

American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK 24, N.Y.

NUMBER 1853

NOVEMBER 29, 1957

Systematic Notes on Palearctic Birds. No. 28 The Families Remizidae and Aegithalidae

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FAMILY RELATIONSHIPS

The question of family relationships among the passerine birds and of the systematic sequence in which these families should be arranged is a very difficult one, on the solution to which scarcely any two authors are in complete agreement. It is evident that many groups of passerine birds are only slightly differentiated, share more or less similar general habits, and have no important anatomical differences that could serve as clues by which to divide them. Such slight differences as do exist are interpreted differently by various authors. The classification of bird families has received much attention in recent years, witness, among others, the paper by Mayr and Amadon (1951, *Amer. Mus. Novitates*, no. 1496) and that by Mayr and Greenway (1956, *Breviora*, no. 58). This last paper is a report of the decisions reached by an international committee, appointed at the Eleventh International Ornithological Congress held in Basel, to draw up a sequence of the families of the passerine birds.

The birds with which my present paper is concerned, the penduline titmice and the long-tailed titmice, are presumably included by the committee in the family Paridae along with the true titmice, although Mayr and Amadon (1951) had previously divided them among three subfamilies: the Parinae, Remizinae, and Aegithalinae. The decision of the committee not to recognize subfamilies in this case seems hasty and is the more surprising in view of the fact that it advocates the recognition of subfamilies in other groups, such as the Muscicapidae and

Emberizidae, and some, at any rate, of the subfamilies recognized by the committee are not so distinct as the three so-called subfamilies of the Paridae.

The division of the Paridae into subfamilies is not a new concept, as it had already been advocated by Hellmayr (1911, *in* Wytsman, *Genera avium*, pt. 18). Hellmayr included other subfamilies indeed besides the three mentioned, such as the Paradoxornithinae and Certhiparinae, in his concept of the family Paridae, but he recognized that these last two were of doubtful affinities. He remarks that, even if these are excluded, the rest of the subfamilies form a heterogeneous group.

Mayr and Amadon state, "The tits appear to be a polyphyletic group of genera placed together on the basis of superficial resemblance due to arboreal habits and a fine, more or less conical bill." They remark that the Remizinae (penduline tits and verdins) may be distantly related to the flowerpeckers (Dicaeidae). The former build an utterly different nest from that of the Parinae (true titmice). In the case of the Aegithalinae (long-tailed and bush tits), Mayr and Amadon state: "In their complete juvenal molt (Stresemann, 1923 [Verhandl. Ornith. Gesell. Bayern, vol. 15, pp. 387-390]), cranial characters, and nest structure (Lucas, 1890 [Proc. U. S. Natl. Mus., vol. 13, pp. 337-346]), the long-tailed tits and bush tits differ radically from the Paridae. The young hatch naked, while young of the true titmice are partly downy. They share several of these characters with *Panurus* and *Paradoxornis* and are perhaps nothing but an offshoot of the Timaliinae. The fact that the parrot-bills make a cup-like nest, while the nest of the present group is bag-like, is not, however, favorable to this suggestion."

Mr. Jean Delacour, who for a long period has been giving much thought to a classification of the passerine birds, tells me that in his opinion the penduline, long-tailed, and true titmice represent three full families. He would place the Aegithalidae between the Paradoxornithinae on one side and the Paridae on the other in a sequence of families. He considers that the Paradoxornithinae are but a subfamily of the Muscicapidae, allied within this family to the Timaliinae, and would place in the Paridae only the true titmice. The Remizidae, which do not seem to be related at all to the Aegithalidae or Paridae, would then be placed next to the Dicaeidae (see also the suggestion of Mayr and Amadon mentioned above).

I agree with Delacour as to the position of the Remizidae, but the true position of the Aegithalidae seems more doubtful. Pending further study, however, I follow Delacour and recognize a family Aegithalidae. We hope in the not distant future to return to the question of the

family relationships of the passerine birds and present our joint concept of the classification of these families.

I would like to express my appreciation to my colleagues Mr. Jean Delacour and Dr. Dean Amadon who have very kindly discussed with me this question of relationships. I am also much indebted to Dr. David W. Snow of Oxford University, England, who is engaged in revising the groups discussed for "Peters' check-list of birds of the world" and has very generously furnished me with his notes on the species he has studied so far. Cordial help has also been given by Mr. J. C. Greenway, Jr., who has lent material from the collection of the Museum of Comparative Zoölogy, and by Mme. Tatiana Gidaspova who has helped in translating Russian texts.

REMIZIDAE

Remiz pendulinus

The penduline titmice of the *Remiz pendulinus* complex present a challenging taxonomic problem, but study of them has been handicapped by the lack of sufficient material from regions where three morphologically distinct forms are sympatric to a greater or lesser extent during the breeding season. Two studies have been published by me (1950, Amer. Mus. Novitates, no. 1459, pp. 51-62; and 1952, *ibid.*, no. 1549, pp. 1-5). The first one was based on about 125 specimens consisting of the series in the collection of the American Museum of Natural History combined with the specimens collected by Dr. W. Koelz in Afghanistan and Iran. This material was very deficient in some respects, and, shortly after the 1950 study, I examined the series in the collections of the British Museum and in the museums of Paris and Stockholm, reporting my observations in the 1952 paper. No count was kept of the material examined in Europe, but altogether a large amount was examined at one time or another. This material, however, was still inadequate, and some of the conclusions I reached were not valid. I have been made aware of this by a paper published recently by Portenko (1955, Trudy Zool. Inst. Akad. Nauk, vol. 18, pp. 459-492). This paper is very thorough and was based on an unparalleled series of 535 specimens gathered from various Russian institutions and individuals. It is exceptionally well illustrated by figures that show structural details and the range in individual variation, a map, and photographs of the nests. Yet, as discussed below, I do not necessarily agree with all the conclusions reached by Portenko.

Portenko's paper has settled many points, but unfortunately the more important question as to whether we are dealing with one or

more species remains unanswered. This question, however, cannot be settled by the mere examination of skins.

The *Remiz pendulinus* complex consists of four groups of forms which are distinct morphologically, and three of these pose a problem as they overlap during the breeding season. The distinguishing characters of the groups are as follows:

1. THE NOMINATE *pendulinus* GROUP: In this group the males show a narrow band of black on the forecrown surmounted by a band of chestnut, the rest of the crown being white or chestnut, as this pigment, which may be reduced to a faint trace above the black band, varies individually and geographically in extent and may spread backward to cover the entire crown. In some individuals the chestnut reaches the hind neck and, in the more extreme cases, even joins the chestnut area on the mantle. The forms of this group have a white throat and their bill, toes, and claws are of moderate size, generally speaking. Slight other differences in coloration exist also.

2. THE *macronyx* GROUP: The males differ from those of the preceding group by having the whole head black, including the throat which is sooty or blackish, and by having the upper breast black rather than tinged with chestnut. Generally speaking, the bill, toes, and claws are large. The birds of this group breed only in reed beds, whereas those of the nominate *pendulinus* group breed in both reeds and trees.

3. THE *coronatus* GROUP: In this group, the males never show any chestnut on the crown, the latter being white above the black frontal band and bordered at the nape by a broad band of black, the throat is white, the bill is small and thin, and the toes and claws are very small and weak. *Coronatus* nests only in trees and is thus separated ecologically from *macronyx* and also from the nominate *pendulinus* group, because in the zone of overlap the latter is restricted apparently to reed beds only.

4. THE *consobrinus* "GROUP": This "group" consists of only one form which is widely isolated geographically from the others and which shows no black or chestnut on the crown. The latter is ashy gray instead and very faintly streaked and is separated from the black frontal band by a narrow band of white. This black frontal band, in addition, is nearly obsolete and is more brownish than true black. The ear coverts are brown rather than black as in the other three groups.

Until a few years ago the first three groups were always considered to be separate species, although Dementiev (1935, L'Oiseau, p. 85) had suggested that perhaps it might be best to treat the nominate *pendulinus* group and the *macronyx* group as conspecific. *Consobrinus* was

treated as a subspecies of nominate *pendulinus*, although it is quite distinct from it as well as from *macronyx* and *coronatus*, as shown above, but it is obviously related to the other penduline tits and, as it is restricted to Manchuria and northern China, its distribution poses no problem. I have not been able to find whether *consobrinus* builds its nest in reeds, bushes, or trees.

With one exception, the nominate *pendulinus* and the *macronyx* groups are geographically representative, and though they do not grade into each other, they interbreed frequently enough to suggest that they are still conspecific. Hybrids have been described under several names: *altaicus*, *loudoni*, *paradoxa*, *bostanjogli*, and *ssaposhnikowi*, and at present two populations with a restricted range seem to consist entirely of individuals that are clearly of hybrid origin. One of these (see below) is found at the southwestern corner of the Caspian Sea in the region of Lenkoran and in the reed beds of the lower Kura River; the other inhabits the reed beds around Lake Balkhash.

According to the statements of range given by Portenko, the two groups overlap only in the delta of the Amu Darya. However, Ivanov (1940, Ptitsy Tadzhikistan, Trudy Tadzhikistan, Bazy, vol. 10, p. 198) states that Zarudny has found that *jaxarticus* (a race of the nominate *pendulinus* group) and *macronyx* both breed in the region of Leninabad on the Syr Darya in northwestern Tadzhikistan, and in the region of Dzhilikul on the lower Vaksh River in southwestern Tadzhikistan. If Zarudny is correct, the degree of overlap between the two groups is very extensive indeed. Whether the overlap is great or small, or whether the colonies are mixed or not, the fact remains that reproductive isolation is not perfect, at least in some regions.

The present evidence suggests that *coronatus* has probably reached species level, though this cannot be decided without field studies. For the present I follow Portenko and also Voinstvenski (1954, Birds of the Soviet Union, vol. 5, pp. 772-784) who treat all the forms of the complex as one species. *Coronatus*, if not a separate species, represents a borderline case in speciation similar to cases that I have discussed in other passerine birds in an earlier paper (1954, Acta 11th Internatl. Ornith. Congr., pp. 369-380).

Coronatus is sympatric with both the nominate *pendulinus* group (subspecies *jaxarticus*) and the *macronyx* group. If Portenko is correct, it overlaps *jaxarticus* only in the delta of the Amu Darya, but, if Zarudny is correct, the overlap is very much greater, as *coronatus* breeds also in the regions of Leninabad and Dzhilikul, and in the case of *coronatus* and *macronyx* the overlap is much greater still, as it

covers the greater part of Russian Turkestan and of Transcaspia as well. Furthermore, *coronatus* apparently does not interbreed with the other two groups, for no hybrids have been reported, and as we have seen above it is very definitely separated from them ecologically. It is probably significant also that both of the races of the *coronatus* group are largely migratory, whereas the *macronyx* group is not, and the nominate *pendulinus* group shows only irregular and very limited movements. In 1950 I mentioned a series of 14 specimens which I stated "appear to be intermediate between *coronatus* and a population of the *pendulinus* type," but at the time I did not realize, unfortunately, that the degree of individual variation could be so great in *coronatus* as Portenko has found it to be in his series of 175 specimens of this form. This variation is strikingly illustrated by Portenko in his figure 2. I mentioned that these 14 specimens lacked chestnut on the crown (the presence of this chestnut color is a characteristic of the nominate *pendulinus* group), but I now find that they fit perfectly within the range of variation illustrated by Portenko. They were not hybrids at all. In short, the presumption is strong that *coronatus* will be found to be a separate species.

SUBSPECIES

In 1950 I recognized 10 subspecies in the following order: nominate *pendulinus*, *persimilis*, *caspius*, *jaxarticus*, *coronatus*, *stoliczkae*, *consobrinus*, *macronyx*, *neglectus*, and *nigricans*. In the supplementary paper published in 1952, I suggested that three of these were invalid: *persimilis* and *jaxarticus*, which I stated should be synonymized with nominate *pendulinus*, and *neglectus* with *macronyx*. I realize now that I was misled by the small amount of material of *jaxarticus* examined. This race is valid, and it is probably best to recognize *persimilis* also (for change in name, see below), though in my opinion it is not a very distinct race. However, *neglectus* is even more poorly differentiated than is *persimilis* and, I believe, should be synonymized with *macronyx*, thus making a total of nine valid subspecies in all. Voinstvenski (*loc. cit.*) has recognized the same 10 races I accepted in 1950 (but called *persimilis* by the name *menzbieri*), while Portenko has recognized 13, in the following order: nominate *pendulinus*, *menzbieri*, *altaicus*, *jaxarticus*, *stoliczkae*, *coronatus*, *consobrinus*, *castaneus*, *ssaposhnikowi*, *macronyx*, *aralensis*, *neglectus*, and *nigricans*. A few of these forms are discussed below.

Remiz p. menzbieri: This race, which ranges from southern and eastern Turkey to Transcaucasia, Armenia, Azerbaijan, and the Zagros

in Iran, is a little paler and smaller than nominate *pendulinus*, the wing length of six males measuring 52–55 (53.5) as against 55–58 (56.5) in 10 of nominate *pendulinus*. The difference in size alone seems too slight to warrant its recognition, but the difference in coloration, though rather slight, is constant. In 1950 I had followed Hartert in calling this race *persimilis* (described by him in 1918, with type locality, Eregli, southern Turkey) because *menzbieri* Zarudny, 1913, type locality, lower Karun River, southwestern Iran, had been described as having a broader band of chestnut on the forehead than nominate *pendulinus* and therefore did not seem to be the same form as *persimilis*, which had been described as having a narrower one than nominate *pendulinus*. Furthermore, all my specimens from Iran had a narrow band and matched the type of *persimilis*, but I realize now that the range in individual variation is so great that the relative width of the band is not a reliable diagnostic character, at least between the three forms involved. It is best, therefore, to use the older name as all the Russian authors have done and call it *menzbieri*.

Remiz p. altaicus is a hybrid form which combines the coloration of the nominate *pendulinus* group with the larger beak and feet of the *macronyx* group and should not be given the status of a subspecies. Its breeding range is very restricted and presumably consists of the reed beds at the southwestern corner of the Caspian Sea which extend from about Lenkoran to the lower Kura River, but no nests have been found. Similar hybrids have also been collected in winter on the "Potemkin Peninsula" at the southeastern corner of the Caspian, according to Zarudny (1914, *Ornith. Monatsber.*, vol. 22, pp. 57–58), and were mentioned by him in his description of *loudoni*. This latter is acknowledged to be a pure synonym of *menzbieri*, described from the same type locality.

If, however, one wishes to recognize *altaicus*, the name is available as it is not a *nomen nudum*, although it is said to be one by Hartert (1907, *Die Vögel der paläarktischen Fauna*, p. 390). Portenko has called attention to the fact that Radde (1899, *Museum Caucasicum*, vol. 1, pp. 147–243), the author of *altaicus*, has supplied a description on page 243, on the basis of specimen "number 91 d" called *altaicus* on page 147 but without a description. This specimen, according to Radde, came from Lenkoran.

The name *caspius* Pelzam, 1870, type locality, Astrakhan, has been in unchallenged use since it was proposed, and it is not desirable to replace it by the name *castaneus* Bogdanov, 1871, type locality, Astrakhan, *ex* Severtzov, as was done by Portenko, on the ground that Pel-

zam's name was proposed in the combination *Parus caspius* and is preoccupied by *Parus Caspicus* [S. G.] Gmelin, 1774 [a synonym of *Motacilla cinerea* Tunstall, 1771]. However, *caspius* and *caspicus* are not homonyms, and, according to Hartert (*loc. cit.*), Pelzam proposed his name in the combination *Aegithalus caspius*. Pelzam's description, published in a rare publication, is not available to me, but it seems that the change proposed by Portenko should be avoided in the interest of stability and to avoid confusion.

The birds that breed in the reed beds of Lake Balkhash were described as *ssaposhnikowi* by Herman Johansen in 1907, and this form is recognized as a valid subspecies by Portenko, though all other current authors do not recognize *ssaposhnikowi*, which is based on a hybrid and unique specimen. The statement of Portenko shows that the population of Lake Balkhash exhibits an extreme degree of individual variability, his 26 specimens from this lake running the whole range of variation from specimens that are very similar to *caspius* of the nominate *pendulinus* group, to others that are virtually identical with *macronyx*. In fact, *ssaposhnikowi* would seem to me to represent a hybrid swarm, which in my opinion should not be recognized as a subspecies. Portenko emphasizes that this population is now isolated geographically from the parental forms, but apparently, if one may judge by the characters of the specimens that have been collected, this isolation is recent and may break down again. It is not sufficiently recognized, I believe, that the distribution of the *Remiz pendulinus* complex is not continuous anywhere and consists of localized little colonies that remain isolated for varying periods, which favors the evolution of distinct forms, but that this isolation apparently repeatedly breaks down, and all forms, with the exception of *coronatus*, then hybridize, the hybrids being more or less stable. The hybrid *ssaposhnikowi* seems to be the least stable of the hybrid forms that have received a name. As, everything considered, the population of Lake Balkhash is closer to *macronyx*, I believe it should be referred to that race.

Portenko recognized *aralensis* and *neglectus*, stating that these forms are very similar to *macronyx* but differ from it in that the first has a longer beak and shorter wing and the second is darker and smaller. He adds, however, that all his 10 specimens of *neglectus* are worn and that they vary individually, some being identical in coloration with *macronyx*. A difference in coloration is thus open to question, and it may be mentioned that Zarudny, the author of *neglectus*, emphasized that there was only a size difference, stating (1914, Ornith. Monatsber., vol. 22, p. 57) that the wing length in *neglectus* was 50–56 as against 56–60.5

in *macronyx*. According to Portenko, seven males of *neglectus* measure 50.9–54.9 (53.4) as against 55.0–59.4 (57.0) in 16 of *macronyx*. It seems to me that the difference is insufficient to warrant nomenclatural separation, and I believe *neglectus* is best synonymized with *macronyx*.

The measurements of *aralensis* are even closer to those of *macronyx*. According to Portenko, nine males of *aralensis* have a bill length of 9.0–10.3 and a wing length of 53.3–57.4 (55.7), as against, respectively, 8.2–9.5 and 55–59.4 (57.0) in 16 of *macronyx*.

Cephalopyrus flammiceps

The Fire Cap is divisible into two races: one in the western Himalayas ranging from Kashmir eastward to Kumaon and probably Nepal, and the second from Nepal or Sikkim eastward to northern Szechwan, and occurring also in northern Yunnan in March and May where it probably breeds. No specimens of the eastern race are available to me, but it is apparently a well-differentiated one, as it is said to differ from the western race by being darker above and below, by having a narrower band of fiery orange on the forecrown, and by having the orange of the under parts restricted only to the chin and throat, rather than extending onto the breast.

The western race is nominate *flammiceps* Burton, 1836, type locality, Simla, but apparently the eastern race was described unwittingly under two names as the diagnoses of these two forms are couched in virtually identical terms. The older of these two names is *olivaceus* Rothschild, 1923, type locality, Tengyueh, northwestern Yunnan, and the younger is *saturatus* Whistler, 1924, type locality, Sikkim. It seems to me that Whistler, who apparently was unaware of the existence of *olivaceus* as he did not mention it, unwittingly redescribed *olivaceus* which had been described only 10 months earlier, December 29, 1923, as against October 29, 1924.

Kinnear (1944, in Ludlow and Kinnear, *Ibis*, p. 205) chose to recognize *saturatus*, questioning the validity of *olivaceus* on the ground that it was described on only one specimen and "does not seem to be a good race." However, if the eastern race is so strikingly differentiated, the fact that it was described on only one specimen is immaterial. Kinnear ignores the fact that the two forms were described on the same characters. I believe that *saturatus* is a synonym of *olivaceus* and not the other way around.

AEGITHALIDAE

Aegithalos caudatus

The Long-tailed Tit varies a great deal geographically, but the

degree of this variation is not constant throughout the range of the species. In some regions, this variation is sharp and many well-differentiated races have been described, but in others it is slight and may be complicated in some instances by an extremely high degree of individual variation. The relative degree of subspecific variation is, however, much less interesting than the over-all pattern of the geographical variation.

This variation shows that the various races belong to three morphologically very distinct groups which were first studied in detail by Stresemann (1919, Beiträge zur Zoogeographie der paläarktischen Fauna, vol. 1, pp. 3-24). In the first group, the nominate *caudatus* group, the populations have a pure white head and are black on the back, the black mixed with a varying amount of pink; in the second group, the *europaeus* group, the head is white on the top but is striped longitudinally on each side by a broad band of black or blackish brown, extending from the region above or in front of the eye posteriorly to reach the black mantle, the color of the back being similar to that of the nominate *caudatus* group. In the third group, the *alpinus* group, the head is striped with black or brown and the back is gray, not black, though in some races of this group a narrow and variable band of black or blackish brown persists on the mantle but only along its upper border. In this third group, the pink pigments on the back are much reduced or are lacking altogether, and some races have a large patch of sooty black at the base of the lower throat which is not present in the first two groups.

The three groups interbreed, the nominate *caudatus* group with the *europaeus* group, and the latter with the *alpinus* group, but they do not grade into one another, though in some regions where the groups meet, as in the Iberian Peninsula and Korea, sufficient information on this point is lacking. Austin (1948, Bull. Mus. Comp. Zool., vol. 101, p. 194) states that a form of the nominate *caudatus* group "intergrades" with one of the *europaeus* group between the forty-first and thirty-eighth parallels in Korea. Elsewhere in the same general region we witness, however, that the race of Hondo (*trivirgatus*), which belongs to the same group and differs only slightly from the race of southern Korea (*magnus*), shows no signs whatever of intergradation with the race (*japonicus*) of the nominate *caudatus* group in Hokkaido. These two are separated, of course, by the Tsugaru Strait, but I suspect that in Korea the two groups do not truly intergrade smoothly and that the zone between the two parallels is one of secondary intergradation. In the Iberian Peninsula such a zone must be looked for in central Spain

between *taiti* of the *europaeus* group and *irbii* of the *alpinus* group. *Taiti* and *irbii* differ sharply from each other, and the only evidence that I have for the existence of a zone of secondary intergradation in Spain consists of a lone specimen from central Spain (Avila) which more or less combines the morphological characters of the two groups.¹

Elsewhere in Europe zones of secondary intergradation run between the nominate *caudatus* and the *europaeus* group from West Prussia, western Poland, and eastern Silesia to northern Romania. In Italy a zone of secondary intergradation runs between the *europaeus* and *alpinus* groups along the foothills of the Alps from the piedmont to the Carnic Alps. In these zones the populations show, as might be expected, an extremely high degree of individual variation, and some specimens could not be identified as belonging to either of the two groups.

Over a large part of Europe, however, the genetic instability is not restricted to the zones of secondary intergradation, and from northern Germany to northern France, eastward through central Europe to Yugoslavia, northern Bulgaria, and Romania the populations vary a great deal individually. They are called *europaeus* Hermann, 1804, type locality, Switzerland, a race that undoubtedly is the result of hybridization between the nominate *caudatus* and the *europaeus* group. This race has not become stable, though it occupies a very extensive range, because occasional individuals are found here and there in which the head is almost completely white. This instability may be increased by migratory pollution. The northern populations of nominate *caudatus* are irregular migrants to western and central Europe, and according to Legendre (1932, L'Oiseau, p. 383) the majority of these white-headed birds do not go back, remaining to breed with individuals with a striped head. Legendre gives no data, and I am not aware that this interesting question has been studied, but if he is correct migratory pollution would certainly reinforce the hybrid characters of *europaeus*.

REVISION

This revision of the subspecies consists chiefly of a mere list of those that I believe are valid, with their synonyms, if any. A few races are discussed.

¹ Since the above was written, I have examined much additional material from Spain in European collections which confirms the presence of this zone of secondary intergradation.

A. THE NOMINATE *caudatus* GROUP: As shown below, the geographical variation is slight in this group.

1. *Aegithalos c. caudatus* Linnaeus, 1758, type locality, Sweden. Synonym: *brachyurus* Portenko (1954, Fauna U.S.S.R., no. 54, Birds, vol. 3, p. 96), type locality, Lysogorka, Letichev district, region of Proskurov, Podolia, western Ukraine.

2. *Aegithalos c. sibiricus* Seebohm, 1890, type locality, central Siberia. Synonym: *kamtschaticus* Domaniewski (1933, Acta Ornith. Mus. Zool. Polonici, vol. 1, p. 81), type locality, Kamchatka.

3. *Aegithalos c. japonicus* Prazak, 1897, type locality, northern Japan.

I recognize three subspecies in this group, although the great majority of authors recognize only nominate *caudatus*, extending its range from northern Europe to eastern Siberia, Kamchatka, northern Manchuria, and Hokkaido. However, as mentioned by Johansen (1952, Jour. Ornith., vol. 92, pp. 187–188), who recognizes *sibiricus*, the populations of southeastern Russia and of Siberia have the white parts of the plumage purer white than those from farther west. In specimens that I have examined, including some from Orenburg in the southern Urals, it is quite obvious that the innermost secondaries also are whiter. On the innermost secondary, the dark part of the feather is usually restricted to a streak along the shaft, whereas in nominate *caudatus* the dark pigment invades virtually all of the inner web of the feather. The eastern race shows also a tendency to be larger. In six males of *sibiricus* that I have measured the wing length measures 65–70 (67) as against 63–67 (65) in 10 of nominate *caudatus*, and according to Johansen 40 specimens of *sibiricus* measure 65–71 as against 63–67 in an unspecified number of nominate *caudatus*. I wish to emphasize that the subspecific characters of *sibiricus* are slight and that the difference in the color of the secondaries is not constant, but nevertheless it is probably desirable to recognize this race. No specimens from Kamchatka are available, but as Domaniewski has described *kamtschaticus* on the sole basis that its innermost secondaries are whiter than in nominate *caudatus* this name appears to be a synonym of *sibiricus*.

Austin (1953, in Austin and Kuroda, Bull. Mus. Comp. Zoöl., vol. 109, p. 517) recognizes *japonicus*, stating that it has a smaller bill and is paler vinaceous on the flanks than nominate *caudatus*. No difference is apparent in the size of the bill in the specimens that I have compared, but specimens from Hokkaido are indeed paler on the flanks, though the difference is rather slight. The tail in *japonicus* is also a little shorter, measuring 85–88 (86) as against 86–100 (92) in nominate *caudatus*, but the relative tail length is of very dubious taxonomic

value between two closely related forms in this species, as it varies a great deal individually and is almost always affected by wear to an unknown extent. In *japonicus* the innermost secondaries are dark as in nominate *caudatus*, but the white parts of the plumage are purer white as in *sibiricus*. A few specimens from lower Amurland and southern Ussuriland have dark secondaries and are pale vinaceous on the flanks, which suggests that the populations of these regions should be referred to *japonicus*. Specimens from northern Korea were not available, but presumably the birds of this region are similar to those in neighboring southern Ussuriland.

In short, I believe that three slightly differentiated subspecies can be recognized in the nominate *caudatus* group, but I think it would be very misleading to divide the populations of Russia, west of *sibiricus*, into two subspecies. This has been done recently by Portenko, who has described as *brachyurus* the populations distributed from Pskov in the northwest and from Smolensk, southeastward to Kharkov and Voronezh, and from the Ukraine south to Podolia, the Carpathians, and the Dobruja. He states that they differ from nominate *caudatus* by being smaller and especially by having a shorter tail, "9 mm. shorter." No other measurements are given, but I do not believe *brachyurus* is separable from topotypical nominate *caudatus*, as eight adults measured by me from Pskov have a tail length of 82–99 (91) and six from Sweden 85–98 (91.5). It is probable that a cline runs southward in Russia, from the northern limits of the range which run from about latitude 65° N. in the west to about latitude 60° N. in the Urals, down to the Ukraine, but, while clinal variation is of interest, it should not necessarily be reflected in the nomenclature. In northern Romania, which neighbors on southern Ukraine, 12 birds have a tail length of 83–96 (86). They average smaller than topotypical nominate *caudatus*, but the individual measurements show a great deal of overlap. In all the specimens measured, the tip of the tail is more or less worn to an uncertain extent. As stated above, I do not believe the tail length is a reliable taxonomic character in closely related populations of this species.

B. THE *europaeus* GROUP: This group consists of races that relatively speaking are not very sharply differentiated but taken as a whole are better differentiated than those in the nominate *caudatus* group. *Europaeus* proper varies a great deal individually and is discussed above, *aremoricus* is very poorly differentiated, *macedonicus* and *tauricus* are slight races, *taiti* and *trivirgatus* are moderately well differentiated, *rosaceus* is well differentiated, and *magnus* and *kiusiuensis*

were not examined but would seem to be rather slightly differentiated.

4. *Aegithalos c. europaeus* Hermann, 1804, type locality, Basel, Switzerland.

5. *Aegithalos c. rosaceus* Mathews, 1938, new name for *rosea* Blyth, 1836, type locality, Selborne, Hampshire, which is preoccupied. Synonym: *chlamyrrhodomelanos* Clancey (1941, Ibis, p. 314), type locality, Scotland. For a discussion of the validity of the latter, see Meinertzhagen (1947, Bull. Brit. Ornith. Club, vol. 68, p. 27).

6. *Aegithalos c. aremoricus* Whistler, 1929, type locality, Brittany, northwestern France. The very poor subspecific characters of this race are well summarized by Meinertzhagen (*loc. cit.*) who states, "A very doubtful race, sometimes intermediate between *A. c. europaeus* and *A. c. rosaceus* Mathews and sometimes tending towards *A. c. taiti* Ingram. It is one of these microraces which should never have been described, but once named had better be accepted."

7. *Aegithalos c. taiti* Ingram, 1913, type locality, northern Portugal.

8. *Aegithalos c. macedonicus* Dresser, 1892, type locality, Greece.

9. *Aegithalos c. tauricus* Menzbier, 1903, type locality, southern Crimea. Voinstvenski (1954, Birds of the Soviet Union, vol. 5, p. 796) has synonymized this name with *major* Radde, 1884, but this is very clearly wrong, as the two races belong to different groups and are very distinct.

10. *Aegithalos c. magnus* Clark, 1907, type locality, Seoul, Korea. Synonym: *shimokoriyamae* Kuroda, 1923, type locality, central Korea.

11. *Aegithalos c. trivirgatus* Temminck and Schlegel, 1848, type locality, Japan.

12. *Aegithalos c. kiusiuensis* Kuroda, 1923, type locality, Kyushu.

C. THE *alpinus* GROUP: All the races are, generally speaking, sharply differentiated. *Tephronotus* and *vinaceus* are less sharply differentiated than the others, but nevertheless there is a clear-cut difference in coloration between *tephronotus* (paler) and *alpinus* (darker), and a clear-cut difference in size between *vinaceus* (in which the wing length averages 64) and *glaucogularis* in which it averages 56.

13. *Aegithalos c. irbii* Sharpe and Dresser, 1871, type locality, Gibraltar. Synonym: *tyrrhenicus* Parrot, 1910, type locality, Corsica. My comparative material of these two forms is limited but shows no constant differences. Meinertzhagen (*loc. cit.*) does not think *tyrrhenicus* is well differentiated and states that it is "A very doubtful race and almost the same as *A.c. irbii*. The best character is the brown forehead which is white in *A.c. irbii*." However, Snow (*in litt.*) tells me that this

character is not very constant or sufficiently well marked to warrant the recognition of *tyrrhenicus*, and I follow his opinion. He states: "Comparison of large and very good series from Spain and Corsica shows that Corsican birds must be considered to be *irbii*. General colour above and below indistinguishable. Brown forehead mentioned by Meinertzhagen just holds good in series, but is not a good enough character to deserve a name." It is worthy of note that this species apparently does not occur on Sardinia.

14. *Aegithalos c. italiae* Jourdain, 1910, type locality, Cremona, Italy. This is the race in the *alpinus* group that approaches most closely the characters of the *europaeus* group. It is not stable in northern Italy.

15. *Aegithalos c. siculus* Whitaker, 1901, type locality, Sicily.

16. *Aegithalos c. tephronotus* Günther, 1865, type locality, Asia Minor.

17. *Aegithalos c. major* Radde, 1884, type locality, Tiflis, Transcaucasia.

18. *Aegithalos c. alpinus* Hablizl, 1783, type locality, northern Iran.

19. *Aegithalos c. passekii* Zarudny, 1904, type locality, Zagros Mountains, southwestern Iran.

20. *Aegithalos c. glaucogularis* Gould, 1855, type locality, Shanghai.

21. *Aegithalos c. vinaceus* Verreaux, 1871, type locality, "Ourato" (= Inner Mongolia).

Aegithalos concinnus

The Red-headed Tit ranges from northern Baluchistan and the Himalayas eastward to southern Kansu and southwestern Shensi and then southward to the hills of Assam, Chin Hills, Southern Shan States and Karenni, mountains of Indochina, southeastern China, and Formosa. It has been divided into a number of subspecies, three of which occur in the Palearctic region: *iredalei* Baker, 1920, type locality, Simla, ranging from Baluchistan eastward through the Himalayas to southwestern Sikang (Trulung); *talifuensis* Rippon, 1903, type locality, northwestern Yunnan, ranging from northeastern Burma and Yunnan eastward to western Szechwan and south to northwestern Tonkin and northern Laos; and nominate *concinnus* Gould, 1855, type locality, Chusan [=? Chu Shan, Chekiang], ranging from Kansu and Shensi southward through south central and southeastern China to Formosa.

Three very slightly differentiated forms are best synonymized with the three valid subspecies above: *rubricapillus* Ticehurst, 1925, type locality, Sikkim, with *iredalei*; *tonkinensis* Delacour and Jabouille, 1930, type locality, northwestern Tonkin, with *talifuensis*; and *taiwanensis*

Yamashina (1944, Bull. Biogeogr. Soc. Japan, vol. 14, no. 2, p. 3), type locality, Formosa, with nominate *concinus*.

The three valid races differ as follows: In *iredalei*, the black face is conspicuously separated from the chestnut crown by a sharp white postocular streak lacking in the other two races, and *iredalei* is not banded with chestnut across the upper breast as in *talifuensis* and nominate *concinus*. It is also paler gray above, not slaty, and is not chestnut on the flanks, being pinkish buff over the whole of the under parts from the lower border of the black patch on the center of the throat, down. In *talifuensis* and nominate *concinus*, the chestnut band is separated from the black of the throat by a white band, the center of the abdomen and lower breast are white, and the flanks are chestnut and of the same shade as the band on the upper breast. *Talifuensis* and nominate *concinus* are so similar that the validity of *talifuensis* has been questioned by several authors, but, as shown by Greenway (1933, Bull. Mus. Comp. Zool., vol. 74, p. 155) and Mayr (1940, Ibis, p. 704), *talifuensis* is valid, differing from nominate *concinus* in comparative plumage by having a very distinctly darker chestnut band on the breast.

Aegithalos c. rubricapillus was described as smaller than *iredalei* and darker. In many species of birds from the Himalayas, the populations from the eastern Himalayas differ from those of the western Himalayas through such characters, but this variation cannot be used misleadingly as a rule of thumb, as it has often been by several authors, such as Ticehurst or Whistler, because the degree of variation varies in different species and is often slight as in the case of *concinus*. As I have shown in an earlier paper (1950, Amer. Mus. Novitates, no. 1459, p. 65), the measurements of specimens from the east and west show a certain amount of overlap, but I could not be sure about a difference in coloration as I had only three specimens from the east, and these were old skins. Snow, however, writes to me that he has examined the very good series of *iredalei* and *rubricapillus* in the collection of the British Museum and says that while "*rubricapillus* is a bit darker and smaller . . . many many birds are not separable" and adds that "as other subspecies of this species are rather distinct, it seems doubly undesirable to admit this poorly marked form."

Delacour and Jabouille described *tonkinensis* as being darker on the crown and on the breast band and flanks than nominate *concinus*, but Mayr (*loc. cit.*) found no differences between specimens in comparative plumage of *tonkinensis* and *talifuensis*, and Delacour (1951, L'Oiseau, p. 111) has now withdrawn *tonkinensis*. The series of *tonkinensis* com-

pared by Mayr consisted of the type and six paratypes, and I have examined the same material. I agree that *tonkinensis* should be synonymized with *talifuensis*, but it seems to me that *tonkinensis* is somewhat darker, though I wish to emphasize that the difference is very slight. Yamashina has described the population of Formosa as *taiwanensis*, stating that it is darker on the crown than nominate *concinus*. He states also that in *taiwanensis* the color of the crown is the same as in *talifuensis* but that the birds of Formosa differ from the latter by being deeper black on the throat, by showing more white on the lower breast, and by being darker chestnut on the breast band and flanks. None of these differences is confirmed by my material when specimens in the same plumage are compared, but my specimens from Formosa do show a slight difference which appears to be geographical. They are slightly darker chestnut on the breast band than nominate *concinus*, but this band is appreciably paler, not darker, than that of *talifuensis*. In my opinion, however, this difference is much too slight to warrant nomenclatural separation, and as the specimens from Formosa are closer to nominate *concinus* I believe *taiwanensis* should be synonymized with the latter.

Fifteen specimens were examined from Formosa and compared to nearly 60 specimens each of *talifuensis* and nominate *concinus*.

Aegithalos iouschistos

The forms *niveogularis* (the White-throated Tit), *iouschistos* (the Rufous-fronted Tit), and *bonvaloti* (the Black-headed Tit) are more or less closely related but are usually considered to be separate species, though *iouschistos* and *bonvaloti* (which seem to be more closely related to each other than these two are to *niveogularis*) are considered to be conspecific by some authors such as Mayr (1940, Ibis, p. 704) and Smythies (1953, The birds of Burma, London, Oliver and Boyd, p. 16). To these three must be added *sharppei* Rippon, 1904, which is always considered to be conspecific with *bonvaloti*, and *obscuratus* described by Mayr (*loc. cit.*) from western Szechwan, which is very similar to *bonvaloti* and is obviously conspecific with it, differing from it only in a manner of degree, chiefly by being duller throughout.

Among the three that are considered to be separate species, the two most distinct morphologically are *niveogularis* and *iouschistos*. These two to my knowledge have never been considered conspecific, as they differ clearly in size and proportions (table 1) and strikingly so in color and pattern, but as shown below all four forms are very distinct. In *niveogularis* the throat is all white (as its name indicates), and the white

throat is very sharply separated by a broad band of brown across the upper breast from the rest of the under parts which are pinkish buff; its forehead is white and the center of the crown is brown, the crown being banded laterally by dull black or brownish black and not very sharply so posteriorly. In *iouschistos*, the chin is black and the center of the throat silvery, with blackish bases to its feathers which show through to a variable extent on the surface, the rest of the throat and of the under parts being a rich shade of reddish chestnut; it has no breast band of any kind, and its forehead and the center of the crown are fawn, banded by very much broader, very much blacker, and very much sharper bands posteriorly than in *niveogularis*.

TABLE 1

MEASUREMENTS AND PROPORTIONS OF ADULTS IN *Aegithalos iouschistos*

Race	N	Bill Length	Wing Length	Tail Length	Wing/Tail Index ^a
<i>niveogularis</i>	5	10-11 (10.5)	62-65 (63)	55-58 (56.6)	90
<i>iouschistos</i>	4	8.5-9 (8.8)	53-57 (55)	45-52 (47)	85
<i>bonvaloti</i>	15	8-9.5 (8.9)	55-60 (58)	52-60 (57)	98
<i>sharpei</i>	4	9-9.5 (9.2)	52-54 (53)	48-50 (49)	92

^a Expressed in per cent of the length of the tail to that of the wing.

Bonvaloti differs less conspicuously from *iouschistos* but is nevertheless very distinct. Its throat is white at the sides and at the base as in *niveogularis*, but the chin and the center of the throat show the same coloration and pattern as in *iouschistos*; it is rufous brown below the white throat and is thus reminiscent of *iouschistos*, with the important exception, however, that it is whitish on the center of the abdomen, the white areas of the throat and of the abdomen being thus separated by a band of pigment across the breast, but this band is rufous, not brown, and is much more diffused than in *niveogularis*. In *bonvaloti* the forehead is white, as in *niveogularis*, but the lateral bands of black on the crown are as deep black and as broad and as sharp as in *iouschistos*.

Sharpei is no less interesting. It is always considered to be conspecific with *bonvaloti* but in fact is nearer in coloration and pattern to *niveogularis*, having a white throat, a very sharp band of brown across the upper breast, a pinkish buff breast and abdomen, and a white forehead. However, the bands at the sides of the crown, though less deep black,

broad, and sharp than in *iouschistos* and *bonvaloti*, are more so than in *niveogularis*, and it shows the same pattern on the chin and on the center of the throat as in these two, though the markings are duller black and less sharp. It is smaller than *bonvaloti* and *niveogularis* (table 1) but about similar in size to *iouschistos*, though its tail is proportionately longer.

From the comparisons above and the measurements and proportions in table 1, it is evident that all four forms differ very distinctly from one another, but it is evident also that they share some characters, and Snow writes to me that he believes they are probably all conspecific. He emphasizes that they replace one another geographically and points out that the differences between them, although striking, are not much more striking than in the three groups of subspecies in *A. caudatus*.

I follow Snow in considering the four forms to be conspecific, but the situation in this complex is not comparable in my opinion to that prevailing in *A. caudatus*. In the latter (see above), the three groups are connected by hybrid populations, but *niveogularis*, *iouschistos*, *bonvaloti*, and *sharpei* are all apparently well isolated geographically and cannot interbreed.

Sharpei is of course extremely isolated in the Chin Hills and appears to be a relict, while present evidence suggests that *niveogularis* and *iouschistos* are widely separated. *Niveogularis* ranges eastward in the Himalayas only as far as Kumaon, while *iouschistos* replaces it in Nepal, where according to Ripley (1950, Jour. Bombay Nat. Hist. Soc., vol. 49, p. 408) it may not range farther west than the Arun Kosi River in eastern Nepal. If Ripley is correct, a wide gap in distribution separates the two. At the eastern end of its range, *iouschistos* seems to be less widely separated from *bonvaloti*, as the most eastern locality from which *iouschistos* is known is the region of Showa, or about longitude 96° E. in southwestern Sikang, while *bonvaloti* is known from the region of Batang, or about 98° 30' E. in central Sikang. *Bonvaloti* reaches about the same longitude in northern Yunnan but farther south extends farther west, to the region east of the Irawaddy in northeastern Burma, and it has also been reported from the Adung Valley in northernmost Burma. This last locality brings it a little closer to *iouschistos*, but it is still well separated from it by distance and very high mountain ranges. The only two forms that are probably not separated by a gap in distribution are *bonvaloti* and *obscuratus*. This is suggested by the fact that they are quite similar and they probably grade into each other, presumably at about the border of Sikang and Szechwan, as

bonvaloti ranges at least as far east as the region of Tatsienlu (now Kangting), and *obscuratus* was described from the region west of Wenchwan and Kwanhsien in western Szechwan.

Further collecting in western Sikang and central and western Nepal should throw more light on the relationships of *niveogularis*, *iouschistos*, and *bonvaloti* and decide perhaps whether these three are conspecific or separate species. If the gaps in distribution should be narrowed considerably, and the specimens collected show no evidence of intergradation, it will be best to consider them to be separate species. Until then we may follow Snow and presume they have not reached species level.

If all five forms are considered to be conspecific, the species name becomes *iouschistos*, as *iouschistos* Hodgson, type locality, Nepal, was described in 1838, *niveogularis* was described by Gould in 1855 with type locality, "Northern India," *bonvaloti* by Oustalet in 1891 with type locality, Tatsienlu, *sharpei* by Rippon in 1904 with type locality, Chin Hills, and *obscuratus* by Mayr in 1940, from Chengou Forks, 30 miles west of Wenchwan. As two races will then inhabit the Himalayas, *niveogularis* in the west and nominate *iouschistos* in the east, the type locality of *niveogularis*, "Northern India," is no longer very satisfactory, and I hereby restrict it to northern Punjab.

Aegithalos fuliginosus

The Sooty Tit¹ inhabits the mountains of western and central China, ranging from eastern Sikang eastward through Szechwan to southern Kansu, Shensi, and western Hupeh. It was considered to be monotypic until Bangs and Peters in 1928 described as *scurrula* a series from this last region, stating that it was much paler and more rufous brown than *fuliginosus* Verreaux, 1870, which was described from what is now known as eastern Sikang. The comparative material mentioned by Bangs and Peters consisted of 11 specimens of the new form collected in 1907 in the region northwest of Ichang and three specimens collected in 1926 in southern Kansu.

The differences in the shade of the brown described by Bangs and Peters are of the sort that one would expect between freshly collected specimens and old ones, and Snow tells me, after comparing the material in the British Museum, that this material suggests that *scurrula* is not valid and was probably based on specimens that had become foxed. Snow's opinion is supported by the fact that one specimen in the col-

¹ As no English name exists for this species, I suggest the name Sooty Tit.

lection of the American Museum of Natural History, collected in 1893 on the border of southern Kansu in the region of Lungan (now Pingwu), matches perfectly the palest and most rufous specimens in the 10 paratypes of *scurrula* which were very kindly lent to me by Mr. J. C. Greenway, Jr., along with the three darker specimens collected in 1926 in southern Kansu. Another specimen in the collection of the American Museum of Natural History collected in 1905 in the Tsingling Range in Shensi also shows signs of fading and foxing when compared to the 1926 specimens but is still very slightly darker than the paratypes and the 1893 specimen, though it is virtually identical with the darker specimens among the paratypes.

I may add that neither Bangs and Peters, nor myself, nor apparently Snow has examined topotypical *fuliginosus*, and it seems to me, in view of the fact that its brown coloration is affected by post-mortem changes, that no subspecies should be proposed in this species that is not based on a comparison of freshly collected specimens. I would like here again to express my appreciation to Mr. Greenway for lending me the material compared by Bangs and Peters, as we have only the two specimens mentioned.

