SHORT NOTES

EARTH TEMPERATURES AT BIRD ISLAND, SOUTH GEORGIA

By W. L. N. TICKELL* *and* P. A. RICHARDS

DURING the biological expedition to Bird Island sponsored by the United States Antarctic Research Program in 1962–64 (Tickell, Pinder and Clagg, 1965; Richards and Tickell, 1967), earth temperatures were recorded daily at depths of 4 in., 1 ft., 2 ft. and 4 ft. (0·10, 0·30, 0·61 and 1·22 m.) below the surface using standard Meteorological Office bent stem and Symons-pattern thermometers (Table I). The site was several feet above mean sea-level; the bulbs of the thermometers at depths of 4 in. and 1 ft. (0·10 and 0·30 m.) were in peaty turf and those of the deeper ones in gravel.

Bird Island (lat. 54°00′S., long. 38°05′W.) is a small island 3 miles (4·8 km.) long situated 400 yd. (366 m.) from the north-west tip of South Georgia. There is complete snow cover in the winter but, although some snow banks high on Roché Peak (1,199 ft.; 365 m.) may occasionally lie throughout the summer, there is none of the permanent ice characteristic of the rest of South Georgia. A large proportion of the land below 500 ft. (152 m.) is covered by tussock grass, *Poa flabellata*, amongst which are numerous flat meadows of the Antarctic grass, *Deschampsia antarctica*, and mosses. This vegetation is peat-forming and it holds a great deal of surface water which runs off in streams, often cutting deep gorges through the peat.

There is no permafrost; it was found that the monthly mean air temperature measured in a Stevenson screen was lower in winter and summer than the monthly mean earth temperatures recorded at all levels. In the autumn, the earth and air temperatures approach each other but in the spring rising earth temperatures lag behind the air temperatures.

With the fall of air temperatures in the autumn (March–May) the ground begins to freeze but water continues to flow in the streams below the surface ice for most of June and July. On the meadows adjoining streams, the frozen turf and peat is no longer absorbent; running water flows out over the surface and freezes in layers, forming large areas of ice like miniature glaciers that remain throughout the rest of the winter. Although the mean air temperature begins to rise after the winter minimum in August, surface (grass minimum) temperatures remain low, with the result that the ice cover persists and it may increase with September and October snows. This accounts for the low mean earth temperatures throughout these months. A further rise in air temperature eventually causes a massive thaw which quickly removes the surface ice. Although the ground thaws and a rise in temperature is apparent at a depth of 4 in. (0·10 m.), it remains for a time waterlogged and cold with occasional re-freezing. At a depth of 1 ft. (0·30 m.) a rise in temperature is barely noticeable during November and the deeper thermometers do not begin to indicate a rise in temperature until December (Fig. 1). Only when the excess melt water has run off is the ground able to warm up to a temperature exceeding that of the air (in December).

At 4 in. (0·10 m.) depth, temperatures below freezing were recorded during 6 months of the year (July–December), although the average mean temperature at this level fell below freezing for only 4 months (July–October). The highest temperature recorded at a depth of 4 in. (0·10 m.) was 9·1° C in January 1963 and the lowest was −0·8° C in August 1963. The temperature at 4 in. (0·10 m.) depth varied least when iced-in during the winter and most during the warmest summer months. With increasing depth the range of temperatures decreases; at 4 in. (0·10 m.) there is a range of 9·9° C between the highest summer maximum and the lowest winter minimum. Much less of the radiation absorbed at the surface reaches a depth of 1 ft. (0·30 m.), where the temperature range is 5·3° C. At depths of 2 and 4 ft. (0·61 and 1·22 m.) the ranges (4·9° and 4·3° C, respectively) are even less affected by fluctuations in the temperature at the surface.

MS. received 8 May 1967

* The Nature Conservancy, 12 Hope Terrace, Edinburgh.

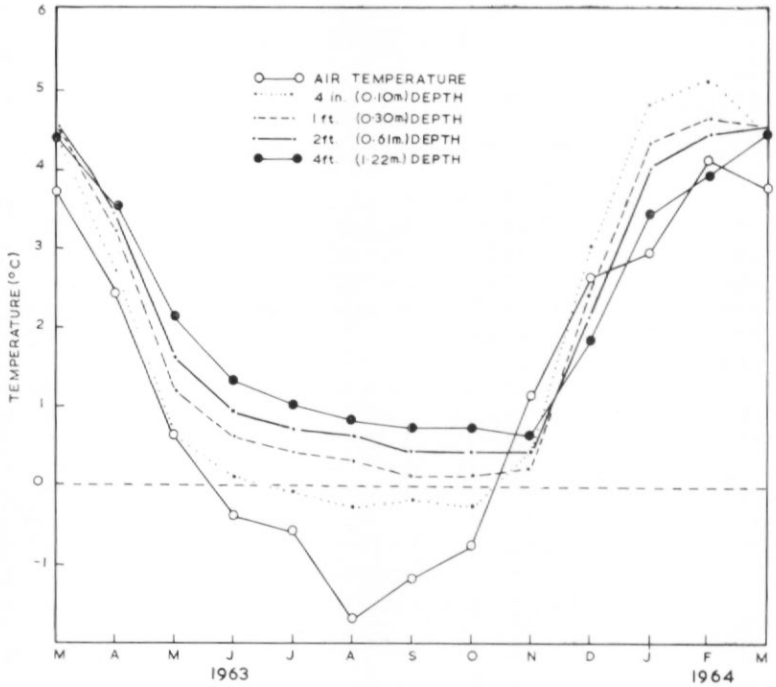

Fig. 1. Temperatures of the air (screen) and earth at depths of 4 in., 1 ft., 2 ft. and 4 ft. (0·10, 0·30, 0·61 and 1·22 m.) for Bird Island, South Georgia.

REFERENCES

RICHARDS, P. A. *and* W. L. N. TICKELL. 1967. Comparison between the weather at Bird Island and King Edward Point, South Georgia. *British Antarctic Survey Bulletin*, No. 15.

TICKELL, W. L. N., PINDER, R. *and* H. B. CLAGG. 1965. Biological studies on Bird Island, South Georgia, 1962–64. *Polar Rec.*, **12**, No. 80, 601–02.

SOUTH GEORGIA ELEPHANT SEAL FOUND IN SOUTH AFRICA

By R. W. VAUGHAN*

ON 25 December 1966 an elephant seal (*Mirounga leonina*) was found on the South African coast at Quoin Point, near Bredasdorp, Cape Province. It had a tag on the fore flipper which had been applied on 6 November 1965 at Hestesletten, Cumberland Bay, South Georgia. The animal had been tagged as a pup about 3 weeks old, and therefore when found it would have been about 14 months old.

Elephant seals have been seen before on the South African coast on several occasions, and in October 1953 a female pupped at Cape Agulhas on the Bredasdorp coast (Kettlewell and Rand, 1955). All of these animals were thought to have come from either the Prince Edward Islands, 900 miles (1,450 km.) to the south-south-east or from the Tristan da Cunha group, 1,500 miles (2,425 km.) to the west, which are the nearest breeding places for the elephant seal.

* Natural Environment Research Council, Seals Research Unit, Fisheries Laboratory, Lowestoft, Suffolk.

The finding of a South Georgia animal which had travelled more than 3,000 miles (4,825 km.) in its first year is of great interest. Other tagged South Georgia animals have been found in South America and at Signy Island, South Orkney Islands, as reported by Dickinson (1967), but this is the first tag recovery indicating migration in an easterly direction.

Carrick and Ingham (1960, 1962) have reported migrations of branded elephant seals from Australian sub-Antarctic islands, involving journeys of up to 1,600 miles (2,575 km.), and Willett (1943) has quoted an animal travelling 1,900 miles (3,050 km.) to Alaska. The animal found at Quoin Point had travelled more than 3,000 miles (4,825 km.), and this is thought to be the longest recorded migration for a southern elephant seal.

MS. received 16 June 1967

REFERENCES

CARRICK, R. *and* S. E. INGHAM. 1960. Ecological studies of the southern elephant seal, *Mirounga leonina* (L.), at Macquarie Island and Heard Island. *Mammalia*, **24**, No. 3, 325–42.

————. *and* ————. 1962. Studies on the southern elephant seal, *Mirounga leonina* (L.). III. The annual cycle in relation to age and sex. *C.S.I.R.O. Wildl. Res.*, **7**, No. 2, 119–60.

DICKINSON, A. B. 1967. Tagging elephant seals for life-history studies. *Polar Rec.*, **13**, No. 85, 443–46.

KETTLEWELL, H. B. D. *and* R. RAND. 1955. Elephant seal cow and pup on South African coast. *Nature, Lond.*, **175**, No. 4466, 1000–01.

WILLETT, G. 1943. Elephant seal in south-eastern Alaska. *J. Mammal.*, **24**, Pt. 4, 500.