

observed in several other species which, together with *R. gigas*, make up the bulk of the Antarctic macroplankton, but these do not appear to include the Crustacean, *Euphausia superba*, which constitutes the food of the Blue and Fin whales. To those who have studied the plankton of the Southern Ocean, it has for long been a problem to understand how organisms drifting in the surface water are not all carried northward into warmer latitudes where they could not be expected to survive. The stations worked by the *Discovery II* in 80° W. have provided material

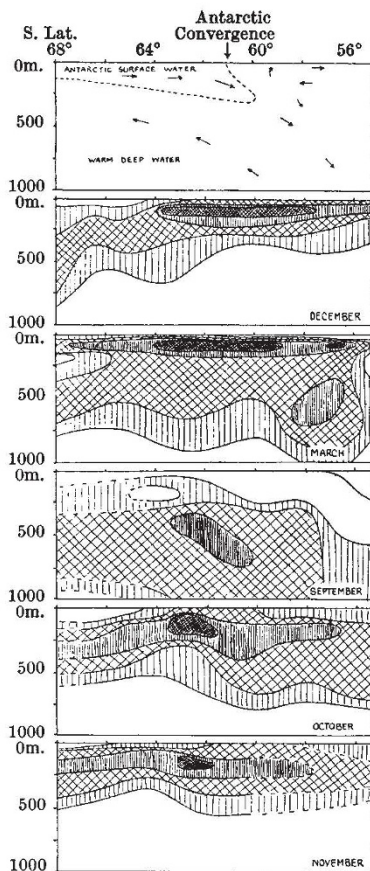


FIG. 2. Seasonal changes in the vertical distribution of the Copepod *Rhinocalanus gigas* on the meridian of 80° W.

from the consideration of which a very substantial contribution can be made towards the solution of this problem. It appears certain that at least a considerable number of the species are carried northwards in summer in the north-flowing surface water, and return south again in winter in the southgoing stream at depths of at least 400 m. It is believed that such a large-scale circulation of the plankton, extending over some hundreds of miles of latitude, has not hitherto been demonstrated in any part of the world.

Among the new devices which were successfully used during this commission mention may be made of the Harvey phytoplankton net and the

echo-sounding recorder. The former is an apparatus designed by Mr. F. W. Harvey of Plymouth<sup>1</sup>. Samples of phytoplankton are treated with acetone, and the amount of chlorophyll extracted is measured by comparison with a series of colour standards. This method is a great improvement on any hitherto used for estimating the relative abundance of phytoplankton in different localities. The apparatus was used at almost every station throughout the commission. With the echo-sounding recorder, the echo from the sea floor, produced by the ordinary deep-sea hammer, is picked up by a microphone and automatically marked on a moving scroll of paper. On this the contour of the bottom is traced out as a continuous line. It is most effective in shallow water and in places where rapid changes in depth occur, and it was in continual use during the surveying of the South Shetland Islands.

Among oceanic soundings, perhaps the most interesting observations were those made in the South Sandwich Deep. Soundings of 7,000–8,000 metres had previously been obtained to the east and north-east of the South Sandwich Islands. It has now been shown that the deep extends considerably farther south in the form of a curious narrow cleft in the sea floor exceeding 7,000 metres in depth, and running parallel with the chain of islands and the bend of the Scotia arc.

On the long line of stations taken up the East African coast, the fullest hydrological observations were made. The vertical section of this line is most instructive, and throws much light on the major current systems of the Indian Ocean. Large closing nets fished in deep water on the same line produced abundant material of biological interest.

During this commission the ship was under the executive command of Lieut. A. L. Nelson, R.N.R.

<sup>1</sup> *J. Mar. Biol. Assoc.*, 9, 2, 761; 1934.

### THE R.R.S. *William Scoresby*, 1934-35

By G. W. Rayner

The Discovery Committee's vessel, the R.R.S. *William Scoresby*, completed in May this year her fourth commission—a short one of seven months devoted entirely to the marking of whales on the whaling grounds in the Antarctic seas off Queen Mary Land, off Enderby Land and to the south of Bouvet Island. The ship sailed from London on October 16, 1934, and made a direct passage to Simonstown, where final preparations for the work in hand were completed. The ship's personnel, under the executive command of Lieut.-Comdr. C. R. U. Boothby, R.N.R., included an experienced Norwegian whale gunner, Capt. J. Endresen, who had charge of the manœuvring of the vessel whilst

hunting and marking whales. The pack ice was encountered on December 3 when seven days out from Cape Town. Whales had been found on December 1 and marking began on that date.

The R.R.S. *William Scoresby* is an oil-burning steam vessel, and arrangements had been made for supplies of fuel oil from the whaling factory ships operating in the neighbourhood. On reaching the pack ice the vessel turned eastwards along its edge, and a few days later ships of the whaling fleet were heard in wireless communication with each other. When fuel oil was required, the vessel was enabled to find the desired factory ship by wireless bearings. She went alongside the factory ships in the same manner as the catchers go alongside for fuel—that is, with a floating whale carcass between the two ships to act as a fender. This manoeuvre was carried out, in the open ocean, on eight occasions.

At the beginning of the season, the majority of the whaling fleet was found to be operating in the neighbourhood of Queen Mary Land, and marking was carried out in this area until the middle of January. During this period, which was largely spent near the edge of the pack ice or inside it, the work was hampered by poor visibility, much snow and fog, but on several occasions when the weather was good, numbers of Humpback and Fin whales were met and marked. Half way through January, a return westwards to the whaling grounds of Enderby Land was made, again skirting the pack ice which was now lying considerably farther south. Off Enderby Land, work was carried on in the open ocean and the pack ice was not again encountered during the remainder of the season. From this time until almost the end of the season, the weather was good and both Blue and Fin whales were usually to be found, sometimes in large numbers. Fin whales are to be met with at

this time of the year in bodies numbering as many as fifty to a hundred and, on occasions, two such bodies were found in the course of a single day. When this occurred it was possible to mark between forty and fifty in the long daylight hours.

One month was spent in the waters off Enderby Land, and in March the ship moved westwards to the south of Bouvet Island. In the middle of March course was laid for the Cape, which was reached on March 29 after 122 days at sea without sighting land of any kind. During this time between seven and eight hundred whales—Blue, Fin, Humpback and Sperm—had been marked.

When opportunity offered, during bad weather or dark hours, water and plankton samples were taken and, for a few days in February, when in wireless communication with the R.R.S. *Discovery II*, the *William Scoresby* was able to co-operate to a small extent in her programme of hydrographic and plankton research.

In the months of December and January of this season, whale-marking was also carried out in the waters around South Georgia by Mr. A. H. Laurie, and several hundred Fin and Blue whales were marked in this area.

A number of whales marked during this commission have already been captured by the whalers, and the marks, together with the required data, returned to the Discovery Committee. Marks from Blue, Fin and Humpback whales have thus been recovered after periods varying from a few hours to three and a half months; and the distances traversed range from a few miles to a thousand miles. The data thus obtained are extremely instructive in showing the trend of movement of the whale stock on these grounds during the course of the season, but more valuable results are to be expected from marks returned during next whaling season.

## National Food Policy

### BRITISH ASSOCIATION DISCUSSION ON ECONOMICS OF DIET

THE discussion on the economics of diet before Sections F and I (Economics and Physiology) at the recent Norwich meeting of the British Association, and the resolution on nutrition at the present assembly of the League of Nations has emphasised the interdependence of problems of public health, agriculture and economics. This interdependence has become evident in the last few years of trade depression when attempts, which are not very successful, are being made to deal with the problems of these subjects separately.

It is now being realised that they must be considered together in the light of the international position.

The world economic crisis paralysed international trade in foodstuffs as well as in other commodities. But agricultural production cannot be cut down so quickly as industrial factory production. Consequently stores of foodstuffs accumulated and prices fell.

The first reaction was an attempt to control production, limit imports and regulate marketing