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## Systematic Notes on Palearctic Birds, No. 49 Columbidae: The Genus *Streptopelia*

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The present paper completes my study of the Palearctic Columbidae. Five species (*roseogrisea*, *decaocto*, *senegalensis*, *turtur*, and *orientalis*) are reviewed, and the relationships of two species pairs (*roseogrisea* and *decaocto*, and *turtur* and *orientalis*) are discussed.

This study is based primarily on the collections of the American Museum of Natural History, but specimens were lent to me by Mr. J. D. Macdonald from the collection of the British Museum (Natural History), and I have used also large series collected by Dr. Walter N. Koelz that were lent by Dr. A. L. Rand and Mr. M. A. T aylor from the collection of the Chicago Natural History Museum, and by Dr. R. W. Storer from that of the Museum of Zoology of the University of Michigan. To these colleagues I am much indebted for their help, and my thanks are due also to Prof. E. Stresemann who compared for me some skins that I had sent him with others in the Museum of Zoology of Berlin, and supplied information on birds collected by Hemprich and Ehrenberg in 1822; and to Mr. Derek Goodwin of the British Museum and Mr. Josh Wallman of New York for making available to me their unpublished notes on some species. I have also discussed with Mr. Wallman the relationships of the doves of this genus, especially those of *roseogrisea* and *decaocto*. It is a pleasure to acknowledge my debt to all those mentioned for much prompt and very cordial assistance.

*STREPTOPELIA ROSEOGRISEA* AND *STREPTOPELIA DECAOCTO*

The Pink-headed Turtle Dove (*roseogrisea*) and the Collared Turtle Dove (*decaocto*) resemble each other in general appearance and are allopatric, *roseogrisea* inhabiting Africa in the dry zone south of the Sahara eastward to western Arabia, and *decaocto* inhabiting Eurasia. They seem to be closely related, and some authors, such as Meinertzhagen (1954) and Cave and Macdonald (1955), consider them conspecific, but the large majority believe they are separate species, an opinion in which I concur. *Roseogrisea* is a distinctly smaller bird, with a shorter wing and tail, and differs also from *decaocto* by having larger white spots at the tip of its tail and by being white, rather than slate gray, on the outer web of the outer rectrices and on the under tail coverts. These differences were mentioned by Hartert (1916), who emphasized also that the voice of the two birds is different. In a large series of *decaocto* and *roseogrisea* measured by Wallman (MS), the average wing length in males measures 175 and the tail length 126 in *decaocto*, as against, respectively, 159.5 and 107.9 in *roseogrisea*, the tail being thus about 5 per cent shorter in *roseogrisea*, a relatively slight but quite noticeable difference in skins of comparative make.

The putative ancestry of the domestic ring dove ("*risoria*") has caused much discussion. A few authors, such as Peters (1937, p. 92), consider that "*risoria*" was derived from *decaocto*. Peters states that "A pale variety [i.e., '*risoria*'] is found under domestication," but he offers no explanation, and most authors believe that *roseogrisea*, not *decaocto*, is the ancestor of the domestic dove. This was the opinion of Hartert (*loc. cit.*), supported recently by Taibel (1951). The domestic dove is more similar to *roseogrisea* in every respect, including voice, than it is to *decaocto*, and Wallman (MS) concludes that it "... is almost certainly descended from *S. roseogrisea*."

*Streptopelia roseogrisea*

The geographical variation of the Pink-headed Turtle Dove is slight, and it probably would be best not to recognize any subspecies, synonymizing *arabica* Neumann, 1904, type locality, Aden, and *bornuensis* Bannerman, 1931, type locality, northeastern Nigeria, with *roseogrisea* Sundevall, 1857, type locality, Nubia. However, the axillaries average somewhat darker in the birds from the coastal districts of the Red Sea, pale blue-gray, rather than white or whitish, and this difference may warrant the recognition of *arabica*. I cannot confirm any other evidence of geographical variation and consider *bornuensis* a synonym of nominate *roseogrisea*.

Bannerman (1931, p. 115) stated that specimens from northern Nigeria west to the Niger River and north to Zinder and the Aïr are "darker throughout," especially below, than the birds of the Sudan, and named them *bornuensis*. Paludan (1936, p. 289) confirmed the validity of *bornuensis*, stating that his two specimens from Tombouctou agree with *bornuensis* and are darker than one from Zinder and some from Darfur and Khartoum. Nevertheless, I find that Hartert (1921, p. 901) is correct in stating that the series of six specimens from Zinder in the Rothschild Collection is indistinguishable from topotypical nominate *roseogrisea*. I can also match perfectly with the latter a paratype of *bornuensis*, a specimen from the region of Maroua in northern Cameroon, one from Baroua on Lake Chad, one from Gangara, 90 kilometers north of Zinder, and six from the Aïr. The specimens from Gangara and the Aïr were reported by Hartert (1924, p. 11). Niethammer (1955, p. 45) has found also that his specimens from the Ennedi and Aïr are indistinguishable from nominate *roseogrisea*.

*Streptopelia decaocto*

The Collared Turtle Dove ranges from Europe eastward to India and Burma and from eastern Russian Turkestan to Korea and also Japan, where it was introduced in Hondo but has now greatly decreased. Its original range is a matter of speculation but probably consisted of the semi-arid or drier regions of southern and central Asia. It appears to have been introduced early in Iran and from there was introduced or expanded (probably both) westward to Iraq, the Near East, Turkey, and southeastern Europe. It was known in Turkey in the sixteenth century and perhaps earlier, and in the Balkans at the end of the eighteenth century. From this last region it began to spread westward in the late 1920's, reaching Sweden in 1949, England in 1952, and northern Estonia in 1957. It is still spreading, and in 1959 had turned into eastern France, reaching the Marne River not far from Paris.

The expansion of this bird has been carefully studied by Stresemann and Nowak (1958), but I do not share their conclusion concerning the origin of the birds of northern China. These authors believe that this dove was probably ("*wahrscheinlich*") brought to northern China by sea from India and then escaped to settle this region. Unfortunately, Stresemann and Nowak can offer no proof, and, in principle, it seems to me that it would have been much easier, not to say cheaper and less risky, for the Chinese of Peking to have introduced this dove from western China and nearby Inner Mongolia. These regions, where the bird is native, are, so to speak, in their own backyard, but India was a very

long sea voyage away and boats cannot have been many. At any rate, the specimens that have been collected in northern China are identical or more similar to those of western China and Chinese Turkestan than they are to the birds of India, which suggests that they were derived from western China, perhaps by natural expansion or through introduction or both. Most authors, in fact, identify the birds of northern China as *stoliczkae*, a name given to the populations of western China and Chinese Turkestan.

Stresemann and Nowak and virtually all authors have divided the populations of *decaocto* into three subspecies: nominate *decaocto* Frivaldszky, 1838, type locality, "Turkey" (but based on specimens collected at Plovdiv, Bulgaria, which was then a Turkish possession); *stoliczkae* Hume, 1874, type locality, Kashgar, Chinese Turkestan; and *xanthocyclus* Newman, 1906, type locality, Burma. The last-named is a very distinct race which differs by being considerably darker and by having an area of bare yellow skin around the eye, the other populations being more feathered and gray or whitish around the eye. *Xanthocyclus* is restricted to Burma, where it is found in the dry zone in the valleys of the Chindwin and Irrawaddy south to Arakan, and requires no discussion.

Hartert (1920) correctly recognized only two subspecies (*xanthocyclus* and nominate *decaocto*) but remarked that the names *stoliczkae* and *intercedens* were available, respectively, for the birds of central Asia and India, if the former proved to be larger and the latter smaller and darker. *Intercedens* C. L. Brehm, 1855, was based on a specimen that apparently came from tropical India, although Brehm believed that it had been collected in North Africa, where, however, the species is unknown. The validity of *intercedens* has not been acknowledged, but *stoliczkae* is generally recognized on the ground that it differs from nominate *decaocto* by being larger, paler, and by having longer white tips on the lateral rectrices. For instance, Hellmayr (1929, p. 133) states that "In Turkestan birds the wing, regardless of sex, ranges from 180 to 186, as against 160–175 in *decaocto*," though he grants that in "a few" birds from Macedonia the wing measures "180 mm. or more."

The specimens that I have measured from southeastern Europe and Turkey do not differ appreciably in size from topotypical *stoliczkae* from Kashgar and Yarkand, the wing length in the latter measuring 176–187 (183.8) in seven males and 169–178 (174) in three females, as against 178–185 (182) in six males and 177, 179 in two females from Europe and Turkey. The specimens listed below show a great deal of overlap, and I cannot confirm a difference in the size of the white tip or a constant one in color. A few individuals from Europe or China are

a little darker than topotypical *stoliczkae*, but the difference is extremely slight and the great majority are identical. Specimens from Iran, Afghanistan, and Transcaspia match also the birds of Chinese Turkestan. I believe, therefore, that *stoliczkae* should be synonymized with nominate *decaocto*.

The birds of India average distinctly smaller and also slightly darker. In a few, which match the type of *intercedens*, the under tail coverts are pale slaty-gray, darker than in birds from the rest of the range. Nevertheless, I do not advocate the recognition of *intercedens*, as too many specimens from India cannot be distinguished from nominate *decaocto* in size or coloration. This evidence of geographical variation is of interest and seems to be correlated with climate, the birds of India inhabiting tropical or subtropical regions which, generally speaking, receive a greater rainfall.

The white tips of the tail are smaller in India, but a statistical analysis made by Josh Wallman shows that the size of the white area is significantly correlated with the length of the tail. The latter averages about 10 mm. shorter in India, and the greatest length of the white area about 5 mm. shorter. The proportion of the white area remains about the same throughout the range, the white area being 35 per cent of the length of the tail in specimens from Kashgar and Yarkand, 36 per cent in southeastern Europe, and 34 per cent in India.

The wing lengths are as follows:

MACEDONIA: Males, 179, 181, 184, 185; females, 177, 179.

MACEDONIA (MEASURED BY STRESEMANN, 1920, PP. 240-241): Nineteen males, 172, 173, 175, 175, 176, 176, 177, 178, 178, 179, 180, 180, 180, 180, 181, 181, 183, 184, 185 (178.6); 15 females, 170, 171, 172, 172, 172, 174, 174, 176, 177, 177, 177, 178, 180, 182, 184 (176).

ALBANIA: Male, 185.

TURKEY: Male, 178.

KASHGAR AND YARKAND: Males, 185, 185, 185, 185; female, 178.

KASHGAR AND YARKAND (MEASURED BY ROONWAL, 1940, P. 446): Males, 176, 184, 187 (type of *stoliczkae*); females, 169, 175.

KANSU: Male, 185; females, 180, 181, 182.

SHENSI: Males, 174, 181, 182, 185; females, 175, 177, 178, 179, 180, 183, 184.

SHANTUNG: Males, 177, 183, 183; female, 181.

HOPEH: Males, 175, 178, 179, 179, 182, 185; females, 172, 179, 182.

HONDO: Male, 177.

INDIA: Forty-one males, 160, 162, 162, 162, 164, 164, 164, 165, 166, 166, 166, 166, 167, 167, 169, 169, 169, 169, 170, 171, 171, 171, 171, 171, 172, 172, 173, 173, 173, 173, 174, 175, 175, 175, 175, 176, 177, 179, 179, 181, 182 (170.4); 22 females, 157, 161, 162, 164, 164, 165, 165, 165, 165, 165, 165, 166, 166, 167, 167, 168, 169, 169, 169, 170, 171, 177 (166.2). The type of *intercedens*, a female, measures 160, and is not included in the 22 other females.

*Streptopelia senegalensis*

The Laughing Dove<sup>1</sup> ranges from Africa, including the islands of São Tomé and Socotra, east to western Arabia, the Near East, and south-eastern Turkey, and, after a broad gap in distribution, from southern Iran to India, north to Transcaspia, Afghanistan, Russian Turkestan, and western Chinese Turkestan. It is strictly resident, as a rule, although a few individuals of the race *cambayensis* have been collected during the winter in Iraq and the Andamans where the species does not breed.

Its populations can be divided into two groups: the nominate *senegalensis* group in the west with four, possibly five, subspecies, and the *cambayensis* group, ranging from Iran eastward, with two subspecies. The birds of the nominate *senegalensis* group differ from those of the *cambayensis* group by being more richly colored, more vinaceous on the head and neck, and redder, much less brown, on the back. The subspecies are listed and discussed below.

1. *Streptopelia senegalensis phoenicophila* Hartert, 1916, type locality, Oumach near Biskra, southern Algeria. This race is duller and larger than the other races of the nominate *senegalensis* group. It inhabits southern and eastern Tunisia north to Cap Bon and some of the oases of the northern Algerian Sahara, where the distribution is curiously irregular, the bird being lacking in some oases which would seem to provide an ideal habitat. Among the oases where it is found can be listed Colomb Béchar, Figuig, Biskra south to the Mزاب (Berriane, Ghardaïa, Metlili, and Guerrara), Ouargla, and Toggourt. It is very common at El Goléa, the southernmost locality, where it was introduced, according to Heim de Balzac (1926, p. 106).

The wing length of the specimens of the nominate *senegalensis* group that I have measured are as follows: 145–153 (148.9) in seven males and 138–144 (142) in nine females of *phoenicophila*; 138–148 (143.3) in nine males and 136–146 (143) in four females of *aegyptiaca*; 132–146 (138.3) in 20 males and 128–140 (133.7) in 20 females of nominate *senegalensis*; and 122, 128, (125) in two males of *sokotrae*.

2. *Streptopelia senegalensis aegyptiaca* Latham, 1790, type locality, Egypt. This race is darker and more richly colored than *phoenicophila*, more vinaceous on the head and neck, redder on the back, and browner on the rump. It is the most richly colored race, and it inhabits Egypt from the Suez Canal and the Delta south in the Nile Valley where it grades into nominate *senegalensis* in the south.

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<sup>1</sup> Called also Palm Dove and, in India, Little Brown Dove.

?3. *Streptopelia senegalensis dakhlae* Meinertzhagen, 1928, type locality, Dakhla Oasis in the Western Desert of Egypt. This form, which I have not examined, is based on only two specimens and requires confirmation. It was said by Meinertzhagen (1928, p. 116) to be paler than *aegyptiaca*, "nearer" *sudanensis* but more sandy above and darker below, and more sandy than *aequatorialis*, but, in view of the fact that all other authors reject the validity of *sudanensis* and *aequatorialis*, some question must be raised also about the validity of *dakhlae*. The diagnosis of *dakhlae* is not convincing, and I suspect that this name will be synonymized eventually with nominate *senegalensis*. When Meinertzhagen (1954, p. 452) listed the races of *S. senegalensis*, he did not mention *dakhlae* (or *sudanensis* and *aequatorialis*), stating merely, "Other races have been described from Dakhla Oasis, Socotra, and São Thomé Island."

4. *Streptopelia senegalensis senegalensis* Linnaeus, 1766, type locality, Senegal, with the following synonyms: *aequatorialis* Erlanger, 1904, type locality, Abyssinia; *sudanensis* Sclater and Mackworth-Praed, 1920, type locality, Upper Nile Province, Sudan; and *thomé* Bannerman, 1931, type locality, São Tomé. The African populations of this species have been reviewed by Mackworth-Praed and Grant (1936, p. 604), White (1949, p. 282), and Amadon (1953, p. 413), who all agree that the three forms synonymized above cannot be upheld, although Mackworth-Praed and Grant do not mention *thomé* and would also include *sokotrae* among the synonyms, which seems to be incorrect. I have seen the same material studied by Amadon, which consists of series from São Tomé and Senegal and of about 170 specimens from other regions of Africa (not counting material of *phoenicophila*, *aegyptiaca*, and *sokotrae*), and have reached the same conclusion as Amadon.

The nominate race is smaller than either *aegyptiaca* or *phoenicophila*, more brightly colored than the latter but less richly colored than *aegyptiaca*; it is also more grayish on the rump, on an average, than the other two races. It ranges from Africa south of the Sahara and Egypt (with the exception of heavily forested regions or high altitudes) and São Tomé Island, north to Mauretania, the Aïr and Ennedi Massifs and the Sudan, and east to western Arabia, and the Near East north to southeastern Turkey. The birds of Arabia, Palestine, and Turkey differ somewhat from those of Africa, as stated by White (*loc. cit.*), and those of Arabia differ also slightly from those of Palestine and Turkey, but in my opinion these very poorly differentiated populations are best called nominate *senegalensis* to which they are most similar.

5. *Streptopelia senegalensis sokotrae* Grant, 1914, type locality, Socotra. Grant, in Mackworth-Praed and Grant (*loc. cit.*), would synonymize his

own race with nominate *senegalensis*, but the two birds I have seen from Socotra are very small and also very pale, paler than the great majority of the large series of nominate *senegalensis* mentioned above. White (*loc. cit.*) found also that his specimens from Socotra were small ("123–133 mm.") and "all very pale" and would maintain *sokotrae* pending further study, a conclusion with which I agree.

6. *Streptopelia senegalensis cambayensis* Gmelin, 1789, type locality, Gulf of Cambay, northwestern India, with *kirmanensis* Koelz, 1950, type locality, Kirman, southern Iran, as a synonym. This race, which ranges from southern Iran eastward through southern Afghanistan and Baluchistan to India, is much browner on the back than the races of the nominate *senegalensis*, as stated above. It is smaller also (see below), with the exception of *sokotrae*.

The birds of southern Iran and southern Afghanistan were named *kirmanensis* by Koelz, who states that they are paler below, more tinged with brownish, and have "much" paler rufous spots on the neck and throat, than the birds of India, but I cannot confirm the validity of *kirmanensis*. I have seen the same material used by Koelz and find that the specimens from southern Iran, southern Afghanistan, and India vary individually to about the same extent, and, if anything, the palest and most "brownish" individuals are from the Punjab, not Iran or Afghanistan. Ticehurst (1927, p. 73) has already stated that "there is no doubt" that the specimens he saw from Baluchistan and southern Afghanistan are *cambayensis*.

The population of Afghanistan does, however, show an interesting evidence of geographical variation, the birds from the region of Maimana in the west to Badakhshan in the northeast being distinctly larger than those from southern Afghanistan, southern Iran, and India and perhaps also very slightly paler. They are intermediate between *cambayensis* and *ermanni*. The wing length measures 124–135 (129.6) in 17 males and 121–129 (125.5) in 16 females of *cambayensis*, 130–142 (136.3) in nine males and 123–136 (128.8) in nine females from northern Afghanistan, and 140–145 (142.7) in three males and 133–144 (138.5) in four females of *ermanni*. These measurements suggest strongly that a cline of decreasing size runs from Turkestan southward through Afghanistan to India, and this cline seems also to be accompanied by one of increasing color saturation, although the difference between *ermanni* (paler) and *cambayensis* (darker) is not sharply marked, notwithstanding the fact that the palest individuals are undoubtedly found in Turkestan. Meinertzhagen (1938, p. 710) has identified two birds he collected at Haibak, northern Afghanistan, as *ermanni*, but the large



series I have seen shows that the population from this region is truly intermediate.

7. *Streptopelia senegalensis ermanni* Bonaparte, 1856, type locality, Bukhara. This race is similar to *cambayensis* but larger and slightly paler (see above). It ranges from the region of Ashkhabad in Transcaspia eastward through Russian Turkestan to western Chinese Turkestan (to at least Suiting in Dzungaria and Kashgaria), and north in the valleys of the Amu and Syr Daryas to the Aral Sea, the Transilian Ala Tau, and north of the valley of the Ili to Kara Bulak in the western foothills of the Dzungarian Ala Tau, which constitutes the northernmost locality; it does not occur, however, in the Kyzyl Kum.

#### *STREPTOPELIA TURTUR* AND *STREPTOPELIA ORIENTALIS*

These two doves are undoubtedly distinct species, as their breeding ranges overlap broadly, and as they differ also very clearly morphologically and in their voice, but some authors, especially Meinertzhagen (1954, p. 447), believe that they are conspecific. Meinertzhagen (*loc. cit.*) has published a map to support his contention that *turtur* and *orientalis* are allopatric, but this map is not correct. Among other inaccuracies, it indicates that the two species do not overlap in northern Afghanistan, although Meinertzhagen himself has reported (1938, p. 709) that they are sympatric in this region, having collected breeding birds of each in the Surkh Ab Valley in May, 1937. Meinertzhagen formerly did not consider them conspecific (as indeed his material from Afghanistan shows), but subsequently (1954) the only concession he makes concerning the true distribution is the following qualified statement, "In the area Gilgit, Kashgar, and Yarkand, there may be a slight overlap between *meena* [the western race of *orientalis*] and *arenicola* [the eastern race of *turtur*], but I can trace no reliable record of the two races actually breeding together."

Sharpe (1891, pp. 118–119) may be the only author who has actually reported that the two birds were collected at the same locality during the breeding season, but many authors have insisted that they breed in the same regions. Koelz did not publish a report on his collections, but collected breeding specimens of the two species at localities about 10 to 13 miles apart in the valley of the Kokcha River in northeastern Afghanistan. In view of the conflict in opinion, I have drawn the accompanying map (fig. 1) and discuss below the morphological differences that distinguish the two species. The difference in the voice is also mentioned.

My map (fig. 1) is based on the specimens that I have examined and

on the reports of Scully (1871), Sharpe (1891), Hellmayr (1929), Ludlow (1934), Meinertzhagen (1938), Whistler (1945), Meklenburtsev (1951), Johansen (1959), and Paludan (1959). It shows that the breeding ranges of *turtur* and *orientalis* overlap over a major part of Afghanistan, on the borders of Chinese Turkestan and of Dzungaria, on the eastern and also over a small area of the northwestern Kirghiz Steppes,

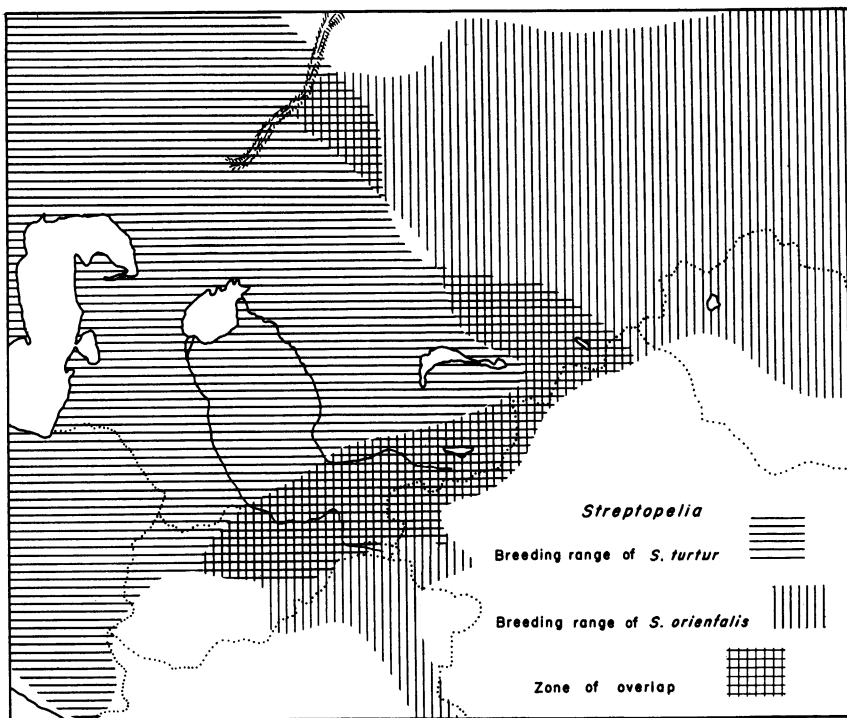


FIG. 1. Distribution of *Streptopelia turtur* and *S. orientalis* during the breeding season in the regions where they come into contact and overlap.

and in extreme western Siberia from the region of Kurgan to the eastern foothills of the Urals. The races involved are *S. turtur arenicola* and *S. orientalis meena*, except in western Siberia where *meena* overlaps with nominate *turtur*. The breeding range of the latter extends beyond the Urals to a distance of about 325 kilometers, and that of *meena* overlaps it on a relatively narrow front which reaches the Urals between about latitudes 54° and 56° N., a distribution that suggests relatively recent expansion on the part of the two species.

The two doves are similar in their color pattern, though not identical. The rufous edges of the coverts, scapulars, and innermost secondaries are broader and the mantle is more uniform, less distinctly barred, in *turtur*. The white tips of the rectrices are considerably larger and the rectrices narrower in *turtur* (fig. 2). The latter is also much smaller, more lightly built, and has a more pointed wing tip than

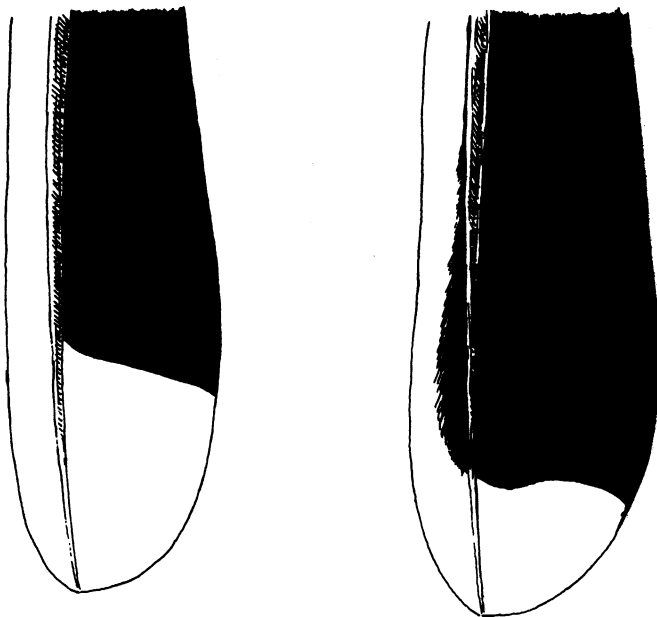


FIG. 2. Width and color pattern of the outer rectrices in *Streptopelia turtur* (left) and *S. orientalis* (right).

*orientalis*. Specimens of the two species can be identified at the most superficial glance. The wing length of 20 males of *arenicola* measures 163–176 (169.5) and of 10 females 161–173 (166.9), as against 188–205 (196) in 20 males and 185–203 (192.3) in 18 females of *meena*.

The difference in the shape of the wing tip appears to be a specific character, not merely an adaptation to migratory habits. *Turtur* is more highly migratory than *orientalis*, generally speaking, and we would expect it to have a more pointed wing, but the difference in shape is very apparent even when we compare a population of *orientalis* which undertakes long migrations with one of *turtur* which does not. For instance, in specimens of *turtur hoggara* from the mountains of the central and

southern Sahara, the first (outer) primary is equal to or only slightly shorter than the second, the third shorter than the second, and the fourth shorter than the other three, the fourth being about 15–20 mm. shorter than the first. In specimens of nominate *orientalis* from eastern Siberia, the first is distinctly shorter than the second (about 8 mm.), the second and third are subequal, and the fourth is only 5–8 mm. shorter than the first, or may be equal to it. Birds from eastern Siberia winter as far south as southern Indochina, a distance that may exceed 6000 kilometers, whereas the birds of the mountains of the Sahara are either sedentary (I have examined winter specimens) or migrate for a distance of only about 1000 kilometers.

The voice of the two species seems to be very different, judging by the description of Tucker (1940). He says that the “ ‘Song of Turtle-Dove [*turtur*] is a deep, crooning or purring note ‘rrōōrrrr, rrōōrrrr, rrōōrrrr,’ ” and that of *orientalis* “ a dull sleepy drone ‘cōōō-cōōō-kakōōr’ .”

#### *Streptopelia turtur*

The Turtle Dove is widely distributed from Europe (with the exception of the Scandinavian Peninsula, where it occurs occasionally but does not breed) eastward to western Siberia, Afghanistan, and western Chinese Turkestan, and south to the Canaries, the Sahara, Egypt, and northern Sudan. It is highly migratory and winters in Africa in Senegal south to the Gambia, Sudan, and Abyssinia, but the winter quarters and migrations of this common bird are not well known. It has been reported, however, as migrating in very large numbers through the western Sahara and presumably crosses the desert.

It varies geographically, and four subspecies have generally been recognized, but the material that I have seen suggests that an additional and very distinct subspecies can be recognized in Egypt.

The five races are reviewed below.

1. *Streptopelia turtur turtur* Linnaeus, 1758, type locality, England, with *moltonii* Trischitta (1939, p. 3), type locality, Sardinia, as a synonym. The nominate race inhabits Europe eastward to western Siberia, Turkey, Syria, and Transcaucasia, and also Corsica, Sardinia, Sicily, Crete, Cyprus, and the Canaries. It grades into *arenicola* in northwestern Iran and along the southern Caspian districts of that country. Some authors include Madeira within the breeding range, but I know of no records from that island, even of migrants.

2. *Streptopelia turtur arenicola* Hartert, 1894, type locality, Fao, at the head of the Persian Gulf, Iraq, with *loëi* von Jordans, 1923, type local-

ity, Mallorca, as a synonym. This race, which occupies a very great range, is similar to nominate *turtur* but differs from it by being paler and by averaging smaller. It inhabits northern Africa from Morocco to Cyrenaica, south to the Sous Valley and the region of Assa south of the Jebel Bani in Morocco and the oases of the northern Algerian Sahara, and Asia from Palestine eastward through Iraq and Iran to northern Afghanistan, Transcaspia, and Russian Turkestan east to western Chinese Turkestan and north to the region north of the Aral Sea and the southern Kirghiz Steppes. A single specimen has been collected also on June 22, 1929, in Mongolia in the central Gobi; this bird was reported by Kozlova (1932, p. 587).

The populations from this great range are not uniform, as the birds of Africa are darker and larger than those of Asia. In Asia, the birds of the mountains of Turkestan are also somewhat darker than those of Afghanistan, Iran, Iraq, and of the lowlands and deserts of Transcaspia, a fact that has already been mentioned by Hartert (1894), the variation being probably clinal in Asia. Some individuals from Africa are indistinguishable from nominate *turtur* from Europe, but the birds of Africa are, taken as a whole, intermediate in coloration and size between those of Europe and typical *arenicola* from western Asia. The wing length of 20 males from each of these three populations measures: Europe, 173–182 (178); Africa, 166–180 (173); western Asia, 163–176 (169.7).

The specimens that I have seen from the Balearic Islands are indistinguishable from those of Africa, and I therefore consider *loëi* a synonym of *arenicola*.

The use of the name *arenicola* for the eastern race is somewhat unfortunate, as I believe that Hartert should have used the name *rufidorsalis* C. L. Brehm, 1855 (type locality, "Südosteuropa, im Winter in Nordostafrika"), rather than proposing *arenicola*, but when he described the latter he was unaware of the existence of *rufidorsalis*. He considered *rufidorsalis* subsequently (1918, p. 51), suggesting that *arenicola* might be a synonym of it, but finally concluded that *rufidorsalis* was indeterminate. He states: "There is only one bird in the Brehm collection labelled *rufidorsalis*. It is quite possible that it is the only specimen which Brehm had, when he created the name *rufidorsalis*, and perhaps the only one that Reichenbach saw. It is a female shot by A. E. Brehm at Khartum, 6 iv 1851. The coloration is somewhat intermediate between that of *Streptopelia turtur* and *arenicola*. It is therefore uncertain and cannot supersede the name *arenicola* of 1894." Nevertheless, I find, after comparing the putative type of *rufidorsalis* to the type of *arenicola*, that it is



FIG. 3. Coloration of the upper parts in *Streptopelia turtur rufescens* (left, Dakhla Oasis, March 25, 1928) and *S. turtur isabellina* (right, Kerma, northern Sudan, February 25, 1904). Both were compared to the lectotype of *rufescens*; the bird from Dakhla Oasis matches it, but that from Kerma is much paler throughout.

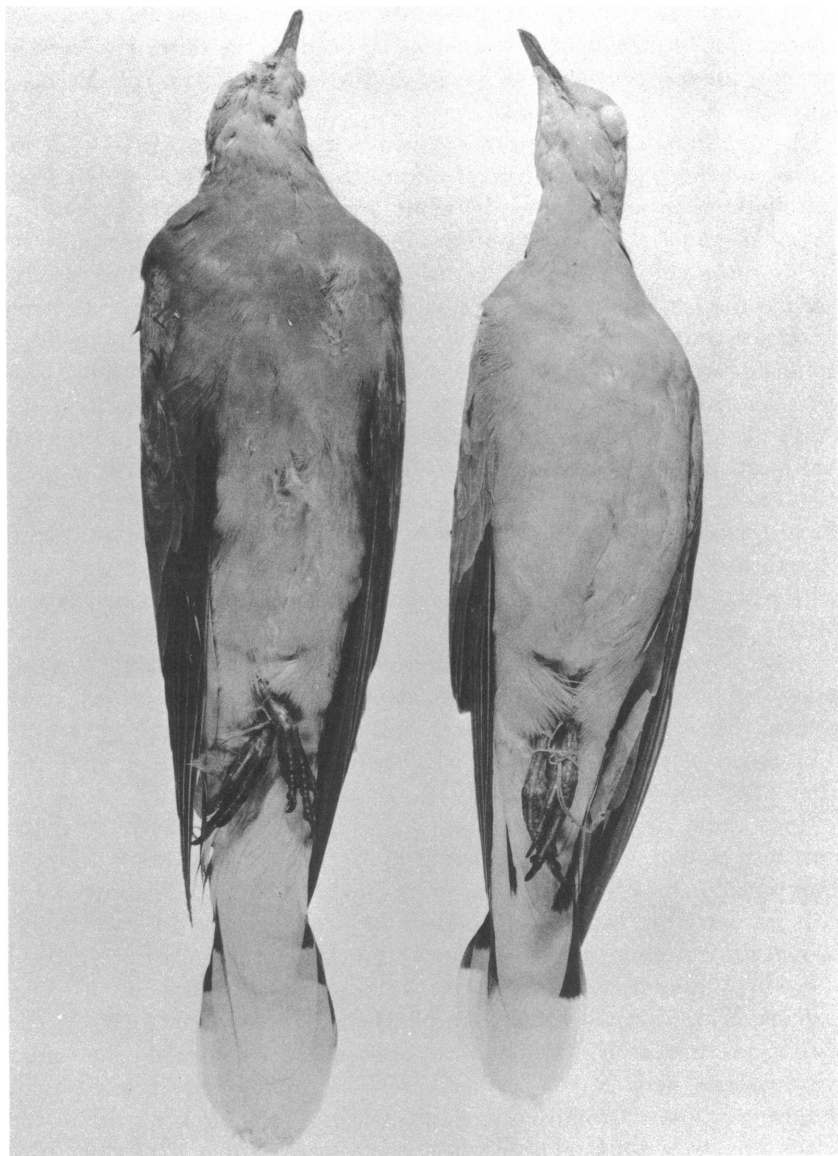


FIG. 4. Coloration of the lower parts of the same specimens of *Streptopelia turtur rufescens* (left) and *S. turtur isabellina* (right) as are shown in figure 3.

quite certain that the two represent the same form. But I do agree that *rufidorsalis* should not supersede *arenicola* because the latter has been in general use for more than 60 years, and we cannot prove that Brehm's specimen is the actual type of *rufidorsalis*.

3. *Streptopelia turtur hoggara* Geyr von Schweppenburg, 1916, type locality, northern Ahaggar Massif, central Sahara. This race differs from nominate *turtur* and *arenicola* by being less gray on the crown (the gray pigment being replaced by buff in some individuals), and constantly by being more rufous brown, less gray-brown, on the back, and also by having the feathers of the upper wing coverts, scapulars, innermost secondaries, and rump more broadly edged and tipped with rufous. *Hoggara* is intermediate in coloration between the two races mentioned and *isabellina* and *rufescens*. It seems to be restricted to the massifs of the Ahaggar and Aïr, although it may also be the breeding form in the Tibesti and Ennedi Massifs, but the subspecific status of the birds of these last two regions is unknown. H. and T. H. de Balsac (1951, p. 202) have questioned whether *hoggara* bred in the Aïr, but Buchanan collected three specimens on June 14, 1920, at Iferouane, Aïr, a date well within the breeding season. These specimens were reported by Hartert (1921, p. 91).

4. *Streptopelia turtur isabellina* Bonaparte, 1856, type locality, "ex Insulis Aegypti superioris," which equals Argo Island on the eastern bank of the Nile near Dongola, northern Sudan.

5. *Streptopelia turtur rufescens* C. L. Brehm, 1845, type locality, "Griechenland," but error for Argo Island as above.

Two quite distinct forms (figs. 3 and 4) breed in Egypt and the northern Sudan. One, which breeds in the oases of the Western Desert (but which so far I have seen only from Dakhla Oasis), is dark and richly colored, varying from ferruginous to foxy-red above, and from violet-brown to vinaceous on the throat and breast. The other form breeds in the Nile Valley from the Delta to northern Sudan and is much paler, pale isabelline-brown above, and lavender or lavender-buff on the throat and breast; it is also considerably paler, less slaty, on the under wing coverts and axillaries. They are both more richly colored than *hoggara* and more broadly edged and tipped with rufous on the upper wing coverts, scapulars, innermost secondaries, rump, upper tail coverts, and central tail feathers.

The birds breeding in Egypt and northern Sudan have heretofore been referred to a single subspecies called *isabellina*, but the material mentioned below that I have seen suggests definitely that two subspecies are involved rather than one extremely individually variable form. Such



a great degree of individual variation would be unprecedented in this species or any other of *Streptopelia*. All the specimens are adults, and most of them are in strictly comparable plumage, the two series varying somewhat individually but no more than is normal in *S. turtur*.

The dark and red birds were all collected in Dakhla Oasis, as stated above, and consist of one taken by W. J. Harding-King on April 27, 1909, and three by Meinertzhagen on March 25 and 26, 1928. The pale ones consist of one specimen collected at Cairo on April 2, 1878, by E. C. Taylor, one from Aswan taken on March 1, 1864, also by E. C. Taylor, another from Aswan taken in March, 1839, by Parreys, and a pair from Kerma, northern Sudan, collected on February 25, 1904, by Rothschild, Henley, and Wollaston. All these were probably breeding birds, if I can judge by the notes of Meinertzhagen (1930, p. 508) and Harding-King. Meinertzhagen states that these doves arrive in the oases of the Western Desert "towards the end of February," leaving by "the middle of September," and arrive in the Delta "about the end of March." Harding-King has written on the label of his specimen "Comes to Dakhlah Oasis in March and April from SW and returns after the date harvest."

The winter quarters of these doves are virtually unknown but appear to be in the Sudan in the region of the Blue Nile to probably neighboring Abyssinia. Only two records exist for the winter range, a single bird collected by Flower on the Blue Nile on November 1 (no date) that is mentioned by Meinertzhagen (*loc. cit.*), and one that I have seen that was collected in the same region by some unknown person at Jebel Guli on February 2, 1914. Jebel Guli is about halfway between Renk and the Blue Nile at latitude 11° 45' N. by longitude 33° 30' E. This last specimen is interesting, as it is similar above to the dark and red birds from Dakhla Oasis but is pale below and more similar to the birds of the Nile Valley, suggesting that intermediate populations exist.

The name *rufescens* Brehm, 1845, is available for the dark and reddish race, and *isabellina* Bonaparte, 1856, for the pale and isabelline race. These names were based on specimens in the Berlin Museum that had been collected by Hemprich and Ehrenberg in early April, 1822, on Argo Island in the Nile near Dongola. The original series consisted of nine specimens, according to Stresemann (1954, p. 174), who also writes to me that all but one were eventually "given away by Lichtenstein" or "dispersed as duplicates." Brehm refers to only one specimen, stating (1845, col. 348) that *rufescens* is based " . . . nach einem Stücke, das ich in Berlin sah, . . ." and this may have been the only one he saw. He did not know where Argo Island was located and assumed that it was

an island in Greece. Stresemann states also in his letter that he has appointed the one specimen that remains in the Berlin Museum ("♀," No. 11252) as the lectotype of *rufescens*, and that of the two skins which I had sent him (figs. 3, 4), "I found the bird from Dakhla Oasis to agree very well with the type [actually Stresemann's lectotype of *rufescens*], whereas the bird from Kerma (Nubia) is much paler throughout than the type." I accept Stresemann's designation of this lectotype, and the dark and reddish race will therefore be called *rufescens*.

The name *isabellina* can, in my opinion, be used for the pale and isabelline race, because we cannot assume that it was based on the same specimen seen by Brehm. We do not know how far the "dispersion" had progressed by Bonaparte's time, and it is logical to believe that he saw at least one specimen other than Brehm's, because he emphasizes (1856, p. 942) that his *Turtur isabellinus* is "*de couleur pâle*." I may add that the selection of the scientific names (*rufescens* versus *isabellinus*) suggests that they describe different specimens, as, respectively, these names diagnose so exactly the coloration of the two races.

No type was selected and no clues were given by either Brehm or Bonaparte, and the question of the putative types cannot be settled incontrovertibly, but, in the interest of nomenclatural stability and acting as the first reviser of this question, I select *rufescens* Brehm, 1845, as the correct name for the dark and rufous race of the oases of the Western Desert of Egypt, and *isabellina* Bonaparte, 1856, as the correct name of the pale and isabelline race of the Nile Valley. *Isabellina* Bonaparte has been in wide and unchallenged use since it was proposed, over 100 years ago, whereas *rufescens* Brehm (here revived) was placed by Hartert (1920, p. 1484) with a query in the synonymy of nominate *turtur* Linnaeus. The type locality (Argo Island) is the same for both, which should present no difficulty, as both races are migratory (see above) and could be collected together in the first days of April.

#### *Streptopelia orientalis*

The Rufous Turtle Dove breeds in Siberia from the eastern foothills of the Urals eastward to the Pacific, Sakhalin, and Japan and southward through China, including Formosa, Turkestan, and Afghanistan to India, Burma, and northern Siam. The northern populations are migratory, wintering from southeastern Iran eastward to southern China and also from central Japan southward. The species varies geographically and can be divided into five subspecies. This is one more than was recognized by Hartert in his review (1920), but the fifth (*orii*) was described in 1932. Hartert's review was very sound, but a great deal of confusion

has been caused by subsequent authors, such as Rothschild (1926, pp. 223–224), Stuart Baker (1928, pp. 238–241), Koelz (1939, 1954) who described three “new” subspecies, and, to some extent, by Whistler. The last-named brought back some order in his discussion (1936, pp. 677–679) of the populations of India, but unfortunately decided later (1943, pp. 25–26) to change his treatment, recognizing an additional race in India, for which he revived the name *erythrocephala* Bonaparte, 1855. It seems desirable, therefore, to present my own conclusions. The five races are discussed below.

1. *Streptopelia orientalis meena* Sykes, 1832, type locality, Deccan, India, on migration. This race is the palest and brightest. It is brownish gray on the back, orange rufous on the edges of the upper wing coverts, scapulars, and innermost secondaries, whitish on the lower abdomen, and white on the under tail coverts and at the tip of the tail. It occupies a very extensive range, from the Urals east to the Ob River and Tomsk (east of which it intergrades with nominate *orientalis*) and from the Kirghiz Steppes east to northwestern Mongolia and south through Russian Turkestan and western Chinese Turkestan to Afghanistan and northwestern India. The range in India cannot be defined with certainty, as *meena* intergrades with *agricola*; intermediates are reported from the foothills of the Himalayas from eastern Nepal and Sikkim. I have seen also breeding specimens from Kanha, south of Mandla, northern Central Provinces, which are intermediate between *meena* and *agricola* in the coloration of the under parts but not that of the upper parts which is identical with or very similar to that of *agricola*. *Meena* is migratory and winters in southeastern Iran, Baluchistan (probably), and in India east to Bihar and south on the western part of the peninsula to North Kanara. Rothschild and Baker, who were badly confused, call this race by the name *ferrago* Eversmann, 1842, and transfer the name *meena* to *agricola*.

2. *Streptopelia orientalis orientalis* Latham, 1790, type locality, China. The nominate race differs from *meena* by being darker and more richly colored. The crown and back are darker gray, the edges of the upper wing coverts, scapulars, and innermost secondaries are redder, and the breast and abdomen are more vinaceous, but the most conspicuous difference is in the color of the under tail coverts and tip of the tail which are bluish gray rather than white. Its range is even more extensive than that of *meena*, extending from central Siberia to the Pacific, Sakhalin, and Japan and south to northern Mongolia (with the exception of the northwest where it is replaced by *meena*), and through Manchuria, Korea, and China to Tibet and the eastern Himalayas, Yunnan, Kwangsi, Kwangtung, Hainan, and probably northern Indochina, as

Delacour and Jabouille (1931, vol. 2, p. 36) state that it breeds in the region of Quangtri, north of Hué, central Annam. It intergrades with *meena* in Siberia, as stated above, namely, in the region extending from Achinsk west to the Ob, and also with *agricola* over a very broad front which extends from northwestern Yunnan and northern Burma to the foothills and lower slopes of the Himalayas west to Sikkim, where, according to Meinertzhagen (1954, p. 447), the three races (*meena*, nominate *orientalis*, and *agricola*) "meet and intergrade . . . on the southern border."

The populations of Korea, China, and Japan (with the exception of Hokkaido) are resident, the birds that breed farther north being migratory and wintering in China from the Yangtze Valley south to Indochina and occasionally northern Burma and northeastern India. In Japan they winter from central Hondo south to the Ryu Kyus and occasionally to the Bonins and Volcanoes.

3. *Streptopelia orientalis stimpsoni* Stejneger, 1887, type locality, Ryu Kyus. This race, which is resident in the Ryu Kyus from Amami Oshima south to Yonaguni, is virtually identical with nominate *orientalis* with the exception of the color of the under parts which is darker and more vinaceous in the great majority of the specimens.

4. *Streptopelia orientalis orii* Yamashina, 1932, type locality, Formosa. The validity of this race has been questioned by Peters (1937, p. 90), but *orii* is valid and rather well differentiated. One would expect, in view of the clinal variation that prevails in this species, to find that it is more similar to *stimpsoni* than to nominate *orientalis*, but it resembles the latter more than it does *stimpsoni*. It differs from nominate *orientalis* by being grayer and duller above and below and somewhat paler, especially below, where it is less vinaceous. It is therefore considerably duller, grayer, and less vinaceous than *stimpsoni*. It also averages somewhat smaller than both, the wing length of four males from Formosa measuring 188–195 (192) and of eight females 179–185 (181), as against 190–206 (196.5) in 20 males and 181–200 (191) in 21 females of nominate *orientalis*, and 190–206 (196.5) in 17 males and 185–198 (192) in 11 females of *stimpsoni*.

5. *Streptopelia orientalis agricola* Tickell, 1833, type locality, Borabham and Dholbham, Bihar, India, with the following synonyms: *erythrocephala* Bonaparte, 1855, type locality, "Afr[ica] mer[idionalis]"; *sylvicola* Koelz, 1939 (p. 81), type locality, Castle Rock, southern Bombay Presidency; *meridionalis* Koelz, 1954 (p. 28), type locality, Sangau, Lushai Hills, Assam; and *khasiana* Koelz, 1954 (p. 28), type locality, Mawryngkneng, Khasia Hills, Assam. The population of India has caused the greatest tax-

onomic difficulty; witness Baker (1928), Whistler (1936, 1943), and the three forms proposed by Koelz. The birds (*agricola*) of India are richly colored, but in the north they intergrade with *meena* in the west and nominate *orientalis* in the east and show some slight local variation in the rest of India. In the north, as Whistler remarks (1936), "The exact attribution of many specimens to one form or the other is quite impossible," but he adds that he is "far from satisfied that the typical race [nominate *orientalis*] occurs in India at all; at any rate no specimen that I have examined from India proper can, in my opinion, be definitely referred to it." He accordingly recognized only two races in India: *meena* in the northwest and *agricola* in the rest of the country. This seems to me to be the only satisfactory conclusion concerning the breeding birds of India, but Whistler stated later (1943) that his former "conclusions were not altogether satisfactory." He then stated that breeding birds from peninsular India from Central Provinces (Nagpur, Raipur, and Seoni), North Kanara, and the Shimoga district in northwestern Mysore were more richly colored, redder above, more vinaceous below, than birds from Manbhum in eastern Bihar, Assam, and the eastern Himalayas and proposed to call them *erythrocephala*, synonymizing *sylvicola* with the latter.

I sympathize with Whistler in his desire to use the older name, but *erythrocephala* does not seem to be well founded, as Meinertzhagen (1954, p. 448) states: "The so-called type of this race is in the British Museum, unsexed and without original label. A subsequent label gives 'Cape of Good Hope,' and 'Type' has been subsequently written on the label. It is a greasy, disintegrating specimen. Monsieur Berlioz tells me that Bonaparte's type is not in the Paris Museum." In other words, this specimen probably cannot be used for color comparison and may not be the type, and Bonaparte's own specimen may no longer be in existence. The name *sylvicola* Koelz would have been a better choice.

The question is quite academic, however, as it seems impossible to subdivide the birds of India subspecifically. The specimens that I have compared from North Kanara (type and paratypes of *sylvicola*), Central Provinces, Margherita in eastern Assam, Garo Hills, Khasia Hills (type and paratypes of *khasiana*), and Lushai Hills (type and paratypes of *meridionalis*) show no essential differences. Many are identical, but those from North Kanara average duller, and those from the hills of Assam (but not Margherita) average less reddish, but such difference as exists is extremely slight. Birds from Burma average also slightly less reddish than those from the hills of Assam, a cline undoubtedly running eastward, but the birds of that country are still far more similar to *agricola* than they are to nominate *orientalis*. It is quite clear that only one race

(*agricola*) can be recognized, the range of which can be broadly defined as India south of the Himalayas (with the exception of the northwest inhabited by *meena*) eastward to Burma and northern Siam, intergrading (see above) with *meena* in the west and nominate *orientalis* in the east. The birds of northwestern Yunnan are intermediate also.

Koelz (1954, p. 28) states that *meridionalis* is smaller than *agricola* but includes in *meridionalis* the birds from the plains of Assam which do not seem to differ in size from his specimens of *agricola*. The average wing length of his series varies, but the measurements show much overlap. The measurements of the males given by Koelz are as follows: Garo Hills, eight specimens, 172–181 (178); Khasia Hills, seven specimens, 180–186 (182.5); plains of Assam, 15 specimens, 177–191 (184); Naga Hills, nine specimens, 175–187 (180.7); Lushai Hills, eight specimens, 171–187 (176); and 179–190 (184) in 23 of *agricola*.

After the above had been written, Mr. Derek Goodwin of the British Museum kindly sent me the notes he had made on the populations of India and Burma. He writes: "I can find no significant differences of measurement or colour among the many specimens from Assam and Burma in the National collection. All the dark greyish individuals are birds in worn plumage, all the very rich ruddy-coloured ones are specimens in very fresh plumage. They certainly average a very little darker and less red in colour than Bihar specimens but I agree with those who think that these differences are too slight for recognition and that *meridionalis* and *khasiana* are best considered as synonyms of *agricola*." I believe, however, that the difference in coloration observed by Goodwin between the birds of Bihar (redder) on the one hand and those of Assam and Burma (less reddish) on the other, represents not solely a difference in plumages but an instance of clinal variation, as I have mentioned above.

*Streptopelia orientalis agricola* differs from *meena* and nominate *orientalis* by being much more richly colored throughout, more reddish above, more vinaceous below, and by being darker gray on the under wing coverts, scapulars, and under tail coverts, the latter being white in *meena*. It averages smaller, the wing length of the birds that I have measured being 175–194 (186) in 20 males and 173–190 (180) in 15 females of *agricola*, as against 190–206 (196.5) in 20 males and 181–200 (191) in 21 females of nominate *orientalis*, and 188–205 (196) in 20 males and 185–203 (192.3) in 18 females of *meena*.

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