

## CRITICAL RANGE LIMITS OF THE TURQUOISE AND BLACK-BACKED WRENS IN S.A.

NICHOLAS REID, J. B. PATON and D. C. PATON

Accepted November, 1976.

### SUMMARY

*Malurus splendens melanotus* occurs along the eastern slopes of the southern Flinders Ranges and *M. s. callainus* on the eastern slopes of the northern Flinders; there is no indication that the taxa have made contact. The darker form 'whitei' of *callainus*, which could indicate past hybridization with *melanotus*, appears to be a geographical isolate. The breast colour of the taxa are the same, and for field identification the contrast between the colours of ear coverts and upper parts in *melanotus*, and between the breast and upper parts in *callainus*, is recommended.

### INTRODUCTION

Until recently, the *Malurus splendens* complex of southern and Central Australia was thought to consist of three, well-differentiated allopecies: the Splendid Wren *M. splendens* of south-western Australia, the Turquoise Wren *M. callainus* of western South and Central Australia, and the Black-backed Wren *M. melanotus* inhabiting the inland regions of eastern Australia.

Serventy and Whittell (1967 : 320) were the first to report that examples of *callainus* from the western limits of its range in W.A. appeared to be transitional with *splendens*, although referring to only one specimen (Ford 1975). Ford also described a number of specimens from the interior of W.A. showing intermediate characters between *splendens* and *callainus*, and thus treated them as conspecific. He also relegated the eastern form, *melanotus*, to subspecific status. Condon (1951) listed *callainus* as a race of *melanotus* but later (Condon 1968) considered them to be separate species. Schodde (1975) provisionally followed Ford (*op. cit.*) in treating the three taxa as conspecific.

In the eastern parts of its range *callainus* closely approaches *melanotus*, but at present there is no positive evidence that the two come into direct contact (Schodde 1965). In this paper, we summarize the range limits, habitat preferences and plumage differences of *callainus* and *melanotus* in the zone of proximity, near the Flinders Ranges in S.A.

### CRITICAL RECORDS

The present distribution of *callainus* and *melanotus* suggests that they evolved respectively in central and eastern refuges at some arid period in the past, being isolated by the Eyrean barrier (Ford 1974). They have subsequently

spread from these refuges and are now separated by the Mount Lofty-Flinders Ranges system. Recent records indicate that *callainus* has been able to penetrate the northern Flinders, and there would now appear to be no geographical barrier separating the two taxa (see Fig. 1).

Reports of *callainus* from the north-eastern Flinders and adjacent plains west of Lake Frome are now detailed:

1. \*Wertalooona Station.

Two coloured males were collected on December 1, 1963 by an SAM party in conjunction with the Harold Hall expeditions (Hall 1974 : 200). These specimens (which the writers have not examined) apparently represent the end point of a cline in the depth of colour of the ventral surfaces, but otherwise are typical *callainus* (Harrison in Hall *op. cit.*).

2. Italowie Gorge, 19 km west-north-west of Wertalooona HS.

Turquoise Wrens were initially recorded by R. LePage and D. von Behrens on September 1, 1967 (Glover 1969). In August 1974 and on several subsequent occasions, I. May (pers. comm.) saw what he took to be *melanotus* in the gorge. Acting on May's directions, JBP, NR *et al.* located a party comprising one partly coloured male, one male in eclipse plumage (black bill) and at least three uncoloured birds (tan bills) on the western perimeter of the gorge on August 26, 1975. The birds were observed in bushes and foraging on the ground by tea-tree *Melaleuca glomerata* lining Italowie Ck, and on the adjacent rocky hillside in predominantly *Acacia victoriae* growing along a wash.

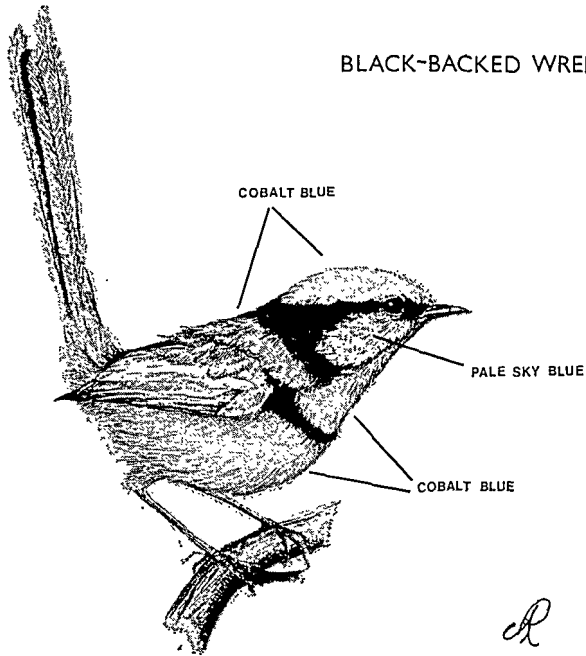
3. Big John Ck, 3 km north-west of Wertalooona HS.

On August 27, 1975 JBP *et al.* located two parties each containing one partly coloured male and at least three uncoloured birds on the plain adjacent to the creek lined by Red Gum *Eucalyptus camaldulensis*. One party was found amongst *Acacia victoriae*, but when pressed, took refuge amongst thickets of *Melaleuca glomerata* closer to the creek-bed.

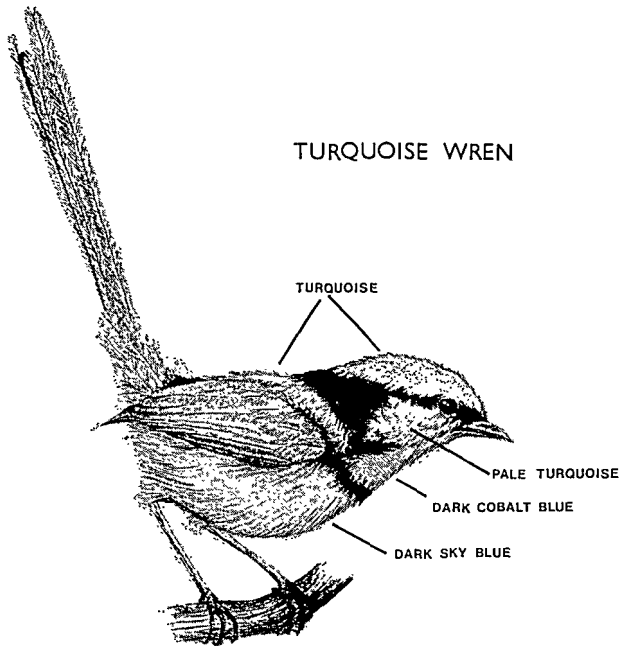
To date there are no records north of Myrtle Springs on the plains immediately west of the Flinders Ranges, nor are there any north of Wertalooona on the eastern side. We therefore

\* Specimen record.

BLACK-BACKED WREN



TURQUOISE WREN



*Drawings by Alex Randell; lettering by J. B. Cox.*

suggest *callainus* has moved through the northern Flinders rather than circled the northern tip of the ranges. Italowie Ck, a tributary of Big John Ck, runs through Italowie Gorge and is a possible route through the ranges.

Recently we have been able to confirm that the western range of *melanotus* extends to the Olary Spur and the eastern slopes of the southern Flinders Ranges. Details of observations from this region are now detailed:

1. \*Koonamore, ca. 160 km south of Werta-loona.

Schodde (1965) reported *melanotus* in desert shrubland overtopped by Black Oak *Casuarina cristata* and mulga *Acacia aneura*. The male specimen (SAM reg. no. B25354) obtained has only a few blue feathers amongst predominantly brown plumage. Comparison of it with a series of both *melanotus* and *callainus* suggests that it is close to typical *melanotus*, but the possibility of a hybrid cannot be ruled out.

2. Binberrie Hill, 22 km north of Olary.

On July 11, 1976 JBP saw a group of four or five *melanotus* on a rocky hillside amongst mulga and *Sida* sp. The latter was about a metre high forming a relatively dense bush stratum, although most of it was dead or dying back. The single fully coloured male spent much of its time in pursuit of two of the uncoloured birds.

3. Near Ucolta, 12 km east of Peterborough.

M. Cooper saw Black-backed Wrens here in 1970 and on several subsequent occasions. On April 4, 1976 JBP saw three parties in the same place along dry creek-beds amongst *Eucalyptus odorata/porosa* complex with a shrub layer one to two metres high of mainly *Acacia argyrophylla*, *Dodonaea attenuata*, *Cassia nemophila* and some chenopods. There were no fully coloured males. In each case the birds were with Purple-backed Wrens *M. lamberti* some of which were fully coloured.

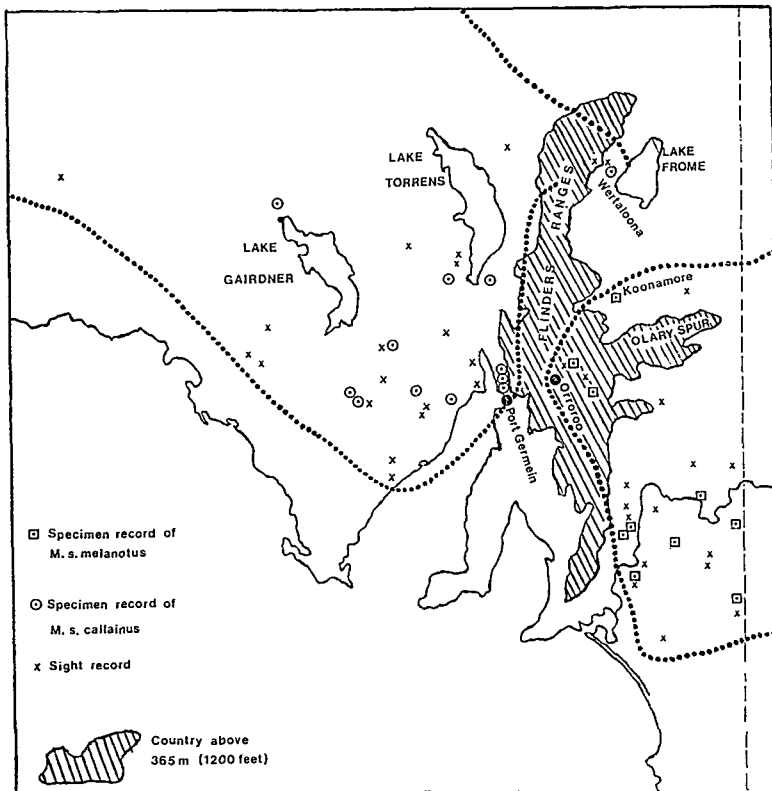


Fig. 1. Distribution of the Black-backed and Turquoise Wrens in eastern South Australia. The dotted lines approximate the known range limits of the respective taxa.

4. Black Rock Conservation Pk, 22 km east of Orroroo.

On October 20, 1973, JBP, NR *et al.* observed a party of wrens containing one fully coloured male and three or four uncoloured birds in savanna woodland comprising Black Oak, False Sandalwood *Myoporum platycarpum* and Bluebush *Kochia sp.* The relatively dark blue of the male suggested *melanotus*. JBP observed two parties, each containing a partly coloured male, and at least three uncoloured birds in the same area on August 12, 1975.

5. \*Thirty-seven kilometres east of Orroroo.

On December 27, 1975 DCP, NR *et al.* located a party of *melanotus* comprising one fully coloured male, two uncoloureds and young on the edge of a flood-plain in dense thickets of *Acacia victoriae*. The shrub layer was two to three metres high with much dry grass and the occasional chenopod in the understorey. The adult male is now lodged in SAM, reg. no. B29320.

6. \*Fourteen kilometres north-east of Terowie.

On December 29, 1975 DCP, NR *et al.* found a fully coloured male with at least three uncoloured birds in *Acacia wilhelmiana* bushes (up to two metres high) on a rocky slope, *ca.* 14 km north-east of Terowie. No tree layer was present in the area of observation, but mallee *Eucalyptus porosa* grew along a gully at the bottom of the slope. The acacias were rounded and growing about a canopy's distance apart; dead bushes comprised approx. 20 per cent. of the shrub stratum. A fairly dense, dry grass layer was present. The adult male is now lodged in SAM, reg. no. B29321.

The plumage of both specimens (records 5 and 6) falls within the range of variation of Murray Mallee populations of *melanotus*. B29320 is darker overall than is normal for Murray Mallee birds, but is not as dark as B19937 collected three kilometres east of Sandleton. This latter specimen is the darkest example of *melanotus* in SAM, and the blues of its dorsal surface are virtually identical to the dorsal blues of nominate *splendens* from south-western Australia. B29321 is paler and identical to specimens from the Victorian border.

Black-backed Wren populations in the Mid North provide a link between the Olary Spur and Murray Mallee populations, and are geographically situated as a possible link with the darker form '*whitei*' of *callainus*. This form occupies or, at least, once occupied the coastal strip bordering Spencer Gulf north of Port Germein, only 75 km west of Black Rock Conservation Pk.

There have been several unconfirmed reports of Black-backed or Turquoise Wrens from upper Yorke Peninsula and west of the Mt. Lofty-Flinders Ranges system south of Port Germein, an area of possible interaction between *melanotus* and *callainus*. Their questionable authenticity and the lack of specimens prevents us from relating these records to the distributions shown in Fig. 1.

#### PLUMAGE VARIATION

The blues of the breast, abdomen, crown and mantle of ten selected specimens of *callainus*, *melanotus* and '*whitei*' in SAM were compared with the standard colour plates in Ridgway (1912). The results are shown in Table 1.

The ten specimens compared were: three specimens of typical *callainus* collected close to the Flinders Ranges at Wertigo (B23408) on Eyre Peninsula, Kallioota (B329), and on the Boocaloo-Wocalla road (B24669); the two specimens of *melanotus* from the Mid North (B29320) and B29321) as well as the palest and darkest S.A. specimens, both from the Murray Mallee (B23281 and B19932 respectively); and three examples of '*whitei*' from the Port Germein area (B8405, B8406, and B3033).

There was no significant difference in the colour of the breast of the ten specimens. Usually the colour of the abdomen was the same as, or slightly paler and greener than, the breast. The crown and mantle of *callainus* and '*whitei*' were both greener than *melanotus*; '*whitei*' was not significantly different from *callainus*, although Mack (1934:106) described it as consistently much darker than *callainus* on the head, mantle and upper tail coverts, "light methyl blue not calamine blue."

In all specimens, the ear coverts were paler and greener than other blue plumage. However in *callainus* the ear coverts did not contrast with the crown and mantle, while in '*whitei*' and particularly *melanotus* they were conspicuously paler.

#### DISCUSSION

The darker colouration of '*whitei*,' the population of *callainus* inhabiting the Port Germein district, could indicate hybridization between *callainus* and *melanotus*. Ventrally '*whitei*' is virtually identical to *callainus*, while dorsally its blues are intermediate, but closer to *callainus*. Ford (1975) has shown that the plumages of hybrid populations linking *splendens* and *callainus* in W.A. are intermediate but variable even in the same locality. With '*whitei*,' how-

ever, the colour of the head, mantle and tail coverts is constant (Mack *op. cit.*). Furthermore, there is no variation attributable to the introgression of 'whitei' genes in populations of *callainus* on Eyre Peninsula, nor any variation in populations of *melanotus* from east of the Mt. Lofty-Flinders Ranges system, and in particular from the Mid North localities only 95 km from Port Germein. Thus no east-west gene-flow is apparent between the forms: Spencer Gulf appears to isolate 'whitei' from *callainus* in the west, and the Flinders Ranges apparently isolates it from *melanotus* in the east.

One could postulate that 'whitei' evolved from *callainus* stock in isolation, because the more humid environment encountered along the western scarp of the southern Flinders Ranges induced an increase in melanin deposition in its dorsal blue plumage.

The other possible region of contact between *callainus* and *melanotus* is between Wertalooona and the Mid North. Ford (*op. cit.*) has shown that the effects of hybridization between *splendens* and *callainus* in W.A. are evident over at least 430 km. The distance between Wertalooona and the Mid North localities where we have collected *melanotus* is approximately 240 km. As stated, both the *melanotus* specimens from the Mid North and the *callainus* specimens from Wertalooona are typical of their respective subspecies. If the population in the Olary Spur is also typical *melanotus*, the gap between the ranges of the taxa is narrowed to 160 km. Obviously the Olary Spur and the intervening country south of Wertalooona needs to be intensively searched and collected to determine if a zone of secondary contact exists, and if so, how the taxa are interacting.

<i>Blues of</i>					
	<i>breast</i>	<i>abdomen</i>	<i>crown</i>	<i>mantle</i>	<i>ear coverts</i>
B 23408	phenyl	light methyl	light cerulean	light cerulean	beryl
B 24669	smelt	salvia	pale cerulean	pale cerulean	beryl
B 329	smelt	salvia	light cerulean	pale cerulean	calomine
B 8405	smelt	amparo	light cerulean	light methyl	beryl
B 8406	smelt	salvia	light cerulean	light methyl	beryl
B 3033	smelt-phenyl	salvia	pale methyl	light methyl	beryl
B 29320	phenyl	phenyl	amparo	amparo	pale cerulean
B 29321	Bradley's	amparo	amparo	amparo	pale cerulean
B 19932	phenyl	phenyl	phenyl	phenyl	pale methyl
B 23281	phenyl	salvia	salvia	salvia	pale methyl

Table 1. A comparison of the blue plumage of selected specimens of *M. s. callainus*, *M. s. melanotus* and '*M. s. whitei*.' The following colours are adjacent on the plates and differ very slightly: smelt and phenyl blue; phenyl and Bradley's blue; Bradley's and amparo blue; amparo and salvia blue; light methyl and light cerulean blue; light cerulean and pale cerulean blue; pale cerulean and calomine blue; calomine and beryl blue.

Ridgway's Bradley's, amparo, phenyl and smelt correspond with various shades of cobalt blue (cobalt being about mid-way between sky and navy blue); his light methyl and salvia correspond with dark sky blue; his light and pale cerulean with turquoise; and beryl and calomine with pale turquoise.

*Callainus* and *melanotus* have similar habitat preferences. Both are known from mulga habitats (Ford 1974; White 1915; Ford and Parker 1974; JBP and NR, pers. obs.), mallee associations, and areas of acacia and other scrubby undergrowth, in particular, *Acacia victoriae* growing along flood-plains and washes near the Flinders Ranges. If there is suitable habitat between Koonamore and Wertaloon, there is no obvious reason why *callainus* and *melanotus* should not make contact there. The marked differences in plumage between *splendens* and *callainus* have not prevented them from hybridizing in W.A. Since *callainus* is closer in plumage to *melanotus* than to *splendens*, plumage differences should not prevent interbreeding. It is significant that the breast colours of the three taxa are very similar despite wide variation in the hues of other blue plumage. Breast colour may well be an important factor in species recognition within *Malurus*, since the plumage of the chestnut-shouldered wrens, *M. pulcherrimus* and *M. lamberti assimilis*, differs significantly (but slightly) only in the colour of the breast; yet apparently they do not hybridize in an area of sympatry (Ford 1966).

Both McGill (1970) and Slater (1974) state that *melanotus* and *callainus* are distinguished by ventral plumage. According to McGill the "cobalt-blue throat and underparts" of *melanotus* separate it from *callainus* which has a "dark turquoise throat contrasting with the paler underparts." Slater says that *callainus* is distinguished from *melanotus* by "the richer throat colouring and paler blue upperparts." In all specimens we examined, the colour of the breast is the same, though it may be marginally

darker (but not more purple) in *callainus*. The impression that the breast of *callainus* appears more purple may be due to contrast with the paler and greener crown and mantle. We suggest that the colour of the abdomen is not sufficiently different to warrant using it as a means of distinguishing *callainus* from *melanotus* in the field. The contrast between the colour of the breast and upperparts in *callainus*, and that between the ear coverts and upperparts in *melanotus* would be a more useful distinguishing character.

#### ACKNOWLEDGEMENTS

We wish to thank Shane Parker of the S.A. Museum (SAM) for permission to examine specimens; Mavis Cooper, Ian May, Julian Reid and Penelope Paton, and members of the ornithology classes of the Department of Adult Education, University of Adelaide, for help in the field.

#### REFERENCES

- Condon, H. T. 1951. Notes on the birds of South Australia: occurrence, distribution and taxonomy. S.A. Orn., 20 : 55.  
 ——— 1968. A Handlist of the Birds of South Australia. Adelaide: S.A.O.A.  
 Ford, J. 1966. Taxonomy and variation of the chestnut-shouldered wrens of Western Australia. Emu, 66 : 47-57.  
 ——— 1974. Speciation in Australian birds adapted to arid habitats. Emu, 74 : 161-168.  
 ——— 1975. Hybridization of Splendid and Turquoise Wrens. Emu, 75 : 153-154.  
 ——— and Parker, S. A. 1974. Distribution and taxonomy of some birds from south-west Queensland. Emu, 74 : 177-191.  
 Glover, B. 1969. Bird Report 1967-68. S.A. Orn., 25 : 83.  
 Hall, B. F. 1974. Birds of the Harold Hall Australian expeditions. London: Trustees Brit. Mus. (Nat. Hist.).  
 Mack, G. 1934. A revision of the genus *Malurus*. Mem. Nat. Mus., Vic., 8 : 100-125.  
 McGill, A. 1970. Australian Warblers. Melbourne: B.O.C.  
 Ridgway, J. 1912. Colour standards and colour nomenclature. Washington D.C.  
 Schodde, R. 1965. Observations on new distributions and habitat of five Australian land birds. Emu, 65 : 204-8.  
 ——— 1975. Interim List of Australian songbirds. Passerines. Melbourne: R.A.O.U.  
 Serventy, D. L. and Whittell, H. L. 1967. Birds of Western Australia, 4th ed. Perth: Lamb Publ.  
 Slater, P. 1974. A field guide to Australian birds. Passerines. Rigby.  
 White, S. A. 1915. Maluri found in Central Australia. S.A. Orn., 2 : 13-15.

*N. Reid, 11 Marlborough St., College Park, S.A. 5069.*  
*J. & D. Paton, 1 Dashwood Rd., Beaumont, S.A. 5066.*