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AN INFRARED DEVICE FOR FINDING WILSON'S STORM PETREL *OCEANITES OCEANICUS* NESTS

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Wilson's Storm Petrels *Oceanites oceanicus* usually breed in cavities beneath rocks, moss mats and soil (Warham 1990). Their nests, mostly out of sight, consist of a complex entrance and a chamber generally situated at about 30 cm beneath the surface (Beck & Brown 1972). However, at Cierva Point, Danco Coast, Antarctica Peninsula some breeding chambers were found to be at one metre deep (pers. obs.). Novatti (1978) reported nests with more than one entrance or exit. The complexity in the nest structure together with the species' nocturnal activity contribute to making a study of Wilson's Storm Petrel populations logistically difficult. Wasilewski (1986) concluded that the problem of estimating absolute numbers of petrel remains open, and to date population density data have been obtained through indirect estimations due to the difficulty of detecting the exact number of nests beneath the surface. In fact, several methods for nest localization have been suggested. Beck & Brown (1972) used mist nets at Signy Island, South Orkney Islands. Novatti (1978) reported that the calls of breeding birds made in response to human presence were useful for nest finding. Wasilewski (1986) used mist netting as well as counts along transects during courtship flights.

I have developed a new method, previously published in Spanish (Orgeira 1997) and here made available to a wider audience in English, for finding Wilson's Storm Petrel nests. The method was first tested at Primavera Station, Cierva Point (64º09'S, 60º57'W), during the 1995/96 breeding season, utilizing an infrared sensor which detects body heat emitted by birds inside their cavities. The device consists of a length-adjustable cane with an infrared sensor at one end and a red testing light activated when detecting heat, at the other end (Fig. 1). A portable battery is adjusted to work at temperatures from -5º to 5°C over 24 h, water-tight to snow and water. The device can detect heat sources of temperatures in excess of 6°C from a range of 10 m. Thus, the localization of Wilson's Storm Petrels is possible since their body temperatures range from 38.7 to 38.8°C (Roberts 1940, Mougin 1968, Novatti 1978). To check the efficiency of the device, a coastal area of 12×12 m in which the exact number (n = 16) of nests was already known was surveyed. All 16 nests were detected. Seven other coastal areas of about 548 m^2 were then searched. Each area was surveyed twice, first by using torches and playing a tape of Wilson's Storm Petrel calls. The number of responses was taken to equal the number of occupied nests present. The infrared device was then used by inserting the cane into cavities to detect an increase in temperature due to the presence of breeders. Field work was conducted from 27 December 1995 until 15 February 1996, starting after 01h00 by which time birds had returned to their nests. To determine peak activity, surveys every hour from 18h00 to 06h00 were undertaken on 15, 18 and 23 December. All Wilson's Storm Petrels observed flying over the colony were recorded. Activity peaked between 22h00 and 01h00 (Fig. 2). Nest searching was carried out after this period of time when most birds were assumed to be back at their breeding sites. The results showed

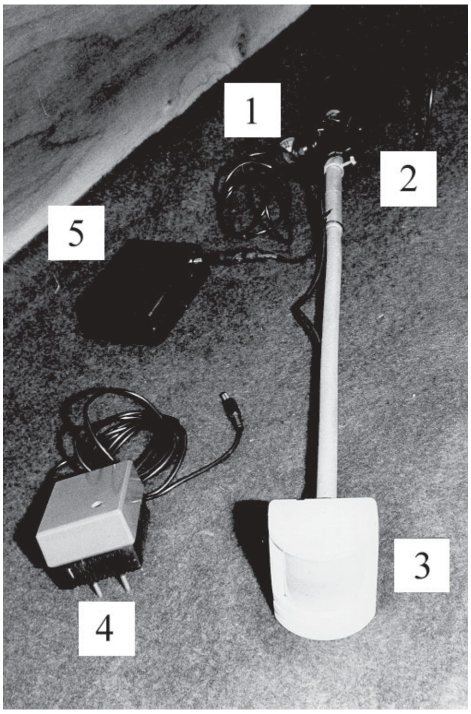

Fig. 1. *Infrared device used for finding Wilson's Storm Petrel nests. 1: red testing light; 2: length-adjustable cane; 3: infrared sensor; 4: battery adaptor; 5: portable battery.*

that a higher density was obtained when using the infrared sensor (Table 1) which turned out to be extremely sensitive to the presence of birds beneath the rocks. The surveys were easy to perform and proved to be error-free mainly because the device could not be activated if there was no heat source. Also, when the red light was on I checked the presence of birds by using a torch or playback. We can thus infer that the density data obtained are reliable. The use of infrared sensors provides several advantages. First of all, such sensors are harmless devices since they emit no radiation and the impact of human presence on birds (stress, obstruction at nest entrance, mortality) is minimized since observations are quick and easy and it is not necessary to remove rocks to localize nests. In addition birds, are no longer directly handled as in mist-netting. Wilson's Storm Petrels are particularly sensitive to handling

TABLE 1

Comparison between abundances (number of individuals) of Wilson's Storm Petrels obtained with torches and taped calls (T&T) and infrared sensors (IRS). A1 to A7: sampled areas

	A1	A2	A3	A4	A5	A6	A7
T&T	4	9	40	5	10	23	12
IRS	38	27	108	24	29	35	16
Area (m2)	900	900	360	119	600	510	450

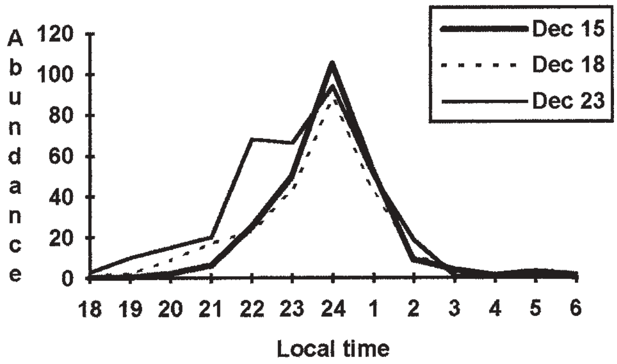

Fig. 2*. Activity of Wilson's Storm Petrels at Cierva Point, Danco Coast, Antarctic Peninsula based on counts of flying birds over the breeding colony.*

or interference, especially during incubation (Warham 1990); with breeding failure (Davis 1957) and nest desertion (R. Quintana pers. comm.) having been reported as a consequence of such handling. Lastly, this new method has also allowed me to measure internest distances, colony size and the relationship between the number of nests and features of the breeding area. It is considered the infrared device will have applicability to others species of cavity-nesting and burrowing birds.

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