

ORNITHOLOGICAL OBSERVATIONS AT EDWARD VII PENINSULA, ANTARCTICA, IN 1987-88

By P. A. BROADY, C. J. ADAMS,
P. J. CLEARY and S. D. WEAVER

INTRODUCTION

During a geological expedition to Edward VII Peninsula ($78^{\circ}45'S$, $154^{\circ}W$), Marie Byrd Land (Fig. 1), between 28 November 1987 and 12 January 1988, we took the opportunity to make wide-ranging biological observations and collections. Reported here are the ornithological observations. Our expedition travelled over 500 km by sledge and motor toboggan, visiting all the nunataks in the Alexandra and Rockefeller Mountains. Our travel route between nunataks is shown in Fig 2. During a reconnaissance overflight on 25 November, the coastline was surveyed from a height of about 700 m.

There have been few expeditions to Edward VII Peninsula. The region was discovered by the British National Antarctic Expedition 1901-1904, which made the first bird observations offshore (Scott 1905, Wilson 1905). A party from Amundsen's expedition 1910-1912 was the first to reach ice-free land in the Alexandra Mountains (Amundsen 1912), but the Rockefeller Mountains were not visited until 18 years later by a party from the 1st Byrd

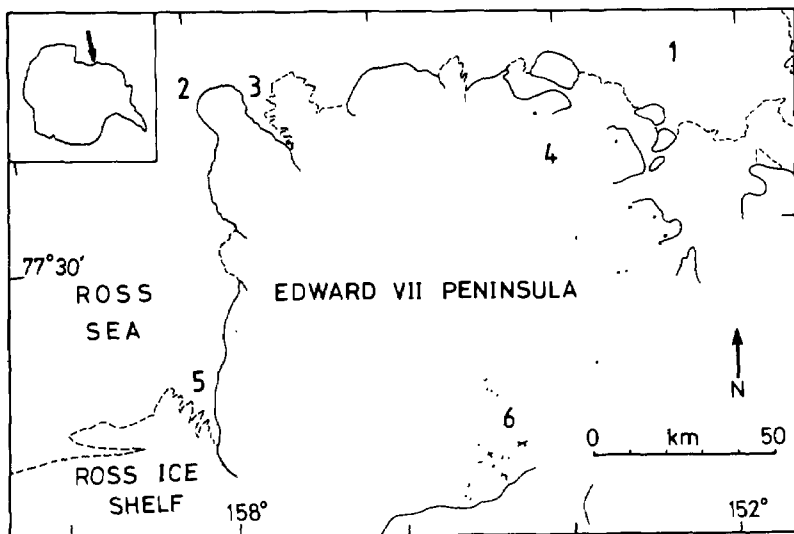


FIGURE 1 — Edward VII Peninsula. 1. Sulzberger Bay. 2. Cape Colbeck. 3. Bartlett Inlet. 4. Alexandra Mountains. 5. Okuma Bay. 6. Rockefeller Mountains. Dashed line = coastline of ice-shelves and glaciers. Nunataks are marked in the Alexandra and Rockefeller Mountains. Inset locates Edward VII Peninsula on the Antarctic Continent

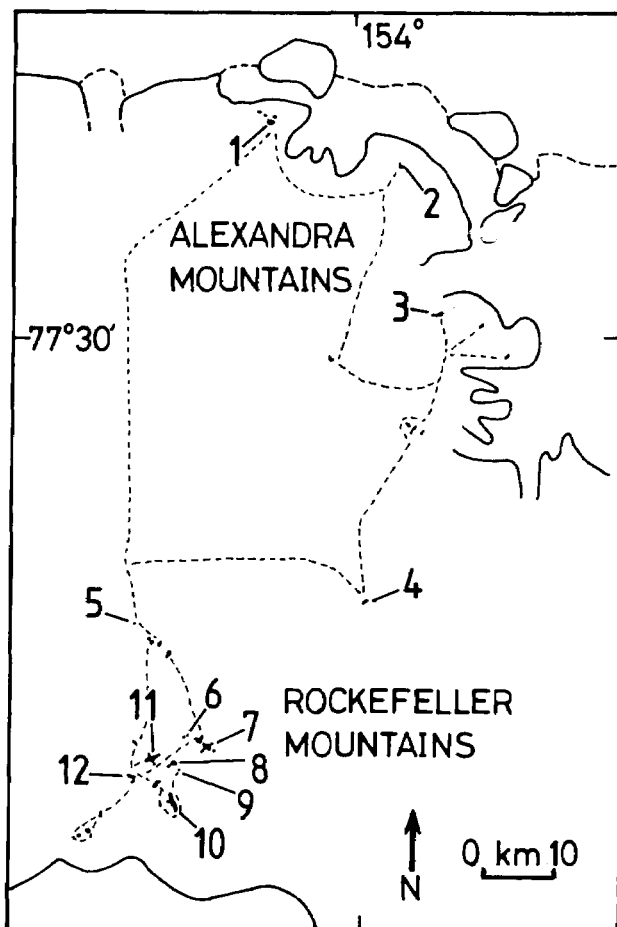


FIGURE 2 — Nunataks of the Alexandra and Rockefeller Mountains. 1. Scott Nunataks. 2. Mt Swadener. 3. Bowman Peak. 4. Drummond Peak. 5. Mt Frazier. 6. Melbert Rocks. 7. Mt Paterson. 8. Mt Schlossbach. 9. Fokker Rocks. 10. Washington Ridge. 11. Mt Nilsen. 12. Breckinridge Peak. Dashed line = sledging route of the expedition

Antarctic Expedition 1929-1930. However, the first attempts at detailed observations on birds in the region were made by the 2nd Byrd Antarctic Expedition 1933-1935 (Siple & Lindsey 1937) and the United States Antarctic Service Expedition 1939-1941 (Friedmann 1945, Perkins 1945). No further observations on birds have been made.

DESCRIPTION OF THE REGION

Edward VII Peninsula is almost covered by ice-fields and glaciers (Fig. 1). The seven nunataks of the Alexandra Mountains and the 16 nunataks of

the Rockefeller Mountains are the only ice-free land, comprising a small fraction of 1% of the total area (Fig. 2). There are no coastal rock outcrops. The coastline is entirely ice-cliffs of ice-shelves, glacier tongues and ice-covered land. Summits of nunataks range from about 419 m to 1174 m altitude and, except close to the coast, the surrounding ice-surfaces have an elevation of 400 m to over 1000 m. The most extensive nunataks are in the Rockefeller Mountains, where they are mostly low ridges up to about 3 km long. Ice-free rock in the Alexandra Mountains is much less extensive and is mostly steep slopes and cliffs of two north to north-east facing escarpments. A general description of the region was provided by Wade (1945) and a 1:250 000 map is available (USGS 1972).

During our period in the field, which covered early to mid-summer, the air temperature ranged from -17 to -2 °C and was usually from -10 to -3 °C. There was a high proportion of overcast and windy days but wind speeds did not exceed 20 knots.

OBSERVATIONS AND DISCUSSION

ANTARCTIC PETREL (*Thalassoica antarctica*)

The major ornithological find of the expedition was the location and size of the nesting colony of Antarctic Petrels on Mt Paterson (Fig. 2 - 5). The US Antarctic Service Expedition discovered a colony there and collected eggs (Perkins 1945, Friedmann 1945), but they did not give its size. We had previously observed numerous birds flying around the southernmost peak (Fig. 4) through binoculars from Mt Schlossbach, 7 km distant. However, we were unprepared for the spectacular sight of close-packed nest sites, 1-2 m apart (Fig. 5), covering most of the eastern, southern and western lower slopes of this peak. As the colony stretched about 50 m upslope from the ice edge and 400 m around the peak at ice level, we estimated it to occupy

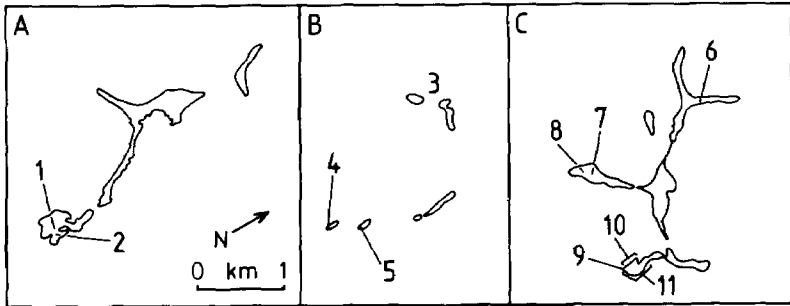


FIGURE 3 — Locations of breeding birds and other observations at the Rockefeller Mountains (see text for details). A, Washington Ridge; 1, three to four empty skua nest bowls at summit of southernmost peak; 2, small colony of Snow Petrels on east-facing slope. B, Fokker Rocks; 3, Mt Schlossbach; 4, skua perch on boulder at southern end of Fokker Rocks; 5, pair of nesting skuas. C, Mt Paterson; 6, three to four empty skua nest bowls; 7, small colony of nesting Snow Petrels; 8, Pair of skuas with two chicks; 9, pair of skuas with one chick; 10 and 11, slopes occupied by the large colony of Antarctic Petrels on the southernmost peak

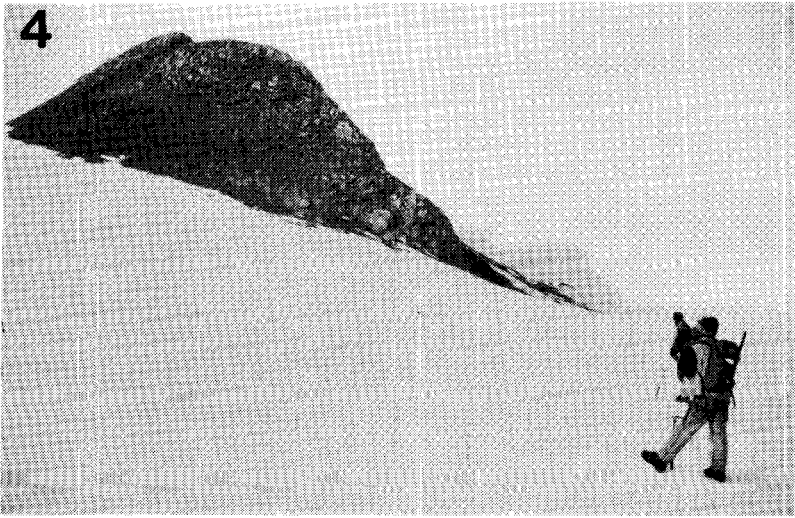


FIGURE 4 — The southernmost peak of Mt Paterson (see Fig. 3C for location) viewed from the north-west from about 0.5 km. The lower slopes shown and those on the other side of the peak supported the large colony of Antarctic Petrels. Snow Petrels nested on the steeper bluffs towards the summit of the peak, and a pair of breeding skuas occupied a site close to the right-hand extremity of the slopes in this view



FIGURE 5 — A general view of the Antarctic Petrel colony on the south-facing slope of the southernmost peak of Mt Paterson (see Fig. 4). Most nests are attended by single birds and the nests are all in exposed positions on the guano-covered slopes

1-2 ha. The birds occupied exposed positions on the stable scree-slopes. The ground between the nests was covered by guano, feathers and broken eggshells. Towards the bottom of the slopes and close to melting snowdrifts were large growths of the nitrophilous green alga *Prasiola crispa*, which thrived on the guano. Many of the birds were sitting on eggs (29 December) but we saw no chicks. We could not make detailed counts, having only about two hours at the colony. However, by counting birds in a small area and extrapolating to the entire nesting area, we estimated that about 10 000 birds were on the southern to eastern slopes and 5000 on the western. As a large proportion of nests had only a single bird attending, we estimate a total of roughly 10 000 nest sites. This is relatively few compared with colonies elsewhere, for example, the 207 000 nesting pairs reported from Dronning Maud Land by Mehlum *et al.* (1987).

We found no evidence for other breeding sites. We saw surprisingly few birds during our travels, and only on 8 days of the 46 days in the field, of which only two were in the Alexandra Mountains. The largest flock seen away from the colony was one of 15 birds over Mt Nilsen. We may only rarely have crossed their main route to open-water feeding grounds, the closest of which were 85 km west to north-west of the colony near Okuma Bay (Fig. 1). Birds at colonies elsewhere in Antarctica are known to fly even further to their feeding grounds, for example, at least 200 km by birds from the Dronning Maud Land colony (Mehlum *et al.* 1987).

Members of the British National Antarctic Expedition observed "very large numbers ... in a very local area about King Edward's Land" (Wilson 1905) when they were sailing in that region. Wilson made the perceptive comment that "a search for the nesting grounds might quite possibly be well repaid". It was not until the 2nd Byrd Antarctic Expedition that Antarctic Petrels were seen in the Rockefeller Mountains. Siple & Lindsey (1937) estimated about 500 in a mixed flock of Antarctic and Snow Petrels flying around Washington Ridge and thought nesting likely there. However, we found only a few Snow Petrel nests. The only other definite breeding site in the Ross Sea region is in the far north at the Balleny Islands, although Scott Island and Robertson Bay are possible sites (Harper *et al.* 1984).

SNOW PETREL (*Pagodroma nivea*)

In the Rockefeller Mountains we found nesting Snow Petrels on two nunataks, Washington Ridge and Mt Paterson (Fig. 2 and 3). The colony on the upper, east-facing slopes of the southernmost peak on Washington Ridge was small with only 12 occupied nests, and 4 unoccupied, one with an apparently abandoned egg. We saw only a small group of 5 birds flying above the peak.

We found the major Snow Petrel nesting area to be at Mt Paterson. On 29 December, we found a small group of 11 nests with birds on eggs close to the ridge crest in the middle of the more northerly of the two south-west projecting ridges. However, on the steep upper crags of the southernmost peak, above the extensive Antarctic Petrel colony, several hundred birds were nesting. The crags were inaccessible, but birds were flying on and off ledges and white streaks of guano were visible on the rocks.

Snow Petrels were seen on 23 of the 46 days in the field, varying from single birds passing over campsites to hundreds around the nesting colony on the southernmost peak of Mt Paterson (Fig. 3 and 4). Elsewhere in the Rockefeller Mountains, the largest flock seen was 100 birds over Melbert Rocks (Fig. 2). In the Alexandra Mountains, the most seen together were about 15 birds overflying Bowman Peak (Fig. 2). Birds were also seen in the air during periods of white-out when we were confined to our campsites.

In the Alexandra Mountains, we did not find nesting birds, although we saw small groups of petrels, up to 15, flying around each of the seven nunataks. We could, however, have missed small numbers of nest sites on inaccessible areas of rock. Birds were also seen around nunataks in the Rockefeller Mountains where we were certain there were no nests, e.g. a flock of up to 15 birds around Drummond Peak (Fig. 2). At Scott Nunataks (Fig. 2) we found fragments of white eggshells below stones close to the summit of the small knoll at the base of the main rock exposure, and immediately north of it. Measurements on these indicate that they are probably fragments of Snow Petrel eggs (G. Tunncliffe, pers. comm.).

It seems likely that the shell fragments found at Scott Nunataks were exactly the same "remains of birds' nests" as found by the Eastern Party of Amundsen's Expedition led by Prestrud (Amundsen 1912), when they were first to reach ice-free land on Edward VII Peninsula.

A previous record of "about 100 nests" on Breckinridge Peak in the Rockefeller Mountains (Tanner 1941 cited by Friedmann 1945) was not confirmed. We found no evidence of a nesting colony on the "north exposed side of the mountain", an observation ascribed by Tanner to Frazier, of the US Antarctic Service Expedition 1939-41.

Siple & Lindsey (1937) suggested that the southernmost peak on Washington Ridge was the location of a large colony. They described a flock of about 1000 birds enveloping the summit, comprising approximately equal numbers of Snow and Antarctic Petrels. Although they found birds on eggs they did not estimate nest numbers. However, Byrd (1936), in his general narrative of that expedition, mentioned that only "...one hen nesting" was encountered. The US Antarctic Service Expedition collected Snow Petrel specimens at both Washington Ridge and Mt Paterson (Perkins 1945, Friedmann 1945). Neither author gave colony sizes, although Friedmann noted that eight eggs were collected at Washington Ridge.

The Rockefeller Mountain breeding areas were not included by Harper *et al.* (1984) but they noted three sites in the eastern ranges of Marie Byrd Land to the east of Edward VII Peninsula.

WILSON'S STORM PETREL (*Oceanites oceanicus*)

Three solitary birds were seen flying over snowfields close to Mt Swadener and Scott Nunataks in the Alexandra Mountains and near our final campsite, 10 km north-east of Mt Frazier in the Rockefeller Mountains (Fig. 2). The three locations were respectively 11, 11 and 75 km from the closest open water.

Previous expeditions had seen Wilson's Storm Petrels over the Ross Ice Shelf, west of Edward VII Peninsula (Siple & Lindsey 1937, Perkins 1945). It is not unusual to find birds a long way from the closest open water.

Wilson (1907) reported birds flying over the Ross Ice Shelf some 96 km from open water.

This region of Marie Byrd Land has no known breeding sites (Harper *et al.* 1984). The closest known site is on Franklin Island ($76^{\circ}10'S$, $168^{\circ}20'E$) about 900 km to the west-north-west.

SOUTH POLAR SKUA (*Stercorarius skua*)

Nesting skuas were found at three locations (Fig. 2 and 3). On the middle group of Fokker Rocks, a pair was incubating eggs at the southern end of the rock exposure on 24 December. On Mt Paterson we found two pairs with chicks on 29 December. One pair with two young chicks in down occupied a ridge crest site close to a small group of Snow Petrel nests. The second pair had a single, larger, more mobile, unfledged chick. Their site was at the southernmost extremity of Paterson Ridge at the base of the peak which supported the large Antarctic Petrel colony on its lower slopes (Fig. 4). On the ice slopes beside the nest site were the remains of over 20 recently killed Antarctic Petrels. The summit ridge of this peak may have had another skua nest as two more birds were seen flying above the peak, but we did not traverse the ridge. In Dronning Maud Land, Mehlum *et al.* (1987) observed 50 pairs of breeding skuas around a large Antarctic Petrel colony, with a ratio of about one pair to 4000 pairs of petrels. This is perhaps a smaller ratio than that of about one to 7000 - 15 000 pairs at the Rockefeller Mountains rookery.

Evidence of skua feeding and breeding activities was seen on nine rock outcrops in the Rockefeller Mountains in addition to those noted above, but only at Scott Nunataks (Fig. 2) in the Alexandra Mountains. This comprised the rare find of dried and bleached bones of Snow Petrels and Antarctic Petrels or equally rare dried feeding pellets containing feathers and bones. Unoccupied nest sites, consisting of shallow scraped bowls in gravel and surrounded by sparse scatterings of bones and feeding pellets, were found on the summit of the southernmost peak of Washington Ridge and on Mt Paterson, about 2 km north-west of the petrel colonies (Fig. 3). Each location had 3-4 nest bowls, probably constructed by the same pair of skuas. On Washington Ridge one nest contained the desiccated carcass of a young chick in down.

Skuas were observed on 13 of the 46 days spent in the field, five in the Alexandra Mountains and eight in the Rockefeller Mountains. These birds were flying over while we were travelling or were seen at our campsites. Nine times they were single birds, four times pairs, and three times trios. Several sightings may have been of the same birds.

From these observations we believe that no more than 30 adult skuas were in the whole region visited, including in 1987-88 no more than four breeding pairs. This total is probably an overestimate as undoubtedly the same birds were seen on two or more occasions.

A party from the 1st Byrd Antarctic Expedition was the first to record skuas in the region when three visited their camp below Washington Ridge (Gould 1930). Siple & Lindsey (1937) saw perhaps the same birds five years later flying around the Snow Petrel rookery at Washington Ridge. As the nests

there have been abandoned skua numbers could be fewer than 50 years ago. Two eggs were collected at Mt Paterson by the US Antarctic Service Expedition (Friedmann 1945, Perkins 1945). In their review Harper *et al.* (1984) omitted Edward VII Peninsula as a breeding area.

EMPEROR PENGUIN (*Aptenodytes forsteri*)

During the reconnaissance flight on 25 November, we checked the fast ice along the coastline for Emperor Penguins. Fast ice and heavy pack-ice stretched northwards to the horizon. By this date, any colony should not have dispersed. In particular, we wanted to check Bartlett Inlet (Fig. 1; 77°15'S, 157° 20'E), where a colony is marked on the 1:500 000 USGS sketch map of the Saunders Coast (1968). The plane stayed at about 700 m from Howard Heights (77°15'S, 151° 40'W) to the tip of Cape Colbeck (77°10'S, 158°W), following the northern edge of the ice-shelf and ice-covered land (Fig. 1). Only west of Cape Colbeck did low cloud prevent us from looking for penguins. We saw no penguins even though visibility was good along the coastline examined and we could clearly see seals with pups.

Despite the lack of sightings from the air, an intriguing observation was made at Scott Nunataks (Fig. 2). On the low rocky knoll immediately north of the main outcrop we found a scattering of some hundreds of penguin feathers caught up among a square metre of abundant growths of the "bushy" lichen *Usnea antarctica*. When G. Tunnicliffe matched these feathers against study skins of antarctic penguins, he found the closest similarity with the Emperor Penguin. The feathers cannot be dated but look in good condition. The most likely explanation is that a bird wandered inland to moult at this location, 11 km from the coast. These birds have been seen inland before. For example, Siple & Lindsey reported tracks 24 km from the coast of the Ross Ice Shelf.

Emperor Penguins in Sulzberger Bay have often been seen from ships (Scott 1905, Wilson 1905, Perkins 1945), but a colony has not been confirmed (Harper *et al.* 1984). Wilson (1905) at first considered the "groups of hundreds of the birds all huddled together in enormous colonies" to be breeding but on later consideration concluded that they were "simply moulting". We are confident that there was no colony at Bartlett Inlet or elsewhere along the route of our reconnaissance. However, a colony could exist south of Cape Colbeck in the vicinity of Okuma Bay or further east from Howard Heights, outside the area examined during the flight.

ADÉLIE PENGUIN (*Pygoscelis adeliae*)

We did not see Adélie Penguins during the reconnaissance flight or during the sledging journey. The Peninsula coastline is all ice and has no coastal rock outcrops for nesting colonies.

Three Adélie rookeries are known further east in Marie Byrd Land (Strandtmann 1978), the closest being at Cruzen Island (74°45'S, 140°40'W) about 550 km to the north-east. Scott (1905) reported large numbers of birds offshore from the Alexandra Mountains in Sulzberger Bay, and Perkins (1945) reported one captured on the Ross Ice Shelf "near the Rockefeller Mountains and at least 45 miles from the nearest open water".

ACKNOWLEDGEMENTS

We gratefully acknowledge the logistic support of Antarctic Division, DSIR, and the US Navy VXE6 Squadron. G. Tunnicliffe, Canterbury Museum, identified ornithological materials. E. Young, University of Auckland, and P. C. Harper, University of Canterbury, gave constructive criticism of the manuscript.

LITERATURE CITED

- AMUNDSEN, R. 1912. The South Pole. London: John Murray.
- BYRD, R. E. 1936. Antarctic Discovery. London: Putman
- FRIEDMANN, H. 1945. Birds of the United States Antarctic Service Expedition 1939-41. Proc. Am. Phil. Soc. 89: 305-313.
- GOULD, L. M. 1930. Cold, the record of an Antarctic sledge journey. N. Y.: Brewer, Warren and Putman.
- HARPER, P. C.; KNOX, G. A.; SPURR, E. B.; TAYLOR, R. H.; WILSON, G. J.; YOUNG, E. C. 1984. The status and conservation of birds in the Ross Sea sector of Antarctica. ICBP Tech. Publ. No. 2: 593-608.
- MEHLUM, F.; BECH, C.; HAFTORN, S. 1987. Breeding ecology of the Antarctic Petrel *Thalassoica antarctica* in Muhlig-Hofmannfjella, Dronning Maud Land. Proc. Nat. Inst. Polar Res. Symp. on Polar Biology. No. 1: 161-165.
- PERKINS, J. E. 1945. Biology at Little America III, the West Base of the United States Antarctic Service Expedition 1939-41. Proc. Am. Phil. Soc. 89: 270-284.
- SCOTT, R. F. 1905. The Voyage of the Discovery. Vol. 1. London: Smith, Elder and Co.
- SIPLE, P. A.; LINDSEY, A. 1937. Ornithology of the Second Byrd Antarctic Expedition. Auk 54: 147-159.
- STRANDTMANN, R. W. 1978. Three Adelie Penguin colonies on the Hobbs Coast, and a nesting site of the Snow Petrel, Marie Byrd Land, Antarctica. Antarct. J. U.S. 13: 151-153.
- TANNER, V. M. 1941. Antarctic birds contributed by Dr. Russell G. Frazier. Great Basin Naturalist 2: 122-124.
- U.S.G.S. 1968. Antarctic sketch map. Saunders Coast - Marie Byrd Land. Scale 1:500 000. Washington D. C.: U.S. Dept. Int., Geological Survey.
- U.S.G.S. 1972. Alexandra Mountains, Antarctica. 1:250 000. Washington D.C.: U.S. Dept. Int., Geological Survey.
- WADE, F. A. 1945. The geology of the Rockefeller Mountains, King Edward VII Land, Antarctica. Proc. Am. Phil. Soc. 89: 67-77.
- WILSON, E. A. 1905. On the whales, seals and birds of Ross Sea and South Victoria Land. Pages 469-494 in (Scott, R. F.) The Voyage of the Discovery. Vol. 2. London: Smith, Elder and Co.
- WILSON, E. A. 1907. Aves. National Antarctic Exped., Nat. Hist. Vol. 2, Vertebrata Pt. 2: 1-21, pls. 1-13. London: Br. Mus. Nat. Hist.
- P. A. BROADY, *Department of Plant and Microbial Sciences, University of Canterbury, Christchurch*; C. J. ADAMS, *Institute of Nuclear Sciences, DSIR, Lower Hutt*; P. J. CLEARY, *9 Craven Street, Christchurch*; S. D. WEAVER, *Department of Geology, University of Canterbury, Christchurch*