

BARC Case 109:
Tropical Shearwater *Puffinus bailloni*,
Wollongong, 28 February 1987:
Reappraisal as a Newell's Shearwater *Puffinus newelli*

By Jeff Davies and David James, 25 May 2020

Background and Context

BARC Case 109 involved a claim of Audubon's Shearwater *Puffinus lherminieri* from Wollongong on 28 February 1987. Herein, we will refer to this bird as the 'Wollongong shearwater'. It was assessed by the RAOU Records Appraisal Committee (then RAC, now BARC) around 1990 and accepted as Audubon's Shearwater on 13 November 1990 (Patterson 1991). Apparently the assessment was based on a detailed published account by Carter (1988) plus four photos, but there was no specific submission to RAC, probably because RAC was inactive between c. 1985 and c. 1988. The case files are unavailable at this time, either in storage or lost (T. Palliser in litt.). The case summary, as published in Patterson (1991), is copied in Appendix A, and Carter's (1988) article is attached in Appendix B. Based on this record, Audubon's Shearwater received a full text account in Marchant & Higgins (1990). Nevertheless, the record was not considered an addition to the Australian list by Christidis & Boles (1994) because Condon (1975) had earlier included Audubon's Shearwater based on "One alleged record" off Cape Upstart, Qld, in 1770, which, subsequently, was not accepted by Marchant & Higgins (1990). The only other accepted record of Tropical Shearwater in Australia is BARC case 705, which involved a bird of unknown subspecies ashore on North Keeling Island in November 2009.

Since the 1987 Wollongong shearwater record, Austin et al. (2004) have provided a seminal and global molecular revision of the small shearwaters in the genus *Puffinus*, which split the extensive 'Audubon's complex' into several species. This has since been followed (with variations and modifications) by field guides including Onley & Scofield (2007), Menkhorst et al. (2017) and Howell & Zufelt (2019), as well as the prominent world checklists, including the IOC (Gill et al. 2020), HBW/BLI (HBW and BLI 2019) and Clements (Clements et al. 2019). Consequently, Audubon's (*sensu stricto*) is now a species restricted to the Atlantic Ocean, while all taxa breeding in the Central and Western Pacific are now assigned to Tropical Shearwater *P. bailloni*. Although Christidis & Boles (2008) did not adopt this approach for the Australian checklist, BARC adopted the IOC Taxonomy in 2013, and replaced Audubon's Shearwater *P. lherminieri* (*sensu lato*) with Tropical Shearwater *P. bailloni* on the Australian list. Even this new taxonomy is provisional, and further splits are knocking on the door. Tropical Shearwater itself is already treated as five species world-wide by Howell & Zufelt (2019). Here we focus on the three South-West Pacific forms of the so-called Tropical Shearwater and compare them with Newell's Shearwater *P. newelli*.

We contend however that the Wollongong shearwater on 28 February 1987 was not a Tropical Shearwater *P. bailloni* (or *P. dichrous*) at all, but in fact a Newell's Shearwater. This conclusion occurred to JD during research for the *Australian Bird Guide* (Menkhorst et al. 2017) and the Wollongong record was listed under Newell's in the *ABG*. Mike Carter (who published the record; see Carter 1988) quite correctly suggested to the *ABG* authors that this was not an appropriate way to challenge the identification of a published record confirmed by BARC (RAC). Nevertheless, we believe that the record needs correcting and we now take formal steps to do so. We feel it is important to state that we are not criticising the original RAC decision, nor the original identification of Carter (1988). We may well have reached the same conclusions then, given the knowledge and resources available at that time.

Since 1990 the digital photography revolution has provided a far more extensive and accessible catalogue of reference photos of seabirds at sea, including all the relevant contender species for this case (although good photos of Tropical Shearwaters are still rare). After initially studying a single ventral photo of the Wollongong shearwater provided by Mike Carter, JD had concerns that the bird was not a Tropical Shearwater. At that time JD had been studying small black and white shearwaters (*Puffinus* species) in preparation for illustrating the *ABG*. This bird's features seemed more in keeping with JD's understanding of Newell's Shearwater. Subsequently, Mike Carter circulated a discussion paper (Carter 2017) on this bird which included an additional six photos by Mike and four by Peter Lansley, all of which, in our view, reinforce the identification of the bird as a Newell's. This submission therefore includes a discussion of all the issues raised in Carter's (2017) discussion paper.

Many of the small *Puffinus* shearwaters are poorly known, especially those in the Tropical Shearwater complex. Surprisingly, little has been published on the field marks of this group even since the advent of digital photography.

Therefore, the discussion below regarding identification features is based extensively on comparisons with photos of the relevant species collected by JD over a number of years; and many of them are included in this document as evidence.

The key features

The photos of the Wollongong shearwater reveal a strongly black and white shearwater with well demarcated features, as shown in Figures 1 and 2:

- The underwing is mostly white, with well-demarcated black margins that are mostly narrow except for the entirely black primaries and a bulge at carpal bend (Figure 1).
- There is an isolated black bar in the under secondary coverts (at the junction with the humerals) that is cleanly separated from the black leading edge of the wing (Figures 1 and 3).
- The collar is shallow, not deepening towards the base of wing, and is black in tone, concolorous with the head, and very sharply demarcated from the white throat (Figure 3).
- There is an obvious, sharply defined, white triangular wedge extending up the side of the neck behind the ear coverts (Figure 3).
- The under-tail coverts are a mix of black and white, with white central feathers and black lateral feathers forming a white V pointing toward the tail tip (Figure 4).
- The legs are bicoloured, black and flesh (pink) (Figures 5 and 6).

We will discuss all of these features and rate the relevance of each feature for usefulness in separating Newell's and Tropical Shearwaters in the Pacific.

Collar or side of neck

Refer to Figure 3. The Pacific races of Tropical Shearwater, *P. b. gunax*, *P. b. dichrous*, and *P. b. polynesiae*, show substantially deeper collars towards the base of wing than Newell's Shearwater does. The rear boundary of the collar is rather clean on *dichrous* and *polynesiae*, initially straight and vertical (i.e. perpendicular to the line of the body, in flight), before it curves gently forward but still down towards the white centre of the neck. Micronesian (*dichrous*) examples of Tropical have the deepest collars and from a distance and when fully side-on, the white central neck can be hidden, giving a rather hooded appearance at certain angles. When fresh, the collars on all Tropicals show white fringes which make the collar look blurred and tonally greyer than the black head and hind-neck. It is a persistent look that seems to be maintained even with wear, because the background tone of the collar feathers is generally greyer than the black crown and hindneck feathers to start with. This greyness is especially noticeable immediately distal of the blacker ear coverts, and makes the head look obviously darker and almost caped (Figure 3, E to H). The neck scalloping is most pronounced on *gunax*, the form most likely to occur off eastern Australia. This increased scalloping creates a more jagged lower edge to the collar and a less perfect rear boundary below the wing base.

Newell's Shearwater does not show a deepening of the collar towards the base of the wing. Onley & Scofield (2007) even described Newell's as lacking a collar. The demarcation between the black neck and the white throat and chest rises up towards the wing base. The collar of Newell's tends to always be the same black tone as the hind-neck and head, without the tonal difference of Tropical, while the demarcation line between black and white on the head and neck is particularly sharp (Howell et al. 1994). This black sharpness is even maintained when fresh lateral neck feathers can have narrow white tips, and Newell's never shows the bold scalloping on a grey collar that Tropical does.

As can be seen in Figure 3, the Wollongong shearwater (A and B) matches the reference photos of Newell's (C and D) and not the reference photos of Tropical Shearwaters (E to H). We rate the collar difference between Newell's and Tropical Shearwaters as probably the most useful feature in all circumstances, because it is relatively easy to determine whether it is one pattern or the other without a need for subjective judgement.

Carter (1988), citing Harrison (1983), concluded that a shallow collar is inconsistent with Newell's and consistent with "Audubon's". Unfortunately, Harrison (1983) was wrong about this (cf. Onley & Scofield 2007; Howell & Zufelt 2019). The RAC summary for case 109 (dated 13 November 1990; Patterson 1991) listed the "slight dark extension onto the sides of the neck" as evidence for eliminating alternatives, presumably following Carter (1988) and Harrison (1983). However, as shown in Figure 3, the shallow collar actually fits Newell's and not Tropical.

White wedge behind ear-coverts

Refer to Figure 3. A prominent and clean white wedge, with well-defined edges front and back, extends from the throat up behind the ear-coverts in the Wollongong shearwater. It clearly separates the black collar from the black ear-coverts (Figure 3, A and B). This feature is characteristic of Newell's Shearwater (Figure 3, C and D). Tropical Shearwater has a very different look (Figure 3, F and H). Although a white wedge does extend well up behind the ear-coverts and it contrasts with the darker ear-coverts, its rear border is far more diffuse and merges obscurely into the white scalloped collar on the side of the neck. The resultant effect is that the feature is less discernible as a wedge, and more like the grey and scalloped collar runs right up to the dark ear-coverts (Figure 3 E and G).

This is a good feature for separating Tropical and Newell's. Combined with the neck collar, the appearance in Tropical is that of a dark head contrasting with a paler neck (e.g. Figure 3E), versus the all-black but clearly separated ear-coverts and collar of Newell's. This difference should be possible to judge in most circumstances, without much subjectivity.

Underwing pattern

Refer to Figure 3. The underwing of the Wollongong shearwater is substantially white and the limited markings are black and very well demarcated with minimal fine detail or bleeding of tones (Figures 1 and 3B). There is a discrete, small, black patch in the lesser secondary coverts that is cleanly separated from the leading edge and runs down to the junction with the humerals (auxiliaries). This is typical of Newell's Shearwater (e.g. Figure 3, C and D), but near the minimalist end of the spectrum for that species. Unfortunately, it is difficult to be certain how much the low resolution and associated white bleed in the images is affecting the appearance of the underwing on the Wollongong shearwater, and perhaps the bird was not quite so pale under the wing in reality.

Tropical Shearwater tends to be less discretely demarcated, with dark streaks that sully the smaller secondary and primary coverts at the leading edge of wing, especially in *dicrous* and *polynesiae* (Figure 3F), and both those subspecies would be unlikely to ever look as clean on the underwing as the Wollongong shearwater, according to the evidence that we have gathered. However, *gunax* (Figure 3E) is very much closer to Newell's in underwing appearance. The palest (lightest marked) *gunax* underwings can closely match the darkest Newell's underwings, and while it remains unlikely that *gunax* would ever look so pale as the Wollongong shearwater, the palest *gunax* might potentially overlap with darker Newell's.

We therefore consider that the underwing pattern on the Wollongong shearwater supports the identification as Newell's, but it is not conclusive on its own. We are confident that it safely eliminates *dicrous* and *polynesiae*, but we are not certain if it would eliminate all individuals of *gunax*.

Undertail coverts

Refer to Figure 4. As can be seen in Figures 1 and 4A, the Wollongong shearwater had dropped its legs to completely reveal white anterior and central under-tail coverts and black distal and lateral longest under-tail coverts. The white pattern is a cleanly demarcated 'V'-shape pointing backwards. This pattern is consistent with Newell's Shearwater (Howell et al. 1994; Enticott & Tippling 1997; Figure 4). When seen in high resolution (Figure 4B) Newell's can show a stepped ('saw-tooth') demarcation between the black outer under-tail coverts and the white central 'V'. There are also some tiny white triangular tips on some of the black coverts to the side and rear of the 'V'. These two details are visible in the sharply focussed photograph of Newell's at sea, presented in Figure 3D.

Both *dicrous* and *polynesiae* have a dark centre to the under-tail coverts region across an extra four or five rows of coverts (Figure 4D) compared to Newell's; the narrow pale tips are not apparent from any distance and only discernible at high resolution. This pattern easily eliminates them both from contention for the Wollongong shearwater.

The situation is more complex for *gunax*, which has white reaching deep into the under-tail coverts to a similar extent as Newell's (Figure 4C), contra most of the literature. The posterior row and longest in the outer line of coverts are all black, but the central and anterior coverts are all white. An abrupt intergradation between the black and white areas consists of black feathers with broad white tips or oblique edges, and white feathers with black subterminal crescents. Thus the under-tail patterns of *gunax* and Newell's are very similar, although *gunax* is possibly slightly less clean cut than Newell's, and the central white area is potentially slightly more extensive than Newell's.

We believe the fine detail of the undertail coverts can aid identification of Newell's and Tropical in the hand, or at sea if seen well or photographed at high resolution. However at sea they all typically hold their feet and legs covering the area, usually preventing observation of fine details. Thus, although some differences exist, their use for field identification has considerable limitations.

The Wollongong shearwater was photographed with the feet out of the way, but unfortunately the resolution is low so eliminating *gunax* under these circumstances without getting a good take on the finer detail is not really possible in this instance.

Leg Colour

Refer to Figure 5 and 6. Carter (1988) stated that the flesh-coloured feet of the Wollongong shearwater were consistent with "Audubon's" and not with Newell's. In full agreement, the summary for case 109 (Appendix A) listed the flesh-coloured feet as one of the features used to eliminate alternative species including Newell's. This conclusion appears to be based on inconsistent descriptions in the sources cited by Carter (1988), which included "flesh pink", "dark", "blackish, webs pinkish" and "fleshy bluish grey [with black parts]". Since then, Unnit et al. (2009) described a bird in care in California as having the "tarsi and feet bluish to lavender, pinker on the webs, with black outer edges on both the tarsi and lateral toes". Nevertheless, however variable the leg and foot colours may be in Newell's, flesh-coloured legs and feet do not eliminate Newell's. Figure 5 shows a Newell's photographed in Hawaii with flesh-coloured legs and feet, with black edges. Figure 6 shows that the Wollongong shearwater had a leg colour and pattern precisely matching the Newell's in Figure 5.

On present knowledge, leg and foot colour has limited application for identification of Tropical and Newell's. Whilst it may be helpful in specific cases, better documentation of the variation in all forms is needed. In this case, the leg colour is not useful to eliminate either of the contenders.



Figure 1. The Wollongong shearwater, 28 February 1987. The well-defined and discrete nature of the black features in the underwing are clearly apparent in this excellent image. The shallow collar is very sharply demarcated. The white anterior and central undertail coverts form a V shape pointing to the tail. The legs and feet are pink.

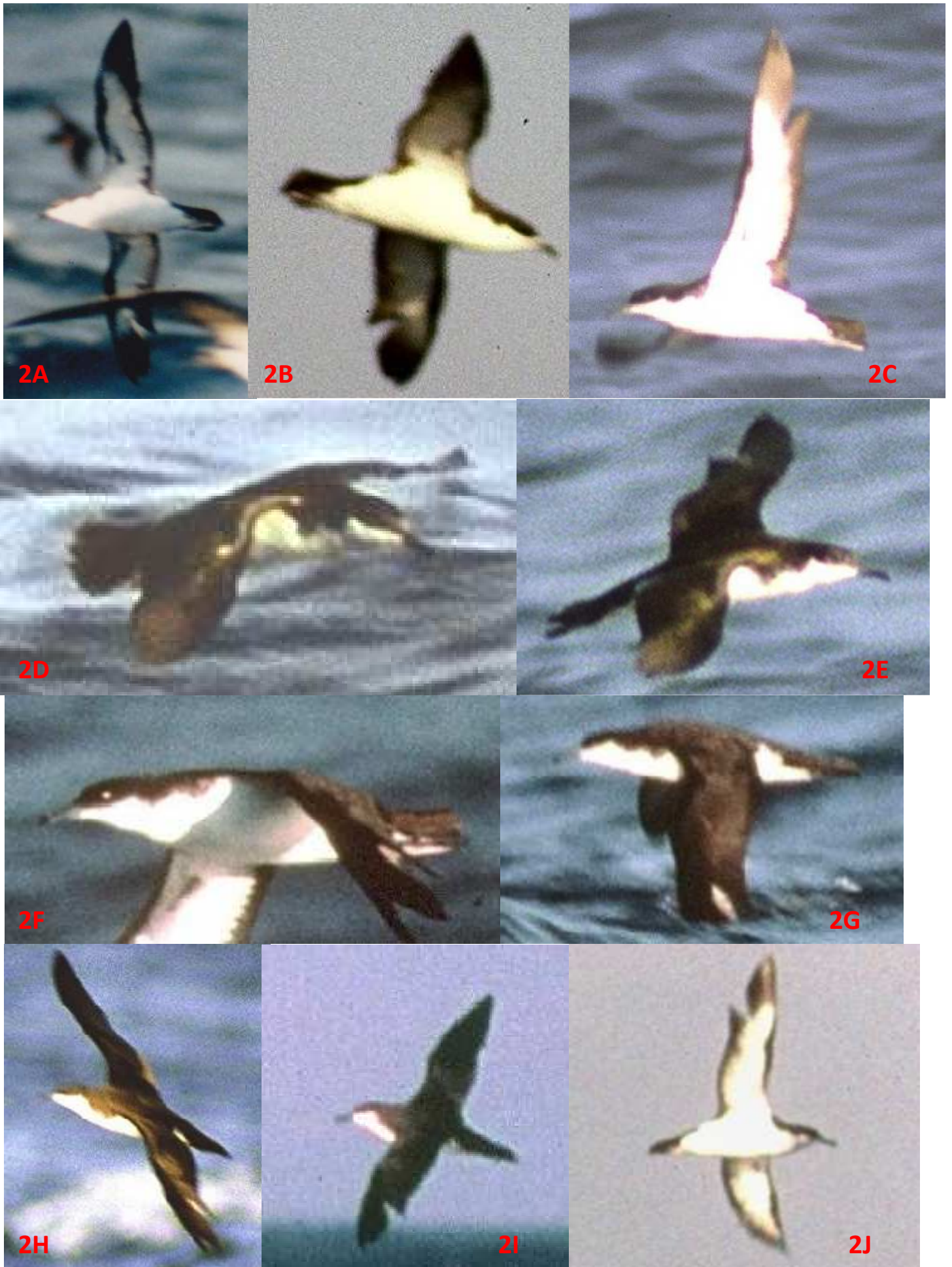


Figure 2. Ten more images of the Wollongong shearwater, 28 February 1987

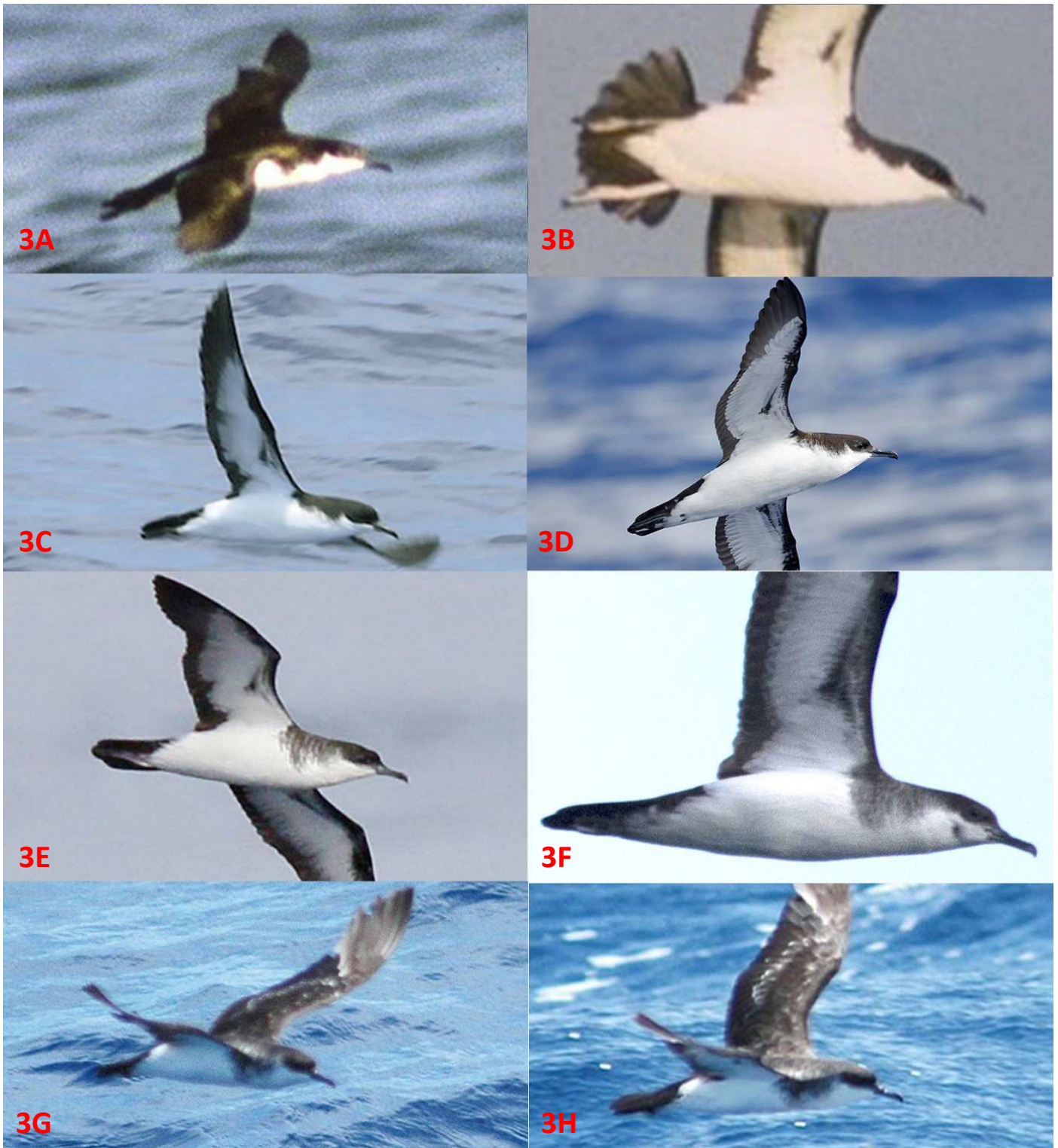


Figure 3. Comparison of the side collars in relevant shearwaters. **A** and **B** The Wollongong shearwater. **C** Newell's Shearwater, Hawaii, 26 April 2009. **D** Newell's Shearwater, Hawaii, April 2016. **E** Tropical Shearwater ssp. *gunax*, Vanuatu, Jan 2017. **F** Tropical Shearwater ssp. *dichrous*, Mangarava Polynesia, Nov 2014. **G** and **H** Tropical Shearwater ssp. unknown, Solomons, Aug 2005. Note the shallow and sharp collar patterns on the neck in A to D compared with the deeper and more blurry patterns in E to H. Also note the prominent and clean white wedges on the ear-coverts in A to D versus the absent of diffuse wedges in E to H. Compare the cleaner, whiter underwing patterns of B to D with the more sullied patterns of E and F.



Figure 4. Undertail coverts. **A** The Wollongong Shearwater. **B** Newell's Shearwater, San Diego, 2 Aug 2007. **C** Tropical Shearwater, ssp. *gunax*, Mere Lava Vanuatu, 2 April 2005. **D** Tropical Shearwater ssp. *dicrous*, Samoa, March 2011.



Figure 5. Newell's Shearwater, Hawaii. Note the bicoloured legs and feet with prominent flesh colour on inside of legs and toes. Such a pattern obviously does not eliminate Newell's Shearwater, *contra* Carter (1988) and Patterson (1991).



Figure 6. The Wollongong shearwater. The flesh (pink) on the legs is clearly visible, with black on the outside toes of the closed foot and tarsus on the right leg. This compares well with the bird in Fig. 5.

Comments on the Wollongong shearwater discussion paper by Mike Carter (2017)

After the ABG listed the Wollongong shearwater as A Newell's Shearwater, Mike Carter prepared and circulated a discussion paper (Carter 2017) which defended the original identification as Audubon's (=Tropical) Shearwater. The paper included eight reasons why Mike Carter believed the bird was Tropical. We disagree with all eight reasons and the conclusion, as explained below.

1) Newell's has a "Long cylindrical body, not cigar-shaped (bulbous in the belly) like subject bird especially when viewed ventrally"

Subtle body shape differences are subjective characters and are rarely diagnostic between closely related species, particularly when they inhabit similar climatic biozones. Using such characters is particularly dangerous when assessing a lone individual of one species when other contender species are not present. JD has looked at his extensive reference collection of photos for both species and could not find a major structural difference as described in this statement. We are not aware of any published reference promoting this as a way of separating the two species.

2) In Newell's the "Projection behind wings is greater than ahead of wings whereas in subject bird projections fore and aft are equal"

The discussion paper contains a scan from Steve Howell's (2012, p. 144) field guide to North American petrels. In the caption for Newell's (P15.3) Howell wrote "note long tail and big wings, which suggest Audubon's Shearwater." In

other words, Howell (2012) said that Audubon's and Newell's are closely similar in this respect. Enticott & Tippling described "Audubon's" as comparatively long tailed. We question whether comparison of these relative structures can be of any use in separating Newell's from Tropical when only one bird was present. We are not aware of any other published references recommending this as a way of separating the two species.

In contradiction, Carter (1988, p. 141) wrote that the Wollongong shearwater "was distinctly larger than Fluttering Shearwater", notwithstanding that this species was not there for comparison. However, the largest form of Tropical (ssp. *gunax*) is slightly smaller than Fluttering, while Newell's is slightly larger than Fluttering (Onley & Scofield 2007; Howell & Zufelt 2019; *contra* Carter 1988).

3) In Newell's the "Tail [is] longer, more tapered and pointed" than the subject bird

Our arguments against point 2 above apply equally well here. Analysis of JD's photo collection confirms that both Newell's and Tropical *gunax* have essentially the same wing/tail ratios, structures and shapes.

4) In Newell's the "Feet do not trail beyond tail contra subject bird"

There does not appear to be any foot projection beyond the tail tip of the Wollongong shearwater. Of the 11 photos available to us (Carter 2017), ten show no sign of trailing feet (Figure 2). One image (Figures 1, 3B and 4A here; Figure 1 in Carter 2017; Plate 31 in Carter 1988) appears to show trailing feet, but these are actually dangling feet, and the angle of photograph makes it look like they are trailing when they are not.

More importantly, neither Newell's nor Tropical is known to show foot projection in a relaxed flight posture, so it is not a relevant field character anyway. There is also an incompatible implication that Tropical has both a long tail and trailing feet, although these characters would be mutually exclusive.

5) In Newell's the "White tabs at sides of rump [are] much larger and bolder"

There seems to be no real difference in the average size of 'white saddlebags' ('white tabs') at the sides of rump between Newell's and Tropical (including both ssp. *dichrous* and *gunax*). Howell et al. (1994) noted that Newell's have large flank patches (or 'saddle bags') compared to Audubon's (= Galapagos Shearwater *P. subalaris* and/or [Atlantic] Audubon's *P. herminieri*?), but went on to suggest that moult and individual variation makes this character unreliable for identification. Howell (2012: caption P15.3) stated that the "White saddlebags of Newell's Shearwater average larger than Manx". Howell did not say they are larger than Audubon's or Tropical. Presumably Howell meant that they often encroach further onto the rump, and not that they are larger feathers. Looking at a selection of dorsal shots for Tropical, Newell's and Manx demonstrates that the 'saddle bags' are variable in the extent to which they encroach onto the rump (Figures 10 to 12). These are long rear flank feathers that flop onto the rump once the bird is in flight. It is possible (perhaps likely) that they can shift a bit depending on the birds activity, and perhaps in different ways between species. The Wollongong shearwater did have small 'saddle bags', but so did the Norfolk Island Newell's (BARC Case 770), which was fully accepted by BARC as a Newell's (see Figure 8A, below).

6) In Newell's the "Black below eye dips lower on cheek"

We are not aware of any substantial difference between Newell's and Tropical, or indeed the Wollongong shearwater, regarding this feature. Jehl (1982) stated that Newell's has less black below the eye than Townsend's, but that is not relevant here. True Audubon's Shearwater *P. herminieri* most definitely differs in having minimal dark and much white feathering under the eye, but that is also not relevant here.

7) In Newell's the "White hook behind auriculars, larger, better defined and more conspicuous"

We agree with this statement. The white hook on the Wollongong shearwater is large, well defined and conspicuous, which is consistent with Newell's, and inconsistent with Tropical.

8) In Newell's the "Bill wholly black rather than grey"

Newell's might have a blacker bill than Tropical, but it isn't wholly black. Any degree of difference between Newell's and Tropical is nowhere near substantial enough to be detected in these low resolution images that have been scanned from Ektachrome transparencies (compare Figure 2).



7A



7B

Figure 7. White 'Saddle bags' on the sides of the rump. **A** Newell's, Hawaii, April 2016. **B** Manx, UK. Newell's is said to have larger 'saddle bags' than Manx (e.g. Howell 2012). However, these two photos do not suggest that Newell's has larger 'saddle bags' than Manx. They often look similar because the flanks feathers are movable and can occasionally shift further onto the rump. We suggest that the flanks on the top image are sitting in a position not unlike the Wollongong shearwater (i.e. not encroaching very far onto the rump).



8A



8B



8C

gap



8D

Figure 8. White 'Saddle bags' are caused by white flank feathers lapping onto the rump. **A** Newell's, north of Norfolk I, April 2010 (BARC case 770). Note that the flank feathers are being held tight and low, which produces a small 'saddle bag' effect. **B** The Wollongong shearwater showing 'saddle bags' similar to **A** but showing a ding in the top of what should be a neatly rounded bunch of flank feathers. This could be due to a feather growing and not full length or a feather missing, both of which are common events during moults. **C** Newell's, July 2008, showing the flank feathers lifted high onto the rump above the red line which indicates the approximate top of the flanks in other photos (e.g. Figures 7, 8A, 8B). These flank feathers are mobile and can move around, they originate from the body under the wings and are not attached to the rump; they underlie the trailing edge of the scapulars and humerals. **D** San Diego, 2 Aug 2007. Note this bird is missing its longest flank feathers revealing a bunch of smaller feathers which also appear to originate from the side of the body but from further back; they have dark centres and would lead to a flat topped very low profiled 'saddle bag' barely rising onto the rump and probably giving the appearance of no 'saddle bags' at all.



Area normally covered by longest scapulars

Figure 9. Tropical Shearwater, Solomons, August 2005; Note the large area of white 'saddle bag', which is presumably caused by missing longest scapulars due to moult. Figure 10B appears to be the same bird, which is in extensive moult.

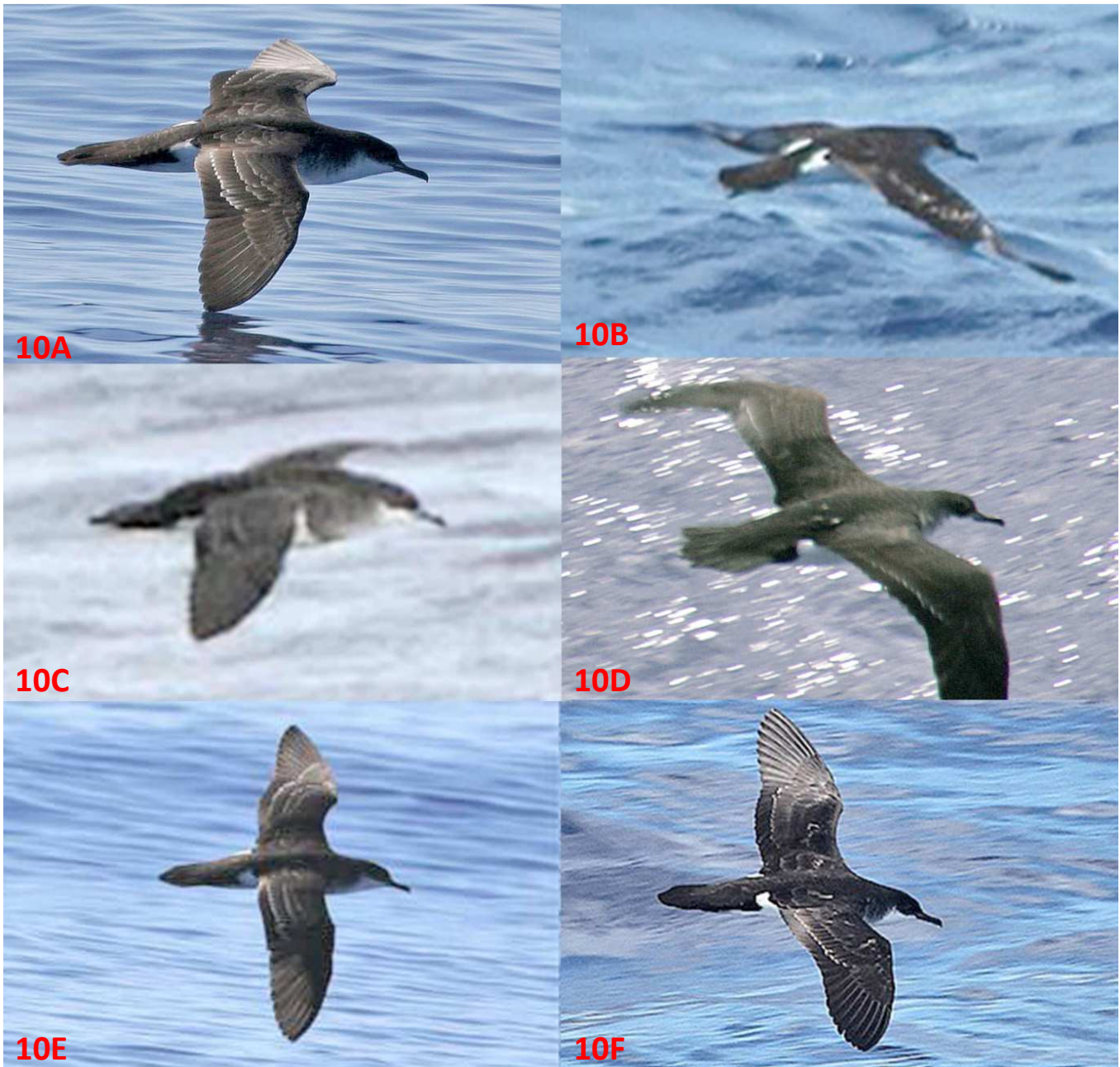


Figure 10. Variation in the ‘saddle bags’ of Tropical Shearwater subspecies in the Pacific. **A** *Ssp. polynesiae?*, Portland Bank Pitcairn, 15 June 2006. **B** *Ssp. gunax*, Solomons, August 2005; with very large area of white on the rump, which may be due to moulting scapulars missing (see Figure 9 also). **C** *Ssp. dichrous*, Caroline Islands, April 2008; ‘saddle bags’ missing due to moult; also note that birds from the western equatorial Pacific (*dichrous*) have a very deep collar and short bill, compared with *ssp. polynesiae* from the rest of Polynesia. **D** *Ssp. gunax*, 19 Nov 2005. **E** *Ssp. polynesiae?*, Portland Bank Pitcairn, 15 June 2006 (same bird as **A**). **F** *Ssp. polynesiae?*, French Polynesia. Note the extreme variation in the position of the flanks in the six photos, from nothing in **C** to extreme in **B**.

Conclusions

For the most part, Carter (1988) described the Wollongong shearwater carefully and accurately. However, we contend that in many instances he described the field characters that best identify this bird as a Newell’s Shearwater and rule out Tropical Shearwater. After compiling all the right evidence and sifting through it deliberately, he did not find any ways of eliminating “Audubon’s”. However, he found two ways of eliminating Newell’s, namely “the pattern on the side of the face, neck and breast”, and “the colour of the legs and feet” (Carter 1988, p. 146). We have shown above that neither of these features rules out Newell’s.

Times change. The taxonomy has shifted significantly. Digital photographs have revealed much more about the field characters of *Puffinus* shearwaters from the tropical Pacific. We believe that it is now time for this historical record to be amended. This amendment would not remove Tropical from or add Newell’s to the Australian list.

Supplementary Materials

We are supplying an electronic copy of the RAC 1990 decision for Case 109 in Appendix A and Carter's (1988) article on the bird in Appendix B. We are also providing a separate copy of Carter (2017) for the use of Committee members but not for publication on the BARC website.

Acknowledgements

Thanks in particular to Mike Carter for graciously sharing his ideas, photographs and writings regarding the Wollongong shearwater and other *Puffinus* shearwaters he has recorded. Thanks also to the photographers who supplied the images that we used, as follows.

Photo Credits

Fig. 1 by Mike Carter

Fig. 2 A to E and H by Mike Carter. F, G, I and J by Peter Lansley.

Fig. 3 A, B, G and H by Mike Carter. C by Daniel Webster. D by Pete Morris. E by John Holmes. F by Geoff Jones.

Fig. 4 A by Mike Carter. B by Dana Hogan. C photographer unknown. D photographer unknown.

Fig. 5 by Jim Denny

Fig. 6 by Mike Carter

Fig. 7 A by Pete Morris. B photographer unknown.

Fig. 8 A by Adam Riley. B by Peter Lansley. C by Robin Baird. D by Dana Hogan.

Fig. 9 by Mike Carter

Fig. 10 A and E by Chris Collins. B by Mike Carter. C by Mike Danzenbaker. D by Ron Saldino. F by Rainer Ertel.

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Appendix A. RAC Case Summary 109 for Audubon's Shearwater

This is a scan of the original letter advising the verdict of the case. It was later reprinted in Patterson (1991). Note that the date of the record was incorrectly given as 25 February 1984 instead of 28 February 1987.

Memorandum to: The Director RAOU
From: RAOU Records Appraisal Committee
Date: 13 November 1990
cc. Mark Barter
Simon Bennett
David Eades
Danny Rogers
Bob Swindley
Bob Patterson
File

RAC Case No. 109: Audubon's Shearwater, *Puffinus lherminieri*; off Wollongong NSW, 25 February 1984 (*Aust. Bird Watcher* 12 (5): 141 – 149).

Verdict: unanimously accepted

The submission accompanied by four photos describes a small black and white petrel seen by a number of observers for 10 minutes to within 15 metres. The published account provides a detailed description, with particular attention to head and facial and underwing patterns and the demarcation of black and white elsewhere in the plumage. A comprehensive analysis is used to eliminate possible alternatives such as *gavia*, *huttoni*, *puffinus* and particularly (*a*) *newelli*.

The crucial features noted were the black forehead and crown to below the eye forming a neat cap and the slight dark extension on to the sides of the neck; white axillaries together with the nature and extent of the black border to the white underwing; black undertail and lateral coverts; and the flesh-coloured feet. Size, flight and jizz are also analysed. Bill size is not considered as an aid to identification, but the photos suggest that it is proportionally short.

This is a comprehensive analysis and we are satisfied that the description and photos support the identification. We accept the record as *Puffinus lherminieri*.



R.M. Patterson
Chairman, Records Appraisal Committee

AUDUBON'S SHEARWATER

VOL. 12, No. 5
March 1988

Published by the
Bird Observers Club

M. J. Carter

ISSN 0045-0316

The Australian Bird Watcher



The Australian Bird Watcher

VOL. 12 No. 5
MARCH 1988

Editor:
Stephen Debus
P.O. Box 1015
Armidale, NSW 2350

Assistant Editor:
Jack Hyett

Production:
Bill Rolland

Publisher:
BIRD OBSERVERS CLUB
P.O. Box 185, Nunawading,
Victoria 3131

Subscription Rate:
\$9.50 postage paid for four
issues.
(\$14 per annum for overseas
subscribers)

The Bird Observers Club encourages the study and conservation of Australian wild birds. Details of club activities and publications may be obtained from the BOC Centre, 183 Springvale Road, Nunawading, Victoria 3131. Telephone (03) 877 5342. Membership rates and sample copy of monthly newsletter available on request.

COVER:
Sketch of Audubon's Shearwater at sea off Wollongong,
N.S.W., 28 February 1987, from photographs taken by Mike
Carter.

Plate 30

Drawing: John Cox

NOTES FOR CONTRIBUTORS

The *Australian Bird Watcher* welcomes original papers and short notes on Australian ornithology, particularly those reporting data derived from watching birds in the field. Suitable subjects include behaviour, ecology, breeding data, field identification and Australia-wide distribution. Black and white photographs are preferred for illustrations, but colour transparencies of adequate contrast are acceptable. Colour plates can be included for subjects of exceptional ornithological merit, e.g. species or plumage phases not previously illustrated by colour photos. Line drawings illustrating behaviour etc. in the text are also welcome.

Papers should be typed, wide spaced with generous margins, and submitted in triplicate to the editor. Bird names follow the list of recommended English names in the *Emu* 77 Supplement. Nomenclature and order of families follow current RAOU Checklists and Supplements.

The conventions adopted in the *Australian Bird Watcher* follow those in the *Style Manual for Authors, Editors and Printers*, 3rd edn, rev. John Pitson, AGPS, Canberra, 1978. References follow the author-date (Harvard) system.

The proportions of graphs, figures and tables should be selected so they can fit within all or part of a single page, or in exceptional cases a double page.

Authors are asked to consult a current issue of the journal as a guide, particularly on style, layout and capitalisations in titles, sub-headings and references.

Reprints: it is now much more economical for authors to photocopy their articles or, for articles with colour plates, to order extra copies of the journal at cost plus postage.

Audubon's Shearwater *Puffinus lherminieri* in Australia

by MIKE CARTER, 30 Canadian Bay Road, Mt Eliza, Victoria 3930

Summary

An Audubon's Shearwater *Puffinus lherminieri* was watched and photographed at sea off Wollongong on 28 February 1987. The circumstances of this observation and the satisfactory resolution of the identification problem now enable this species to be included with confidence on the Australian list. The identifying characteristics are discussed. Previous and possible occurrences of this and similar vagrant species are listed.

Introduction

Excellent views and several photographs of a medium-sized black and white *Puffinus* shearwater were obtained off Wollongong in New South Wales during an organised group seabird excursion on 28 February 1987. The identification of the bird was problematical, two species being in contention, Audubon's Shearwater *Puffinus lherminieri* (the race *gunax* from Vanuatu being the suspected form), and Newell's Shearwater *Puffinus auricularis newelli*. This is the central Pacific race of Townsend's Shearwater *Puffinus auricularis auricularis* (Jehl 1982) which breeds in Hawaii. Newell's has recently been reported from between Samoa and Fiji (Meeth & Meeth 1981/82), but not previously from Australasia. Audubon's has only a tenuous position on the Australian list with perhaps three previous claims, and there are no reported occurrences in New Zealand. There are at least another three occurrences which may involve these species or Manx Shearwater *Puffinus puffinus puffinus*, so resolution of this well-documented observation was important. There is now general consensus among the many authorities consulted that the bird was an Audubon's Shearwater.

The observation

Thirty-two observers watched the bird for between 5 and 10 minutes from 0645 h (eastern standard time) when about 12 nautical miles (20 km) east of Wollongong (position 34°25'S, 151° 10'E) at a water depth of 135 metres (75 fathoms).

The shearwater flew in to join the c. 20 Pomarine Jaegers *Stercorarius pomarinus*, c. 10 Wedge-tailed Shearwater *P. pacificus* and a single Flesh-footed Shearwater *P. carneipes*, which were feeding on fish scraps and suet being tossed as berley into the wake of the 13.4 m long vessel the 'Sandra K'. It settled several times to pick at the scraps from the surface of the sea and passed within 15 m of the boat, enabling photographs and detailed descriptions to be taken. The weather was fine and sunny with a 15 knot (force 4) north-easterly wind producing a slight to moderate sea on a low swell. We had immediately realised that the bird was something rare and had stopped the boat to provide a more stable viewing platform. All observations were made with the sun from behind shining directly on the bird.

At first glance the shearwater resembled the other small 'black and white' shearwaters common to the area, Fluttering *P. gavia* and Hutton's *P. huttoni*, but with a more distinct sharply defined black and white pattern ventrally and uniformly black, not brown, upperparts. It was distinctly larger than a typical Fluttering Shearwater and had white axillaries, thus lacking the dusky armpits shown by both those species. Its shape was similar to Hutton's Shearwater, perhaps appearing more robust, rather straighter winged and longer at the tail. The upperparts and the border to the underwing were black without any brownish tone, with a sharp demarcation between these

areas and the remainder of the underparts which were clear white. The forehead was black to the lores, the chin and throat white, with the demarcation on the cheek passing just below the eye. The white extended up the side of the neck in a partial collar which was not particularly conspicuous. The black extension behind the white 'collar' was marginal and did not extend so far on to the foreneck as indicated in Harrison (1983, plate 32) for Newell's, more resembling his drawing of Manx Shearwater in this feature. The rump and tail were black with conspicuous panels of white just aft of the wings, composed of the white flanks with a small extension on to the rump. The projecting tail feathers as viewed from below were also black. The under-tail coverts appeared white but the trailing feet sometimes gave the impression of a dark under-tail (see, however, comments under 'Further details revealed in the photographs'). The under-wing coverts were mostly clear white broadly bordered on the rear edge and at the tip of the wing by black secondaries and primaries. The black along the leading edge was narrower and at the carpal ran slightly diagonally in, just remote from the leading edge along the inner under-wing coverts towards the base of the wing, reminiscent of the paler 'cookilaria' petrels of the genus *Pterodroma*, e.g. Cook's Petrel *P. cookii*. Bill and feet appeared dark. Subsequent study of the photographs showed that only the outside of the legs were dark, the remainder being pale.

The rather dashing flight was usually close to the sea with a stiff-winged shallow beat action, reminiscent of Manx Shearwater and more like Short-tailed Shearwater *P. tenuirostris* than the faster, more frequently beating Fluttering Shearwater. When settling among other shearwaters to feed, it momentarily held its wings in the half-open position, turning the underside forward to expose the white coverts in a brief threat display. When rising, it pattered rapidly on the surface, soon becoming airborne.

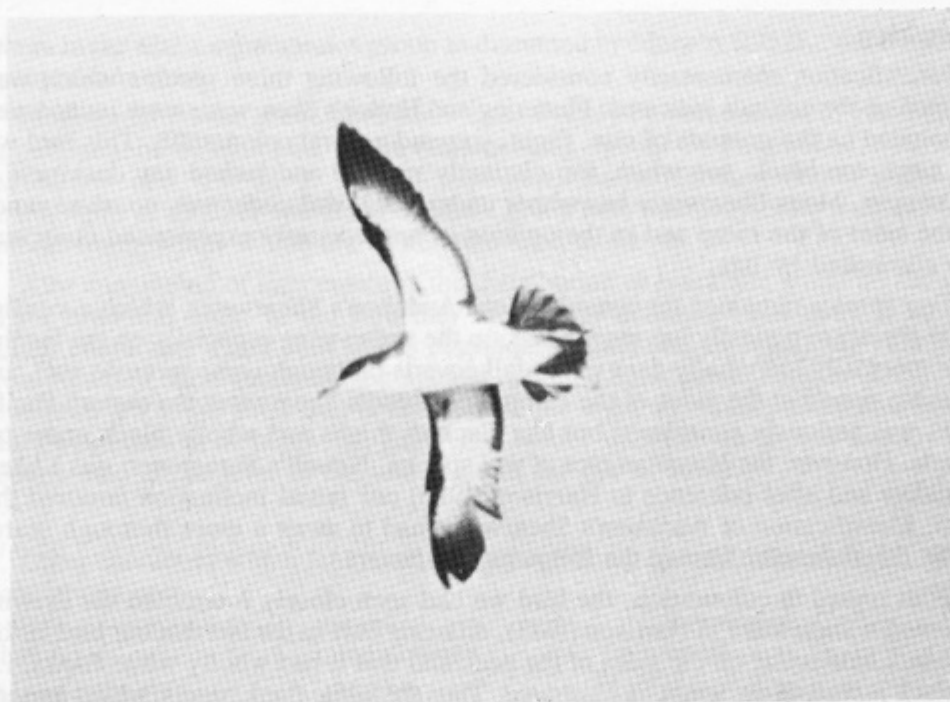
The above description was written the next day from notes taken in the field before viewing the photographs.

Further details revealed in the photographs

Over 36 slide photographs were taken. Four of these taken on Ektachrome 100 ASA were made into prints for circulation and were commented on by several authorities. Ventral aspects were particularly well recorded in these pictures which proved to be valuable in confirming, refining and elaborating on the field notes, especially with regard to shape and structure which are difficult to convey in writing or by field sketches. One of the photographs is reproduced here, Plate 31, and John Cox has prepared the drawing, Cover Plate 30, from two of the other photographs.

Although the white flank patches are shown to just overlap the sides of the rump, their actual extent is not as great as sometimes appeared in the field. Although most of the under-tail coverts are clearly white it is apparent that the central ones are black at the tip and that the lateral under-tail coverts are also black. According to the literature this pattern could fit both species under consideration.

The black on the side of the head is seen to have its origin at the base of the maxilla such that the foremost lower loreal area is white. The black then extends to about the same level at the back of the head forming a neat, slightly convex cap dipping to the lower rim of the eye. The black behind the head extends just a little lower to envelope about a third of the side of the neck, thus creating a white 'notch' at the rear of the ear coverts, and then continues to just below and beyond the leading edge of the under-wing where it stops abruptly. At its maximum it embraces about half of the lateral aspect of the neck. The border with the white foreneck, although not absolutely sharp, is distinct and only slightly irregular. Thus there were no dusky markings extending well down the sides of the neck or upper breast and this was contrary to expectations



Audubon's Shearwater *Puffinus lherminieri* off Wollongong, N.S.W., 28 February 1987

Plate 31

Photo: Mike Carter

for Newell's Shearwater (Harrison 1983) but was consistent with Audubon's Shearwater. I now consider this facial and neck pattern to be diagnostic of Audubon's Shearwater. Similar species have either more black or less black although the differences may be rather subtle. The photographs clearly show that there was no black along the leading border of the under-wing between the elbow and the body. However, the marginals on the edge itself were black.

The robust form of the bird is well shown in the photographs as well as the rather broad wings. The tail is seen to be slightly wedge-shaped or at least graduated at the tip. The feet are seen to trail with the toes just extending beyond the tip of the tail. This position for the toes was considered relevant to identification, obviating Audubon's, but may not be as significant as first thought.

The best photograph (reproduced here) is of the bird stalled in flight overhead and shows the tail fully fanned. This is a well-known characteristic of Audubon's Shearwater (Curtis et al. 1985) and is shown in a photograph in Lee & Booth (1979). However, a photograph in Jehl (1982) of a nominate Townsend's Shearwater rising from the sea shows a similar posture. Indeed, the bird in Jehl and the picture of our bird reproduced here are very similar. The under-wing pattern is virtually identical. The differences in the pattern of the under-tail and neck could be explained by the differences between the nominate *P. a. auricularis* and *newelli*. To quote from Murphy (1952) 'The best character for the separation of *newelli* is apparently the white central under tail-coverts (these being black in *auricularis*) and the absence of mottling on the sides of the neck (Godman 1908, p. 116)'. *Newelli* also has less extensive black on the cheek, barely below the eye (Jehl 1982). Modify Jehl's picture accordingly and it would closely resemble our bird. However, two other pictures in Jehl's paper, lateral views, show Townsend's Shearwater to have long narrow wings rather like Hutton's Shearwater and thus in this respect do not match the Wollongong bird.

Discussion

Identification momentarily considered the following three species which were rejected on the grounds indicated. Fluttering and Hutton's Shearwater were immediately discounted on the grounds of size, flight, jizz and general colouration. This bird was too large, too black, too white, too distinctly marked and lacked any duskiness in the armpits. Manx Shearwater has whiter under-wings and under-tail, no white panels on the sides of the rump and in the opinion of appropriately experienced observers, was eliminated by jizz.

Two species remained for consideration. Audubon's Shearwater, which according to the literature typically has more black on the under-wing especially on the leading edge, normally has wholly dark under-tail coverts (although some races do not), and no white panels at the sides of the rump. Townsend's Shearwater, an eastern Pacific form, was seriously considered but has blackish thighs and wholly black under-tail coverts. However, the Hawaiian race of this species, Newell's Shearwater, was a likely candidate and after reference to Harrison (1983) our initial inclination favoured this form. Identification of Audubon's Shearwater had to await a more thorough search of the literature considering the following characters.

With regard to colouration, the bird we had seen closely resembled the drawing of Newell's Shearwater in Harrison (1983), differing only in the fact that our bird lacked the black half-collar on the sides of the neck and that it had wholly white flanks, i.e. no black just aft of the wings as illustrated. Thus the white flank panels, whilst present, were more forward than indicated by Harrison.

The bird was quite unlike Harrison's (1983) illustration of Audubon's Shearwater in two major respects: the pattern on the under-wing and the under-tail. Also, Harrison gave no hint of plumage variations which could embrace our individual. A study of the literature cited reveals that a broad dark border to the under-wing as illustrated by Harrison is typical of only some races of Audubon's, namely *P. l. subalaris* (from Galapagos Is.), *P. l. lherminieri* from the western Atlantic, *P. l. persicus* from the Arabian Sea, and *P. l. bailloni*, *nicolae* and *temptator* from the Indian Ocean. It would appear however that the western and central Pacific races, *bannermani*, *gunax* and *dichrous* (those most likely to occur off eastern Australia), can have much less black on the under-wing although there is some individual variation (Harper & Kinsky 1978; Jenkins 1973; King 1967; Louette & Herremans 1985; Turbott 1985). Moreover, some races have white or mixed black and white under-tail coverts.

Among the other literature searched, Jenkins (1973) is the most helpful reference as three photographs of a bird which came aboard his ship in Tonga are provided. These show the head, an outstretched under-wing and the under-tail. Allowing for some minor variation, the pattern of our bird matches the features revealed in these photographs. Jenkins' bird also had the central under-tail coverts mainly white. Because of the exceptionally small bill, only 23 mm, Jenkins' bird was presumably of the 'local' race *dichrous* which is widespread in the tropical western Pacific. *P. l. dichrous* is characterised by having the shortest bill within the group, the exposed culmen averaging 26 mm (Murphy 1927). Only one specimen in 50 reported by Murphy had such a short bill. Conversely, at 92 mm, Jenkins' bird had an exceptionally long tail. Murphy quotes tail at 73-84 mm averaging 80.2 mm for that race.

Identification as Audubon's Shearwater was based initially on structure, the significant characters considered to be the robustness of the body ('stocky': Harrison 1983; King 1967), the breadth of the wings and the rather long graduated tail. To some extent this was predicated on the belief that Newell's Shearwater would have a similar structure to Townsend's (this has been confirmed by Jehl in litt.), and would resemble

others in the Manx superspecies group as discussed by Murphy (1952), which includes *gavia* and *huttoni*.

Judgements on the above have been made mainly by comparison of photographs in publications as indicated in the references by *Pl for *P. lherminieri*, *Pa for *P. auricularis* and *Ph for *P. huttoni*. See particularly Harrison (1987) which has photographs of all three species. The Manx group have distinctly more slender bodies and narrower wings which are more attenuated at the tip.

Also considered of importance is the distribution of black and white on the sides of the head and neck. In our bird they are clearly delineated and there is no dark collar, characters which Jehl (1982) considered significant in separating Audubon's from Newell's Shearwater. Photographs of Newell's Shearwater (King & Gould 1967; Shallenberger 1984) show that in this species the lores are wholly black and that the black originates at or below the gape. The border with the white chin and throat is *straight* and at the level of the underside of the eye or lower.

Other characters which Jehl listed for distinguishing eastern tropical Pacific Ocean populations are:

	<i>newelli</i>	<i>lherminieri</i>
Size	medium-size	small
Dorsal colouration	blackish	blackish brown
Under-tail coverts	mixed, white at base, black distally	blackish, whitish, proximally
White flank patch	present	absent
Under-wing	sharply black and white	whitish with dusky markings
Leading edge of under-wing	thin dark line	whitish or dusky

The race of *P. lherminieri* which occurs in the eastern Pacific is *subalaris* and thus is the form which Jehl was comparing to *newelli*. If we compare the western Pacific forms, especially the race *gunax*, described by Murphy (1927) as a distinct and striking shearwater, the differentiations fade. Firstly *gunax* is characterised by its 'large' size — 'length in the flesh, 305 mm'. Table 1 gives the dimensions of the shearwaters under consideration. Dorsal colouration is described by Murphy as 'blackish-brown almost black on the pileum', and he listed among the subspecific characters 'exceptionally dark-hued race . . .'. The under-tail coverts are 'mixed blackish-brown grey and white'. The eastern Pacific race *subalaris* is 'marked . . . by the prevalence of dark feathers on the flanks', whereas the western Pacific forms are not and thus the presence of a white flank patch ceases to be so significant. The extension of this white patch onto the rump was marginal in our bird and not nearly as extensive as illustrated in Harrison (1983) or King (1967) for Newell's Shearwater. The lack of significant differences in the under-wing patterns has already been discussed.

It has been suggested that in flight, the feet of Audubon's should not trail beyond the tail, one character of the species being its long tail. However, measurements of *gunax* show it to be a relatively short-tailed, long-legged member of the group, whereas *newelli* is both absolutely and relatively the longest-tailed of the *puffinus* and *auricularis* group (Jehl 1982). Thus the position of the trailing toes relative to the tip of the tail may not be diagnostic. However, the fact that the feet did trail support the subspecific identification as *gunax*. Using average dimensions for *gunax*, the sum of the length

of the tarsus and mid-toe with claw is 1.15 times the length of the tail whereas in *dichrous* the same ratio is 0.99. For *newelli* the ratio is 1.12 and for *P. p. puffinus* it is 1.25.

Apart from the pattern on the side of the face, neck and breast, the colour of the legs and feet is perhaps the only other readily diagnostic character separating Audubon's from Newell's Shearwater, and helps identify our bird. The photographs clearly show that the legs and feet of our bird were flesh-coloured with black on the outer toe and outer side of the tarsus. This accords fully with Audubon's Shearwater (Murphy 1927; Harrison 1983). The legs and feet of Newell's Shearwater are variously described by King & Gould (1967) as 'flesh pink', by Berger (1981) as 'dark' and by Harrison (1983) as 'blackish, webs pinkish'. A detailed description given by Munro in Ripley (1957) is as follows: 'Legs a fleshy bluish grey colour with the exception of the following parts which were black: outer toe, part way up outer part of leg, outer part of second toe and claws.' Thus it is concluded that the legs of *newelli* would not be as pale as in our bird.

Jehl (in litt.) commented on the photographs and an early draft of this paper and stated 'Certainly the bird is not *auricularis* or *newelli* . . .' Peter Colston (pers. comm.) compared the description and photographs with specimens in the British Museum and found a perfect match for *P. l. gunax*. The specimen showed no trace of white fringes to the feathers, of which much is made in early literature (Murphy 1927, 1928), although pale bases to the contour feathers showed through when they were ruffled.

The flight of Audubon's is often referred to as being similar to Little Shearwater *Puffinus assimilis*, having a 'very rapid flutter-and-glide flight' (Bourne in Palmer 1962) with far less sailing, gliding, banking and careening than Manx Shearwater (Curtis et al. 1985). Jehl (1982) described the flight of *P. a. auricularis* as 'low, fast with very little gliding', and another description of *P. a. newelli* by Harrison (1983) is similar.

It is my opinion that the flight of Audubon's is quite unlike that of the Little Shearwater. I noted the flight of Audubon's Shearwaters seen near Samoa in October 1979 in a force 4 wind as 'low over the sea. Quick but noticeably shallow wing beats in short bursts with longer glides than Fluttering Shearwater with an easy turning and undulating path giving a smoother flight than other small shearwaters'. This is in accord with Jenkins (1973), who described the flight of three Audubon's Shearwaters in an 18 knot wind off Tonga as 'a lot of gliding between the wing beats and it appeared that the wing beats were not as rapid as those of Fluttering Shearwaters'. See also the description given below of the flight of the Audubon's Shearwater seen on 28 February 1984 off Sydney.

Table 1
Dimensions of six Pacific forms of black and white shearwaters, range (mean)

Form	Culmen	Wing	Tail	Tarsus	Mid-toe with claw
Audubon's					
<i>P. l. gunax</i> ^a	29-31 (30.1)	207-213 (209)	73-77 (75.5)	41-43 (42)	43-46 (44.5)
<i>P. l. dichrous</i> ^b	22.6-27 (26)	188-209 (202)	73-84 (80.2)	36-40 (38.2)	39-43 (40.8)
<i>P. l. subalaris</i> ^b	24.7-29 (27.7)	189-203 (195)	68-75 (72)	34-37 (36)	40-43.6 (41.3)
Newell's					
<i>P. a. newelli</i> ^{c,d}	30.2-35.5 (33.1)	223-249 (237)	79.7-88.8 (84.8)	43.3-48.3 (45.7)	47.0-51.5 (49.3)
Fluttering					
<i>P. gavia</i> ^{e,f}	28.3-37.4 (33.3)	192-220 (209)	61-67.5 (63.4)	36-46 (42)	43-51
Hutton's					
<i>P. huttoni</i> ^{b,f}	32.2-39.4 (36.4)	212-231 (221)	67-70.5 (69)	40-44 (42)	45-50 (48)

^aMurphy (1922)

^cKing & Gould (1967)

^eServenty et al. (1971)

^bMurphy (1927)

^dMurphy (1952)

^fKinsky & Fowler (1973)

The foregoing demonstrates the similarity between the western Pacific races of Audubon's Shearwater and Newell's Shearwater and therefore the ease with which these may be confused. In fact when Mathews & Iredale (1915) gave the original description of the form *bannermani* they assigned specific status to the bird and stated 'its nearest relative being *Puffinus newelli* Henshaw and *P. auricularis* Townsend . . .', and made no reference of any resemblance to *P. lherminieri*. Loomis (1918) went even further, stating 'Obviously *Puffinus bannermani* is a variation of *Puffinus auricularis* . . .'

Previous reports of Audubon's Shearwater or similar species in Australia

1. A specimen of *gunax* from 'off Townsville Queensland', at 19°S, 147°E, on 6 June 1770 was described from Solander's manuscript (Mathews 1912).
2. On 3 December 1976, a bird considered by the observer to be a Manx Shearwater was seen at 9 nautical miles (15 km) south of Gabo Island, Victoria, at 35°31'S, 149°54'E (Barton 1977).
3. On 30 November 1980 in the Gulf of Carpentaria (whilst in block 15°S, 138°E), ten small black and white shearwaters with dark under-tail coverts were flushed by the research vessel 'Soela' from which I was observing. They flew only a short distance and settled again. The upperparts were recorded as being blackish, not uniform, somewhat mottled. Sides of the rump and flanks were noted as dusky. There was very little white visible from above and behind. Details of the underwings were not seen. The legs were pale, clearly emphasised by the dark under-tail coverts when lowered on alighting. I identified the birds as Audubon's Shearwaters.
4. On 25 February 1984 one Audubon's Shearwater was seen 18 miles east of Sydney Heads, New South Wales. Twenty-one experienced observers including Kevin Bartram, Chris Corben, David Eades, David Fischer, Alan McBride, Tony Palliser, Tim Reid, Greg Roberts and myself watched the bird for approximately one minute. The bird was similar to the one described herein except for the following:
 - (1) The under-tail coverts were wholly black, almost squared off and sharply delineated from the white belly at the base of the tail.
 - (2) The white flank patch was less conspicuous and did not obviously intrude on to the side of the rump.
 - (3) There appeared to be more black on the leading edge of the under-wing.
 - (4) The flight was 'light and graceful when compared with Fluttering Shearwater, more gliding, with easy turns and slowish wing beats'. It was thus less dashing than the February 1987 bird but was flying in a gentle breeze of only 8 knots.
5. A bird watched by Ian McAllan, Dariel Larkins and others (in litt.), following in the wake of their excursion vessel off Sydney, New South Wales, for half an hour on 30 June 1984, may also have been an Audubon's Shearwater. The general pattern and flesh-coloured feet suggest this identification but the under-tail coverts were largely white and the possibility that the bird was a Manx or Newell's Shearwater cannot be discounted.
6. A bird seen on 22 September 1984, again during a group excursion from Sydney, New South Wales, was considered at the time to be an Audubon's Shearwater (A. McBride in litt.). The under-wing of this bird was largely white and the under-tail coverts described as black but photographs of the bird show that they were not entirely black. As pointed out by Chris Corben (pers. comm.), the photographs by T.R. Lindsey, including that published on page 303 in Lindsey (1986), show

a white crescentic mark behind the ear coverts which is considered diagnostic of Manx Shearwater (Cramp & Simmons 1977). However, Newell's Shearwater also has a white crescent on the side of the neck although less well developed than in Manx Shearwater. See, for example, photographs in King & Gould (1967). The lack of dusky axillaries shows that the bird is not a Fluttering Shearwater.

In addition to the above, there are two beach-washed specimens of nominate Manx Shearwaters from New Zealand. The first was in 1972 (Kinsky & Fowler 1973) and the second in 1985 (Tennyson 1986). Both were considered unusual in that they displayed more black along the leading edge of the under-wing (at the elbow rather than at the carpal as in our bird) than standard texts regard as normal for the species. The dimensions of the specimens, especially that of the tail, confirm identification as *P. p. puffinus*. Interestingly the feet colouration in the 1972 record is similar to that of our bird and is not consistent with the description provided in Cramp & Simmons (1977). Apart from the distinctions in the under-wing pattern, our bird had less black on the side of the head. In these New Zealand records the black came 'well below eye level' rather than just enveloping the eye. Neither account mentions the presence or absence of the characteristic white crescentic mark on the ear coverts.

Acknowledgements

Particular thanks are due to David Eades for his critical and stimulating comments and for supply of much reference literature. Peter Colston has provided assistance from British Museum resources. Others who provided information and advice on earlier drafts of this paper include Chris Corben, Neil Cheshire, David Fischer, John Jenkins, Peter Lansley, Joseph Jehl, Peter Fullagar and John Cox who also prepared the drawings.

Also to all 36 who shared the excitement of the Wollongong observation and contributed to the discussion while still at sea, including Keith Brandwood, Mike Doyle, Don Jeans, Rob Morrow, Lester Mulford, Chris Prentice, Andrew Silcox, Ken Simpson, Fred Smith and the skipper and crew of the 'Sandra K', many thanks.

Special thanks are due to David Fischer for leading and organising the Wollongong pelagic excursions, and for commenting on as well as helping in the preparation of this paper.

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