

Lastly the value of type specimens cannot be over-estimated, and they should be deposited in national collections.†

"That the R.A.O.U., recognising the value of the International Code of Zoological Nomenclature, Berne, 1904, is of opinion that:

- (a) For new Type Descriptions (see Article 21), the use of a mere "indication" is not the intention of the Code.
- (b) Nothing but a good description of any new genus, species, or sub-species of Australian birds will be acceptable to Australian students.
- (c) That for such Type Descriptions a standard be set to a specified schedule based on descriptions, such as are used in British Museum Catalogues of Birds."

Acanthizae or Thornbills

A. G. CAMPBELL, J.P., R.A.O.U., Croydon, Victoria.

(Read before R.A.O.U. Annual Congress, Adelaide,
18th October, 1922.)

In tropical regions of Australia with over 40 inches rainfall per annum *Acanthizae* are not generally found, their place being taken by *Gerygone*, which are closely allied in structure and habit. From 40 to 30 inches mark the most favoured portions of the Continent, many of the highlands and most of the heavily timbered coastal areas of the east being in that position. From 30 to 20 inches represent approximately the temperate portions and more open forest regions of the south-east and south-west as well as the elevated pastoral regions of the east beyond the coastal fringe. While from 20 to 10 inches include the lightly timbered lowlands, most of them extremely flat, and all the wheat belts, subject to periodic drought.

Below 10 inches per annum, rainfall is erratic, and conditions are undoubtedly eremian or desert. The stronghold of *Acanthizae* is in the normal region of 30 to 20 inches, with strong tendency toward the regions of lower rainfall.

This distribution in the main also represents the true range of the *Eucalyptus* forest from heavy to light timber and dwarf varieties.

The close affinity between the fauna and flora of south-eastern and south-western Australia leads to the belief that they were once connected by a direct land belt of somewhat similar conditions; that is, the continent once extended a considerable distance

†See Chapman, "What are Type Specimens," Vic. Nat., vol. xxix, p. 59.

south of Cape Leeuwin and that portion was joined to the eastern extremity of Australia, which then included Tasmania as part of the mainland.

In the study of geology the vast changes that may occur are an impressive lesson, and time only was required for the Great Australian Bight to appear and work its way, assisted, no doubt, by various earth movements, across the timbered belt of good conditions.

In the south-west there was no indigenous Kookaburra or Lyrebird, to name two well-known species. They must have arrived in the south-east after the appearance of the barrier. On the other hand there are certain passerine birds which show an intimate connection, east with west, namely, *Pachycephala* and *Atrichornis*, and in particular *Acanthizæ*. It is reasonable to assume that these were well established in east and west before the break occurred. *Pachycephala* shows little or no alteration western to eastern form. *Atrichornis*, from its strictly limited habits, shows a very marked difference both in size and coloration, while the *Acanthizæ* are at a very interesting stage of evolution; eastern and western forms have become sufficiently differentiated to warrant specific rank, while new races or subspecies are developing in conditions that are considerably drier than those in which the original stock lived.

Another geological fact we must notice at the outset. In Tertiary times a great portion of southern Australia was submerged, namely, a great basin extending from about Portland in Victoria, eastward to near Corowa on the Murray, round in a great semi-circle to Broken Hill and down near Adelaide. Another great area extended from Spencer Gulf well inland around the head of the Australian Bight and back to the coast near Esperance Bay.

This subsidence must have had a most marked effect on the distribution of bird-life generally, and it will be noticed as we proceed with examination of the *Acanthizæ* that it is an important factor in the distribution of that genus. All the eastern and southern highlands, the Mt. Lofty Ranges, the country north from Tarcoola to McDonnell Ranges, and most of West Australia, stood out around those Tertiary seas and probably the forests of those parts and their bird inhabitants were not very different from each other. They were the immediate ancestors of all our present species, and perhaps more which have passed out of existence.

When the Tertiary seas retreated and left exposed those boundless plains, what a wealth of new country awaited population! On account of a low rainfall the central area at the head of the Bight is now a "desert," and a very substantial barrier to further east-west movement of bird-life. That part between the coast-line and Musgrave Ranges is the most desert-like tract inhabited by *Acanthizæ*.

Geological change has been more violently retrograde in this portion of Australia than in any other part. This is the cause, which, in effect, produced the pallid and desert forms of the genus. Possibly the region became dry gradually, and birds steadily adapted themselves to the harder conditions.

The other Tertiary area, embracing, as it does, the whole of the Murray basin, consisting of more than two-thirds of New South Wales and about half of Victoria, though extremely flat, is a land of plenty, well covered with light to medium forests, well watered, and in the southern half, with a good rainfall—real “Australia Felix” harbouring a great variety of birds of all classes. The hypothesis is that on the higher lands in Eastern, South, and Western Australia the direct descendants of the original stock of *Acanthiza* will be found, while on the flat intervening country the sub-species, or later varieties, occur.

WHAT IS A SPECIES ?

This is the next question.* If intergradations can be found between west and east forms, these intergradations occurring in intervening localities, then it is obvious that the species is one and the same throughout. If intergradations are found in one and the same locality, this fact should be still more obvious. But if complete intergradations cannot be found (or have not yet been found), or, if two species, even though grading toward one another, are yet separated by a reasonable gap, we must conclude they are worthy of separate specific rank.

A species in scientific classification is a group of individuals of similar nature and constitution. A species may vary within reasonable limits. Reasonable limits being—

- (a) One species must not intergrade with another species, connecting links may have existed in the past, but have all died out.
- (b) The gap between two closely allied species must be consistent and wide enough to be easily recognisable.

Two or more species of a genus may occur in any one locality.

A species may collectively be formed by two or more sub-species.

A sub-species is a local race which, owing to change in environment or geographical location, differs consistently from the race first discovered.

Sub-species may grade into one another.

Sub-species should exhibit some recognisable and consistent characters in the normal average, though a much narrower margin of demarcation be allowed than with species.

*See The Auk, vol. xxxix., p. 147.

Only one sub-species of a species can normally occur in any one locality.

Sub-specific characters are more variable than specific characters, owing to the fact that the inter-variations are now in progress between sub-species which have passed out of existence between species. For the same reason, specific characters are more variable than generic, intergradation of the latter being lost in antiquity.

VARIATION.

It is remarked by even a casual observer that birds of one species may vary in tone of colour according to their surroundings. There is the influence of heat and cold, light and shade, humidity and dryness, the matter of food supply being correlated. It is plain that under such external stimuli the living bird reacts or adjusts itself to the requirements of the case. This gives rise to variation, and under the influence of its environment a bird may become brighter or duller, lighter or darker, larger or smaller than the type.*

A.—INDIVIDUAL VARIATION.

It is a fundamental fact that no two individuals of any one species from one locality are identically alike. Little individual variations occur within certain limits, however small they be, that make it necessary for the observer to have several specimens before him in order to obtain the average or typical characteristics.

This, the first step in variation, does not necessarily constitute a specific difference because it may not be sufficiently fixed to stand the experience of a movement in the reverse direction, when it finds itself in alternating conditions of drought and plenty—essentially phases of the Australian climate in the interior.

B.—REGIONAL VARIATION.

This is a further stage, with an important bearing upon the question of sub-species. Where variation has been in progress for a long period of time in two localities that have some marked difference in geographical environment, then the two branches of original stock each take on some character or characters that apparently apply, or belong to that particular region. And, if two such regions become separated from one another by some natural feature, such as sea or desert, preventing an interchange of stock, then regional variation may exhibit marked and permanent differences worthy of being classed as sub-specific. Many

*Type is the first specimen of that species to be described and named. A typical specimen is different, being one of average appearance.

instances will be quoted in their proper place throughout these notes. What that difference is which will be considered worthy of separating sub-species is a point to decide. If ornithologists cannot agree upon common rules of working and accept them as foundation principles, then the whole study must remain in a state of chaos, each worker a law unto himself. These suggestions arise from a desire to start from something known, and therefore definite, which should be the basis of ornithology at all events.

C.—SPECIFIC VARIATION.

Specific variation is the next stage in adaptation to environment, when sub-specific differences have become so far established, probably in opposite directions from a common starting point, that complete intergradation cannot be found. A gap exists where some have died out and two more or less closely allied species are the result. A clinching argument in favour of fixation of a species is when two allied species are found in the same locality due probably to some subsequent movement of one species overlapping the range of its ally.

What constitutes a specific difference* in *Acanthizæ* is another point to decide. Will a difference of tone in the same colour or system of colours be acceptable? I think colour tone is a good and serviceable means of fixing a standard, that is, if it can be agreed what variation of tone† constitutes a difference.

I am prepared to suggest that a difference of at least three tones (Ridgway) be accepted as a standard of variation in *Acanthizæ* sufficient to warrant specific rank when a change of tone is noted in any particular part of the plumage, provided this variation is supported by at least one other noticeably different feature in the bird's plumage, or in its life-history, and provided always that no intergradation is found in the parts selected.

Acanthizæ are notoriously "small fry," and for that reason are both difficult to handle and liable to escape observation; nevertheless they have their colour schemes, in a small way, just as important as colour arrangement in larger birds. Our observations and systematic research so far are confined to outward and visible characters chiefly of plumage, and do not extend to anatomy, where obviously there is a wide field for research.

*Example.—*Acanthizæ inornata* can be looked upon as the western form of *A. nana* from which all traces of citrine on the upper surface and of yellow on the under surface have disappeared. Both are now distinct species. The same applies as between *Geobasileus tenuirostris* and *G. reguloides*, the former having almost lost the buff base to the tail, which is well developed in the latter.

†See "Color Standards and Nomenclature," Ridgway.

D.—SPORT OR CASUAL VARIATION.

Independent of A, B, and C, which are ordinary common types of variation, there is this sportive variation not arising from any obvious natural reason, and often right across the track of ordinary variation. I refer to such variation as a red rose appearing casually upon a white-flowered bush; many similar cases in the animal world can be called to mind. Whether this is a throwing back, or variation due to the appearance of characters belonging to some distant progenitor, or whether it is entirely casual and without reason, is a question with which we are not now concerned. But it is affirmed that this kind of variation is not sufficiently taken into account when dealing with the distribution of birds. I believe that *Acanthiza ewingi*, for instance, of Tasmania, is a sport, and proof will be offered in the notes dealing with that species.

* * * *

To further illustrate: *Geobasileus chrysorrhous* has yellow upper tail-coverts. *G. uropygialis* has coverts and base of tail tawny. *G. reguloides* exhibits a colour (buff) which may be said to lie between these two extremes.

Can we honestly consider this a link, or intergradation, and say that all three must be lumped into one species? The idea is absurd. Though they may not show much difference otherwise, yet the contrast in colour between yellow, buff and tawny is obviously distinct and specific.

Again, *Geobasileus squamatus*, from North Queensland, has upper tail-coverts yellow, like *G. chrysorrhous*, and base of tail buff like *G. reguloides*. Is this an intergradation? We are narrowing down to finer points, but when we see that *squamatus* has under surface citron yellow, which neither of the others has, its specific difference is maintained.

Take another example, *A. pusilla* and *A. pyrrhopygia* (Gould). The former may be termed the coastal species of browner mantle and duller rump, the latter the interior species of greyer mantle and brighter rump. Is *A. apicalis* of W.A. a link between the two, with its brown mantle and bright rump? To casual observers all three may seem alike, but close examination is required to bring out the facts. Since Gould's day much material has been procured across the whole width of Australia. Many interior, far interior and desert races have been brought to light. I confidently assert that these three species stand distinct and separate, as do the *Geobasileus* already referred to, but proof is too lengthy to be offered here.

What constitutes reasonable sub-specific difference may be illustrated with *Geobasileus chrysorrhous*, a very common bird, whose range extends over nearly the whole continent. Taking the colour of the under tail-coverts as a guide, we find yellow, buff, or white. This is a small feature, but not unimportant. Yellow under-coverts are found in birds of the northern half of

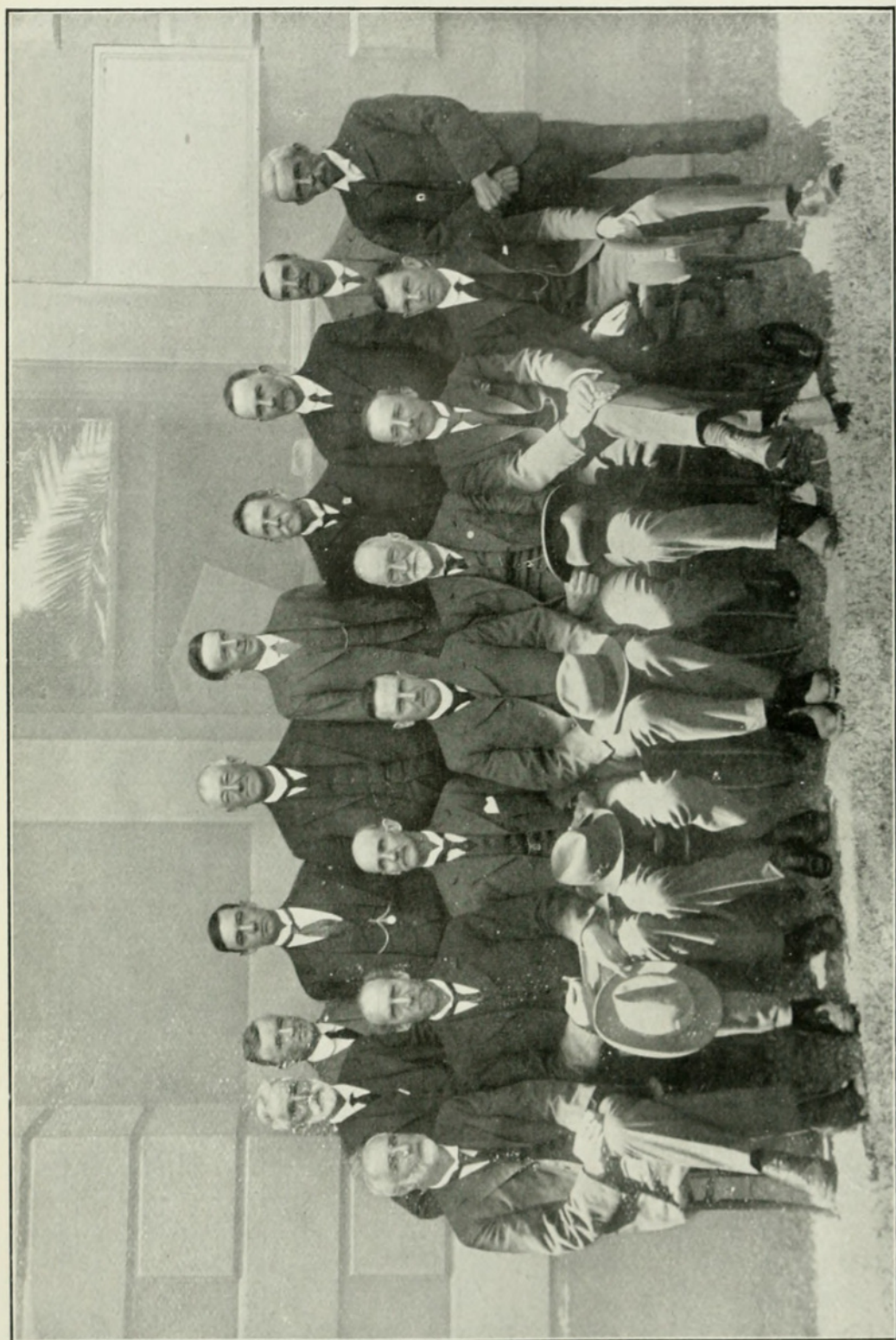
New South Wales and in Queensland, go directly west through Central Australia, and are found near the coast in W.A., 150 miles north of Perth. Buff under-coverts are found largely in southern New South Wales, Victoria, and Tasmania. White under-coverts appear in South Australia, and are found exclusively in south-western Australia. These points, together with two essential differences in the markings of the crown, give the key to at least six races. Intergradations, however, existing between them, they rank as sub-species, not species.

Only a tyro in ornithology would think there are no races or sub-species among *Acanthizae*. The study of sub-species, the defining of their main characters and their geographical limitations is just as important as the study of species. This branch of ornithology has not yet been seriously attempted. The material in existing collections, both public and private, requires tabulating and co-ordinating, and it is scientific research of this kind that now awaits students.

Of these small birds there are at least two genera. Gould followed Cabanis in separating them into *Geobasileus* and *Acanthiza*. Present day observations support this. They resemble each other only in size and in having brightly coloured upper tail-coverts. They differ appreciably in wing formula, and in the arrangement of colour pattern, especially in the tail.

The following table compares the main features:—

	<i>Acanthiza</i>	<i>Geobasileus</i>
Habit	Lives in trees and thickets	Feeds largely upon the ground
Wing formula	Second primary less than twice length of first: fourth longer than third by about $2\frac{1}{2}$ mm.	Second primary more than twice length of first: fourth longer than third by about 1 mm.
Shape of tail	Rounded: outer feathers about 5 mm. shorter than central	Squarer: outer feathers about 2 mm. shorter than central
Dark band on tail . .	Narrow and sub-terminal	Wide and covering about half the tail
Base of tail	Dark in colour and not like upper tail-coverts	Light or brightly coloured like upper tail-coverts
Throat	Usually striated with black	Plain or minutely fringed with brown
Upper tail coverts . .	Dark tones of brown	Light tones yellow to tawny



Some of the Delegates, R.A.O.U. Congress Adelaide, 1922.
 Sitting (left to right)—A. Ashby (S.A.), E. R. Waite (S.A.), C. A. Barnard (Q.), Dr. J. A. Leach (President, V.) A. J. Campbell (V.)
 Capt. S. A. White (S.A.) and Neville W. Cayley (N.S.W.).
 Standing—S. Saunders (S.A.), W. Ham (S.A.), E. Cantwill (S.A.), J. Sutton (S.A.), C. Lord (Tas.), J. F. Bailey (S.A.) Neil McGillp (S.A.),
 A. L. Butler (Tas.) and J. W. Mellor (S.A.).

Photo. by Smith, Adelaide.

The throat striations of *Acanthiza* are unique. Each feather has two edges black but not the tip. As the feathers overlies one another the effect produced is a series of bold black striations. These, however, are movable and rearrange themselves as the feathers are moved from side to side. The markings are entirely different from those of *Hylacola pyrrhopygia* (first called *Acanthiza pyrrhopygia* by Vigors and Horsfield), which consist of a black central stripe on each feather. A marked peculiarity of *Geobasileus* is that the two outermost tail feathers have a white, or buff edging on the outer web, distally, for at least half an inch.

There have been listed ten species and no less than 73 subspecies*—total 83. I submit there are 17 species and 43 subspecies—total 60.

My notes and criticisms where they touch upon the work of others are intended to be constructive, building upon the foundations already laid, or at most a rearrangement of certain parts of the material already in hand.

For the examination of the bird-skins and literature I am chiefly indebted to the trustees of the National Museum, Melbourne (per favour of Mr. J. A. Kershaw, Curator), in which is the "H. L. White Collection" of skins. I am also indebted for material and assistance to the R.A.O.U., to Mr. Edwin Ashby, Adelaide, and to Mr. A. J. Campbell, Melbourne.

The Annual Congress and Camp-out of the R.A.O.U.

The twenty-first annual congress was held at the Royal Society's rooms, Adelaide, on October 16th, 17th, and 18th (three sessions daily), and the camp-out was held at Mt. Remarkable from October 19th—24th. Lectures illustrated by lantern slides were given in the Royal Society's rooms and at Melrose, Mt. Remarkable, by Dr. MacGillivray, Captain White, Messrs. Cayley and Bellchambers. The proceedings terminated with committee meetings to clean up the check-list on Wednesday, October 25. This "majority" congress ranks amongst the most important in the history of the Union. Delegates were present from all the States except Western Australia. South Australia, the home State, of course, had the largest representation. Tasmania and Victoria had four delegates each; New South Wales had two,

*See "List of The Birds of Australia," 1913, G. M. Mathews, and additions thereto.



Campbell, Archibald George. 1923. "Acanthizae or Thornbills." *The Emu : official organ of the Australasian Ornithologists' Union* 22(3), 192–199.
<https://doi.org/10.1071/mu922192>.

View This Item Online: <https://www.biodiversitylibrary.org/item/35198>

DOI: <https://doi.org/10.1071/mu922192>

Permalink: <https://www.biodiversitylibrary.org/partpdf/347365>

Holding Institution

American Museum of Natural History Library

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: NOT_IN_COPYRIGHT

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.