FRESHWATER BIOLOGY AT ROTHERA POINT, ADELAIDE ISLAND: I. GENERAL DESCRIPTION OF THE POOLS AND THE FAUNA

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ABSTRACT. Biological collections have been made at Rothera Point, Adelaide Island. Descriptions of the freshwater pools and chemical analyses of the waters are presented and a list of the freshwater fauna, which includes four species of rotifer, one species of nematode, two species of tardigrade and four species of arthropod, is given.

THE decision of the British Antarctic Survey to establish a new station at Rothera Point (lat. 67°34′S, long. 68°07′W), Adelaide Island, has provided an opportunity to measure Man's impact on near-pristine territory. Collections of biological material, to provide a base line for future comparison, were made in this area in January 1976 and the results of the freshwater faunal collections are presented here.

The area around the station has been mapped and the locations of the various bodies of water are given in Fig. 1. There are ten pools which may be subdivided into two distinct groups: intermittent pools and seasonal pools. They are all small and range in size from less than 1 m² to more than 800 m² in area. Intermittent pools (Nos. 9 and 10) are present only for parts of the summer when the air temperature is high enough for melt water to fill the basin. They are shallow with a muddy bottom, no recognizable benthic vegetation and have a considerable through flow of water. Seasonal pools are present throughout the summer and at Rothera Point they are ice-dammed, or in the case of Pool 7 dammed by a beach. The seasonal pools have a discontinuous algal felt of *Phormidium* spp. and other blue-green algae covering the bottom (Priddle and Belcher, in press). None of the pools is very deep (maximum recorded depth 220 cm; Pool 4), so all must freeze solid in the winter.

Three separate water samples were taken from Pool 4 for chemical analysis. Each of the 2 l samples was frozen immediately after it was collected and was examined 4–5 months later (details of the methods used are given in Heywood and others (1980)). The results (Table I) are very variable. They may be explained, however, as exhibiting local variation in this large (70 m by 12 m) pool, since the water samples were taken from (1) the shallows; (2) close to the bottom in moderately deep water (about 1 m), and (3) just below the surface over the deep spot, close to the ice dam.

TABLE I. CHEMICAL ANALYSES ON WATER FROM LARGEST POOL (POOL 4) AT ROTHERA POINT. ION AND CHLOROPHYLL *a* (chl *a*) CONCENTRATIONS IN mg l^{-1}, ALKALINITY (Alk) IN m-equiv. l^{-1}; PO_4, SiO_3, NO_3 AND NO_2 EXPRESSED AS mg l^{-1} OF P, Si AND N, RESPECTIVELY

Sample	pH	Alk	Cl	K	Na	Ca
1	6.25	0.05	9.75	0.3	14.5	1.0
2	5.75	0.05	19.50	0.4	17.5	1.0
3	6.60	0.06	17.40	0.4	9.5	1.6
Mean	6.20	0.05	15.55	0.4	13.8	1.2

Sample	NO_3-N	NO_2-N	PO_4-P	SiO_3-Si	chl *a*
1	3.08	n.d.	0.0540	0.0528	0.00022
2	4.76	n.d.	0.0590	0.0479	0.00022
3	5.18	n.d.	0.0683	0.0484	0.00032
Mean	4.34	n.d.	0.0604	0.0497	0.00025

n.d. Concentrations below detectable level.

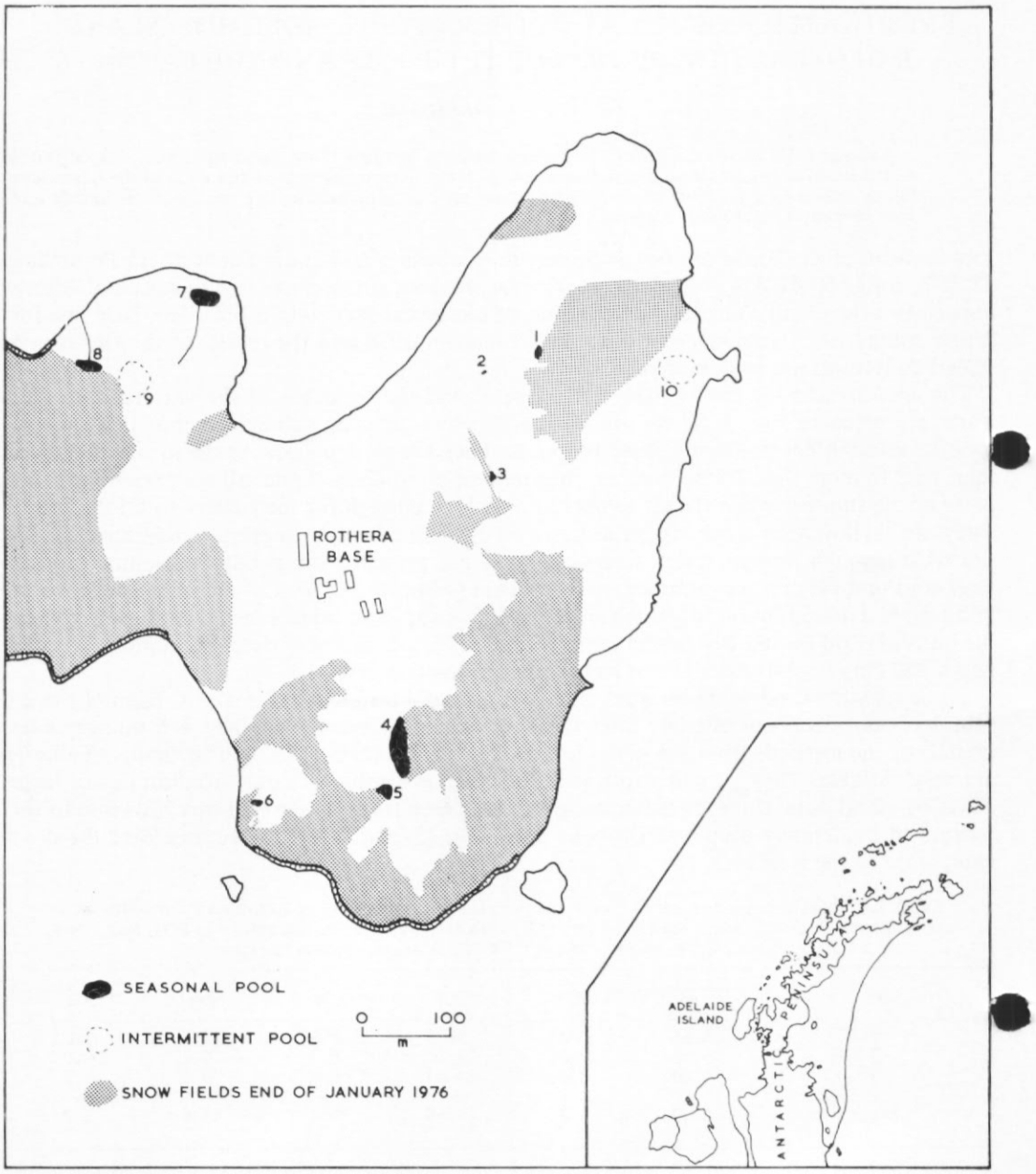

Fig. 1. Location of the seasonal and intermittent pools at Rothera Point, Adelaide Island. The inset shows the position of Adelaide Island in relation to the Antarctic Peninsula.

Scoops of bottom vegetation were taken for the faunal analysis, since most Antarctic freshwater invertebrates are benthic (Dartnall, 1977). The samples were examined as soon as possible (within a month). A list of the species found is given in Table II and the four species of rotifer are illustrated in Fig. 2. All of these species have been recorded from Signy Island (lat. 60°43′S, long. 45°38′W), South Orkney Islands (Dartnall, 1977; Heywood and others,

TABLE II. THE FRESHWATER FAUNA OF ROTHERA POINT

Rotifera	*Colurella colurus* (Ehrb.) *Encentrum* sp. *Resticula gelida* Harring and Myers *Philodina* sp.
Nematoda	*Monhystera* sp.
Tardigrada	Two species
Arthropoda	*Branchinecta gaini**† *Pseudoboeckella poppei*† *Parabroteas sarsi*† *Cryptopygus antarcticus* Willem‡

* Personal communication from J. H. C. Fenton
† Personal communication from D. D. W. Fletcher } probable identification.
‡ The collembolan which normally lives terrestrially was frequently found on the surface film of water.

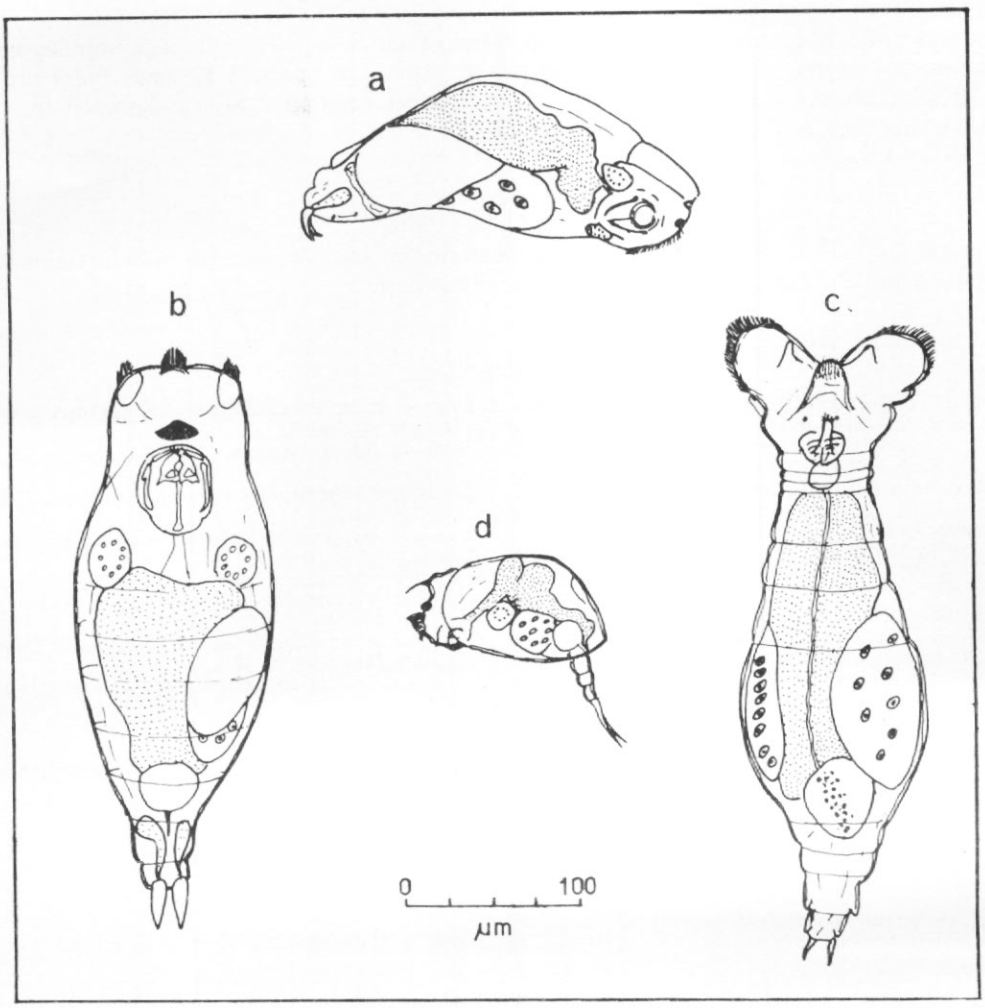

Fig. 2. The Rothera Point rotifers. a. *Encentrum* sp.; b. *Resticula gelida*; c. *Philodina* sp.; d. *Colurella colurus*.

1979), and all of the Arthropoda from South Georgia (lat. 54–55°S, long. 36–38°W) (Dartnall and Heywood, 1980).

Records for the Antarctic Peninsula are very sparse and most of the sites investigated have only a few species. de Beauchamp (1913) found the rotifers *Lindia torulosa* and *Colurella colurus* as well as numerous unidentified bdelloids at Jenny Island (lat. 67°43′S, long. 68°24′W). Schmitt (1945) found *Branchinecta gaini*, cited as *B. granulosa*, at Lagotellerie Island (lat. 67°56′S, long. 67°24′W) and the rotifer *Philodina gregaria* in a shallow pool at Red Rock Ridge (lat. 68°17′S, long. 67°13′W). *Philodina gregaria* has also been found at Ablation Point (lat. 70°49′S, long. 68°25′W) together with *P. antarctica*, *Colurella* sp. and new varieties of the rotifers *Lindia torulosa* and *Notholca verae*, and the copepod *Pseudoboeckella poppei* (Heywood, 1977*b*). *P. poppei* has also been recorded from King George Island (lat. 62°00′S, long. 58°15′W), South Shetland Islands; at Hope Bay (lat. 63°24′S, long. 56°59′W); at Horseshoe Island (lat. 67°51′S, long. 67°12′W), and at Fossil Bluff (lat. 71°20′S, long. 68°17′W), Alexander Island (Heywood, 1977*a*).

Bodies of freshwater are infrequent on the Antarctic Peninsula and the fauna is sparse when compared with Signy Island (Heywood and others, 1979). The faunal composition of these lakes and pools is apparently dependent on several factors, especially the age, the degree of isolation and degree of enrichment by birds and seals. The pools at Rothera Point are all oligotrophic and may be transient. Seven of the eight seasonal pools are ice-dammed and it is possible that they will disappear in the near future.

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