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THE SHORT-TAILED SHEARWATER COLONIES OF KING ISLAND

I.J. Skira[1] *and G. Davis*[2]

[1] National Parks and Wildlife Service, Hobart, Tas.
[2] 22 Hill Street, Bellerive, Tas. 7018

Introduction

Short-tailed Shearwaters *Puffinus tenuirostris* first began to breed on King I. at the turn of the century. The Field Naturalists Club of Victoria expedition to King I. in 1887 did not locate a single burrow although shearwaters were nesting on the New Year Is. (Campbell 1888). Where the birds first nested is not certain. The then oldest resident, Mr. Hickmott Grave, interviewed in the King I. News of 1 April 1970, said that "the first rookery was established near Stokes Point and the next just south of Wickham". However we were told by Mr. Len Sullivan, the vice-president of the King I. Field Naturalists Club, that when his father came here in 1898, Short-tailed Shearwaters were coming in to the Dromedary area (Seal Rocks) but could not establish due to the now extinct feral pigs. According to Mr. Sullivan, about 40 years ago the Dromedary was only about one quarter of its present size.

The colonisation of King I. by Short-tailed Shearwaters was rapid. A correspondent for the King I. News of 4 October 1916 reported many thousands of Short-tailed Shearwaters landing at Grassy. At a King I. municipal council meeting in 1936 the increase in Short-tailed Shearwaters was commented upon, as the extension "to many points around the coast of

King I. being very rapid of late" (King I. News 3 March 1936). The council saw no need for special sanctuaries. In 1938, 11 colonies were known (Fauna Board Files H4/50). These were Stokes Point, Surprise Bay (Seal Rocks), Catarique Point, Whistler Point, West of Wickham Lighthouse, Cape Wickham, Rocky Point, Sea Elephant (north of Cowper Point), Bold Head, Grassy and Red Hut. The file also said that the colony west of the lighthouse was first started in 1923. Green and McGarvie (1971) listed, in addition to these, Boulder Point, Martha Lavinia, Cowper Point and on the coast west of Loorana. Naarding (1980) added Naracoopa Beach, Fraser Bluff, Sandblow Point, Badger Box and the Wash and Springs to Green and McGarvie's list.

Until now no accurate estimates were available of the size of the colonies. Green and McGarvie (1971) listed the colonies they found and guessed the size of some of the larger ones. Naarding (1980) estimated the size of each and obtained burrow densities for eleven of them.

Methods

Between 1 and 11 February 1985 and 31 January to 10 February 1986 visits were made to each colony. Each colony was measured on the ground and the area determined by scale drawings. The burrow density was estimated by counting burrows on straight line transects 2m wide, as described in Skira and Wapstra (1980). The number and length of transects varied at each colony. The number of burrows was estimated by multiplying the mean burrow density by area. The range in the number of burrows is given by 95% confidence limits of ± 2 SE of the mean density.

Results and Discussion

The 19 known colonies on King I. cover 141ha and are estimated to contain 547,960 burrows. This is approximately 5% of the 11.4 million burrows in Tasmania (Skira *et al.* 1986). We only added Barrier Creek to Naarding's list. The increase in new colonies does not necessarily mean that they did not exist when lists were made, but that they may have been unknown. We did not find any burrows at Stokes Point and Loorana. These colonies are now most likely extinct. Sea Elephant could not be located either, possibly because we did not search the right area.

The mean density of burrows was 0.39 burrows/m^2 with a range of 0.19 – 0.70. This density compares to a mean of 0.75 for colonies elsewhere in Tasmania. The reason for the lower density is because almost all colonies are on sand dunes. Green and McGarvie (1971) surmised that the colonies at Seal Rocks and Red Hut were up to 200 acres in area. Naarding's (1980) estimate of the area for all the colonies was only 10% greater than ours. Our experience is that it is very easy to overestimate areas particularly that of large colonies, and that a tape measure is essential in obtaining estimates in the field.

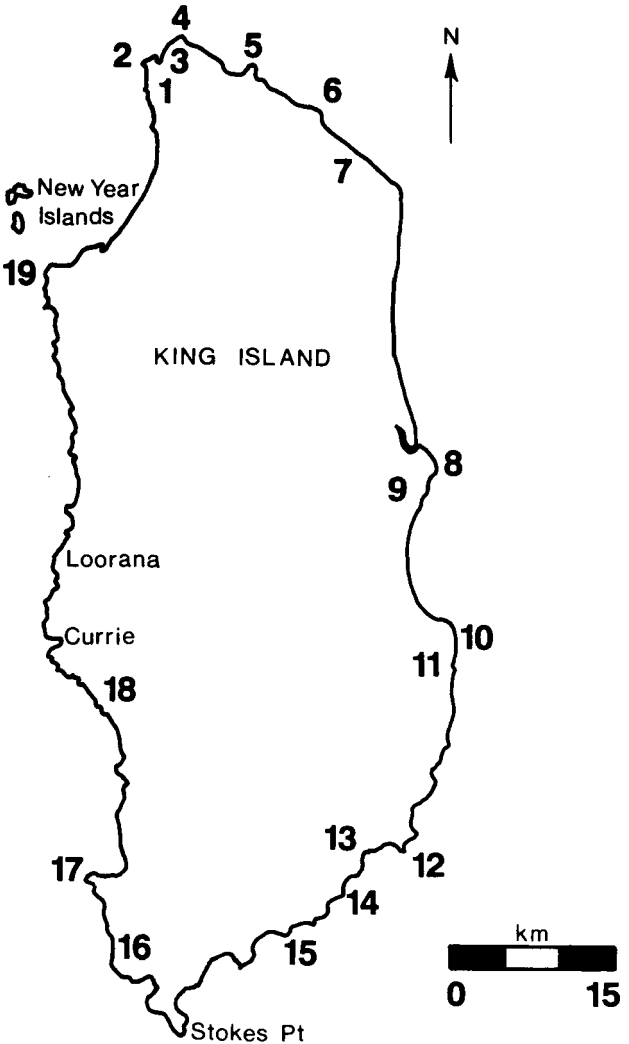

Figure 1. Distribution of Short-tailed Shearwater colonies on King I. Refer to Table 1 for localities.

Table 1. Size of the Short-tailed Shearwater colonies on King Island. Estimates for colonies 6 and 8 are each based on a single transect and no range values are available.

Colony	Area (ha)	Burrow density (burrows/m²)	Number of burrows	
			Mean	95% confidence limits for mean
1. Wash and Springs	12.82	0.46	59150	37850–80400
2. Cape Farewell	5.31	0.46	24650	21900–27350
3. Cape William Lighthouse	2.58	0.32	8350	7050–9650
4. Cape Wickham	3.71	0.40	14800	8400–21300
5. Rocky Point and Disappointment Bay	7.06	0.40	27950	18200–37750
6. Boulder Point	3.05	0.70	21200	–
7. Martha Lavinia	3.97	0.28	11200	4900–17450
8. Cowper Point	4.04	0.19	7700	–
9. Naracoopa Beach (Blowhole)	2.28	0.33	7600	3350–11800
10. South of Fraser Bluff	0.38	0.43	1750	1490–1950
11. Barrier Creek	0.25	0.63	1550	1200–1850
12. Bold Head	19.5	0.35	68200	53050–83300
13. Grassy	5.42	0.47	26000	22050–29950
14. Sandblow Point	2.98	0.42	12500	10150–14900
15. Red Hut Point	18.98	0.45	85400	62650–108200
16. Seal Rocks	26.66	0.31	82650	72000–93300
17. Catarique Point	4.88	0.20	9760	7800–11700
18. Badger Box	3.64	0.44	16000	15300–16750
19. Whistler Point	13.72	0.44	61700	44050–79350
	141.23	0.39	547960	

The colonies were well vegetated predominantly by succulents or native scrub. Tussock grass *Poa poiformis* was rarely found. The majority of colonies were relatively free of erosion although most showed signs of cattle grazing. During dry summers cattle may magnify existing erosion. This is certainly the case at Cape Wickham where large sandblows have buried many burrows. At Seal Rocks and Catarique Point severe fires in the past have also destroyed vegetation causing sandblows. All colonies are serviced by tracks except for Cowper Point where the track ends about 600m from the colony. Some of the smaller colonies may be affected by over-harvesting

of chicks but harvesting is not as intensive as it was 10 years ago due to a decrease in the human population to 2500 and a change in eating habits compared with earlier years.

The turn of the century corresponded with an expansion in the range of shearwaters in North West Tasmania. Colonies were previously unknown or very small on Robbins, Walker, Hunter and Three Hummock Is. (Burnie Advocate 26 March 1977; Atkinson 1890; P.J. Maguire pers. comm.). There was also no Short-tailed Shearwaters on Albatross I. in late November 1894 when eggs could have been expected (Le Souef 1895). They now breed on the island (Brothers and Davis 1985). Furthermore, commercial harvesting on Trefoil and Steep Is. was limited in this period (Burnie Advocate 26 March 1977; Buckby 1984).

The cause of the expansion is not known. It could have been brought about either by deterioration of existing colonies or an increase in numbers. Sea levels reached their present level 6000 to 7000 years ago (Jennings 1971) and until several hundred years ago the shearwaters were probably in equilibrium with their environment. Their breeding limit in terms of distribution and numbers was probably reached. In the last 2 to 300 years there has been an unprecedented slaughter in both the Southern and Northern Hemisphere of seals, whales and fish stocks, disrupting the food chain. This may have made more food available for Short-tailed Shearwaters which feed predominantly on krill, squid and fish (Ogi *et al.* 1980, Skira 1986). The population therefore increased.

Colonization of King I. by Short-tailed Shearwaters coincided with human settlement possibly providing areas suitable for burrowing. We may still be seeing increases due to suitable habitat being available in spite of harvesting.

Acknowledgements

We would like to thank Jim and Mae Patterson for the extensive hospitality provided to us on King I.

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Book Review
SOUTHERN AUSTRALIAN LIVERWORTS

by George A.M. Scott (with drawings by Rod Seppelt and photographs by Bruce Fuhrer).
Australian Flora and Fauna Series Number 2
Canberra: Australian Government Publishing Service, 1985, 216pp.
Retail price approx. $20.00
Reviewed by David Ratkowsky

The bryophytes (mosses and liverworts) tend to be much more poorly known than the flowering plants. Although the Tasmanian species were monographed by Leonard Rodway in the early part of this century, making the bryophytes of Tasmania better known than those of virtually any other Australian state, Rodway's treatment was badly out of date half a century later with many genuinely new species being discovered and with increasing recognition by most botanists that many taxa described as species in Rodway's treatise were not deserving of specific rank. Also, Rodway's monograph contained no illustrations and therefore was not likely to be of use to anyone other than the most dedicated botanist.

When George Scott moved from the University of Otago to Monash University in Melbourne, he perceived that modern works on the bryophytes of the southeastern Australian states was the most pressing botanical need in this region. His collaboration with Ilma Stone resulted in the publication of *Mosses of Southern Australia* in 1976, a work which, with its excellent keys and fine illustrations by Celia Rosser, make it possible for the talented amateur to identify most of the mosses which occur in Tasmania.

After publication of the book on mosses, Scott set to work on a similar treatment of the liverworts. His decision to limit himself to the liverworts of Victoria led to difficulties in finding a publisher who was prepared to take the risk of limited sales in a potentially restricted market. Happily, the Australian

Bureau of Flora and Fauna agreed eventually to publish the book provided that he expand it to include the liverworts of other Australian states. This was done, although parts of the book still betray a bias towards the liverworts of Victoria. I will return to this theme again later.

Southern Australian Liverworts is a beautifully illustrated book, in which Australia's leading academic botanical photographer, Bruce Fuhrer, has excelled despite being confined, no doubt by cost, to black-and-white photography. Only the cover, with its reproduction of a painting by Celia Rosser, is in colour. Fuhrer's extraordinarily detailed photographs, including some of nature's smallest liverworts, the Lejeunaceae, provide a good basis for the amateur to identify and appreciate this relatively little studied group of non-flowering plants. The fine drawings of Tasmanian resident Rod Seppelt adequately supplement and complement the photography. The easy writing style of George Scott and his detailed, easy-to-use keys to the genera and species will lead the user to the right genus, even if they don't always give one the exact species.

One reason why one will not find all the Tasmanian (and for some genera, Victorian) species in this book is due to the fact that some genera are badly in need of revision by competent bryologists specializing in those genera. For example, the genera *Lepidozia, Kurzia* and *Telaranea* in the Lepidoziaceae are likely to have more species, when a scholarly study is finally undertaken, than are described in this book. Similarly, in the Geocalycaceae, *"Lophocolea"* and *"Chiloscyphus"* will have to await the publication of Engel and Schuster's monograph, before the exact number and status of each species becomes known. I use inverted commas on those genera, because a recent paper by Engel and Schuster [Nova Hedwigia 39: 385-463 (1984)] considers that the species previously known under *Lophocolea* should really be called *Chiloscyphus* species, whereas most species hitherto recognised under *Chiloscyphus* should be called *Heteroscyphus* species (confusing, isn't it?).

Another reason why all the Tasmanian species are not listed is due to the book's origin as an exclusively Victorian work. Thus, of the Tasmanian species of *Acromastigum*, only *A. colensoanum* gets an appropriate treatment. Because *A. anisostomum* and *A. mooreanum* are not known from Victoria (although both occur in Tasmania), they receive a lesser description, appearing in a smaller boldface type than the Victorian species of that genus. *A. cavifolium*, also found in Tasmania, gets no mention at all. A further example of inadequate treatment is that of the Schistochilaceae. Only three species of this family are given in this book, although nine species are known from Tasmania, as described in the detailed treatment of Schuster and Engel [J. Hattori Bot. Lab. 58: 255-539 (1985)]. I make these points not to indicate an omission or inadequacy on the part of the author, but to emphasize the book's Victorian bias. Many Tasmanian species also occur in New Zealand but not in mainland Australia. Thus, an adequate treatment of the Tasmanian species must take account of the trans-Tasman affinities of

the Tasmanian bryophyte flora. Nevertheless, some of the Tasmanian/New Zealand species can turn up in N.S.W. and Victoria, so it was pleasing for me to read (p. 88) that *Trichocolea rigida*, formerly known only from New Zealand and Tasmania, has recently been found in the Blackwood Ranges of Victoria.

Among the Tasmanian species that are not mentioned are *Acroscyphella phoenicorhiza, Haplomitrium gibbsiae, Herbertus oldfieldianus, Hygrolembidium australe, Isophyllaria attenuata, Treubia lacunosa* and *Triandrophyllum subtrifidum*. And dare I also mention three other species new to Tasmania, *Plagiochila ratkowskiana* H. Inoue, *Radula ratkowskiana* Yamada, and *Vandiemenia ratkowskiana* Hewson, species all collected by my wife, Ann Ratkowsky?

Lest the reader think my criticisms reflect a feeling on my part that this is not a good book, let me hasten to correct that impression. The publication of this book makes it possible for an interested amateur (and some professionals!) to develop an interest in the liverwort flora of southern Australa, including Tasmania, and to have an excellent chance of identifying the species to generic level, if not to species level. That the book is seen to be a preliminary, rather than a definitive work, is made clear in the foreword provided by the Bureau of Flora and Fauna: "This number is a precursor to the Liverwort volume of the *Flora of Australia* .....It is hoped that this precursor will stimulate further field work, observation and research with the liverwort flora in Australia."

AN ORANGE-CROWNED NEW HOLLAND HONEYEATER

A.M. McGarvie
22 Huxley Street, Currie, King Island 7256

The New Holland Honeyeater is plentiful throughout King Island and is a regular visitor to gardens in Currie. Some three years ago I was told of one bird which had a bright orange patch on the top of the head. I assumed that the unusual coloration would be due to pollen collecting on the feathers of the crown while the bird was feeding, but shortly after I saw the bird myself and realized that the coloration was certainly not due to pollen.

Like most of its kind, while busy feeding, this bird is quite approachable, and at various times I have had perfect views from as close as two metres and there is no doubt whatever that the coloration is natural and permanent. The organge patch is not merely a small spot, but completely covers the crown back to the level of the eyes.

During late spring of last year, my neighbour suspected that the bird was nesting nearby, but could not locate the nest. However, a few weeks later the bird brought two recently fledged birds to her garden and both young had similar but slightly less extensive areas of orange on the crown.