



**Fig. 1**  
A selection of the animals from the Southern Ocean zooplankton. a, comb jelly; b, salp; c, pteropod (swimming snail); d, arrow worm; e, larva of the Antarctic 'cod', *Notothenia rossii*; f, the amphipod *Themisto*; g, copepod; h, Antarctic krill. A jellyfish, very much larger than the other animals, is shown in the background. Animals are not shown to the same scale.

## Introduction

The British Antarctic Survey has been involved in marine biological research for over two decades. This was concerned almost exclusively with the nearshore environment until 1977, when the Offshore Biological Programme (OBP) was initiated in response to growing concern over the fisheries in the Southern Ocean. There remains a need for basic research into many aspects of the ocean ecosystem. Studies cover a variety of scientific disciplines, from the physics and chemistry of the ocean to animal behaviour and population dynamics. They interact with other aspects of BAS work, especially on marine birds and mammals, and the inshore marine environment. Fieldwork is centred on the seas around the sub-Antarctic island of South Georgia and near to the Antarctic Peninsula (Figure 2). Some of this research forms the British contribution to the international BIOMASS programme (Biological Investigation of Marine Antarctic Systems and Stocks).

## Historical background

Much of the incentive for the exploration of Antarctica in the eighteenth and nineteenth centuries came from the search for profitable sealing and whaling grounds. The introduction of modern techniques of whale-catching such as the harpoon gun and factory ship led to a great reduction of most species of baleen (filter-feeding) whales in the Southern Ocean during the first half of this century. In 1924, the British Government set up a research programme to investigate the biology of whales and the ecology of the Southern Ocean, with particular reference to the crustacean known as 'krill' upon which most whales feed. These studies became known as the 'Discovery Investigations' after their research ship, which had first travelled to the Antarctic as the support vessel for Captain Scott's British Antarctic Expedition, 1901-04. They were funded by the duties charged on whale products.

Discovery Investigations set up a shore laboratory at King Edward Point on South Georgia, near to the Grytviken whaling station. Later this became the site of a BAS research station. From this laboratory, scientists sailed far and wide across the Southern Ocean, gathering data which have formed the foundation for present-day work in the area. The major current systems within the Southern Ocean were described. High concentrations of chemical nutrients such as nitrogen and phosphorus were found to support large populations of microscopic algae in the southern summer, but winter growth was shown to be negligible. The biology of krill was investigated and its basic life-cycle described. Krill was shown to be unevenly distributed around the Antarctic landmass, with notable concentrations in the vicinity of the Antarctic Peninsula and around South Georgia. The distribution and biology of whales, hitherto largely unknown apart from whalers' observations and anatomical investigations, were also studied, and work was also carried out on birds and seals. All of this information, together with descriptions of the equipment used, places visited and animals and plants studied, are contained in the 37 volumes of the Discovery Reports, as well as papers in scientific journals.

Just as the Discovery Investigations advanced scientific knowledge by employing new techniques in a large-scale multidisciplinary study, so present international work, including the Offshore Biological Programme, is using modern methods to reveal the dynamics of the interactions between organisms and with the Southern Ocean environment. Such information is essential to the controlled exploitation of any ocean ecosystem and especially so in the Southern Ocean where a few species, notably krill, dominate the biological interactions.