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TAXONOMIC NOTES ON THE AUSTRALIAN BUTCHER-BIRDS (FAMILY CRACTICIDAE)

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This small Australo-Papuan family is composed of the three following genera:

Cracticus: This genus contains the Australian "butcher-birds" which, like the true butcher-birds or shrikes (*Lanius*), impale large insects and small vertebrates upon thorns or wedge them in forks before tearing them apart with their hooked bills. The species of *Cracticus* are stocky, big-headed birds. Compared with the members of the two other genera of Cracticidae, they have short legs and wings and a tail of medium length. They spend most of their time in trees or bushes but secure some food on the ground. Butcher-birds are about the size of a jay and, though larger than most song birds, they are smaller than their relatives. Two of the species of *Cracticus* inhabit both New Guinea and Australia; two are restricted to Australia (one reaching Tasmania) and two (allopatric) species are restricted to New Guinea or its off-lying islands.

Gymnorhina: The two species of this genus are the so-called Australian "magpies." They are larger than the butcher-birds and more terrestrial. Their legs are long and strong, the wings long and rather pointed, while the tail is comparatively short. The bill is less strongly hooked than in *Cracticus*, and the habits are less predatory. The food is chiefly insects secured on the ground. The magpie (there is usually only one form in a region) is typical of Australia and Tasmania, but in New Guinea, where it is probably a recent arrival, it is found only on the savannas along the southeast coast.

Strepera: The two species of currawongs are the largest members of the Cracticidae. The larger of them is the size of a raven (*Corvus*), a bird that it also resembles in proportions and appearance. Currawongs feed on fruit and insects and, like crows or ravens, are at home both on the ground or in trees. The wings and tail are relatively long and the legs of medium length. The hook on the bill is much reduced in this genus and in some specimens of the larger species is not evident at all in fully adult individuals. *Strepera* is the most austral of the three genera: both species are represented in Tasmania, neither reaches New Guinea.

The measurements of a typical specimen of a representative of each of the three genera of the Cracticidae (tables 1, 2) makes more evident the generic differences in proportions mentioned above. The body length is the total length of a museum skin minus the length of the tail. It provides a rough measurement of the general size of a bird, useful in reducing the measurements of the appendages (wings, legs, tail) to a common denominator when proportions are compared.

TABLE 1

MEASUREMENTS (IN MILLIMETERS) OF REPRESENTATIVES OF THE GENERA OF CRACTICIDAE

	Wing	Tail	Tarsus	Body Length
<i>Cracticus quoyi</i>	182	155	45	220
<i>Gymnorhina tibicen</i>	230	144	64	248
<i>Strepera graculina</i>	268	213	54	232

TABLE 2

RATIOS OF OTHER MEASUREMENTS TO BODY LENGTH

	Wing	Tail	Tarsus
<i>Cracticus quoyi</i>	.83	.70	.20
<i>Gymnorhina tibicen</i>	.93	.58	.26
<i>Strepera graculina</i>	1.16	.92	.23

The three genera of Cracticidae are rather closely related, and if they were members of a large family it might be preferable to reduce them to subgenera. It will be noted, however, that the differences in proportion on which the genera are based reflect adaptations to somewhat different habitats and methods of feed-

ing. A quick appraisal of color pattern might suggest that *Gymnorhina* should be merged with *Cracticus* while *Strepera* is retained, but further study indicates, to the writer at least, that it would be better either to recognize all three genera or to reduce all three to subgenera or synonyms of *Cracticus*. The curious communal territories of the magpies (*Gymnorhina*), without pair formation (Wilson, 1946), are not found in the butcher-birds (*Cracticus*) and currawongs (*Strepera*).

It is probable that the terrestrial adaptations of *Gymnorhina* and to a lesser extent *Strepera* are comparatively recent adaptations to the Australian environment. It does not necessarily follow therefrom that the family is of Australian origin, inasmuch as the most primitive genus, *Cracticus*, which is more arboreal than the other two, is as characteristic of New Guinea as of Australia.

The relationship of the Cracticidae to other song birds is little understood. They have often been placed in the Laniidae, but there can be little doubt that the resemblance to *Lanius* is convergence. Relationship to the Vangidae of Madagascar or to the Prionopidae of Africa cannot be entirely discounted, but it is improbable. The bill of cracticids resembles to some extent that of the curious *Pityriasis gymnocephala* of Borneo. The latter stands apart, though it is perhaps distantly related to the Prionopidae.

The genus *Strepera* was dissociated from the other two cracticids by Sharpe and placed with the Corvidae. Leach (1914) by a careful anatomical study proved that this was a mistake. Indeed, *Strepera graculina* provides such a perfect link between the smaller cracticids (*Gymnorhina*, etc.) and the crow-like *Strepera versicolor* as to make it obvious from external appearance alone that *Strepera* belongs with the Cracticidae.

The Cracticidae is one of several superficially crow-like families of birds centered in the Australian region. These families are, in addition to the Cracticidae, the Grallinidae (including *Struthidea* and *Corcorax*), Ptilonorhynchidae, Paradisaeidae, and, in New Zealand, the Callaeidae. All these birds are rather large oscines with a semi-booted tarsus and a long tenth primary. Whether they are related to the Corvidae or not is a moot question; they may be closer to such families as the Artamidae, Oriolidae, and Dicruridae.

The culmen length used in this paper is the distance from the mid point of the base of the horny sheath, where it meets the feathers of the forehead, to the most anterior part of the bill,

which is not necessarily the tip of the hook. All measurements are in millimeters.

CRACTICUS

Cracticus mentalis

Cracticus mentalis kemp Mathews

Cracticus mentalis kemp MATHEWS, 1912, Austral Avian Rec., vol. 1, p. 95. The type is from "Skull Creek, 20 miles s. of Cape York." Type: A.M.N.H. No. 673566; adult male; June, 1912; Robin Kemp. Wing, 145; tail, 110; culmen, 38.

The race *kemp* is found on the Cape York Peninsula, Queensland, while the nominate race inhabits the coast of southern New Guinea opposite Cape York. The species thus has a rather restricted distribution and may be in process of replacement by other species.

TABLE 3

MEASUREMENTS OF *Cracticus mentalis*

Locality	Males			Females		
	Number	Range	Mean	Number	Range	Mean
Wing						
Cape York	14	137-149	145	9	137-147	142
New Guinea	6	148-156	151	4	144-147	145
Tail						
Cape York	12	103-112	107	11	104-112	108
New Guinea	5	110-114	113	4	108-113	110
Culmen						
Cape York	14	37-42	40	10	36-40	38
New Guinea	6	39-44	43	6	35-42	38

Cape York examples of *Cracticus mentalis* average smaller than ones from New Guinea, as is evident from the measurements in table 3. Mathews (*loc. cit.*) wrote of *kemp*, "The back of the neck in the Australian bird has less white, and the white on the tail-feathers is less extensive." The apparent difference in the width of the nuchal collar requires confirmation in uniformly prepared specimens. The supposed variation in the white on the rectrices is not evident to me.

Cracticus torquatus

The change from immature to adult plumage in the Collared

Butcher-bird seems to be a rather prolonged process involving both molt and wear. Females tend to be somewhat duller in hue than adult males, more like immatures, especially in the races *torquatus* and *cinereus*. With complete maturity the adults often, if not invariably, become indistinguishable. A female shot by White from a nest with eggs on Eyre Peninsula, South Australia, is somewhat browner above and more heavily streaked below than most birds in fully adult plumage, although the crown is black as in the latter. This suggests that females, at least, may nest before they have come into completely adult dress.

***Cracticus torquatus cinereus* (Gould)**

Vanga cinerea GOULD, 1837, A synopsis of the birds of Australia, pt. 1, pl. 2; Tasmania.

The race *cinereus* is endemic to Tasmania. It is larger than *t. torquatus* of Victoria and New South Wales, particularly as regards bill length. Gadow (1883, p. 101) thought *cinereus* was somewhat browner, less gray than *torquatus*, while Gould (1865, p. 186) wrote that *cinereus*, when fully adult, is grayer than *torquatus*. The specimens of *cinereus* available to me seem to agree better with Gadow's statement, but this may be the result of their poor plumage condition.

***Cracticus torquatus torquatus* (Latham)**

Lanius torquatus LATHAM, 1801, Index ornithologicus, suppl., p. xvii; Sydney, New South Wales.

Cracticus torquatus olindus MATHEWS, 1912, Novitates Zool., vol. 18, p. 374; Olinda, Victoria. Type: A.M.N.H. No. 673512; adult, sex?; "9/5/08," presumably May 9, 1908. The original label is a small, unsigned tag, but the data on it appear to be in the hand of Thomas Tregallas who, according to Mathews' manuscript catalog, was the collector. Wing, 141; tail, 108; culmen, 40. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 384, top figure.

Cracticus torquatus torquatus is found over most of New South Wales and Victoria. It is replaced by *leucopterus* in northern New South Wales (Richmond River district) and in western Victoria (mallee country). Possibly *leucopterus* is also the form that occurs in westernmost New South Wales.

In the nominate race the upper parts are duskier, more blackish, than in any of the others except perhaps *cinereus* of Tasmania. The type of Mathews' race *olindus* is near the darker extreme, but a skin from Auburn, Victoria, has the black of the upper parts ex-

tending well down on the shoulders, and the remainder of the back is dark slaty blackish without a trace of brownish or fuscous. On the other hand, some Victoria specimens are no darker than those of New South Wales.

***Cracticus torquatus leucopterus* Gould**

Cracticus leucopterus GOULD, 1848, The birds of Australia (in 7 vols.), vol. 1, p. xxxv; southwest Australia.

Cracticus torquatus ethelae MATHEWS, 1912, Novitates Zool., vol. 18, p. 375; the type is from "Mt. Dutton, W. coast Eyre's Peninsula, S[outh] A[ustralia]." Type: A.M.N.H. No. 673503; adult male; August 30, 1911. The original label is unsigned, but seems to be in the hand of S. A. White, who is said in Mathews' manuscript catalog to have been the collector. Wing, 148; tail, 117; culmen, 42. Colored plate: Mathews' "The birds of Australia," opposite p. 384, the central one of the three birds figured. In the description of this specimen accompanying this plate (p. 386) the date is given as August 20. This is a mistake; the original label has it "30/8/11."

Cracticus torquatus colei MATHEWS, 1912, Austral Avian Rec., vol. 1, p. 119; the type is from Underbool (mallee), Victoria. Type: A.M.N.H. No. 673540; adult male; September 9, 1910; C. F. Cole. Wing, 144; tail, 115; culmen, 40.

The race *leucopterus* is by far the most widely distributed one of the species. In Western Australia it is the only form present. There it ranges north to about the middle of the continent, i.e., to the "Minilya and Upper Ashburton Rivers and Wiluna" (Serventy and Whittell, 1948, p. 341). It is also found in South Australia and in the mallee country of western Victoria and probably western New South Wales. Thence it ranges through northern New South Wales (Richmond River district) well into Queensland as we have a specimen from Cedar Bay, which, I believe, is just south of latitude 14° S. at the base of the Cape York Peninsula. On the latter it is absent.

Perhaps *leucopterus* ranges across northern Queensland, and intergrades with *argenteus*.

When writing the "Catalogue of birds" Gadow was surprised, apparently, to find that the birds of Queensland and of southwestern Australia are alike. Actually, *leucopterus* has a continuous distribution from Queensland through western and northern New South Wales, western Victoria, and South Australia to Western Australia. The racial characters are best developed, or at least most universal, in Western Australia and Queensland. Specimens from other parts of the range often show tendencies towards the nominate race.

Cracticus torquatus leucopterus differs from *C. t. torquatus* as follows: the back is a much lighter gray; the under parts are somewhat lighter, with less suggestion of the grayish or brownish barring of the immature plumage; the lesser wing coverts are often whitish, but this is variable.

Cracticus torquatus argenteus Gould

Cracticus argenteus GOULD, 1840, Proc. Zool. Soc. London, p. 126; "north-west coast of Australia." Gadow (1883, p. 100) listed a specimen in the British Museum, the only representative of the race in that collection at the time, as the type of *argenteus*, with type locality as given above. Stone (1913, p. 168) considered a male from Port Essington in the collection of the Academy of Natural Sciences of Philadelphia to be the type. Mathews in "The birds of Australia" (1922-1923, p. 397) favored Gould's designation, but in the "Systema" (1930, p. 655) gave "Hanover Bay, North-west Australia" as the type locality. I am unable to find this locality. Most, if not all, of the known specimens of *argenteus* are from Northern Territory. It is doubtful if the race gets into Western Australia at all.

Cracticus torquatus colletti MATHEWS, 1912, Austral Avian Rec., vol. 1, p. 46; the type is from the Mary River, Northern Territory. Type: A.M.N.H. No. 673539; adult male; May 15, 1895; [Knut] Dahl. Culmen 38. The tail and wing quills are extremely worn and cannot be measured; this was quite enough for Mathews to seize upon this specimen as the type of a "subspecies," supposedly of smaller size and with less white on the tips of the tail feathers.

This race is found in north-central Australia and possibly, as noted above, in some adjacent areas in northwestern Australia. It is not common in collections and may be rare or local. Three of our four specimens are from the South Alligator River; the fourth is from the Mary River.

Cracticus torquatus argenteus is the most distinct and handsomest form of the species: pure white below, light gray above, with much white on the wings and tips of the tail feathers.

Size variation among the races of *Cracticus torquatus* is summarized in table 4. The Tasmanian race is perhaps separable only on the basis of size, but the continental forms are primarily "color" races. Only one adult specimen of *argenteus* suitable for measuring was available. This bird, a female, suggests that individuals of this race are characterized by large size, equalling that of the Tasmanian form, as well as by the excellent color distinctions which led early authors to list *argenteus* as a full species. The measurements given in table 4 are, with the exception of the specimen of *argenteus* just mentioned, all of males.

TABLE 4
MEASUREMENTS OF *Cracticus torquatus*
(See text)

Race	Number	Range	Mean
Wing			
<i>cinereus</i>	3	149-156	152
<i>torquatus</i>	4	144-153	147
<i>leucopterus</i>	11	143-152	147
<i>argenteus</i>	1	152	152
Culmen			
<i>cinereus</i>	3	44-47	45
<i>torquatus</i>	4	40-43	42
<i>leucopterus</i>	14	32-43	40
<i>argenteus</i>	1	41	41

Cracticus nigrogularis

The Black-throated Butcher-bird does not vary geographically in color. The population of Northern Territory (north) and adjacent parts of the north coast of Western Australia contains birds of distinctly smaller size. Long ago Gould recognized and named this form.

Examples of this species from Western Australia (except the north coast) and from central Australia (Finke River) have, on the average, a longer bill (50+ mm.) than do nominate *nigrogularis* of eastern Australia. The oldest name for these western birds, which are just barely recognizable as a race, seems to be *kalgoorli* Mathews.

Cracticus nigrogularis nigrogularis (Gould)

Vanga nigrogularis GOULD, 1837, A synopsis of the birds of Australia, pt. 1, pl. 3, 1837; near Sydney, New South Wales.

Cracticus nigrogularis inkermani MATHEWS, 1912, Novitates Zool., vol. 18, p. 374; Inkerman, north Queensland. Type: A.M.N.H. No. 673405; adult male; date partly illegible but written as March 14, 1907, on a later label; W. Stalker. Wing, 173 (molt?); tail, 130; culmen, 43.

Cracticus nigrogularis mellori MATHEWS, 1912, Novitates Zool., vol. 18, p. 374; South Australia. Type: A.M.N.H. No. 673348; adult male; date ?; collector ? "Gerrard." The specimen has no field label, but "Gerrard" is written across one end of a label on which "Collection of G. M. Mathews" is printed. No collector of this name is listed in Mathews' "Bibliography" (1925). The bird may have been collected by J. W. Mellor, for whom it was named. In this case "Gerrard" could be the locality, though I am unable to find such a place in South Australia. Wing, 182?; tail, 143; culmen, 45.

This race is found in eastern Australia (Victoria, New South Wales, Queensland) and in South Australia. Birds from the northern and western parts of the latter state may be nearer to the race *kalgoorli*. The birds of northern Queensland are rather small, but, unlike Hartert (1905, p. 229), I consider them closer to *n. nigrogularis* than to *picatus*. Material was not sufficient to establish the best line of separation between these two intergrading races. *Cracticus nigrogularis* is absent from some parts of Cape York, but Thomson (1935, p. 77) found it common along the Stewart River, well north on the Peninsula.

In his "Systema" Mathews (1930, p. 654) did not include Victoria in the range of *nigrogularis*, but in naming the supposed subspecies *mellori* from South Australia he listed Victoria in its range. The only specimen from Victoria in the Mathews collection is one taken by Thomas Tregallas at "Wandella (near Kerang)." He states on the label that the species is not plentiful anywhere in the state, but is found chiefly in the north of Victoria in timber along the Murray River.

***Cracticus nigrogularis kalgoorli* Mathews**

Cracticus nigrogularis kalgoorli MATHEWS, 1912, Novitates Zool., vol. 18, p. 374; "Kurrawang, W. Kalgoorlie" (from label); Western Australia. Type: A.M.N.H. No. 673412; adult male; September 30, 1905; G. C. Shortridge. Wing, 190; tail, 145; culmen, 50. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 374, figure at right.

Cracticus nigrogularis coongani MATHEWS, 1923, Austral Avian Rec., vol. 5, p. 35; "Coongan River, Mid-west Australia." Type: The only bird from the Coongan River in the Mathews collection has the following specifications: A.M.N.H. No. 673422; adult male; July 13, 1908; "F. L. W.," said, on a later label, to be F. L. Whitlock. Wing, 171; tail, 132; culmen, 50. Mathews often disdained to designate a type in his descriptions, but in such cases sometimes wrote the word "type" on a specimen. In the case of *coongani* he did not do even this, unless the type was not in his own collection, which is unlikely. While the suggestion that the above bird is the type seems plausible, it is entirely possible that Mathews had no particular specimen or specimens in mind and merely proposed the new name in the hope that it might later prove valid. In "The birds of Australia" he intimates as much, writing as follows (p. 382): "It is somewhat curious that the bird criticised by Hartert and also by Campbell from the Upper Coongan River and Point Cloates, whence Tom Carter also recognized its distinction, has never been named. I have named it *Cracticus nigrogularis coongani* pointing out the features emphasized by these writers." In the actual description Mathews said that *coongani* differs from his race *tormenti* by having a shorter bill and by having the "black parts of a more distinct black." Actually the type of *tormenti* has a bill 6 mm. shorter than that of the Coongan River specimen (44 versus 50 mm.) and is in fresher (and hence blacker) plumage than the latter.

This race is found in Western Australia (except the extreme north) and in arid central Australia.

Cracticus nigrogularis picatus Gould

Cracticus picatus GOULD, 1848, The birds of Australia, pt. 34; Port Essington, Northern Territory.

Cracticus nigrogularis tormenti MATHEWS, 1912, Austral Avian Rec., vol. 1, p. 46; "Mission Station, Napier Broome Bay," Western Australia. Type: A.M.N.H. No. 673440; adult female; May 20, 1910; G. F. Hill. Wing, 164; tail, 127; culmen, 44. Mathews' subspecies *tormenti* was presumably named after Point Torment in King Sound, where the race *kalgoorli* is found (wing, one male, 183 mm.). But the type of *tormenti* is not from Point Torment but from Napier Broome Bay at the northern tip of Western Australia, within the range of *picatus*. Hence *tormenti* must be listed as a synonym of the latter race.

Cracticus nigrogularis territorii MATHEWS, 1913, Austral Avian Rec., vol. 2, p. 77; Mt. Shoobridge, Northern Territory. Type: A.M.N.H. No. 673358; adult, sex ?; November 13, 1894; [Knut] Dahl. Culmen, 37?. The type is in extremely worn and stained plumage; the correct measurements of the wings and tail cannot be determined.

The range of *C. n. picatus* is chiefly the northern part of Northern Territory, but it reaches northernmost Western Australia. It intergrades with *kalgoorli* in the west and south and with *n. nigrogularis* in Queensland. Birds of this race are smaller in every way, but the difference in tail length seems to be relatively greater than in wing length or bill length (see tables 5, 6, and 7).

TABLE 5
WING LENGTHS OF *Cracticus nigrogularis*

Locality	Males			Females		
	Number	Range	Mean	Number	Range	Mean
Victoria	1	185	185	—	—	—
New South Wales	5	173-181	178	—	—	—
South Australia	2	181, 182	182	1	176	176
Queensland	10	172-179	174	7	163-173	168
Central Australia	1	183	183	1	177	177
Western Australia (except northernmost part)	7	171-190	182	3	173-183	179
Northernmost Western Australia (<i>picatus</i>)	1	168	168	2	160, 164	162
North Australia (<i>picatus</i>)	9	157-168	164	11	152-165	159

TABLE 6
TAIL LENGTHS OF *Cracticus nigrogularis*

Locality	Males			Females		
	Number	Range	Mean	Number	Range	Mean
Victoria	1	152	152	—	—	—
New South Wales	5	139-147	142	—	—	—
South Australia	2	143, 145	144	1	140	140
Queensland	6	130-139	135	6	128-138	134
Central Australia	1	145	145	1	143	143
Western Australia (except northernmost part)	8	132-148	142	3	141-149	146
Northernmost Western Australia (<i>picatus</i>)	2	128, 129	129	2	125, 127	126
North Australia (<i>picatus</i>)	8	118-129	123	11	112-127	121

TABLE 7
CULMEN LENGTHS OF *Cracticus nigrogularis*

Locality	Males			Females		
	Number	Range	Mean	Number	Range	Mean
New South Wales, Victoria, South Australia	8	40-48	45	1	42	42
Queensland	13	42-49	45	7	41-45	44
Central and Western Australia (except northernmost part)	9	49-52	50	5	46-47	47
Northernmost Western Australia (<i>picatus</i>)	2	43, 45	44	2	40, 44	42
North Australia (<i>picatus</i>)	10	41-44	43	11	39-44	41

Cracticus quoyi
***Cracticus quoyi quoyi* (Lesson)**

Barita quoyi LESSON, 1827, Bull. Sci. Nat. (Ferussac), vol. 10, p. 289; Dorey, northwestern New Guinea.

Cracticus q. quoyi inhabits New Guinea and its western coastal islands. As compared with the other two races, it is smaller than *spaldingi* and larger than *rufescens*. The base of the bill is broader

than in the other two races and appears swollen. The actual width of the bill at the rear of the nostril-slit in *q. quoyi* is more than 15 mm., usually about 16 mm.; in the other two races it is usually about 14, rarely over 15 mm.

***Cracticus quoyi spaldingi* Ramsay**

Cracticus spaldingi RAMSAY, 1878, Proc. Linnean Soc. New South Wales, vol. 2, p. 211; Port Darwin, Northern Territory.

Cracticus quoyi tunneyi HARTERT, 1905, Novitates Zool., vol. 12, p. 228; Alligator River, Northern Territory. Type: A.M.N.H. No. 673163; adult male; September 25, 1903; "J.T.T." [Tunney]. Wing, 207; tail, 157; culmen, 65.

Cracticus quoyi jardini MATHEWS, 1912, Austral Avian Rec., vol. 1, p. 94; Cape York. Type: A.M.N.H. No. 673191; adult male; September 2, 1911. Wing, 184; tail, 154; culmen, 59. The original label is unsigned but is in the handwriting of J. P. Rogers.

Cracticus quoyi spaldingi is the race of the Aru Islands, the coast of Northern Territory, and Cape York, Queensland. The wing and the bill are longer than in the New Guinea race, and the bill is narrower, less bulbous. The size is larger than in either of the other races. Birds from Northern Territory, the type locality, are the largest, but those of the Aru Islands and Cape York need not be separated. It is possible that the "*rufescens*" phase may occur occasionally in the Cape York population of this race.

***Cracticus quoyi rufescens* De Vis**

Cracticus rufescens DE VIS, 1883, Proc. Linnean Soc. New South Wales, vol. 7, p. 562; Tully River Scrubs, north Queensland.

This subspecies inhabits northern Queensland, south of Cape York. It is smaller than either of the other two, and its bill does not have the bulbous appearance of that of *q. quoyi*. A rufous phase is found in the immatures.

In his series of mutation studies in birds, Stresemann (1943) discussed the rufous phase of *C. quoyi rufescens* at some length and cited the pertinent references. The distribution of the rufous phase in Queensland varies geographically. In parts of central Queensland all the young are believed to be rufous, while towards Cape York in the north and Mackay to the south the black phase becomes universal. In the intervening areas mixed broods, but never intermediate individuals, are found. Stresemann concluded, quite justifiably, that the rufous phase is governed by a single alternative genetic factor.

Stresemann suggested that the rufous phase represents a new mutation, one that produced an immature plumage phylogenetically unknown in the genus and that came later in time than the black immature (and adult) garb elsewhere universal in the species. As evidence in favor of this supposition, he emphasized the small area of distribution of the rufous phase and stated that

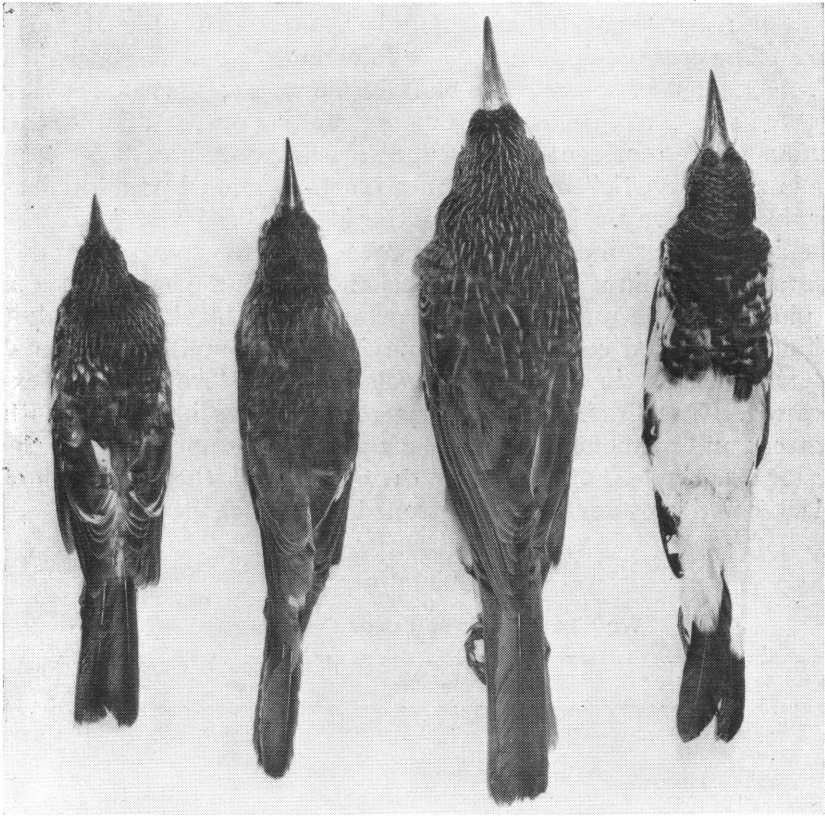


FIG. 1. Specimens in immature plumage of (left to right): *Cracticus mentalis kempi*, *C. torquatus leucopterus*, *C. quoyi rufescens*, *C. cassicus cassicus*. The light shaft streaks or, in *C. cassicus*, edges of the feathers are rufous in all these species in this plumage.

phaeomelanin pigments are otherwise unknown in the genus *Cracticus*. With these statements and conclusions I can agree only in part.

Some immature specimens of the other species of *Cracticus* and

of the closely related *Gymnorhina* have a pattern very reminiscent of that of "*rufescens*." Immatures of *Cracticus torquatus* may be almost as rufous as "*rufescens*" itself, and the juvenal plumage of *C. cassicus* has the feathers edged with rufous. In *C. torquatus* the pattern of the juvenal plumage approaches that of *rufescens*, with similar streakings on the head (see fig. 1).

Hence in *Cracticus* we often find juvenal plumages (apparently very transient) that are marked and streaked with rufous or grayish. The coal-black plumage of adults and of some immatures of *C. quoyi* must be considered a later development; the rufous phase found in parts of Queensland, a more primitive one. Whether this rufous phase represents a persistent feature, only now being lost, or is an "atavistic" mutation in a black-plumaged population is impossible to say. Even if the latter is true, "*rufescens*" must be considered an example of the widespread tendency towards parallel mutations within a species or genus and not as the appearance of a plumage quite unknown in the genus. The black of the adult plumage can be considered as having supplanted the juvenal plumage except in those individuals in which "*rufescens*" is expressed. The "*rufescens*" plumage, differing as it does in both pattern and pigment from the black plumage, is not apt to be the result of a single mutation. On the other hand, the expression of black could presumably be controlled by a single gene.

TABLE 8

WING LENGTHS OF MALES OF *Cracticus quoyi*

Locality	Number	Range	Mean
New Guinea	6	177-192	184
Aru Islands	2	190, 195	193
Northern Territory	7	196-207	203
Cape York ^a	5	184-198	190
Range of <i>rufescens</i>	14	171-183	175

^a Two from Thomson (1935).

RELATIONSHIPS OF THE SPECIES OF *Cracticus*

The species of *Cracticus* are all rather closely related. Careful study of their distribution, comparative abundance, and geographical variation might be rewarding, but at present one can merely suggest some of the phylogenetic tendencies. *Cracticus*

mentalis, restricted as it is to the coasts of southern New Guinea and to parts of the Cape York Peninsula, may be the most primitive species of the genus. Its coloration suggests both that of the white-throated *torquatus* and that of the black-throated *nigrogularis* and *cassicus*.

Cracticus torquatus is absent on Cape York, and it would be logical to assume that it is represented there by *mentalis*. That the situation is not this simple is suggested by Thomson (1935) who found that *mentalis* and *nigrogularis* seem to replace each other on different parts of the Peninsula. In general, however, one must suppose that the large, black-throated species, *nigrogularis*, and (in New Guinea) *cassicus*, form one group and the smaller white-throated *mentalis* and *torquatus* another. The latter seems to be the commonest species in the more southern parts of Australia and is the only one present in Tasmania. In the more arid central and western parts of Australia, *torquatus* is absent, but it is found nearly, or quite, to the Cape York Peninsula in Queensland and then, as the well-differentiated form *argenteus*, locally in the Northern Territory. It is absent on Melville Island and in other areas of Northern Territory, where *C. nigrogularis picatus* happens to be common.

Cracticus louisianensis, found only on Tagula (Sudest) Island in the Louisiades, is apparently a well-marked, specific insular representative of *cassicus*, though the possibility that it was derived from *mentalis* cannot be dismissed entirely.

Cracticus quoyi is the most specialized member of the genus. It is entirely black, with the exception of the "*rufescens*" phase found locally in Queensland. In Australia *quoyi* is found only in dense mangroves or other coastal growth, but in New Guinea it is less restricted ecologically. It may be a rather recent arrival in Australia.

In considering the phylogeny of the species of *Cracticus* it must be remembered that the magpies (*Gymnorhina*) and even the currawongs (*Strepera*) are but specialized derivatives of the butcher-birds (*Cracticus*) and may have replaced the latter in certain habitats.

GYMNORHINA

There has long been disagreement as to whether there are one, two, or three species of Australian magpies (*Gymnorhina*). The forms of questionable status are:

1. A form in which the male has a white back; the female a light gray back, with the feathers margined with white. Here belong the small *hypoleuca* of Tasmania and the larger but otherwise similar *leuconota* of southern Victoria and southern South Australia. *Leuconota* occurs sparingly in northern Victoria and southern New South Wales.

2. A white-backed form (*dorsalis*) in which the males are virtually inseparable from those of *leuconota*, but the females have the feathers of the mid back black, with white margins. *Dorsalis* inhabits southwestern Australia north to the middle part of the continent.

3. A form (*tibicen*) in which the middle of the back in adults is solid black in both sexes. This type of plumage is found from south New Guinea south over much of Australia to the middle of the continent in the west and to northern Victoria in the east. There are several recognizable races.

What happens in the areas where these three forms of *Gymnorhina* meet or overlap? In mid Western Australia the ranges of *dorsalis* and of the black-backed form *tibicen longirostris* meet. The two seem to replace each other geographically, but Whitlock (*in* Mathews, 1922-1923, p. 347) mentions securing one white-backed bird (*dorsalis*) within the range of *longirostris*. This may have been a straggler; furthermore ranchers in this section are said to have brought in caged individuals of *dorsalis*, some of which escaped. Records of interbreeding or intergradation between *longirostris* and *dorsalis* are lacking, but specimens of the former are comparatively uncommon in collections.

Better known is the overlap between *leuconota* and the nominate form of *tibicen* in northern Victoria and southern New South Wales. South of the Dividing Range or Victorian Alps in Victoria, the white-backed *leuconota* is the prevailing form, and there are few, if any, records of *tibicen*. North of the Dividing Range and in southern New South Wales *tibicen* is the dominant form, but white-backed birds occur in small numbers. There is a similar mingling in parts of South Australia. Cole (1921) published a photograph of four specimens taken in the Wangarrata district of northeastern Victoria which he considered to be intermediate between *tibicen* and *leuconota*. He was undecided whether they were variants of *tibicen* or hybrids between *tibicen* and *leuconota*. Examination of the specimens of *tibicen* in the American Museum reveals two in which the black back of *tibicen* is somewhat reduced,

perhaps indicating previous crossing with *leuconota*. Both are from the area where overlap between the two forms exists (Brainwood, New South Wales; Nagambie, Victoria). Since the region of the scapulars and back is frequently distorted in preparing specimens of birds, it is often difficult to decide whether a particular specimen is intermediate between these two forms of *Gymnorhina* or not. There can be no doubt, however, that some of the four birds figured by Cole, as well as the two mentioned above, are really intermediate as regards the amount of black on the back.

Cole (*op. cit.*) recorded matings between birds of mixed and pure plumages and described the progeny of such matings. If we accept his statement that he was able to predict the pattern of the adult plumage by examining that of nestlings, he established that all variations from a black-backed (*tibicen*) to a white-backed (*leuconota*) type of bird may mate with one another and that the young of a single brood may show wide variation in the color of the back.

As further evidence of interbreeding Mathews (1922-1923, p. 355) cited a statement by Thomas P. Austin, writing from Cobora, New South Wales, as follows, "*Gymnorhina leuconota* is a very rare bird here, but one has mated with a Black-backed, and reared their young in the same tree for the last three years." Chandler (1913) reported seeing several "hybrids" on the Kow Plains, in the Victorian mallee country near the South Australian border. In South Australia *leuconota* is replaced by *tibicen* in the dry interior but both are said to occur at some places, as for example, 100 miles north of Adelaide.

No fewer than eight of the specimens of *leuconota* in the American Museum (almost half of the total number) are from New South Wales. There are three females and five males, all typical. The three localities represented, Cooma, Bathurst, and Delegate, are in the southern part of that state.

It will be apparent that the evidence as to the interrelationships of these forms of magpies is conflicting. Some interbreeding evidently occurs in the area where *leuconota* and *tibicen* overlap, but most specimens, if the material examined is any indication, show no evidence of crossing. The very fact that two such distinct forms meet in an area where natural barriers are absent indicates that their differentiation occurred in isolation and that they have recently come into secondary contact with each other. If such is

the case, it may well be that some interbreeding occurs but not enough to prevent the further differentiation of the two forms, in which case they would correctly be regarded as distinct species.

Analysis of measurements of *tibicen* and *leuconota* favors the view that they are conspecific. The Queensland race of *tibicen* is small, but size increases towards the south so that nominate *tibicen* of New South Wales is almost or quite as large as *leuconota*. That the measurements of the latter average a little larger is presumably because this bird is affected by the same cline and is a still more southern form. If *leuconota* and *tibicen* are distinct species, one would expect any size difference between them to be magnified by ecological competition in the area where they meet and overlap. Just the opposite occurs, and the measurements blend. The same is true in Western Australia where *dorsalis* and *longirostris*, both long-billed forms, meet. We have not enough material to indicate whether or not the bill of *dorsalis* increases towards the north, where its range approaches that of *longirostris*, but typical *dorsalis* is itself a rather long-billed form.

It is quite likely that future field work will show that all forms of *Gymnorhina* are conspecific, especially since they all are said to have similar habits. If such is the case the variation would resemble, to some extent, that found in the hooded and carrion crows of Europe (*Corvus corone* and *cornix*), which appear quite different but interbreed freely. At present it would be premature to unite the white-backed and black-backed magpies.

As regards the relationship of *leuconota* and *dorsalis*, the fact that the males can be differentiated only by slight average characters suggests conspecificity. The difference in the females, while quite sharp, is one of degree. Both have the feathers of the back margined with white, but in *leuconota* the centers of the feathers are gray, in *dorsalis* black. Magpies have been seen but apparently not collected in the deserts inland from the Great Australian Bight (Wilson, 1946). Perhaps *dorsalis* and *leuconota* intergrade in that area.

At the present time white-backed birds are restricted more or less to moist temperate habitats in southern Australia and Tasmania. Black-backed forms are found in similar habitats in northern Victoria and in New South Wales, but occur in Queensland, in the deserts of mid Western Australia and northern South Australia, and in the savannas of southern New Guinea. This greater ecological tolerance of *tibicen* can be taken to indicate that

it is the older form. The plumage sequences, too, favor this view. The white-backed plumage is preceded by dark-backed immature stages and is limited to adult males.

The measurements of the forms of *Gymnorhina* whose status is doubtful at the point of contact or overlap are given in table 9; those of the remaining forms of the genus are given in the text.

Gymnorhina tibicen

Gymnorhina tibicen papuana Bangs and Peters

Gymnorhina tibicen papuana BANGS AND PETERS, 1926, Bull. Mus. Comp. Zoöl., vol. 67, p. 431; "Southwest New Guinea: Princess Marianne Straits."

This subspecies is endemic in the savannas near the coast of southeastern New Guinea.

The original description of this bird is as follows: "Similar to *Gymnorhina tibicen longirostris* Milligan, but white nuchal patch much narrower, bill stouter anteriorly and less tapering. Tibiae white, the feathers blackish only at the base." None of our four specimens of *papuana* is fully mature. The color of the tibiae in these birds is the same as in some examples of *longirostris*. The color of these feathers probably varies with age, not race. The smaller size of the nuchal patch in *papuana* seems to be a valid racial character, but needs confirmation with adequate material. Probably *papuana* is a smaller bird than *longirostris*. Bangs and Peters give the wing length of their type (a female) as 245 mm. The culmen lengths of our subadult specimens of *papuana* are: male, 64; female, 60, 62; of the type of *papuana*, 64 mm.

?Gymnorhina tibicen eylandtensis H. L. White

Gymnorhina tibicen eylandtensis WHITE, 1922, Emu, vol. 21, p. 163; Groote Eylandt, Gulf of Carpentaria, Northern Territory.

The race, if valid, inhabits only Groote Eylandt. Mr. H. G. Deignan kindly permitted me to examine two specimens he collected on Groote Eylandt while a member of the recent Smithsonian expedition to Arnhem Land. Measurements of the only adult, a male, are: wing, 244; tail, 139; culmen, 64. This specimen thus has a bill much longer than that of *terraereginae*, the race of Queensland and eastern Northern Territory. It is highly unlikely that either *papuana* or *longirostris* occurs on Groote Eylandt, unless the latter race has a much wider range than is now realized.

For the time being the race *eylandtensis* must be upheld, chiefly on geographical premises.

***Gymnorhina tibicen longirostris* Milligan**

Gymnorhina longirostris MILLIGAN, 1903, Emu, vol. 3, pp. 96-97; "Cane and Ashburton Rivers, northwestern Australia."

Gymnorhina tibicen longirostris HARTERT, 1905, Novitates Zool., vol. 12, p. 230; Nullagine, Western Australia. Type: A.M.N.H. No. 673039; adult male; April 16, 1907; J. T. Tunney. Wing, 260; tail, 134; culmen, 63. Hartert used the same name as Milligan by coincidence.

Gymnorhina tibicen finki MATHEWS, 1914, Austral Avian Rec., vol. 2, p. 100; "Horseshoe Bend, Fink [= Finke] River, N. T." Type: A.M.N.H. No. 673060; adult male; September 26, 1913; (Capt. S. A. White). Wing ? (mutilated); tail, 150; culmen, 61.

This long-billed race ranges across the dry belt of mid Australia. In the west I have examined specimens from Nullagine, the Coongan River, and from 50 miles south of Roeburne. In central Australia, White secured it at Alice Springs in the MacDonnell Range and on the Finke River.

***Gymnorhina tibicen terraereginae* (Mathews)**

Cracticus tibicen terraereginae MATHEWS, 1912, Novitates Zool., vol. 18, p. 372; Bartle Frere, Queensland. Type: A.M.N.H. No. 673046; adult male; May 26, 1900; E. Olive. Wing, 242; tail, 135; culmen, 57. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 337, small figure at left.

This race occurs in Queensland and also in the eastern part of Northern Territory. To the south it undoubtedly intergrades with *t. tibicen* of New South Wales, which differs only in its larger size. For the time being, the Queensland-New South Wales boundary can be considered to mark the limits of the range. Thomson (1935) found that its range on Cape York is restricted to the hills or mountains in the center of the Peninsula.

Measurements of *Gymnorhina tibicen terraereginae* are as follows: wing, six males, 242-265 (250); three females, 240-251 (245). Culmen, six males, 53-57 (55); four females, 53-56 (55).

***Gymnorhina tibicen tibicen* (Latham)**

Coracias tibicen LATHAM, 1801, Index ornithologicus, suppl., p. xxvii; Sydney, New South Wales.

Cracticus tibicen intermissus MATHEWS, 1912, Novitates Zool., vol. 18, p. 372; Bendigo, Victoria. Type: A.M.N.H. No. 673014; adult male; March 30, 1907; Thomas Tregallas. Wing, 251; tail, 141; culmen, 47.

This race is separable from *terraereginae* only by larger size. It is the race of New South Wales and of Victoria north of the Dividing Range. In South Australia it is said to replace *leuconota* in the drier interior; probably it intergrades with *longirostris* in the northern part of South Australia.

Gymnorhina hypoleuca

Gymnorhina hypoleuca dorsalis Campbell

Gymnorhina dorsalis CAMPBELL, 1895, Proc. Roy. Soc. Victoria, ser. 2, vol. 7, p. 206; southwest Australia.

Gymnorhina hypoleuca dorsalis has its center of distribution in southwestern Australia. It extends north in smaller numbers about to the middle of the continent and east possibly to or beyond the South Australian border.

In this form adult males are white backed and almost inseparable from those of the following race *leuconota*, but they average smaller, with longer bills. In *dorsalis* the basal half of the outer vane of the outer rectrix is usually white, while in *leuconota* it is usually black, but there are exceptions in both races.

Females of *dorsalis* have the feathers of the mid back black margined with white and are thus readily separable from those of any other race. Serventy and Whittell (1948, p. 345) state that females of *dorsalis* and *tibicen* are inseparable. I have seen no female of *dorsalis* in which the white edgings of the back feathers are absent. They are sometimes reduced by wear but never to an extent that would lead to confusion (in the hand, at least) with *tibicen*.

Gymnorhina hypoleuca leuconota Gould

Gymnorhina leuconota GOULD, 1844, The birds of Australia, pt. 17 (vol. 2), pl. 47; South Australia.

Cracticus hypoleucus intermedius MATHEWS, 1912, Novitates Zool., vol. 18, p. 373; Cooma, New South Wales. Type: A.M.N.H. No. 673093; adult male (sexed "female" by collector, but it is a male unless a physiological abnormality); 1896. According to Mathews' manuscript catalogue the collector was "Thorpe." Wing, 290; tail, 157; culmen, 57. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 337, figure at bottom.

This is the magpie of southern Victoria and South Australia. It occurs sparingly in northern Victoria and in New South Wales. Females have the feathers of the mid back light gray margined with white, and are thus easily separable from those of *dorsalis*.

Measurements of our specimens of *leuconota* from New South Wales averaged slightly greater than those from Victoria, but this is almost certainly chance variation in small samples. Only one specimen was available from South Australia. It is a male in rather poor condition, but the measurements indicate a bird of small size with long bill, suggesting the possibility of intergradation with *dorsalis*: wing, 268; tail, 147; culmen, 59.

***Gymnorhina hypoleuca hypoleuca* (Gould)**

Cracticus hypoleucus GOULD, 1837, A synopsis of the birds of Australia, pt. 1, pl. 4; Tasmania.

This race is endemic to Tasmania. Judging from the few available specimens the Tasmanian magpie is identical, sex for sex, with *leuconota* in color. Wing, male, 251, 252, 253, 255; female, 235. Culmen, male, 45, 47, 48, 50; female, 43. Tasmanian forms are often of large size; moreover, as already noted, there is a north to south cline of increasing size in this genus in eastern Australia. Nevertheless, the Tasmanian white-backed magpie is a very small bird compared with the mainland races.

TABLE 9

MEASUREMENTS OF SOME FORMS OF *Gymnorhina*

Race	Males			Females		
	Number	Range	Mean	Number	Range	Mean
Wing length						
<i>t. tibicen</i>	8	251-292	275	3	245-275	260
<i>h. leuconota</i>	9	275-292	283	4	272-280	276
<i>h. dorsalis</i>	7	263-274	269	8	248-261	254
<i>t. longirostris</i>	2	252, 260	256	1	250	250
Culmen length						
<i>t. tibicen</i>	10	47-56	52	4	47-53	49
<i>h. leuconota</i>	11	53-59	56	6	48-53	50
<i>h. dorsalis</i>	9	55-64	59	8	49-57	54
<i>t. longirostris</i>	3	61-64	63	2	59, 59	59

STREPERA

This genus contains two species or, if one prefers, superspecies. *Strepera graculina* is found in eastern Australia, in Tasmania, and Lord Howe Island; *S. versicolor*, across southern Australia and in Tasmania. *Strepera graculina* shows, in its color pattern and

hooked bill, a rather closer relationship than does *versicolor* to the species of *Cracticus* and *Gymnorhina*. In *S. versicolor* the hook on the bill may be almost wanting. In one race, *melanoptera*, the plumage is entirely black except for the white-tipped tail.

Geographical variation in the two species of *Strepera* has some parallelisms. In *S. graculina* a decrease in the white areas in the wings and tail is evident in Victoria and reaches a climax in *fuliginosa* of Tasmania. In *versicolor* a similar tendency is noticeable but in a different area, South Australia. In that state geographical variation in color of the body plumage is pronounced; *centralia* of the north is gray like the populations of southeastern and southwestern Australia, while the other South Australian races are, to varying extents, black.

Strepera graculina

There is little geographical variation in general size, but pronounced variation in the length of the bill. On the mainland of Australia a cline of increasing bill length runs from south (Victoria) to north (Cape York). As is so often true, the insular populations of the species, those of Tasmania, King Island, and Lord Howe Island, have long bills.

TABLE 10
CULMEN LENGTHS OF MALES OF *Strepera graculina*

Locality	Number	Range	Mean
Victoria	1	59	59
New South Wales	6	57-63	59
South Australia	1	61	61
Queensland (part)	11	60-68	62
Cape York ^a	3	68-70	69
King Island	1	68	—
Tasmania	3	63-68	66
Lord Howe Island	6	62-72	68

^a From Thomson (1935) and White (1923).

The Tasmanian form *fuliginosa* has usually been listed as a full species, but its voice is said to be like that of mainland *graculina* and quite unlike that of the *versicolor-arguta* section of the genus. The reduction of the white areas of the plumage evident in *fuliginosa* is already noticeable in the nearest of the continental races,

ashbyi of Victoria, though the same areas are not involved throughout. A specimen identified as *fuliginosa* has been recorded from Queensland by Kinghorn (1928), and since it was nesting it could scarcely have been a straggler from Tasmania. Unless there was some mistake in the locality, this bird was probably a black mutant in the local population. The occurrence of such a variant indicates that *fuliginosa* may be a race of *graculina*, not a species.

***Strepera graculina robinsoni* Mathews**

Strepera graculina robinsoni MATHEWS, 1912, Novitates Zool., vol. 18, p. 443; Johnstone River, south of Cairns, northern Queensland. Type: A.M.N.H. No. 673608; adult male; June 16, 1900, E. Olive. Wing, 247; tail, 186; culmen, 64. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 406, lower figure.

Strepera graculina magnirostris H. L. WHITE, 1923, Emu, vol. 22, p. 258; [Coen], Cape York.

The range of this form is Queensland (see below).

The culmen averages longer in *robinsoni* than in *graculina*, or in the other mainland race, *ashbyi* (usually from 62–70 mm. in adult males). The plumage is perhaps a shade blacker and the white mirror in the wing slightly more pronounced than in *graculina* (the latter is somewhat intermediate towards *ashbyi* of Victoria which is grayish and has a reduced wing speculum).

As mentioned above, there is a cline of increasing culmen length from south to north in the mainland population of this species. It is unfortunate that White's name *magnirostris*, based on a true appreciation of the characters of the northern birds and with type locality on Cape York where the culmen reaches its maximum length, is antedated by Mathews' *robinsoni*. White's belief that *robinsoni* is a small race occurring between the ranges of *magnirostris* and of *g. graculina* is not supported by examination of the type of *robinsoni* and of other specimens from the Johnstone River in the Mathews collection.

A male from the Bunya Mountains near Brisbane in southern Queensland has a culmen of 63.5 mm., slightly larger than in any specimen examined from New South Wales. Although the change from *graculina* to *robinsoni* is doubtless gradual, it would seem that the distribution of the latter can be best defined to agree with the political limits of Queensland.

No specimens from Cape York were available, but Thomson (1935) gives the culmen length of a male from there as 68 mm.,

and White (1923) of two males as 68 and 70 mm. and of a female as 56 mm. These measurements, if comparable with mine, indicate that the culmen is slightly longer in Cape York birds than in those from the Johnstone River. The small culmen length of the female measured by White, if based upon an adult, tends to contradict this. More specimens should be measured.

***Strepera graculina crissalis* Sharpe**

Strepera crissalis SHARPE, 1877, Catalogue of the birds in the British Museum, vol. 3, p. 58; Lord Howe Island.

Found only on Lord Howe Island, *crissalis* differs from *robinsoni* by having the culmen even longer (about 70 mm. in adult males) and slightly more slender and keeled. The tip of the maxilla (beyond the notch) is longer. The white area at the base of the rectrices is somewhat shorter in *crissalis*, so that the white lower tail coverts extend about 3 or 4 cm. beyond it rather than about a centimeter or less beyond it as in *graculina* or *robinsoni*. The white wing speculum is perhaps slightly smaller in *crissalis* than in the races just named. The reduction of the white area on the tail is by no means so great as that usually found in *ashbyi*.

***Strepera graculina graculina* (J. White)**

Corvus graculinus J. WHITE, 1790, Journal of a voyage to New South Wales, p. 251; Sydney, New South Wales.

The white patches in the wing and at the base of the tail are more pronounced than in *ashbyi*; the bill is shorter than in *robinsoni* (culmen in males seldom exceeding 60 mm.).

The range coincides rather closely with the limits of New South Wales, though the populations of southern Queensland and north-eastern Victoria may prove closest to this race. A specimen from "Caskerill," South Australia, in the British Museum seemed to be of this race, as the white mirrors in the wing were well marked.

***Strepera graculina ashbyi* Mathews**

Strepera graculina ashbyi MATHEWS, 1913, Austral Avian Rec., vol. 2, p. 78; Black Spur, Victoria. Type: A.M.N.H. No. 673622; immature female; "8/5/01" [May 8, 1901]; Edwin Ashby. Wing, 246+; tail, 194; culmen, 51.

Neostrepera versicolor riordani MATHEWS, 1913, Austral Avian Rec., vol. 2, p. 78; Airey's Inlet near Geelong, Victoria. Type: A.M.N.H. No. 673621; adult male; April 29, 1913; collected "for" H. A. Purnell. Wing, 279; tail, 214; culmen, 59.

Strepera graculina grampianensis ASHBY, 1927, Emu, vol. 26, p. 291; Grampian Ranges, western Victoria.

This race, the range of which coincides more or less with the boundaries of Victoria, differs from the other Australian races by having the white areas in the primaries and at the base of the tail much reduced or absent. Perhaps the general coloration, at least of females and immatures, is duller (more gray or brown, less black) than in the other races, but this requires confirmation. Bill shorter than in the other races.

Ashby considered *grampianensis* to be browner and duller than *graculina*. In a postscript to the paper in which *grampianensis* was described, he declared that comparison with specimens from near the type locality of *riordani* showed *grampianensis* to be a synonym of that race. Ashby stated that specimens from Burnley and Rutherglen, the latter in the far north of Victoria, belong to *riordani*, but that the race *graculina* extends down from New South Wales into the Black Spur region of northeastern Victoria, the type locality of *ashbyi*. As pointed out below, however, the type of *ashbyi* agrees with the Victoria race, so it seems best to use this name, even though the type locality is in a borderline area where, if Ashby was correct, many of the individuals may resemble *graculina*.

Of six specimens from Victoria, including the types of *ashbyi* and *riordani*, only one (the type of *riordani*) is black; the others are to varying degrees brown or gray. The type of *ashbyi* is obviously immature, and the others may be. The type of *riordani*, though from southern Victoria, is as black as many birds from New South Wales or Queensland. Aside from immaturity, much of the variation in intensity of black in this species is perhaps a result of fading and foxing of specimens. A recently taken male from Bunya Mountains, Queensland, is blacker, especially on the belly, than any other specimen examined; this suggests that fading occurs.

Four of the six Victoria specimens differ from typical *graculina* by having the white areas on both the wing and the base of tail reduced. The white area on the rectrices is then concealed by the upper tail coverts, a circumstance that led Mathews to make one of his "wrong species" races, *Neostrepera "versicolor" riordani*.

The two specimens that show no appreciable reduction of the white mirror and but little in the white bases of the rectrices are from Gippsland and from Castlemaine, respectively. The

type of *ashbyi*, from Black Spur, does show much reduction of the white, so this region is here included within the range of the Victoria race.

To summarize, although the Victoria population of *Strepera graculina* is variable, it seems to warrant racial separation. Examination of additional material is needed. It is quite possible that *ashbyi* also occurs in South Australia, near the border of Victoria.

Strepera graculina fuliginosa (Gould)

Coronica fuliginosa GOULD, 1837, A synopsis of the birds of Australia, pt. 1, pl. 5; Tasmania.

Strepera fuliginosa colei MATHEWS, 1916, Austral Avian Rec., vol. 3, p. 63; King Island, Bass Strait. Type: A.M.N.H. No. 673683; female; November 24, 1908; A. H. Mattingley. Wing, 260+; tail, 190+; culmen, 69.

Strepera graculina fuliginosa inhabits Tasmania and King Island. The tendency towards reduction of white in the plumage, noticeable in *ashbyi*, is further advanced in *fuliginosa*. The white wing speculum is about as in *ashbyi*, i.e., poorly but variably developed. The white area at the base of the rectrices is absent, and the under tail coverts, white in all the other races, are black.

Mathews' few specimens from King Island, including the type of *colei*, are in wretched plumage. His assumption that adult birds from King Island are not black has been refuted by others. Comparison of adequate material from King Island and Tasmania is desired, but it is very doubtful if differences exist, so the range of *fuliginosa* can be assumed to be Tasmania and the islands in Bass Strait.

Strepera versicolor

In this species geographical variation in color is pronounced. Unlike *S. graculina* the culmen is of about the same length relative to general size in all the populations, hence is of no particular value in subspecific determination.

The wing lengths of the material examined are summarized in table 11. Considering the small number of specimens measured and the possibility that some mis-sexed or immature specimens were included, the only conclusion to be drawn is that *arguta* is significantly larger than the other races, with the possible exception of *centralia*, of which the type, and only known specimen, is very large.

In the specimens examined of the races *versicolor*, *plumbea*, and *howei*, the culmen is about 65 to 67 mm. long, reaching 70 in one specimen of *versicolor*. In *melanopectera* and *intermedia* it varies from 69 to 74 mm. in males. The type of *centralia* has a culmen of 75 mm., another reason for believing this bird to represent a valid subspecies, distinct from *plumbea* by larger size if not by paler color. The generally large size of the Tasmanian form *arguta* is reflected in the bill length, which reaches 77 mm. in the few specimens examined.

TABLE 11
WING LENGTHS OF *Strepera versicolor*

Subspecies	Males	Females	Sex ?
<i>versicolor</i> (New South Wales)	275+	260, 260, 264?	275, 280, 280, 283, 285
<i>versicolor</i> (Victoria)	273, 287	262, 262, 268, 270, 290	—
<i>centralia</i>	296	—	—
<i>plumbea</i>	279, 283, 287	272, 273, 276, 279	—
<i>howei</i>	267, 272, 277, 278, 280	267, 272	—
<i>melanopectera</i> (mainland)	271?	—	292
<i>melanopectera</i> (Kangaroo Island)	277	264, 273	—
<i>intermedia</i>	282	261, 266, 270, 273	273
<i>arguta</i>	290, 309	287, 295	290

The forms here united under *versicolor* are often listed as three species: *arguta* (Tasmania), *melanopectera*, and *versicolor*. *Arguta* is so similar to one of the mainland forms, *intermedia* of Eyre Peninsula, South Australia, that they have been confused at times. This is by no means the portion of the mainland closest to Tasmania, and the resemblance of these two is probably in part parallelism. *Intermedia* in turn has sometimes been associated with *melanopectera*, sometimes with *versicolor*. Kinghorn (1928) would associate it with *versicolor* (though one is gray, the other black) because the difference is in "shade" not in "colour." The existence of intermediate specimens and populations is discussed later. Ashby (1926) found that the notes of *arguta* and *melanopectera* are similar, and this observation seems to apply to all members of the *versicolor* group.

***Strepera versicolor versicolor* (Latham)**

Corvus versicolor LATHAM, 1801, Index ornithologicus, suppl., p. xxv; Sydney, New South Wales.

Strepera versicolor vieilloti MATHEWS, 1912, Novitates Zool., vol. 18, p. 444; Olinda, Victoria, Type: A.M.N.H. No. 673716; adult female; April 14, 1911; Thomas Tregallas. Wing, 270; tail, 225; culmen, 58 mm.

This is the lightest, grayest race of the species. The wing has a large white speculum. The range of *versicolor* is New South Wales and eastern Victoria.

Victoria birds seem not to differ from typical New South Wales ones except insofar as those from western Victoria are intermediate towards the South Australian races. The type of *vieillotii* has, the wing patches somewhat smaller than in typical *versicolor* and can be considered as varying in the direction of the race *howei*.

***Strepera versicolor centralia* (Mathews)**

Neostrepera versicolor centralia MATHEWS, 1916, Bull. Brit. Ornith. Club, vol. 36, p. 92; Everard Ranges, northwestern South Australia. Type: A.M.N.H. No. 673739; adult male; August 14, 1914; S. A. White. Wing, 296; tail, 243; culmen, 75. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 423, upper figure.

On the label of the type specimen of *centralia*, White noted that he saw this bird in small numbers in the Everard and Musgrave ranges, northwestern South Australia. The validity of *centralia* must be confirmed before its range can be further delimited.

The type of *centralia* is like *v. versicolor* but perceptibly darker, more plumbeous, almost as much so as the following race, *plumbea*. It is an unusually large specimen, only exceeded by some examples of *arguta* from Tasmania, though not much larger than occasional males of *melanoptera*. More material is needed to determine whether or not *centralia* is a synonym of *plumbea*.

***Strepera versicolor plumbea* Gould**

Strepera plumbea GOULD, 1846, Proc. Zool. Soc. London, p. 20; southwestern Australia.

This race of the gray currawong inhabits southwestern Australia. The plumage is considerably darker, more leaden in hue, than in *v. versicolor* and slightly more so than *centralia*. The size is about as in *v. versicolor*.

***Strepera versicolor howei* Mathews**

Strepera melanoptera howei MATHEWS, 1912, *Novitates Zool.*, vol. 18, p. 444; Kow Plains, (northwestern) Victoria. Type: A.M.N.H. No. 673673; male; "9-10-09" [October 9, 1909]; F. E. Howe. Wing, 277; culmen, 64. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 413, upper figure.

The name *howei* can be applied to a variable population occupying the mallee country of northwestern Victoria and adjacent South Australia, north of the ranges of *melanoptera* and *intermedia* but south of the range of *centralia*. To the east in Victoria it intergrades with the nominate race.

In *howei* the general tone of the plumage is lighter than in *intermedia* or *melanoptera* but darker than in *versicolor*. The wing speculum is usually much reduced or even absent.

No specimens of *howei* from South Australia were examined. In addition to the type, other Victoria specimens were three from Geramen and one each from Tahwin, Linga, Daytrap, and Carina. All of these are of dusky grayish brown hue, except the specimen from Linga which is as black, or almost so, as examples of *melanoptera*. Before it can be assumed that this is individual variation it must be determined whether or not old males and even females from the area assigned to *howei* are normally blackish. (See remarks under the subspecies *intermedia*.)

In a report of the South Australian Ornithological Association (Anon., 1905) it was stated that "Specimens from Quorn, Laura, and Mt. Remarkable in the north of South Australia, resembled *Strepera fusca* [= *intermedia*] in general colour, but the speculum on the wings was not so defined, and not nearly so white." Further comparisons are needed to show whether the birds of this area (really near the head of Spencer Gulf, not in "northern" South Australia) are best assigned to *intermedia*, *melanoptera*, or *howei*.

The occurrence in South Australia of intermediate and variable populations is the best evidence that the various forms treated as races of *versicolor* in this paper do actually belong to a single species. Whether or not a sufficiently stabilized and widespread intermediate population exists to justify recognition of the race *howei* requires further investigation.

***Strepera versicolor melanoptera* Gould**

Strepera melanoptera GOULD, 1846, *Proc. Zool. Soc. London*, p. 20; South Australia.

Strepera melanoptera halmaturina MATHEWS, 1912, *Novitates Zool.*, vol. 18, p. 444; Middle River, Kangaroo Island, South Australia. Type: A.M.N.H. No. 673670; adult male; October 17, 1905; Edwin Ashby. Wing, 277+; tail, 222; culmen, 74. Color plate: Mathews' "The birds of Australia," vol. 10, opposite p. 413, lower figure.

This race, characterized by its black plumage and the absence of a white wing patch, is found in southeastern South Australia, east of the Gulf of St. Vincent, and on Kangaroo Island.

From the mainland two specimens (one from the "Forest Ranges" and the other without definite locality) were available for comparison with three from Kangaroo Island. The latter birds seem a trifle darker, probably because they were in somewhat better plumage when collected. Examination of adequate series is needed.

Strepera versicolor intermedia Sharpe

Strepera intermedia SHARPE, 1877, *Catalogue of the birds in the British Museum*, vol. 3, p. 59; Port Lincoln, Eyre Peninsula, South Australia.

Strepera fusca ASHBY, 1905, *Emu*, vol. 5, p. 27; Edithburgh, South Australia. Type: A.M.N.H. No. 673738; sex ?; October, 1886; Edwin Ashby. Wing, 273; tail, 215; culmen, 69.

This race is like *melanoptera* though perhaps slightly more leaden, less blackish in hue, and with a white speculum in the wing. It is found in south central South Australia (Yorke Peninsula and Eyre Peninsula).

The Mathews collection contains a pair of birds shot from the nest as the male was feeding the female by S. A. White at Arno, Eyre Peninsula. The male is black, as much so as *melanoptera*, while the female is leaden colored, inseparable from *plumbea*. The lighter color of this female may represent sexual dimorphism, immaturity (even though it was nesting), or racial intergradation towards *plumbea*. The last possibility is the likeliest one. The other females examined are a shade darker than the one mentioned, or than most females of *plumbea*. The type of *fusca* is a very worn bird but seems to have been quite dark.

From the above, it is evident that *intermedia* is based on a variable but probably recognizable population, linking *melanoptera* and *plumbea*.

Strepera versicolor arguta Gould

Strepera arguta GOULD, 1846, *Proc. Zool. Soc. London*, p. 19; Tasmania.

This, the largest race of the species, is black, with a white wing

patch. Scarcely, if at all, separable from black individuals of *intermedia* except by larger size, it is restricted to Tasmania.

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