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A MASS STRANDING OF SQUID *MARTIALIA HYADESI* ROCHEBRUNNE & MABILLE
(TEUTHOIDEA: OMMASTREPHIDAE) AT MACQUARIE ISLAND.

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(with one text-figure)

ABSTRACT

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A large number of squid, subsequently identified as *Martialia hyadesi* (Ommastrephidae) was stranded on beaches at the northern end of Macquarie Island, 54°30'S, 158°57'E, on 5 March 1971. The squid were immature, or at least pre-breeding, and had been feeding recently. It is suggested that a sudden change in wind direction, coupled with a rising tide, caused the stranding. This is the first reported stranding of this species, which has not previously been recorded in the Pacific region.

THE STRANDING

On the afternoon of 5 March 1971 a large number of squid came ashore on a rising tide on the shingle beach at Hasselborough Bay (fig. 1) which forms the western shore of a narrow isthmus near the northern end of Macquarie Island (54°30'S, 158°57'E). A few were also found on the eastern shore. The squid were alive but seemed unable to swim out again, though they had not lost the ability to swim. Some were thrown into the light surf but were washed ashore again. Others swam strongly when placed in a container of seawater.

Squid were stranded along at least 400 m of the shore of Hasselborough Bay, where the density was roughly 5 per metre initially. Possibly several thousands of individuals were stranded, but the extent of the strandings and the number of squid involved is unknown.

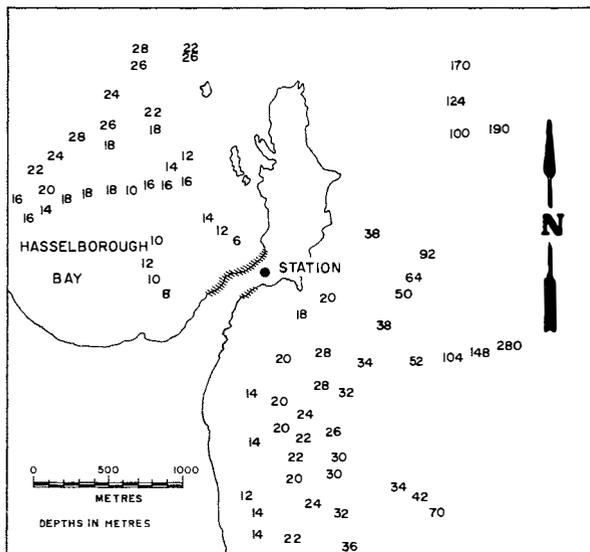


FIG. 1 - Map of the north end of Macquarie Island showing stranding areas (hatched). Depths in metres.

A Mass Stranding of Squid *Martialia hyadesi*.

EXAMINATION OF THE STRANDED SQUID

Thirty squid were collected, frozen and returned to Australia. In 1974, six were deposited at the National Museum of Victoria, and have since been identified as *Martialia hyadesi* Rochebrunne & Mabile by Dr C.C. Lu. In 1976, five others were placed in the National Museum of New Zealand; one of these was independently identified by Dr M.A. Roeleveld, who is revising the family Ommastrephidae, as *M. hyadesi* (pers. comm.).

The rest of the squid remained in the Australian Antarctic Division collection. In 1981 those in the Division collections and those at the National Museum of Victoria were examined for sex, maturity, mantle length and stomach contents. The squid were all immature; only one of the twelve males exhibited hectocotylation but it had no spermatophores in its Needham's sac. The nidamental glands and ovaries of the thirteen females were not developed. The mantle length ranged from 232 to 292 mm. Each specimen was found to have a full stomach, the contents consisting mainly of macerated crustaceans.

PREVIOUS STRANDINGS

Many species of squid have been stranded (Clarke 1966, p.101,117,127,129,132, Anon. 1976, Prescott 1977, Lux *et al.* 1978), but many incidents involved only one individual (Clarke 1966, p.147,148,161 etc.). Mass strandings are apparently unique to the Ommastrephidae and all species that have stranded inhabit the continental shelf and near shore waters.

Various causes of mass strandings have been suggested but all remain speculative for lack of evidence. They include squid being driven ashore by predators, or strong winds, squid becoming disorientated and losing their way, becoming affected by toxicity in the water or a rapid change in water temperature, pursuing food close to shore, or becoming excited immediately prior to copulation, leading to disorientation (Gillespie 1953, Hamabe & Shimizu 1959, Lux *et al.* 1978).

DISCUSSION

This is the first reported stranding of *Martialia hyadesi* and is among the few records of this squid. The species is a predominantly subantarctic form, being found on and off the continental shelf (between 100 and 300 m) along the Atlantic coast of South America from 39°S down to the Falkland Islands (52°S; Castellanos & Menni 1968). It has not been recorded from the Pacific although Castellanos & Menni (1969) thought it possible that the species originated in the Pacific and moved around Cape Horn to establish the existing population off southern Patagonia and the Falkland Islands.

During current studies at Macquarie Island beaks of *Martialia hyadesi* are being found in the stomach contents of the seabirds *Macronectes giganteus*, *M. halli*, *Phoebetria palpebrata* and *Diomedea exulans*, indicating that *M. hyadesi* is common in the oceans of the region.

The period prior to the stranding (2-4 March 1971) was characterised by persistent strong to gale force onshore winds (NW-WNW) with steady temperatures and low rainfall. On the morning of March 5, the prevailing wind was still a strong WNW but at about 1500 hours the wind direction changed to ESE, an offshore wind of 20-30 kph. It was at about this time that the squid were seen to be coming ashore.

Hasselborough Bay rises from about 28 m to a gently sloping beach. The prevailing current, driven by the West Wind Drift, is easterly and hence onshore in Hasselborough Bay. It is possible that the squid were feeding close inshore and the sudden change in wind direction may have caused changes in the hydrology of the Bay so that the squid were brought into the beach by upwelling currents close to shore. This could have occurred only on the western shore of the isthmus, and the proposed mechanism does not explain the smaller stranding on the eastern shore.

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Alternatively, the squid may have become disorientated by a sudden change in wind direction of the surface water, brought about by the change in wind direction. In either case, the rising tide and moderate wave action would have helped to carry the squid onto the beaches and would have hindered any attempt to swim free again.

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