged sepia, almost black. The underlying mottling, which may be mixed with some cloudy markings, is light lavender grey and darker greyish. In some shells all markings have a secondary character, but in all eggs examined most stains are at the larger end or somewhat lower, forming a more or less distinct zone.

275. **Rhipidura euryura** S. Müller — Spotted Fantail Flycatcher

Bartels: 2/2; April, September; West Java. Measurements (4): av. 20.1 × 14.8. Weight (4): av. 0.105.

Description. — The colour is white with a greenish tint, faintly and sparingly marked with pale brown and greyish spots, mainly at the blunt end.

Hoogerwerf: 1 odd shell; May; West Java. Measurements: 18.2 × 14.5. Weight (3/2, 1 odd shell): av. 0.103 (0.097-0.108); maximal variation in the same clutch: 0.004 (0.104-0.108). For three previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 216, pl. 17 fig. 248).

Description. — Except in size the eggs are much like those of the preceding species, though the mottling averages more sharply defined, forming a more open zone, almost failing beyond this area. The colour is white or slightly creamy tinged white, marked with not very numerous irregular fairly fine and sharply defined primary speckles and dots, which are buff to dark olive. The rather conspicuous underlying markings are greyish olive or mouse-grey, whereas some deeper lying cloudy stains are pale olive buff. Almost all mottling is concentrated at the blunt end, forming an open or better pronounced zone.

Remarks. — This egg and my six previously measured ones average considerably smaller than those of the Bartels collection, though the average weight is almost similar.

276. **Rhipidura j. javanica** (Sparrman) — Fantail Flycatcher

Bartels: 8/1, 12/2; February (1), April (5), May (10), July (1), August (2), September (1); West Java. Measurements (32): av. 17.8 (16.2-20.3) × 13.4 (12.7-14.3). Weight (32): av. 0.080 (0.070-0.095).

Description. — Resembling the eggs of *R. phoenicura* (no. 274), but as a rule the zone is less striking.

Hoogerwerf: 2/2, 1/3, 5 odd shells; May (2), June (1). Measurements (11): av. 17.5 (16.5-19) × 13.14 (12.5-13.6); largest egg: 19 × 13.6;

maximal variation in length in the same clutch: 0.9 (16.7-17.6). Weight (1/2, 1/3, 11 odd shells): av. 0.085 (0.066-0.099); maximal variation in the same clutch: 0.016 (0.066-0.082). One aberrant egg: 14.4 × 11.3; weight: 0.068. For 102 previously recorded breeding dates and 24 earlier measured eggs see Hoogerwerf (1949: 217, pl. 7 fig. 81 and pl. 17 fig. 249).

Description. — The eggs show some resemblance to those of both the preceding species, but generally they are paler mottled. They are creamy or buffy tinged white and marked with fairly many, most often faded and poorly defined irregular speckles and small dots which are brown, most often olive brown or buff. The usually more numerous secondary stains vary in different tints of violet- and mouse-grey; the darkest ones may predominate over the primary markings. The shells are almost exclusively mottled around the lower part of the larger end, forming a distinct, though fairly pale well pronounced zone, often showing a light olive brownish shade.

277. **Culicicapa ceylonensis percnocara** Oberholser — Grey-headed Flycatcher

Bartels: 3/2; May; West Java. Measurements (6): av. 15.7 (14.8-16.6) × 12.2 (11.7-12.7). Weight (6): av. 0.050 (0.045-0.055).

Description. — The eggs are pale greenish- or yellowish white, faintly marked with greyish brown clouds with a distinct cap or zone.

Hoogerwerf: Weight (1/3): av. 0.048 (0.047-0.048). For one previously recorded breeding date and the measurements of these three eggs see Hoogerwerf (1949: 218, pl. 17 fig. 250).

Description. — Except in size the few eggs examined are much like those of the preceding species. They are broad-oval with slightly different ends and a smooth, well glossy texture, which is greenish tinged cream, marked with fairly many irregular, poorly defined speckles and dots. These stains are deep greyish olive or they show different shades of smoke-grey, mixed with some écru and buffy olive speckles. Almost all markings are concentrated at the lower part of the larger end, forming a distinct zone in which the greyish mottling may predominate.

278. **Muscicapa i. indigo** Horsfield — Sunda Island Blue Flycatcher

Bartels: 1/1, 26/2; January (2), February (2), March (4), April (6), May (6), June (5), September (1), October (1); West Java. Measurements (46): av. 20.4 (18.8-21.9) × 14.3 (13.1-15.6). Weight (46): av. 0.100 (0.085-0.105).

Description. — The eggs are very pale cream, almost white, with a light zone of very fine reddish brown spots.



Hoogerwerf: 1/2; April; West Java. Measurements:  $20.4 \times 14.1$ ,  $20.6 \times 14$ . Weight (38): av. 0.098 (0.079-0.114); maximal variation in the same clutch: 0.029 (0.085-0.114). For 23 previously recorded breeding dates and 36 earlier measured eggs see Hoogerwerf (1949: 219, pl. 17 fig. 251).

Description. — The eggs, which have a dull or faintly glossy surface, are almost white or creamy white mottled with fairly many regular, ill-defined points and fine speckles, which are dull light rusty brown, often with a few darker speckles or scribbles, which may range to dark sepia. The hardly visible secondary markings are lavender- or purplish grey. Almost all stains are concentrated at the larger end, forming a distinct, though faded zone, in some rare occasions a cap, but shells showing an open zone or cap in which all mottling remained well separated are certainly no exceptions.

279. **Muscicapa unicolor infuscata** (Hartert) — Pale Blue Flycatcher  
Bartels: No material available.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 220). This species may be considered rare in Java.

280. **Muscicapa rufigaster rhizophorae** (Stresemann) — Common Blue Flycatcher

Bartels: No material available.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 220-221).

281. **Muscicapa banyumas cantatrix** Temminck — Hill Blue Flycatcher

Bartels: 6/1, 29/2, 7/3; February (1), March (7), April (8), May (8), June (1), August (3), September (6), October (6), November (2); West Java. Measurements (50): av.  $20.7$  (18.5-22.7)  $\times$   $14.9$  (13.5-15.8). Weight (50): av. 0.113 (0.095-0.135).

Description. — The colour is greenish, as a rule densely marked with brown spots and clouds, sometimes almost evenly distributed, but also more separately marked, mainly at the blunt end, leaving uncovered much of the ground.

Remarks. — Seven clutches contain an egg of *Cacomantis variolosus* (no. 111).

Hoogerwerf: 1/2, 3 odd shells; July (1), September (1); West Java. Measurements (5): av.  $17.52$  (16.4-18.9)  $\times$   $14.32$  (13.6-15.2); largest egg:  $18.9 \times 15.2$ ; maximal variation in length in the same clutch: 0.4 (16.4-16.8). Weight (3/2, 3 odd shells): av. 0.109 (0.089-0.126); maximal variation

in the same clutch: 0.001 (0.089-0.090). For 37 previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 221, pl. 8 fig. 90 and pl. 17 fig. 252).

Description. — The eggs have a smooth, faintly glossy texture, which is brownish cream or slightly greenish tinged white, densely marked with fairly fine, irregular, poorly defined points and speckles, which are snuffbrown or dull reddish brown. The underlying, fairly inconspicuous mottling is pale lavender- to violet greyish. Generally the eggs are most densely marked at the larger end, concentrated in a rather heavy cap or zone, but in certain eggs the mottling is not so distinctly pronounced and in some rare cases all stains are uniformly scattered over the whole surface, giving the shells a uniform brownish tint.

Remarks. — The average measurements and the extremes of these five and the previously measured eight eggs in my collection are considerably smaller than those of the 50 eggs of the Bartels collection indicated above, though the shells of both collections agree fairly well in weight.

**282. *Muscicapa hyperythra vulcani*** (Robinson) — Rufous-breasted Flycatcher

Bartels: 3/1, 4/3; March (2), May (1), June (1), July (1), August (1), September (1); West Java. Measurements (11): av. 17.6 (16.8-18.9) × 12.9 (12.5-13.5). Weight (11): av. 0.070 (0.065-0.075).

Description. — The shells are lustreless white.

Remarks. — Two sets contain an egg of *Cacomantis variolosus* (no: 111).

Hoogerwerf: 5/2, 4 odd shells; January (1), February (1), March (1), April (4), June (1), August (1); West Java. Measurements (14): av. 17.91 (16.8-19.7) × 12.94 (12.3-14.6); largest egg: 19.7 × 14.5; maximal variation in length in the same clutch: 1.0 (16.8-17.8 and 18.5-19.5). Weight (32): av. 0.070 (0.058-0.080); maximal variation in the same clutch: 0.006 (0.074-0.080). For ten previously recorded breeding dates and 17 earlier measured eggs see Hoogerwerf (1949: 222, pl. 17 fig. 253).

Description. — Except in size the eggs resemble those of *Phylloscopus trivirgatus* (no. 267), but they average broader oval. They are pure white, sometimes slightly creamy tinged, perhaps because of dirt.

**283. *Muscicapa d. dumetoria*** (Wallace) — Short-tailed Flycatcher

Bartels: 1/1, 5/2; June (2), October (3), November (1); Mount Pange-rango, Preanger, West Java. Measurements (11): av. 18.4 (17.2-19.7) × 12.9 (12.3-13.3). Weight (11): av. 0.075 (0.070-0.080).

Description. — The colour of the eggs is dull pale blue.

Hoogerwerf: Weight (1/2): 0.077, 0.082. For two previously recorded breeding dates and three earlier measured eggs originating from Tjibodas, Mount Pangerango, West Java, see Hoogerwerf (1949: 222, pl. 17 fig. 254). The previously mentioned average measurements of these eggs are not correct, instead of  $23.2 \times 12.8$  must be read  $18.2 \times 12.8$ .

Description. — The eggs show some similarity to those of the Zosteropidae, known from Java. The only three eggs examined are normal-oval with well or rather distinctly different ends and a smooth, faintly glossy texture. The colour is light bluish green, almost pale Niagara-green without markings, though somewhat soiled by dirt.

284. **Muscicapa westermanni hasselti** Finsch — Little Pied Flycatcher

Bartels: 1/2; June; Mount Pangerango, Preanger, West Java. Measurements (2): av.  $15.8 \times 12.4$ . Weight (2): av. 0.060.

Description. — The colour is uniformly yellowish grey, resembling the eggs of the European *Motacilla flava* L.

Hoogerwerf: No material available. For some particulars compiled from the literature see Hoogerwerf (1949: 223).

285. **Rhinomyias o. olivacea** (Hume) — Hume's Jungle-Flycatcher

Bartels: No material available.

Hoogerwerf: 1/2; Central Java, without further particulars. Measurements:  $18.4 \times 14.3$ ,  $18.6 \times 13.8$ . Weight (1/2): 0.100, 0.107. For two previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 223-224, pl. 17 fig. 255).

Description. — Except in size the eggs show much resemblance to those of *Muscicapa banyumas* (no. 281). The colour is creamy white or slightly olive greenish tinged white, densely marked with numerous dull and ill-defined fine points and speckles of rusty brown. The shells may be so densely mottled that the ground seems uniformly rusty brown. They are most thickly marked at the blunt end, forming a distinct though dull cap or zone in which the colour is darkest with a purplish grey shade, caused by the hardly distinguishable secondary mottling of the same type as the primary one.

286. **Philentoma v. velatum** (Temminck) — Maroon-breasted Flycatcher

Bartels: No material available.

Hoogerwerf: No material available. The species is certainly not common

in Java. For some particulars derived from the literature see Hoogerwerf (1949: 224).

**287. *Hypothymis azurea javana* Chasen & Kloss — Black-naped Flycatcher**

Bartels: 3/1, 3/2; May (2), June (3), August (1); West Java. Measurements (9): av. 18 (17.1-18.8) × 13.4 (12.9-13.8). Weight (8): av. 0.090.

Kooiman: 2/1, 5/2; East Java. Measurements (12): av. 17.4 (16.6-19.3) × 13.3 (13-13.9). Weight (12): av. 0.085 (0.075-0.095).

Description. — The eggs are creamy, marked with small reddish brown spots, mainly at the blunt end.

Hoogerwerf: 1/2, 2/3, 2 odd shells; February (1), June (2); Central and West Java. Measurements (10): av. 17.30 (16.5-18.6) × 13.15 (12.6-13.7); largest egg: 18.6 × 13.7; maximal variation in length in the same clutch: 0.4 (17-17.4). Weight (4/2, 3/3, 2 odd shells): av. 0.089 (0.073-0.098); maximal variation in the same clutch: 0.009 (0.083-0.092). For 23 previously recorded breeding dates and 27 earlier measured eggs see Hoogerwerf (1949: 225, pl. 17 fig. 256-261).

Description. — In the examined series are four rather distinctly different types, viz. (1) the perhaps most common (normal) type; (2) eggs showing some similarity to those of *Parus major* (no. 291); (3) shells fairly similar to those of *Muscicapa indigo* (no. 278) and (4) specimens much like those of *Muscicapa banyumas* (no. 281). All these different types will be discussed below.

(1) These eggs have a creamy white surface mottled with not very numerous pale, though well defined fairly coarse speckles which are dark rusty brown in the open zone around the blunt end and paler beyond this region. The secondary stains are light to dark violet ashy. In many eggs of this type almost all markings are concentrated at the blunt end, forming a more or less distinct zone and scarce, in any case much less numerous, beyond this area.

(2) Shells of this type have the markings much coarser and they are dull reddish brown, often ranging to chestnut. The rather conspicuous underlying mottling is light- to dark-violet ashy and where the primary and secondary markings overlap the colour turns to light sepia. Most mottling is at the larger end, forming an open zone and beyond this area less frequently present, though better defined.

(3) The eggs of this type have the markings very fine; the ground is chalky- or creamy white, marked with numerous irregular well defined, though rather pale points and fine speckles, which are reddish brown,

occasionally slightly purplish tinged. The inconspicuous secondary mottling, often hardly observable, is ashy- to violet grey. Generally these eggs are most densely marked at the blunt end, forming an irregular open zone. Beyond this region the markings are scarce or more abundantly present, but the ground remains always clearly visible.

(4) The ground is light fleshy or dirty cream, mottled with very numerous irregular, ill-defined fine points and speckles of a secondary character. They are dirty purplish grey and pale rusty brown and are most densely scattered at the larger end, forming a distinct, often closed, but faded cap or zone.

288. **Terpsiphone paradisi australis** Chasen — Paradise Flycatcher

Bartels: 1/2; May; Tji Hea, Preanger, West Java. Measurements (2): av.  $19.9 \times 14.7$ . Weight (2): av. 0.115.

Description. — The eggs are white with a pinkish tint, rather sparingly marked with reddish brown spots, mainly at the blunt end, underlying shell-marks.

Hoogerwerf: 1/2; November; Flores (subsp. *floris* Büttikofer). Measurements (2):  $21.5 \times 16$ ,  $21.7 \times 16.1$ . Weight: 0.157, 0.159. Not previously recorded by the present author. This again is a rare species in Java.

Description. — Except in size the only two eggs examined do resemble somewhat those of the normal type of *Hypothymis azurea* as described above. They have a smooth, dull surface which is slightly rose tinged cream, mottled with a moderate quantity of irregular sharply defined points and fairly fine speckles of various tints of reddish brown to dark sepia and fairly conspicuous secondary stains of the same type which are ashy- or vinaceous grey. Almost all markings are at the blunt end, however, without forming a zone. Beyond this area the mottling is very scarce.

Remarks. — Both eggs of the Bartels collection (subsp. *australis*) are smaller and lighter than both eggs from Flores.

Pachycephalinae

289. **Pachycephala cinerea vandepolli** Finsch — Mangrove Flycatcher-Shrike

Bartels: 1/2; April; West Java. Measurements:  $21.7 \times 15.6$ ,  $20.1 \times 15.2$ . Weight (2): av. 0.135.

Kooiman: East Java. Measurements (11): av.  $23.2$  (20.9-25.4)  $\times 16.3$  (15.7-17). Weight (11): av. 0.160 (0.150-0.170).

Description. — The two eggs in the Bartels collection are yellowish green white with a light zone of dark brown spots, underlying shell-marks.

Those in the Kooiman collection are variable in shape and in colour, varying from dirty greenish yellow to brownish or almost white.

Hoogerwerf: 1 odd shell; West Java, without further particulars. Measurements:  $20.7 \times 15.6$ . Weight (2/2, 1 odd shell): av. 0.151 (0.138-0.168); maximal variation in the same clutch: 0.012 (0.156-0.168). For 14 previously recorded breeding dates and 17 earlier measured eggs see Hoogerwerf (1949: 227-228, pl. 17 fig. 262-264).

Description. — The eggs have a smooth texture with little or fairly much gloss; the colour is olive cream, creamy white or almost pure white. Generally there are not very numerous irregular, well defined primary points and coarse speckles, largely olive- or sepia tinged black. The also very conspicuous secondary markings, partly of a cloudy appearance, are light to dark mouse-grey. Almost all mottling is concentrated at the blunt end, forming an irregular, open zone and thinly scattered beyond this area. In certain eggs the markings are much duller and less sharply defined, giving the shell quite a different appearance, more like the few eggs of the preceding species, examined by me.

Remarks. — All 11 eggs obtained by Kooiman in East Java are considerably larger in size and partly heavier in weight when compared with the 18 examined by me and the two of the Bartels collection, all originating from West Java.

290. **Pachycephala pectoralis javana** Hartert — Thick-head or Golden Whistler

Bartels: No material available.

Hoogerwerf: 1/2; August; Flores (subsp. *fulvotincta*). Measurements:  $22 \times 16$ ,  $22 \times 16.6$ . Weight: 0.172, 0.178. Not previously recorded by the present author; the species is very rare in Java, up till now only found in the eastern part of the island.

Description. — The eggs are much like those of the preceding species: on a creamy surface are not many irregular points and speckles of olive- or sepia tinged black with a very few lighter ones in between. The very conspicuous underlying ashy coloured mottling is coarser, fairly well defined and more numerous than the primary one. Nearly all markings are concentrated around the larger end, forming an open zone and there are only a very few ones beyond this area.

#### PARIDAE

291. **Parus major cinereus** Vieillot — Great Tit

Bartels: 1/1, 3/3, 9/4, 2/5, 1/6; February (1), May (6), June (5), July (3),

November (1); West Java. Measurements (50): av. 18 (15.3-18.1)  $\times$  13 (12.2-13.5). Weight (46): av. 0.088 (0.082-0.092).

Description. — The colour is white with fairly small, but also larger, reddish brown blotches, occasionally forming a cap.

Hoogerwerf: 2 odd shells; Central Java, without further particulars. Measurements: 15.7  $\times$  12.5, 16  $\times$  12.8. Weight (1/3, 2/4): av. 0.081 (0.073-0.092); maximal variation in the same clutch: 0.010 (0.082-0.092). For 13 previously recorded breeding dates and 29 earlier measured eggs see Hoogerwerf (1949: 229, pl. 17 fig. 265).

Description. — The eggs are almost indistinguishable from those of *Sitta frontalis* (no. 293). They are chalky white or cream, marked with usually numerous irregular, fairly coarse and well defined speckles and dots, which are light to dark vinaceous brown or Corinthian red, chestnut or chocolate brown in the darkest stains. The secondary markings, generally not very abundantly present, sometimes even not observable, are greyish lavender or vinaceous grey. As a rule most mottling is at the larger end where it may form an open zone or cap, though also rather densely distributed beyond this area.

292. ***Psaltia exilis*** Temminck — Pigmy Tit

Bartels: 6/2, 4/3; February (1), April (1), May (1), June (6), August (1); West Java. Measurements (24): av. 13.2 (12.2-14.6)  $\times$  10 (9.5-10.3). Weight (19): av. 0.035.

Description. — The shells are dull greyish white with small greyish brown or brownish spots, as a rule with a zone or cap.

Hoogerwerf: 2/2, 2/3, 2 odd shells; January (3), June (2); West Java. Measurements (12): av. 12.83 (11.9-13.7)  $\times$  9.93 (9.7-10.3); largest egg: 13.7  $\times$  10.3; maximal variation in length in the same clutch: 0.8 (12.7-13.5). Weight (36): av. 0.037 (0.031-0.044); maximal variation in the same clutch: 0.003 (0.037-0.040, and four times more the same variation). For 16 previously recorded breeding dates and 26 earlier measured eggs see Hoogerwerf (1949: 230, pl. 17 fig. 266).

Description. — Except in size the eggs show some resemblance to those of *Abroscopus superciliaris* (no. 269), but the markings are considerably finer. They have a dull, occasionally faintly glossy texture and are chalky white, also rose tinged white, mottled with numerous fine, often very fine vinaceous brown points and speckles, pale and ill-defined. The underlying markings, often fairly conspicuously present, are dirty lavender grey to vinaceous purple. In many eggs they predominate over the primary ones

at the blunt end where all stains are concentrated, forming an open cap. Generally the shells are only thinly marked beyond this region, though thickly mottled ones are certainly no exceptions, but in all examined eggs the markings are faded.

## SITTIDAE

293. *Sitta frontalis saturator* Hartert — Velvet-fronted Nuthatch

Bartels: 2/3; May, August; West Java. Measurements (6): av. 17 (15.4-18.8) × 13.3 (13-13.6). Weight (6): av. 0.093.

Description. — The eggs vary considerably in shape, from fairly elongate-oval to almost round (15.2-13.5); they are rather densely and coarsely marked with reddish brown blotches, as a rule forming a cap, underlying shell-marks.

Hoogerwerf: For five previously recorded breeding dates and four earlier measured eggs see Hoogerwerf (1949: 231).

Description. — The eggs are much like those of the following species and of *Parus major* (no. 291). When compared with those of the latter species they are more densely marked, showing more secondary ashy- or violet grey stains. However, the few eggs examined do not allow the enumeration of reliable differences when seen in large series.

294. *Sitta azurea nigriventer* (Robinson & Kloss) — Blue Nuthatch

Bartels: 1/2; July; West Java. Measurements (2): av. 19.3 × 13.4. Weight (2): av. 0.095.

Description. — The eggs are much like those of *Sitta frontalis*.

Hoogerwerf: Weight (1/3): av. 0.104 (0.101-0.106). For two previously recorded breeding dates and the measurements of these three eggs see Hoogerwerf (1949: 232, pl. 17 fig. 267).

Description. — The eggs examined are indistinguishable from those of the preceding species. They are dirty white or pale fleshy tinged white, mottled with numerous irregular, coarse and sharply defined speckles and dots which are vinaceous brown to dark chestnut- or chocolate-brown. The fairly numerous underlying markings are greyish lavender to vinaceous grey; they may predominate over the primary ones at the larger end, where the shells are most heavily mottled and may be formed an open cap. Such a thick concentration was not found in the examined eggs of *Parus major* from which they are almost indistinguishable.

## DICAEDAE

295. *Prionochilus p. percussus* (Temminck) — Crimson-breasted Flower-pecker



Bartels: 1/1, 1/2; April; Tji Kahuripan, Preanger, West Java. Measurements (3): av.  $16.4 \times 11.6$ . Weight (3): av. 0.060.

Description. — The colour is white, marked with small purplish brown spots, forming a cap.

Hoogerwerf: 1/2; April; West Java. Measurements:  $15.7 \times 11.3$ ,  $15.8 \times 11.3$ . Not previously recorded from Java; the species is perhaps fairly rare in this island.

Description. — These eggs are elongate-oval with only slightly different ends and a dull texture. The colour is white, thickly mottled with well defined brownish primary points and speckles, forming an almost closed zone around the larger end.

296. **Dicaeum c. chrysorrheum** Temminck — Yellow-vented Flower-pecker

Bartels and Hoogerwerf: No material or particulars available; the species is apparently rare in Java.

297. **Dicaeum agile finschii** Bartels — Thick-billed Flower-pecker

Bartels: No material available.

Hoogerwerf: No material available; this is perhaps a rare Flower-pecker too in Java. For some particulars derived from the literature see Hoogerwerf (1949: 233-234).

298. **Dicaeum concolor sollicitans** Hartert — Plain-coloured Flower-pecker

Bartels: No material available.

Kooiman: 1/2; East Java. Measurements (2): av.  $14.9 \times 10.6$ . Weight (2): av. 0.037.

Description. — The shells are white, without gloss.

Hoogerwerf: No material available though the species is not rare in Java. For some particulars compiled from the literature see Hoogerwerf (1949: 234).

299. **Dicaeum s. sanguinolentum** Temminck — Fire-breasted Flower-pecker

Bartels: 1/1, 2/2; January, August, October; West Java; Measurements (5): av.  $14.8 (14.2-15.5) \times 10.5 (10.2-10.8)$ . Weight (5): av. 0.040.

Description. — The eggs are lustreless white.

Hoogerwerf: Weight (2/1): 0.040, 0.041. For one previously recorded breeding date and one earlier measured egg see Hoogerwerf (1949: 234).

Description. — The only two eggs examined, of which one was heavily damaged, are indistinguishable from those of *Dicaeum trochileum* (no. 300); they are pure white without any mottling.

299a. **Dicaeum sanguinolentum ablutum** Robinson & Kloss — Fire-breasted Flower-pecker of East Java

Bartels: No material available.

Kooiman: 1/1; East Java, no further data. Measurements: 14 × 10.2. Weight: 0.035.

Description. — The colour is white; there is no gloss.

Hoogerwerf: No material or particulars available.

300. **Dicaeum t. trochileum** (Sparman) — Scarlet-breasted Flower-pecker

Bartels: 1/1, 7/2; February (2), March (5), April (1); West Java. Measurements (15): av. 15.4 (14-16.6) × 10.6 (10.2-11). Weight (15): av. 0.050 (0.045-0.055).

Sody: 4/2; March, May, June, July; West Java. Kooiman: 8; East Java (without further particulars). Measurements (16): av. 15 (14-16.7) × 10.8 (10.1-11.5). Weight (16): av. 0.046 (0.040-0.055).

Description. — The eggs are white without gloss.

Hoogerwerf: Weight (1/2): 0.041, 0.043. For 41 previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 235, pl. 18 fig. 268).

Description. — The eggs vary considerably in shape, but normal- to somewhat more elongate-oval ones with rather distinctly different ends are perhaps most common. They have a dull or faintly glossy texture which is white or almost white without markings, though one egg examined shows a single sharply defined dark redbrown point.

301. **Dicaeum trigonostigma flaviclune** Hartert — Orange-bellied Flower-pecker

Bartels: 7/2; February (2), March (1), April (1), May (1), October (1), December (1); West Java. Measurements (14): av. 15.2 (14.6-16) × 10.6 (10.1-11.1). Weight (14): av. 0.045.

Description. — The colour is white and there is no gloss; the shells are

partly very sparingly marked with small brown spots; in some sets marked and unmarked eggs are found together.

Hoogerwerf: Weight (1/3, 1 odd shell): av. 0.050 (0.047-0.058). For ten previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 235-236, pl. 18 fig. 269).

Description. — The eggs are white or almost white, sometimes without any markings, but more often mottled with not very numerous irregular, often fairly ill-defined points and small speckles, varying from yellowish brown to dark brownish sepia, almost black in certain cases. Generally there are no secondary markings, but there may be a very few pale underlying cloudy speckles. Most mottling is concentrated at the larger end where it may form an open zone.

#### NECTARINIIDAE

#### 302. *Anthreptes m. malacensis* (Scopoli) — Brown-throated Sunbird

Bartels: 5/1, 17/2, 1/3; February (2), March (1), April (3), May (10), June (2), July (2), August (3); West Java. Measurements (40): av. 18.2 (17.2-19.5) × 13 (12-13.6). Weight (40): av. 0.080 (0.075-0.085).

Description. — The colour is purplish grey, rather densely marked with purplish black, occasionally purplish brown spots, clouds and hair-lines.

Hoogerwerf: 1 odd shell; West Java, without further particulars. Measurements: 17 × 12. Weight (1/2, 5 odd shells): av. 0.078 (0.065-0.086). For 66 previously recorded breeding dates and 34 earlier measured eggs see Hoogerwerf (1949: 236-237, pl. 18 fig. 270-272).

Description. — The eggs have a dull or faintly glossy surface. The colour is greyish white, mottled with numerous, very irregular and fairly fine points, speckles, scribbles and clouds, which are poorly defined. They vary in colour from violet grey to dark mouse-grey or ashy. Upon this ground are a few or fairly many darker, sharply defined irregular primary speckles and scribbles from light sepia to almost black. On some shells the primary stains are very fine and do not have the character of scribbles. Generally all markings are uniformly distributed all over the surface but eggs with a concentration at the blunt end are no exceptions.

#### 303. *Anthreptes singalensis phoenicotis* (Temminck) — Ruby-Cheek

Bartels: 1/1, 4/2; April (2), May (1), June (2); West Java. Measurements (9): av. 16.6 (15.1-17.7) × 11.8 (11.6-12.1). Weight (9): av. 0.063.

Kooiman: 6; East Java (without further particulars). Measurements (6): av. 17 (16.1-17.5) × 11.8 (11.5-12.2). Weight (6): av. 0.060 (0.050-0.065).

Description. — The shells are purplish grey, marked with purplish black or purplish brown clouds and hair-lines, occasionally entirely dark grey, underlying shell-marks.

Hoogerwerf: 1/2; June; West Java. Measurements:  $16.3 \times 11.6$ ,  $16.9 \times 11.9$ . Weight (2/2, 1 odd shell): av. 0.066 (0.062-0.072); maximal variation in the same clutch: 0.004 (0.062-0.066 and 0.064-0.068). For two previously recorded breeding dates and three earlier measured eggs see Hoogerwerf (1949: 238, pl. 18 fig. 273, 274).

Description. — Except in size the eggs show some resemblance to those of the preceding species but the secondary markings average darker and the primary ones scarcer. The colour is greyish fleshy, almost entirely covered with largely coarse dots and cloudy or smear-like stains, very irregular in shape and of a secondary character, though fairly well defined. They vary in different tints of heliothrope grey, sometimes mixed with some brownish. On these underlying mottling are a few primary, better defined points, speckles and scribbles of dark sepia, almost black. Two of the three eggs examined are most thickly marked at the larger end forming an indistinct cap, but on the third shell all markings are uniformly distributed.

304. ***Nectarinia sperata brasiliiana*** (Gmelin) — Van Hasselt's Sunbird

Bartels: 1/1; May; West Java. Measurements:  $13.1 \times 9.9$ . Weight: 0.040.

Sody: 2/2; January, April; Java. Measurements (4): av.  $13.2 \times 10.4$ . Weight (4): av. 0.045.

Description. — The eggs are on a moderately glossy ground brownish, very densely marked with spots of a darker brown colour, often giving a uniform impression with the exception of a darker cap.

Hoogerwerf: 1/2; June; Central Java. Measurements:  $13.2 \times 9.6$ ,  $14.6 \times 10$ . Weight (2): 0.035, 0.038. For five previously recorded breeding dates and two earlier measured eggs see Hoogerwerf (1949: 239, pl. 18 fig. 275).

Description. — Except in size the eggs are much like those of *Nectarinia calcostetha* (no. 305). They have a smooth, intensively glossy texture. The colour is light coffee brown or creamy brown, almost completely covered with numerous irregular, very dull, fine points and speckles, which are dark brown to very dark sepia, almost black in the zone at the larger end. Here most mottling is concentrated together with the less conspicuous secondary markings, giving a greyish shade to the dark colour of the distinct, though faded zone. The general impression of the surface is a uniform light brown with a much darker, dull zone because no separate markings are visible.

305. **Nectarinia c. calcostetha** Jardine — Macklot's Sunbird

Bartels: 4/1, 1/2; May (4), June (1); West Java. Measurements (5): av. 16.9 (16-17.8) × 12 (11.5-12.5). Weight (5): av. 0.060 (0.055-0.065).

Description. — The glossy shells are greyish clay to warm brown, evenly marked with very small dark brown spots, forming a cap.

Hoogerwerf: Weight (2/1): 0.054, 0.072. For three previously recorded breeding dates and the measurements of these two eggs see Hoogerwerf (1949: 240, pl. 18 fig. 276).

Description. — Except in size the eggs are much like those of the preceding species, though they are less thickly mottled. The colour is perhaps white but difficult to establish because of the numerous, pale and ill-defined points, speckles and dots, varying in colour from bistre to burnt umber and warm sepia. Most mottling is concentrated at the blunt end forming a fairly distinct dark, though dull cap or zone, showing a greyish shade because of the still deeper lying secondary markings, which are hardly visible.

306. **Nectarinia jugularis pectoralis** Horsfield — Yellow-breasted Sunbird

Bartels: 16/1, 35/2; March (6), April (3), May (24), June (3), July (5), August (5), September (1), October (3), November (1); West Java. Measurements (50): av. 15.6 (13.6-18) × 11.1 (10.1-12). Weight (50): av. 0.050 (0.045-0.055).

Description. — The eggs are brownish white or pale brown, sometimes with a greenish tint, marked with brownish spots, clouds and a few striking penumbrae, resembling the eggs of the European *Sylvia borin* (Boddaert).

Hoogerwerf: 1/2; June; West Java. Measurements: 14.5 × 10.6, 14.7 × 10.3. Weight (24): av. 0.046 (0.038-0.053); maximal variation in the same clutch: 0.007 (0.046-0.053). For 105 previously recorded breeding dates and 57 earlier measured eggs see Hoogerwerf (1949: 241, pl. 18 fig. 277-279).

Description. — The eggs have a dull or very faintly glossy texture. The colour is greyish green or olive buff, usually covered with numerous very irregular, largely faded and poorly defined speckles and cloudy markings of a darker olive, darkest at the larger end where most mottling occurs. On these underlying stains are some primary points, speckles and scribbles, sharply defined and dark sepia, almost black in colour. On certain shells are no primary stains, but others show a well pronounced cap with some scarce speckles beyond this area without the dense underlying markings found on a large majority of the eggs.

307. **Aethopyga eximia** (Horsfield) — Kuhl's Sunbird

Bartels: 7/1; January (1), March (1), May (2), December (2); one not dated; West Java. Measurements (7): av. 16.8 (16.2-17.4) × 12 (11.2-12.3). Weight (7): av. 0.055.

Description. — The colour is greyish white, vaguely marked with small dark brown spots and clouds, with a heavy cap or zone. The eggs are very fragile.

Hoogerwerf: Weight (13/1): av. 0.052 (0.041-0.059). For 15 previously recorded breeding dates and 16 earlier measured eggs see Hoogerwerf (1949: 242, pl. 18 fig. 280).

Description. — Besides eggs showing some similarity to those of *Nectarinia calcostetha* (no. 305), though lighter in colour, there are others which are more like those of the preceding species. The shells have a dull texture faintly glossy in some rare cases, which is chalky- or creamy white, almost entirely covered with numerous, largely pale and poorly defined, light to dark snuffbrown speckles and dots. They are most densely present at the larger end, often forming a distinct and dark, though faded zone, without or with hardly any underlying mottling. Different are the eggs which are more uniformly mottled without distinct concentrations, showing coarser and better separated and darker markings, generally warm sepia or bistre with underlying ones of light to dark violet grey.

308. **Aethopyga siparaja heliogona** Oberholser — Raffles' Sunbird

Bartels: No eggs available.

Sody: 1/1, 9/2; March (1), April (1), May (1), June (3), July (1), September (2), December (1); West Java. Measurements (19): av. 14.5 (13.7-15.4) × 10.7 (10.3-11.2). Weight (19): av. 0.036 (0.035-0.040).

Description. — The eggs vary considerably in colour: (a) pinkish, rather sparingly marked with small dark reddish brown spots (penumbrae) and hair-lines and larger light reddish brown clouds, mainly at the blunt end; and (b) densely covered with small spots giving a uniform impression. Eggs of the first type are resembling the erythristic ones of the European *Sylvia atricapilla* (L.).

Hoogerwerf: Weight (1/2): 0.037, 0.042. For 28 previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 243, pl. 18 fig. 281).

Description. — Except in size most of the few examined eggs show some resemblance to those of *Criniger bres* (no. 218). They have a dull or faintly glossy texture. The colour is almost white, light fleshy or pale salmon,

covered with a varying quantity, but generally fairly many irregular, dull and poorly defined coarse speckles and cloudy stains of vinaceous rusty, ranging to clear rusty at the blunt end. The much deeper lying secondary cloudy mottling is vinaceous grey. Certain eggs show some clearly defined primary markings of fine, almost black points or scribbles. Usually most stains are rather uniformly scattered all over the surface, but they may be concentrated at the larger end, forming a more or less distinct cap or zone.

Remarks. — It is rather strange that this species is not represented in the Bartels collection.

309. **Aethopyga m. mystacalis** (Temminck) — Scarlet Sunbird

Bartels: 10/1; January (1), April (1), May (4), June (1), October (3); West Java. Measurements (10): av. 15.1 (13.6-16.6) × 11.2 (11-11.7). Weight (8): av. 0.045.

Description. — The colour is greyish white, as a rule sparingly marked with greyish brown spots with a slight zone. The shells are very fragile.

Hoogerwerf: Weight (2/1): 0.045 and 0.050. For three previously recorded breeding dates and one earlier measured egg see Hoogerwerf (1949: 244, also pl. 18 fig. 282).

Description. — Because of their lighter colour and much better defined markings the eggs differ conspicuously from those of both preceding species. They have a dull or faintly glossy texture, which is white or almost white, covered with fairly numerous irregular, well defined points and small speckles of light to dark olive brown, occasionally ranging to black. The secondary stains are lighter and more greyish. The few eggs examined are most thickly mottled at the blunt end without showing a distinct zone or cap, but certainly not scarcely present beyond this area.

310. **Arachnothera longirostra prillwitzii** Hartert — Little Spider-hunter

Bartels: 9/1, 25/2, 1/3; January (2), February (2), April (3), May (9), June (4), July (2), September (5), October (7), December (1); West Java. Measurements (60): av. 18.4 (16.2-20.2) × 13.4 (12.4-14.7). Weight (58): av. 0.073 (0.065-0.080).

Description. — The eggs are of two different types: (a) white, occasionally with a creamy tint, marked with a heavy zone of reddish brown or purplish brown spots; and (b) almost or completely unmarked with the exception of a few brown spots. The shells of two sets have a slight zone.

Hoogerwerf: 1/2, 17 odd shells; June (1); West Java. Measurements (19): av. 18.52 (17.2-20) × 13.09 (12.4-13.6); largest egg: 20 × 13.6.

Weight (42): av. 0.072 (0.061-0.083); maximal variation in the same clutch: 0.006 (0.067-0.073). For 54 previously recorded breeding dates and 21 earlier measured eggs see Hoogerwerf (1949: 245, pl. 18 fig. 283, 284).

Description. — The eggs have a dull texture without gloss. The colour is almost white, sometimes a trifle creamy tinged, marked with numerous, largely fine, dull and ill-defined primary points, speckles and occasionally fine scribbles. These markings are vinaceous brown to dark Indian red or chocolate brown, sometimes dull stone-red or reddish brown. The secondary mottling may be very inconspicuous, but in as many cases it consists of well defined cloudy stains, which are light to dark vinaceous grey. Invariably most markings are concentrated in a distinct, closed, though fairly dull zone on the lower part of the blunt end. Beyond this area the mottling may be fairly scarce, but also so abundantly present that the ground is hardly visible.

**311. *Arachnothera robusta armata* Müller & Schlegel** — Long-billed Spider-hunter

Bartels: 2/1, 8/2; January (1), April (1), May (3), June (2), July (2), December (1); West Java. Measurements (17): av. 21.8 (20.4-23.6) × 14.8 (14.4-15.6). Weight (14): av. 0.102 (0.095-0.105).

Description. — The colour is white with a handsome zone of black spots and hair-lines.

Hoogerwerf: Weight (2/2, 1 odd shell): av. 0.111 (0.104-0.117); maximal variation in the same clutch: 0.009 (0.108-0.117). For three previously recorded breeding dates and six earlier measured eggs see Hoogerwerf (1949: 246, pl. 18 fig. 285).

Description. — The eggs differ conspicuously from those of the preceding species and also from *Arachnothera affinis* (no. 313), they most closely resemble the eggs of *Chloropsis cochinchinensis* (no. 207). They have a dull or very faintly glossy texture, which is pure white or almost white, very strikingly mottled with rather fine, sharply defined scribbles, threads and fibre-like markings, which are deep black or sepia tinged black. The very inconspicuous underlying points and speckles, often almost failing, are ashy, sometimes mixed with some purplish. Nearly all these markings are concentrated at the larger end, forming a distinct, though open zone, failing almost entirely beyond this region where may be some small points only.

**312. *Arachnothera c. chrysogenys* (Temminck)** — Yellow-eared Spider-hunter

Bartels & Hoogerwerf: No material or particulars available of this very rare Spider-hunter.



313. **Arachnothera a. affinis** (Horsfield) — Grey-breasted Spiderhunter

Bartels: 3/2; April, October, December; West Java. Measurements (6): av. 21.2 (20.2-22.2) × 15 (14.6-15.5). Weight (6): av. 0.113 (0.100-0.125).

Description. — The shells are liver coloured, occasionally with a somewhat darker cap.

Hoogerwerf: Weight (1/2): 0.120, 0.129. For four previously recorded breeding dates and eight earlier measured eggs see Hoogerwerf (1949: 247, pl. 18 fig. 286).

Description. — The eggs differ very strikingly from both those of *Arachnothera longirostra* (no. 310) and *A. robusta* (no. 311). They have a smooth and glossy surface, which is olive greenish white, almost completely covered with a dark brownish olive shade. The very pale, hardly visible mottling, scattered all over the shell, is largely concentrated at the blunt end, forming a faded cap of olive greyish clouds. Occasionally there are a very few well defined, dark scribbles or thread-like markings of sepia tinged black.

#### ZOSTEROPIDAE

314. **Zosterops m. montana** Bonaparte — Greater Zosterops

Bartels: No material available.

Hoogerwerf: Weight (2/2): av. 0.068 (0.058-0.072); maximal variation in the same clutch: 0.013 (0.058-0.071). For two previously recorded breeding dates and the measurements of these four eggs see Hoogerwerf (1949: 248).

Description. — The eggs are normal- to broad-oval with distinctly different ends and a smooth, dull or faintly glossy texture. The colour is of a uniform Niagara-green, generally a trifle lighter than those of *Lophozosterops javanica* (no. 317), showing no markings at all.

Remarks. — It is rather strange that the Bartels collection does not contain eggs of this *Zosterops*.

315. **Zosterops palpebrosa buxtoni** Nicholson — White-eye

Bartels: 1/1, 8/2; March (1), April (1), May (1), June (3), September (3); West Java. Measurements (17): av. 15.3 (14.6-16.3) × 11.4 (10.9-12). Weight (17): av. 0.057 (0.055-0.060).

Description. — The eggs are blue with a moderate gloss.

Hoogerwerf: 2/2, 1 odd shell; May; West Java. Measurements (5): av. 15.3 (14.7-16) × 11.18 (10.6-11.8); largest egg: 16 × 11.8; maximal

variation in length in the same clutch: 0.9 (14.7-15.6). Weight (7/2, 6 odd shells): av. 0.059 (0.050-0.065); maximal variation in the same clutch: 0.007 (0.054-0.061). For 27 previously recorded breeding dates and 15 earlier measured eggs, perhaps partly belonging to the subspecies *melanura*, see Hoogerwerf (1949: 248, also pl. 18 fig. 287).

Description. — The eggs have a dull or faintly glossy texture, which is pale Niagara-green or a trifle darker without any markings, though sometimes soiled.

315a. **Zosterops palpebrosa melanura** Hartlaub — Javan White-eye

Bartels: 2/1, 4/2; April (1), May (3), June (2); West Java. Measurements (10): av. 15.4 (14.6-16.7) × 11.4 (11.1-11.9). Weight (10): av. 0.060.

Description. — The eggs are blue with a moderate gloss.

Hoogerwerf: No certain material or particulars available.

316. **Zosterops f. flava** (Horsfield) — Large Bridled White-eye

Bartels: 2/2, 3/3; May; West Java. Measurements (12): av. 15.4 (14.7-16.3) × 11.4 (11.1-11.7). Weight (12): av. 0.055.

Description. — The colour is very pale blue, with a glossy surface.

Hoogerwerf: No material available, neither of *Zosterops f. maxi* Finsch, a rather common subspecies on many small islands in the area of the Java Sea. For some particulars derived from the literature see Hoogerwerf (1949: 249).

317. **Lophozosterops javanica frontalis** (Reichenbach) — Javan Zosterops

Bartels: 8/2; January (1), April (2), May (1), June (2), July (1), August (1); West Java. Measurements (15): av. 18.3 (17-20.5) × 13.5 (13-14.2). Weight (14): av. 0.090 (0.075-0.100).

Description. — The shells are rather deep blue without gloss.

Hoogerwerf: 2 odd shells; June; West Java. Measurements: 18 × 12, 18.1 × 13.9. Weight (29): av. 0.088 (0.071-0.112); maximal variation in the same clutch: 0.009 (0.071-0.080). For 16 previously recorded breeding dates and 28 earlier measured eggs see Hoogerwerf (1949: 250, pl. 18 fig. 288).

Description. — Except in size the eggs are much like those of *Zosterops montana* (no. 314), but they are perhaps more often dull without any gloss. They are bluish green, generally pale turquoise- or Niagara-green without any markings, though sometimes dirty soiled.

## FRINGILLIDAE

318. **Carduelis e. estherae** (Finsch) — Javan Greenfinch

Bartels and Hoogerwerf: No material or particulars available. The range of this species is an extremely restricted one.

## STURNIDAE

319. **Aplonis panayensis strigatus** (Horsfield) — Tree-Starling

Bartels: 1/2, 5/3; March (1), April (1), September (2), October (1), December (1); West Java. Measurements (17): av. 25.1 (23-28.3) × 18.1 (17.3-19.1). Weight (17): av. 0.26 (0.23-0.30).

Kooiman: East Java. Measurements (6): av. 25.3 (23.3-27.5) × 18.7 (18.5-19). Weight (6): av. 0.27 (0.24-0.30).

Description. — The eggs are pale blue, sparingly but coarsely marked with reddish brown blotches (somewhat resembling the European *Turdus viscivorus* L.). The eggs of two sets have the same ground, but are more finely marked, mainly at the blunt end.

Hoogerwerf: 1 odd shell; West Java. Measurements: 26.8 × 17.8. Weight (1/2, 1 odd shell): av. 0.276 (0.257-0.289); maximal variation in the same clutch: 0.032 (0.257-0.289). For ten previously recorded breeding dates and 18 earlier measured eggs see Hoogerwerf (1949: 251, pl. 18 fig. 289).

Description. — The eggs have a smooth and glossy texture, which is clear blue green, mostly pale Niagara-green, marked with usually not numerous, fairly coarse, irregular primary speckles and dots, which are often almost circular and sharply defined. They are light to dark vinaceous- or sepia tinged brown, often ranging to chocolate brown. The conspicuous underlying mottling, generally also well defined, is greyish lavender to vinaceous grey. Most stains are concentrated at the larger end without forming a distinct zone or cap and rather thinly present beyond this region.

320. **Aplonis m. minor** (Bonaparte) — Small Tree-Starling

Bartels: No material available.

Hoogerwerf: 1/3; September; Flores. Measurements (3): av. 24.2 (23.6-24.8) × 17.93 (17.7-18.3); largest egg: 24.8 × 17.8. Weight (3): av. 0.245 (0.241-0.247). Not previously recorded by the present author.

Description. — Except in size the eggs show some similarity to those of the preceding species, but in the only three eggs examined the markings are smaller and more numerous. The colour is pale bluish green, mottled with rather numerous primary points and speckles, which are vinaceous- or sepia tinged brown and well defined secondary stains of the same type of greyish

lavender or vinaceous grey. Most markings are concentrated at the larger end without forming a cap or zone. Beyond this area the eggs are more sparsely marked though considerably more densely than in those of the preceding species.

Remarks. — There is perhaps no reliable proof for considering this starling a breeding species in Java.

321. ***Sturnus contra jalla*** (Horsfield) — Rose-coloured Starling

Bartels: 2/2, 3/3, 2/4; February (2), April (2), May (3); West Java. Measurements (20): av. 26 (22-29.4) × 18.9 (16-20.3). Weight (19): av. 0.36 (0.30-0.40).

Description. — The colour is rather deep greenish blue without markings.

Hoogerwerf: 2/2, 1/3; April, May, June; West Java. Measurements (7): av. 27.69 (26.2-28.7) × 19.47 (18.9-20.1); largest egg: 28.7 × 20.1; maximal variation in length in the same clutch: 1.4 (26.2-27.6). Weight (145): av. 0.361 (0.296-0.452); maximal variation in the same clutch: 0.099 (0.297-0.396). For 205 previously recorded breeding dates and 130 earlier measured eggs see Hoogerwerf (1949: 252, pl. 18 fig. 290).

Description. — Except in size the eggs are much like those of *Acridotheres fuscus* (no. 323), but they may average darker. They have a smooth, glossy, but occasionally rough texture, which is blue green, largely clear Niagara green or pale sulphate green without any markings, though not rarely stained with dirt, often excrements.

Remarks. — These seven eggs and the 130 previously measured ones average larger than the 20 shells of the Bartels collection, though the average weight is almost exactly the same, as is the case with the extremes.

322. ***Sturnus m. melanopterus*** (Daudin) — Javan Myna

Bartels: 1/3, 1/4; March, May; West Java. Measurements (7): av. 27.3 (26.5-27.9) × 19.2 (19-20). Weight (7): av. 0.36 (0.34-0.38).

Description. — The eggs are blue, showing no markings.

Hoogerwerf: No material available; the species is certainly not a common bird in West Java though locally not exactly rare. For some particulars compiled from the literature see Hoogerwerf (1949: 253).

322a. ***Sturnus melanopterus tricolor*** (Horsfield) — East Javan Myna

Bartels: No material available.

Kooiman: 1/3; East Java. Measurements (3): av. 28.9 × 21.1. Weight (3): av. 0.45.

Description. — The colour of the eggs is blue.

Remarks. — These three eggs are heavier than those of the subspecies from West Java.

Hoogerwerf: No material available. For two previously recorded breeding dates see Hoogerwerf (1949: 253).

323. **Acridotheres fuscus javanicus** Cabanis — Jungle Myna

Bartels: 2/2, 3/3, 4/4; May (1), June (1), July (4), August (3); West Java. Measurements (29): av. 30.2 (27.5-33.1) × 20.8 (19.5-21.7). Weight (28): av. 0.46 (0.34-0.52).

Description. — The eggs are blue.

Hoogerwerf: 1/3; July; West Java. Measurements (3): av. 28.97 (28.9-29) × 19.83 (19.8-19.9); largest egg: 29 × 19.9. Weight (3/2, 2/3): av. 0.441 (0.392-0.497); maximal variation in the same clutch: 0.082 (0.405-0.487). For 17 previously recorded breeding dates and 15 earlier measured eggs see Hoogerwerf (1949: 253).

Description. — Except in the measurements the eggs are fairly similar to those of *Sturnus contra* (no. 321), but they perhaps average in having a rougher surface and average lighter in colour. They are bluish green, most often pale Nile-blue to pale Niagara-green without markings but often soiled.

324. **Gracula r. religiosa** Linnaeus — Grackle

Bartels: No material available.

Remarks. — There are two doubtful eggs in the Sody collection: February; Deli, Sumatra. Measurements: av. 36.8 × 26.7. Weight: av. 0.975. Their colour is deep greenish blue, sparingly marked with pale, purplish brown blotches. This description agrees with the one published by Hoogerwerf.

Hoogerwerf: No material available. For some particulars derived from the literature see Hoogerwerf (1949: 254-255).

Remarks. — Both shells of the Sody collection mentioned above may indeed originate from this species.

PLOCEIDAE

325. **Passer montanus malaccensis** Dubois — Tree-Sparrow

Bartels: 1/3, 5/4, 6/5; March (3), June (1), July (6), August (2); West Java. Measurements (46): av. 19 (17.5-20.6) × 13.9 (13-14.6). Weight (46): av. 0.13 (0.11-0.15).

Description. — The eggs are very variable: the ground is white with a bluish tint, marked with greyish brown blotches and clouds or almost uniformly greyish brown. Entirely resembling the eggs of the European subspecies, but with more pale ones.

Remarks. — Two sets have very globular eggs (8: av.  $19.2 \times 14.6$ ) with a white, unmarked ground (only one egg has a few spots). They were collected in July and August of the same year, most probably originating from the same female.

Hoogerwerf:  $2/3$ , 2 odd shells; January (2); West Java. Measurements (8): av.  $18.85 (17.4-20.5) \times 13.76 (12.7-14.6)$ ; largest egg:  $20.5 \times 14.6$ ; maximal variation in length in the same clutch: 2.0 (18.5-20.5). Weight ( $1/2$ ,  $1/3$ , 3 odd shells): av. 0.123 (0.097-0.141); maximal variation in the same clutch: 0.019 (0.097-0.116). For 108 previously recorded breeding dates and 28 earlier measured eggs see Hoogerwerf (1949: 255, pl. 18 fig. 291).

Description. — The eggs may vary considerably; besides specimens rather sparsely and uniformly mottled all over the surface, there are others with a distinct cap and a varying quantity of markings beyond this area. Generally the shells are much like those of the European subspecies. They have a dull or faintly glossy texture, which is whitish, sometimes greyish green or creamy white, usually thickly mottled with numerous ill-defined irregular points and speckles of light to dark olive brown or sepia. The less numerous and often very inconspicuous secondary stains are greyish, largely showing varying tints of violet grey.

326. **Ploceus m. manyar** (Horsfield) — Streaked Weaver-Finch

Bartels:  $6/2$ ; May; West Java. Measurements (11): av.  $21 (19.5-22) \times 14.4 (13.9-15.2)$ . Weight (11): av. 0.180 (0.175-0.200).

Description. — The colour is white without gloss.

Hoogerwerf: For 11 previously recorded breeding dates and 13 earlier measured eggs see Hoogerwerf (1949: 256, pl. 18 fig. 292).

Description. — The eggs have a dull or slightly glossy surface, which is pure white without markings, but sometimes soiled.

327. **Ploceus philippinus infortunatus** Hartert — Weaver Finch

Bartels:  $1/1$ ,  $2/2$ ,  $4/3$ ; March (5), April (2); West Java. Measurements (17): av.  $20.8 (19.5-22) \times 14.6 (14.1-15.2)$ . Weight (17): av. 0.170 (0.155-0.200).

Kooiman: East Java (without further particulars). Measurements (10): av. 21.7 (20.7-23)  $\times$  15 (14.7-15.5). Weight (10): 0.20 (0.155-0.215).

Description. — The eggs are white and show no gloss.

Remarks. — The eggs in the Kooiman collection are somewhat larger and heavier than those of the Bartels collection.

Hoogerwerf: For 25 previously recorded breeding dates and 42 earlier measured eggs see Hoogerwerf (1949: 257).

Description. — The eggs do not differ from those of the preceding species.

328. **Ploceus h. hypoxanthus** (Sparrman) — Golden Weaver Finch

Bartels: 1/1, 6/2; January (2), May (5); West Java. Measurements (13): av. 18.5 (17.1-19.7)  $\times$  13.4 (12.6-14.4). Weight (13): av. 0.170 (0.145-0.195).

Sody: 2/2, 1/5, 1/6; May; West Java. Measurements (15): av. 18.6 (17.4-19.5)  $\times$  13.6 (12.8-14.5). Weight (15): av. 0.165 (0.140-0.180).

Description. — The eggs are dirty grey, faintly and vaguely marked with darker grey spots and clouds.

Hoogerwerf: For 15 previously recorded breeding dates and 27 earlier measured eggs see Hoogerwerf (1949: 257-258, pl. 18 fig. 293).

Description. — Except in size the eggs show some resemblance to those of *Megalurus palustris* (no. 259), though they average in showing duller markings; certain specimens are much like the finely mottled eggs of *Passer montanus* (no. 325), though they average lighter in colour. They have a dull or faintly, sometimes higher glossy surface. The colour is pale olive grey, sometimes almost pure white, very thickly covered with numerous, irregular, not well defined points and small speckles, varying from grey to fairly dark sepia. The still duller secondary speckles and cloudy markings are greyish lavender. The shells are rather uniformly marked all over the surface, generally with a concentration at the larger end where may be a dull zone or cap. Occasionally the mottling is so faded and fine that it is hardly visible and other shells are really unmarked beyond the larger end. Once an aberrant, almost pure white egg was found besides two normal ones in the same set.

329. **Estrilda amandava punicea** (Horsfield) — Amandavat

Bartels: 1/2, 4/3, 3/4, 1/5, 2/6, 1/7; January (1), February (1), April (6),

May (2), June (1), July (1); West Java. Measurements (50): av. 14 (13-15.6)  $\times$  11 (10-11.6). Weight (46): av. 0.050 (0.048-0.057).

Description. — The colour is white with a moderate gloss.

Hoogerwerf: Weight (1/6): av. 0.056 (0.053-0.059). For three previously recorded breeding dates and 11 earlier measured eggs see Hoogerwerf (1949: 259).

Description. — The eggs do not differ importantly from those of the *Lonchura* species known to me from this part of the world. They have a dull or faintly glossy texture which is white or almost white without markings except those caused by nest dirt.

330. **Erythrura p. prasina** (Sparrrman) — Long-tailed Munia

Bartels: 1/1, 1/3, 1/4; May (2), September (1); West Java. Measurements (8): av. 16.4 (15.4-17.4)  $\times$  12.4 (12.1-12.8). Weight (8): av. 0.066.

Description. — The shells are of a lustreless white.

Hoogerwerf: Weight (1/4, 1/5): av. 0.068 (0.061-0.075); maximal variation in the same clutch: 0.006 (0.061-0.067). For two previously recorded breeding dates and ten earlier measured eggs see Hoogerwerf (1949: 259).

Description. — When compared with those of the *Lonchura* species from Java, the eggs average extremely large in size, but they do not differ from those in shape or colour. They have a smooth texture without or with hardly any gloss, which is fine white, not marked though sometimes soiled.

331. **Erythrura h. hyperythra** (Reichenbach) — Bamboo-Munia

Bartels and Hoogerwerf: No material or particulars available of this certainly not common species.

332. **Padda oryzivora** (Linnaeus) — Java Sparrow

Bartels: 1/1, 1/2, 1/4, 1/5, 2/6, 1/7; March (2), April (3), May (1), July (1); West Java. Measurements (30): av. 18.3 (17.1-20)  $\times$  13.5 (13-14.2). Weight (30): av. 0.110 (0.100-0.123).

Description. — The eggs are white without any gloss.

Hoogerwerf: For 85 previously recorded breeding dates and 50 earlier measured eggs see Hoogerwerf (1949: 260).

Description. — The eggs are much like those of the *Ploceus* species (no. 326, 327) discussed above, but they average smaller and duller. They have a



dull texture, sometimes slightly glossy which is of a uniform white, not marked, though often rather sallow because of some dirt.

333. **Lonchura leucogastroides** (Horsfield & Moore) — White-bellied Munia

Bartels: 1/3, 5/4, 3/5, 1/6; March (3), April (2), May (1), June (1), July (1), August (1), December (1); West Java. Measurements (44): av. 14.5 (13.2-16.6) × 10.7 (10.1-11.1). Weight (36): av. 0.050.

Description. — The colour is white without gloss.

Hoogerwerf: 2/3, 2/4, 2 odd eggs; West Java, without further particulars. Measurements (16): av. 14.79 (13.5-16.8) × 10.49 (9.6-11.3); largest egg: 16.8 × 11.3; maximal variation in length in the same clutch: 1.8 (13.8-15.6). Weight (23): av. 0.050 (0.042-0.063); maximal variation in the same clutch: 0.018 (0.045-0.063). One pigmy egg: 10 × 7.5; weight: 0.027. For 144 previously recorded breeding dates and 50 earlier measured eggs see Hoogerwerf (1949: 261).

Description. — Except in measurements the eggs do not differ from those of the other representatives of this genus. Perhaps the shells of the present species may average in being more soiled by nest dirt.

334. **Lonchura l. leucogastra** (Blyth) — White-bellied Munia

Bartels: No material available.

Hoogerwerf: No material available. For some previously published particulars see Hoogerwerf (1949: 261). The species is known from Java on account of only one specimen, obtained in the western part of this island (Hoogerwerf, 1949a).

335. **Lonchura p. punctulata** (Linnaeus) — Spotted Munia

Bartels: 1/2, 2/4, 3/5, 2/6; February (2), March (2), April (1), May (2), July (1); West Java. Measurements (37): av. 15.2 (13.6-16.3) × 11.1 (10.2-11.7). Weight (37): av. 0.055 (0.050-0.060).

Description. — The shells are white and show no gloss.

Hoogerwerf: 1/2; West Java, without further particulars. Measurements: 14.1 × 11.1, 14.7 × 11. Weight (1/2, 1/3, 1/5): av. 0.060 (0.054-0.064); maximal variation in the same clutch: 0.008 (0.054-0.062). For 70 previously recorded breeding dates and 55 earlier measured eggs see Hoogerwerf (1949: 261-262).

Description. — The eggs are much like those of the following species,

but they average smaller. They vary considerably in shape, showing a smooth, pure white texture, which might be slightly glossy, sometimes soiled.

**336. *Lonchura f. ferruginosa*** (Sparman) — Black-throated Munia

Bartels: 1/2, 2/4, 3/5, 1/6; January (2), March (5); West Java. Measurements (31): av. 16.5 (14.9-18.3) × 11.8 (11-12). Weight (31): av. 0.060 (0.057-0.068).

Description. — The colour is white without gloss.

Hoogerwerf: Weight (27): av. 0.066 (0.057-0.077); maximal variation in the same clutch: 0.09 (0.059-0.068). For eight previously recorded breeding dates and 36 earlier measured eggs see Hoogerwerf (1949: 262, pl. 18 fig. 294).

Description. — The eggs are much like those of the preceding species, though averaging larger in size.

**337. *Lonchura maja leucocephala*** (Raffles) — White-headed Munia

Bartels: 1/4, 5/5, 1/6; January (1), February (1), April (2), November (1), December (2); West Java. Measurements (35): av. 16.1 (14-17.3) × 11.4 (10.9-12). Weight (35): av. 0.060.

Kooiman: East Java. Measurements (14): av. 16.5 (15.4-17.8) × 11.9 (11.3-12.4). Weight (14): av. 0.068 (0.066-0.072).

Description. — The shells are white without gloss.

Hoogerwerf: For one previously recorded breeding date and five earlier measured eggs see Hoogerwerf (1949: 263).

Description. — Except in size the eggs are indistinguishable from those of both the preceding species.

DICRURIDAE

**338. *Dicrurus macrocercus javanus*** Kloss — Black Drongo

Bartels: 1/1, 8/2, 1/3, 1/4; May (6), June (2), August (1), September (1), October (1); West Java. Measurements (24): av. 25.7 (23.6-27.5) × 18.4 (17.3-19.3). Weight (24): av. 0.240 (0.230-0.275).

Description. — The colour is white to pale creamy, sparingly marked with brown or reddish brown spots, mainly at the blunt end. The eggs of two sets are immaculate white.

Hoogerwerf: 1 odd shell; Central Java, without further particulars. Measurements: 27.6 × 16.9. Weight (3/2, 1/3, 4 odd shells): av. 0.261 (0.227-0.280); maximal variation in the same clutch: 0.015 (0.264-0.279).

For 29 previously recorded breeding dates and 39 earlier measured eggs see Hoogerwerf (1949: 263-264, pl. 18 fig. 295).

Description. — The eggs show some resemblance to those of the following species, but they average more elongate-oval and darker in colour. They have a dull or faintly glossy texture. The colour is creamy white to cream, but also more buff or brownish, covered with not numerous sharply defined irregular, largely coarse points and, often circular, speckles of dark redbrown or warm sepia, occasionally ranging to almost black. The conspicuous secondary markings vary in different tints of vinaceous grey. Most mottling is on the blunt end, however, usually without forming a zone or cap; beyond this region the shells are rather thinly marked, in some exceptional cases more intensively.

339. **Dicrurus l. leucophaeus** Vieillot — Ashy Drongo

Bartels: 9/1, 20/2, 2/3; March (1), April (9), May (14), June (6), July (1); West Java. Measurements (50): av. 24.2 (21.1-26.5) × 18 (17.1-19.5). Weight (44): av. 0.220 (0.190-0.255).

Description. — The eggs are greyish white to warm creamy or salmon coloured, rather sparingly, but handsomely marked with yellowish brown, occasionally reddish brown blotches, mainly at the blunt end; striking underlying shell-marks.

Hoogerwerf: 1/2, 2 odd shells; May; West Java. Measurements (4): av. 23.05 (22.4-23.8) × 17.56 (17-17.9); largest egg: 23.8 × 17.5; maximal variation in length in the same clutch: 0.6 (22.4-23). Weight (4/2, 2 odd shells): av. 0.231 (0.212-0.252); maximal variation in the same clutch: 0.010 (0.227-0.237). For 17 previously recorded breeding dates and 14 earlier measured eggs see Hoogerwerf (1949: 264-265, pl. 18 fig. 296).

Description. — The eggs are much like those of the preceding species, but they average lighter in colour. They have a smooth texture without or with hardly any gloss. The colour is chalky white or somewhat buffy white or creamy, marked with fairly many irregular, sharply defined, partly almost circular points and coarse speckles and dots of light to dark sepia or chestnut, ranging to very dark redbrown and Indian red, often brownish black in the darkest ones. The very conspicuous underlying markings are light greyish lavender to vinaceous lilac. Generally the eggs are most densely marked at the larger end without forming a distinct cap or zone, but not exactly scarce beyond this region.

340. **Dicrurus hottentottus jentinki** (Vorderman) — Hair-crested Drongo

Bartels: 1/3; August; East Java. Measurements (3): av.  $28.6 \times 20.1$ . Weight (3): av. 0.310.

Kooiman: 2/3; East Java (without further particulars). Measurements (6): av.  $28.9 (28.2-30) \times 20.4 (20-20.6)$ . Weight (6): av. 0.310.

Description. — Greyish with a pinkish tint, marked with a few reddish brown spots; underlying shell-marks.

Hoogerwerf: 1/2; October; Flores (subsp. *bimaënsis*). Measurements:  $28.6 \times 20$ ,  $28.6 \times 20.5$ . Weight (2): 0.319, 0.328. Not previously recorded by the present author.

Description. — Because of the similarity in the measurements and the very light, almost pure white ground, both examined eggs are much like those of *Dicrurus paradiseus* (no. 342), but they are finer marked. They have a smooth faintly glossy surface, which is chalky white, mottled with not many very dark brown, almost black points and not very coarse speckles, which are sharply defined. The secondary stains are more numerous and rather conspicuously present; they are vinaceous- and lavender grey. Most mottling is at the blunt end without forming a zone or cap, but not exactly scarce on the remaining part of the shell.

340a. **Dicrurus hottentottus termeuleni** (Finsch) — Hair-crested Drongo of West Java

Bartels and Hoogerwerf: No material or particulars available.

Remarks. — Comparison of birds of this species from West Java with material from the eastern part of this island made it evident that the subspecies *jentincki* cannot be united with *termeuleni* (cf. Hoogerwerf, 1962a) as previously suggested by me (1949: 265, footnote).

341. **Dicrurus r. remifer** (Temminck) — Lesser Racquet-tailed Drongo

Bartels: 1/1, 3/2; April (3), November (1); West Java. Measurements (7): av.  $27.3 (25.8-28.2) \times 18.5 (17.2-19.1)$ . Weight (6): av. 0.23 (0.21-0.25).

Description. — The eggs are pinkish creamy, sparingly and vaguely marked with reddish brown spots and blotches, mainly at the blunt end; underlying shell-marks.

Hoogerwerf: 2/2, 1 odd shell; April; West Java. Measurements (5): av.  $24.76 (24-26.3) \times 17.92 (17.6-18.2)$ ; largest egg:  $26.3 \times 18.1$ ; maximal variation in length in the same clutch: 1.3 (25-26.3). Weight (6/2, 2 odd shells): av. 0.233 (0.204-0.258); maximal variation in the same clutch:

0.029 (0.229-0.258). For six previously recorded breeding dates and 12 earlier measured eggs see Hoogerwerf (1949: 266, pl. 19 fig. 297, 298).

Description. — Generally the eggs differ from those of the other drongo species known to me on account of the much darker ground and the paler markings. They have a dull or slightly glossy texture which is salmon coloured or salmon buff, marked with usually not very numerous, largely fairly coarse speckles and dots, which are light to dark rusty brown, but almost invariably ill-defined and faded. The secondary mottling, usually conspicuously present, is light ashy- to vinaceous grey. Certain eggs show some darker and better defined markings and exceptionally they are very fine. Most stains are at the larger end, but usually there is no zone or cap and they are almost never numerous beyond that area.

Remarks. — These eggs and 12 previously measured specimens average smaller in size than seven eggs of the Bartels collection, though the weights are almost identical.

342. **Dicrurus paradiseus formosus** (Cabanis) — Larger Racquet-tailed Drongo

Bartels: 2/1, 1/2, 1/3; October (1), November (1), December (2); West Java. Measurements (7): av. 26.4 (23.2-28.9) × 20 (19.6-21). Weight (7): av. 0.325 (0.300-0.380).

Description. — The shells are: (a) white, sparingly but distinctly marked with brownish black blotches, mainly at the blunt end; underlying shell-marks; and (b) creamy, less sparingly marked with small spots and clouds; shell-marks.

Remarks. — One set contains an egg of *Cuculus micropterus* (no. 107).

Hoogerwerf: 1 odd shell; December; West Java. Measurements: 28.7 × 20.8. Weight (1/3): av. 0.322 (0.319-0.328). For one previously recorded breeding date and three earlier measured eggs see Hoogerwerf (1949: 267, pl. 19 fig. 299, 300).

Description. — Most closely resembling the eggs of *Dicrurus hottentottus* (no. 340), but more coarsely marked. The colour is white or almost white, perhaps mixed with some rose, covered with not very many, but largely very coarse speckles and dots which may be sharply defined and dark, but also poorly defined and faded. Their colour is black or almost black, often mixed with sepia in the dark, much lighter, more rusty brown in the paler mottled shells. The conspicuous secondary markings are ashy, passing into nearly black in the darkest ones. Most mottling is at the larger end without forming a zone or cap.

## ORIOLIDAE

343. **Oriolus chinensis maculatus** Vieillot — Black-naped Oriole

Bartels: 6/1, 13/2, 1/3; February (2), March (3), April (2), May (9), June (3), October (1); West Java. Measurements (34): av. 31.2 (27.3-34.2) × 21.6 (20.1-23.2). Weight (34): av. 0.370 (0.320-0.415).

Description. — The eggs are white with a moderate gloss, sparingly marked with almost black blotches and smaller spots, mainly at the blunt end.

Hoogerwerf: Weight (1/2): 0.345, 0.360. For 46 previously recorded breeding dates and 17 earlier measured eggs see Hoogerwerf (1949: 268, pl. 19 fig. 301).

Description. — The eggs have a smooth, glossy surface. The colour is chalky white or mixed with some rose, mottled with numerous, very sharply defined primary points and fairly coarse speckles, largely almost circular, which are black or sepia tinged black, often surrounded by a dull vinaceous or light Vandijke red numbus. The secondary markings are scarce, though in some exceptional cases rather plentiful and nearly always well defined and conspicuous; they are light to dark ashy. Many shells are most densely mottled at the larger end, often forming an open zone and scarcely present elsewhere.

344. **Oriolus x. xanthonotus** Horsfield — Black-headed Oriole

Bartels: 2/2; May, June; Mount Masigit, Preanger, West Java. Measurements (3): av. 24.8 × 17.8. Weight (3): av. 0.305.

Description. — The shells are white with a moderate gloss, rather densely marked with yellowish brown blotches, mainly at the blunt end.

Hoogerwerf: No material available. The species is certainly not common in Java. For some particulars derived from the literature see Hoogerwerf (1949: 269).

345. **Oriolus c. cruentus** (Wagler) — Black- and Crimson Oriole

Bartels: 1/2; May; Mount Pangerango, Preanger, West Java. Measurements (2): av. 32.3 × 22.2. Weight (2): av. 0.40.

Description. — The eggs are white with only little gloss, sparingly marked with purplish black blotches (penumbrae), mainly at the blunt end.

Hoogerwerf: No material or particulars available.

## CORVIDAE

346. **Platylopus g. galericulatus** (Cuvier) — Jay-Shrike

Bartels: 1/1, 1/2; January, December; Mount Masigit, Preanger, West Java. Measurements (3): av. 30.7 × 21.7. Weight (3): av. 0.41.

Description. — The colour is pale blue, rather sparingly and vaguely marked with reddish brown blotches, mainly at the blunt end.

Hoogerwerf: For one previously recorded breeding date and one earlier measured egg from Mount Salak, West Java, see Hoogerwerf (1949: 269, pl. 19 fig. 302).

Description. — The only egg examined is normal-oval with rather distinctly different ends and a smooth, dull not glossy texture. The colour is greenish white, marked with numerous irregular, largely coarse and not too well defined, dull speckles and dots, which are very light rusty- or vinaceous brown. The underlying mottling is not less numerous, well defined and fairly conspicuous, because of its dark tint of heliothrope- or violet grey. Most markings are at the blunt end forming a distinct, though faded cap, but they are certainly not scarcely present beyond this area.

347. **Cissa t. thalassina** (Temminck) — Green Magpie

Bartels: 1/1, 4/2; January, February, April, September, December; West Java. Measurements (9): av. 32.9 (31.1-34.3) × 22.3 (22-22.9). Weight (9): av. 0.48 (0.42-0.50).

Description. — The colour is white with a greyish or bluish tint, finely and densely marked with brown and yellowish brown blotches and small clouds.

Remarks. — An additional set of two eggs is doubtful; measurements: 28.2 × 18.1, 26.8 × 18.2; av. weight: 0.225. In these shells the ground is dirty yellowish green marked with yellowish brown blotches and small clouds.

Hoogerwerf: Weight (3/2): av. 0.517 (0.481-0.539); maximal variation in the same clutch: 0.052 (0.481-0.533). For three previously recorded breeding dates and the measurements of these six eggs see Hoogerwerf (1949: 270, pl. 19 fig. 303).

Description. — Except in measurements the eggs show some resemblance to those of the following species, but the markings average much finer and duller, almost invariably forming a distinct cap. The shells have a smooth, slightly or better glossy texture, which is perhaps most often greenish- or greyish chalky white, almost entirely covered with very numerous, ill-defined and faded points and speckles of a light to dark Isabella tint, ranging to brownish olive. The inconspicuously present secondary mottling is dirty lavender grey, most strikingly observable at the larger end, giving a greyish shade to the concentrated markings, forming a distinct though dull zone.

348. **Crypsirina temia** (Daudin) — Racquet-tailed Magpie

Bartels: 3/2, 2/3; January (1), June (2), July (1), September (1); West

Java. Measurements (11): av. 24.9 (23.6-27.4) × 18.1 (17.8-18.5). Weight (11): av. 0.245 (0.235-0.255).

Description. — The colour is pale greenish, finely marked with small yellowish brown and olive brown spots.

Hoogerwerf: Weight (1/2, 1/3): av. 0.254 (0.237-0.275); maximal variation in the same clutch: 0.010 (0.239-0.249). For ten previously recorded breeding dates and 11 earlier measured eggs see Hoogerwerf (1949: 271, pl. 19 fig. 304, 305).

Description. — Except in size the eggs show some similarity to those of the preceding species, but the markings average coarser and they do not show such a pronounced zone. They have a dull or faintly glossy texture, which is white or ivory, but most often almost invisible on account of the dense, poorly defined fine points and coarser speckles and smears of buffy- to brownish olive, passing into dark olive brown in the darkest ones. The secondary mottling, not or hardly observable, is greyish, largely lavender grey to dirty mouse-grey. Most mottling is on the blunt end where it may form a dark cap or zone. Generally beyond this region the shells are densely marked too.

349. **Corvus m. macrorhynchos** Wagler — Larger-billed Crow

Bartels: 4/3, 1/4, 3/5; August; West Java. Measurements (27): av 44.1 (41.2-50) × 30.4 (29.6-31.8). Weight (27): 1.43 (1.24-1.47).

Description. — The eggs are olive green, rather densely marked with well-defined olive brown blotches and clouds. The shells of one set are marked with purplish grey blotches.

Remarks. — One pigmy egg measures: 27.8 × 22.8 and has a weight of 0.51.

Hoogerwerf: 1/4; August; Central Java. Measurements (4): av. 46.35 (45-48) × 31.43 (31-31.8); largest egg: 48 × 31.2. Weight (1/4, 1 odd shell): av. 1.186 (0.960-1.385). For 28 previously recorded breeding dates and 17 earlier measured eggs see Hoogerwerf (1949: 272, pl. 19 fig. 306).

Description. — Besides in measurements the eggs differ from those of the following species because of their coarser and duller markings. They have a dull or faintly glossy, occasionally somewhat rougher texture which is pale to a trifle darker bluish green, often mixed with some olive, generally rather densely covered with dull, ill-defined irregular, largely very coarse smears, speckles and dots, which are yellowish- to dark olive, ranging to olive sepia. In most eggs distinct secondary markings are not or hardly



observable, but certain shells show a predomination of an underlying mottling of lavender- to olive grey. Usually the eggs are most thickly mottled at the larger end, forming an indistinct cap; occasionally there are only few stains beyond this area, although it is more common perhaps to find them rather abundantly present everywhere, but always faded except some rare almost black points or small speckles.

350. **Corvus e. enca** (Horsfield) — Slender-billed Crow

Bartels: 6/3, 4/4, 2/5; January (4), April (1), May (1), October (2), November (2), December (2); West Java. Measurements (41): av. 40.4 (38-47.3) × 28.1 (27-30.7). Weight (41): av. 1.01 (0.98-1.16).

Description. — The colour is clear blue, marked umber brown; some eggs, however, are almost or entirely unmarked.

Remarks. — There is one pigmy egg measuring: 35 × 25.3, weighing 0.75.

Hoogerwerf: 1/4; October; Central Java. Measurements (4): av. 41.3 (39-42.5) × 28.4 (27.9-28.8); largest egg: 42.5 × 28.8. Weight (1/2, 1/3, 1/4): av. 1.066 (1.035-1.126); maximal variation in the same clutch: 0.048 (1.035-1.083). For 11 previously recorded breeding dates and 38 earlier measured eggs see Hoogerwerf (1949: 273, pl. 9 fig. 101 and pl. 19 fig. 307).

Description. — Besides in size the eggs differ from those of the preceding species because of their clearer bluish green tint and the finer and sharper defined markings, though this latter character is not always so distinctly present. The shells have a fairly rough, dull or faintly glossy texture, which is light to a trifle darker bluish green, more or less sea-green, covered with usually fairly numerous, largely fine and sharply defined points and speckles. They vary in colour from light to dark olive brown, sometimes ranging to black. The secondary markings may be more numerous and coarser than the primary ones, but sometimes they are not or hardly observable; they vary in colour from vinaceous- and mouse-grey to dark olive grey. Generally there is a light concentration of markings at the larger end, however, without forming a distinct cap or zone, and in some exceptional cases the eggs are very thinly marked or show hardly any stains.

Shells in which the markings are duller, partly showing the character of smears, are not exactly rare, but they too are finer marked than those of *Corvus macrorhynchos* use to be.

Remarks. — The shell of the Bartels collection indicated above as a pigmy egg is most probably the egg of *Eudynamys scolopacea* (no. 115) with which it matches in size and weight.

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