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THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME METEOROLOGY PREPARED BY THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE

VOL. XLIII No. 240 APRIL 1973

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Report of Work for 1972

(MARINE DIVISION OF THE METEOROLOGICAL OFFICE: VOLUNTARY OBSERVING FLEET AND OCEAN WEATHER SHIPS)

1. Voluntary Observing Ships

At the end of the year the British Voluntary Observing Fleet was comprised as follows:

(*a*) 504 Selected Ships, including 4 trawlers, which are supplied with a full set of meteorological instruments on loan and which make observations in code every six hours and transmit them to the appropriate coastal radio station wherever their voyages take them.

(*b*) 48 Supplementary Ships, including 16 trawlers, which make less detailed observations than Selected Ships and are supplied on loan with only a barometer, air thermometer and screen. They use an abbreviated code for their messages.

(*c*) 59 coasting ('Marid') vessels, and 1 light-vessel, which make sea-surface temperature observations in U.K. coastal waters and transmit them in a special code by W/T or R/T. When in the North Sea, the coasting ships include in their messages wind, weather and visibility observations.

(*d*) 13 light-vessels and 1 light-tower which make observations of wind, waves, visibility, air and sea temperatures; 13 of these send coded reports by R/T, the other one records its observations for climatological purposes only. Reports from the Royal Sovereign light-tower and the *Galloper*, *Dowsing* and *Varne* light-vessels are included in the BBC weather bulletins for shipping and all four report barometric pressure, using the precision aneroid. The first two also report barometric tendency.

(*e*) 29 trawlers which make non-instrumental observations only and transmit them by W/T or R/T, using an abbreviated code, to radio stations in the U.K., Canada, Iceland, Norway or U.S.S.R. depending on the area in which they are fishing. In addition to these, 4 trawlers now figure in the Selected Ships' List and 16 in the Supplementary Ships' List.

(*f*) 23 Auxiliary Ships which make and transmit visual observations similar to those made by trawlers, with the addition of pressure and air temperature readings from the ships' own instruments (using the 'Shred' code). These ships do this work only when in areas where shipping is known to be sparse.

The numerical strength of the Voluntary Observing Fleet has remained almost static throughout the year. The six Port Meteorological Officers at the main ports, on whom most of the effort of building up the strength of the Voluntary Observing Fleet rests, have found that frequently the number of new recruitments is equalled, and sometimes exceeded, by the number of withdrawals as a consequence of ships being sold, broken up or laid up for long periods. This pattern will probably continue for many years and it appears likely that eventually all but a few ships of the British Merchant Navy will be oil tankers, bulk carriers or container ships. To complete the change will take many years; in the meantime it is unlikely that a really significant increase in the strength of the Voluntary Observing Fleet will be possible. At present we are barely able to maintain it at its present level. The part-time Agent on the Tyne bears his share of the burden, but, as a part-time officer, the contribution he is able to make is naturally very limited.

Some light in this somewhat gloomy picture is afforded by the fact that new ships, in the fitting-out stage, can be wired to carry distant-reading meteorological instruments. So far, every shipping company approached has readily agreed to this being done and seven ships have been fitted with distant-reading instruments. It is

perhaps worth mentioning that the Sugar Line was the first in the field just as they were the first British company to carry a meteorologist aboard two of their ships for the purpose of making radiosonde observations as part of the World Weather Watch plan. The fitting of distant-reading instruments must be a continuing process, for naturally any ship's officer who has got used to recording weather observations from distant-reading instruments does not take kindly to a return to reading air temperatures from thermometers in a Stevenson Screen hung on the weather side of a windswept bridge or taking temperatures from a rubber bucket lowered over the side in severe weather conditions. There is the same feeling about taking pressure readings from a mercury barometer after serving in a ship equipped with a precision aneroid.

The standard of observing on Voluntary Observing Ships has been, in general, well maintained throughout the year; where a deterioration has been noticed, and there have been very few cases, it has almost invariably been found in ships which are either now sailing with one deck officer fewer than previously, or in ships which are equipped with new electronic devices or new cargo loading and discharging apparatus. This is a psychological, rather than a meteorological problem but it does show the necessity of continuing our practice of appointing Port Meteorological Officers who are themselves experienced mariners with considerable experience as voluntary weather observers, as well as being keen on the work and possessing the essential qualities of tact and patience.

The British Voluntary Observing Fleet includes ships of many shipping companies and Table 1 shows the variety of trade routes on which they are engaged.

Table 1. Average numbers of British Selected and Supplementary Ships on main trade routes to and from the U.K.

Europe	39	West Indies	32
Australasia	73	South America	19
Far East	76	Pacific Coast of North America	8
Persian Gulf	36	Falkland Islands and Antarctic	2
South Africa	33	World-wide 'tramping'	107
West Africa	22	Near and distant-water fishing grounds	21
North Atlantic	84		

Once again the Marine Division acknowledges its debt to many Port Meteorological Officers in the Commonwealth and other countries for holding small stocks of instruments for the replacement of defective instruments on British voluntary observing ships calling at their ports during protracted voyages away from the U.K. and for withdrawing instruments from such ships as may have been sold during their voyage. Such sales are not uncommon; sometimes they are not even notified in the shipping press until the sale has been completed and if it were not for the timely intervention of Port Meteorological Officers overseas our instruments might have been lost.

During two typical days, one in June and one in December, the total number of reports from ships received in the Central Forecasting Office at Bracknell from various sources is shown in Table 2.

2. Ocean Weather Ships

British weather ships completed quarter of a century of continuous service in the North Atlantic during the year. The present four ships, ex 'Castle' class corvettes built for the Royal Navy in 1944, have been in service as weather ships for about 13 years and, though long past their prime and becoming increasingly expensive to operate, continue to perform their arduous duty satisfactorily.

From the middle of June to the middle of July, for the benefit of competitors in

Table 2. Total number of reports received at Bracknell by various sources from ships during two typical days in 1972

	JUNE	*DECEMBER*
Direct reception from		
British ships in eastern North Atlantic	92	107
Foreign ships in eastern North Atlantic	38	17
British trawlers in North Sea	16	12
British merchant ships in North Sea	45	54
	191	190
Via other European countries		
Ships in eastern North Atlantic	367	277
Ships in Mediterranean	54	69
Ships in North Sea	116	137
Ships off North Russia	19	29
Ships in other European waters	12	22
Ships in Pacific	41	3
	609	537
Via North America		
Ships in North Atlantic	432	428
Ships in North Pacific	647	867
Ships in other waters	36	30
	1115	1325

the *Observer* Single-handed Transatlantic Yacht Race unable to pick up the special forecast from Bracknell, broadcast daily from Portishead, our Weather Ships on stations 'India' and 'Juliett' relayed the forecast when conditions were hazardous.

In July we were pleased to welcome the French weather ship *France I* to Greenock on a two-day official visit. Although mainly a social occasion, the opportunity was taken to exchange ideas on matters of common interest. *France I*, a purpose-designed vessel, is much more spacious than our converted ships but carries the same complement of 52.

In September the *Weather Adviser*, with the research vessels *Discovery* and *Researcher*, took part in a joint air-sea interaction experiment in the area of Ocean Weather Station 'Juliett'. The purposes of the experiment were:

(*a*) to examine the structure of the atmospheric boundary layer by making repeated vertical soundings simultaneously from three ships.
(*b*) to make spatial and temporal measurements of temperature and currents in the oceanic mixed layer with a view to including advective terms in heat budget calculations for the mixed layer.
(*c*) to make surface measurements from three buoys to allow estimation of fluxes across the air-sea interface and of their horizontal variability. In particular, to measure horizontal pressure gradients to allow calculation of the geostrophic wind.
(*d*) to test our ability to measure currents in the top 10 to 20 metres of the ocean in the presence of surface waves.
(*e*) to examine vertical gradients of currents and density at the bottom of the oceanic mixed layer and across the seasonal thermocline.

It is likely to be a long time before the results of this experiment are fully known but indications, so far, are that it was valuable.

The following additional observations were regularly made throughout the year

by British Weather Ships: solar radiation and radiation balance, sea temperature and salinity down to the sea bed, magnetic variation and surface sea-water sampling; also biological sampling for the Institute for Marine Environmental Research, using a Longhurst/Hardy plankton sampler to determine the vertical distribution of plankton in the upper 500 metres of the ocean at Station 'India' (see article on p. 73). For most of the year a scientist from that Institute was aboard a Weather Ship at Station 'India' in order to direct the programme.

Communication and navigational facilities were provided for trans-atlantic aircraft by all the British Weather Ships, search and rescue exercises were frequently carried out in which RAF Nimrod aircraft sometimes participated. Air/sea rescue equipment was kept in a constant state of readiness.

3. Services for marine activities

Following discussions with the Department of Trade and Industry and the BBC, the title of the late night Coastal Waters Forecast on Radio 4 was changed to 'Forecasts for Inshore Waters' and the area of coverage of the forecast was standardized at up to 12 miles off shore.

At the request of Trinity House and with the agreement of the BBC, reports from the Varne light-vessel were included in the shipping bulletins broadcast on Radio 2.

Ship-routeing services were provided for both the North Atlantic and North Pacific Oceans, the latter being a new service inaugurated in October. About 20 ships have so far made use of the North Pacific service; 250 ships were routed across the North Atlantic during the year. In general, the aim of the routeing service is to provide shipmasters with advisory routes and courses to steer so that the time on passage will be minimal, commensurate with the avoidance of wave conditions liable to cause damage to the ship or cargo.

4. Awards to Voluntary Observing Ships

'Excellent' awards were made, as customary, to the masters, principal observing officers and radio officers of the hundred Selected and Supplementary Ships which had sent in the best logbooks during the year. Seven distant-water trawlers were included in this list. Similar awards were made to the officers of four ships in the coastwise and short sea trades ('Marid' ships), and also to the eight trawler skippers and eight radio operators whose work for us in high latitudes deserved special recognition. Barographs were presented to four shipmasters for their long and meritorious work at sea.

The books selected for awards were *Cassell's English Dictionary*, *Lost Leviathan* by F. D. Ommanney and *The University Atlas*.

April, May, June

The Marine Observers' Log is a quarterly selection of observations of interest and value. The observations are derived from the logbooks of marine observers and from individual manuscripts. Responsibility for each observation rests with the contributor.

Observing officers are reminded that preserved samples of discoloured water, luminescent water, etc. considerably enhance the value of such an observation. Port Meteorological Officers in the U.K. will supply bottles, preservative and instructions on request.

TYPHOON 'ORA'

off Manila, Philippines

m.v. *Benarmin*. Captain J. C. Allan. Manila to Bugo. Observers, Mr. I. A. Hamilton, 1st Officer, Mr. J. A. Williamson, 2nd Officer and Mr. J. D. Beattie, 3rd Officer.

24th–25th June 1972. At 1500 GMT on the 24th we sailed from Manila, having completed cargo and with the intention of avoiding Typhoon Ora whose position indicated that it would pass close to Manila. On clearing the harbour breakwater it was found necessary to anchor in order to perform urgent engine repairs. This operation was carried out and at 1640 the vessel was anchored with 5 shackles of cable on starboard anchor, the breakwater light bearing 060°, distance 2 miles. It was remarked that we could think of more pleasant situations to be in than sitting out a typhoon with no engines! The following observations were made while we waited.

GMT

1700: Wind N'E, force 3. Moderate rain began to fall; visibility not seriously affected.

1800: Pressure 1003·9 mb. Continuous moderate rain; visibility 7 miles.

2000: Wind N'E, force 4. Pressure 1003·1 mb. Rain becoming heavy; visibility 5½ miles.

2100: Wind backed to N'W, force 4.

2130: Vessel lying to two anchors, 3½ shackles on port, 6 shackles on starboard cable.

2200: Wind N'W, force 4. Pressure 1003·0 mb. Continuous heavy rain; visibility 2 miles.

25th

0001: Wind backed to NW, force 5. Pressure 998·3 mb, falling steeply. Continuous heavy rain.

0100: Wind increased to force 7. Pressure 996·8 mb. Veered cables to 6 shackles on port, 8 shackles on starboard.

0200: Wind NW'W, force 7. Pressure 994·3 mb, falling steeply. Continuous heavy rain; visibility 1 mile.
0300: Wind W'N, force 11. Pressure 990·9 mb. Torrential rain and flying spray; visibility 180 m. At 0320 the barograph trace started to rise.
0400: Wind SW's, force 12. Pressure 995·6 mb. Barograph trace rising vertically. Continuous heavy rain; visibility 180 m.
0500: Wind SSW, force 10. Pressure 999·8 mb. Rain eased to continuous moderate; visibility 5 miles.
0600: Wind eased to force 7. Pressure 1002·1 mb. Intermittent rain showers; visibility 5 miles. Prominent SW'ly swell.
0800: Wind SSW, force 5. Pressure 1003·2 mb. Occasional moderate showers; visibility 10 miles.
1300: Completed engine repairs: proceeded to Bugo.

This was an experience that none of the officers would care to repeat too often. The Chief Officer is still lamenting over his paintwork which was very efficiently stripped down to the metal by the rain, in particular the funnel and masts.

Position of ship: 14° 36'N, 120° 54'E.

Note. Typhoon Ora was born to the east of Yap on the 22nd. It moved WNW and later NW, passing close to the north of Manila during the night of the 24th/25th before dissipating over North Vietnam on the 27th.

SEVERE STORM

North Atlantic Ocean

R.M.S. *Queen Elizabeth 2*. Captain M. F. Hehir. New York to Southampton. Observer, Mr. J. R. D. Hall, 2nd Officer.

16th–20th April 1972. At 2306 GMT on the 16th the vessel departed New York bound for Cherbourg. The passage was planned for 'C' track east because of the ice situation on the Grand Banks. Forecasts from Washington and the 0230 weather prognosis on the Mufax indicated that a low pressure system, originating south of the Great Lakes, was due to pass north of Cape Hatteras and be in a position south of Sable Island by midnight on the 17th. Accordingly we anticipated it would pass south of us and then cross ahead of our intended track.

At 0545 on the 17th the wind was E'ly, force 6 and very heavy rain was experienced for two hours. At 0650 we took our departure from Nantucket light-vessel and set course 084° for the 'C' track position in 40° 00'W. Throughout the day the wind direction stayed ENE and gradually increased to force 9, indicating that we were keeping 'station' ahead of the storm. At 1800 the barometer stood at 989·3 mb; wind ENE, force 8; position of ship 41° 00'N, 62° 42'W.

At 0600 on the 18th the barometer was reading 979·2 mb; wind NE, force 11. Speed was reduced to 16 kt to ease the ship's motion. We attempted to turn to the south-west but the resultant rolling prevented this. From 1400 on the 18th to 0200 on the 19th the wind remained N'ly, force 12. The ship was hove-to on a heading of 030°T. During this period the visibility rarely exceeded 1 mile.

At 0600 on the 19th the wind started to shift to NW and eased slightly to force 11; the barometer had risen to 992.6 mb. At 1400, after being hove-to for 24 hours in position 42° 22'N, 53° 32'W, with barometer reading 994·4 mb and wind NW, force 10, we altered course to 145°T and gradually increased speed to 26 kt.

At 0400 on the 20th, with the barometer reading 1008·4 mb and wind NW, force 9, we started to alter further to the eastwards to a course of 090°T. Finally, at 1600 we set course for the Channel; pressure 1011·1 mb, wind WNW, force 8.

On the Consol Communication System antenna the anemometer registered a maximum reading of 80 kt during the period that the ship was hove-to.

Position of ship at 1600 on 20th: 39° 12'N, 42° 11'W.

QUEEN ELIZABETH 2

STORM CERTIFICATE

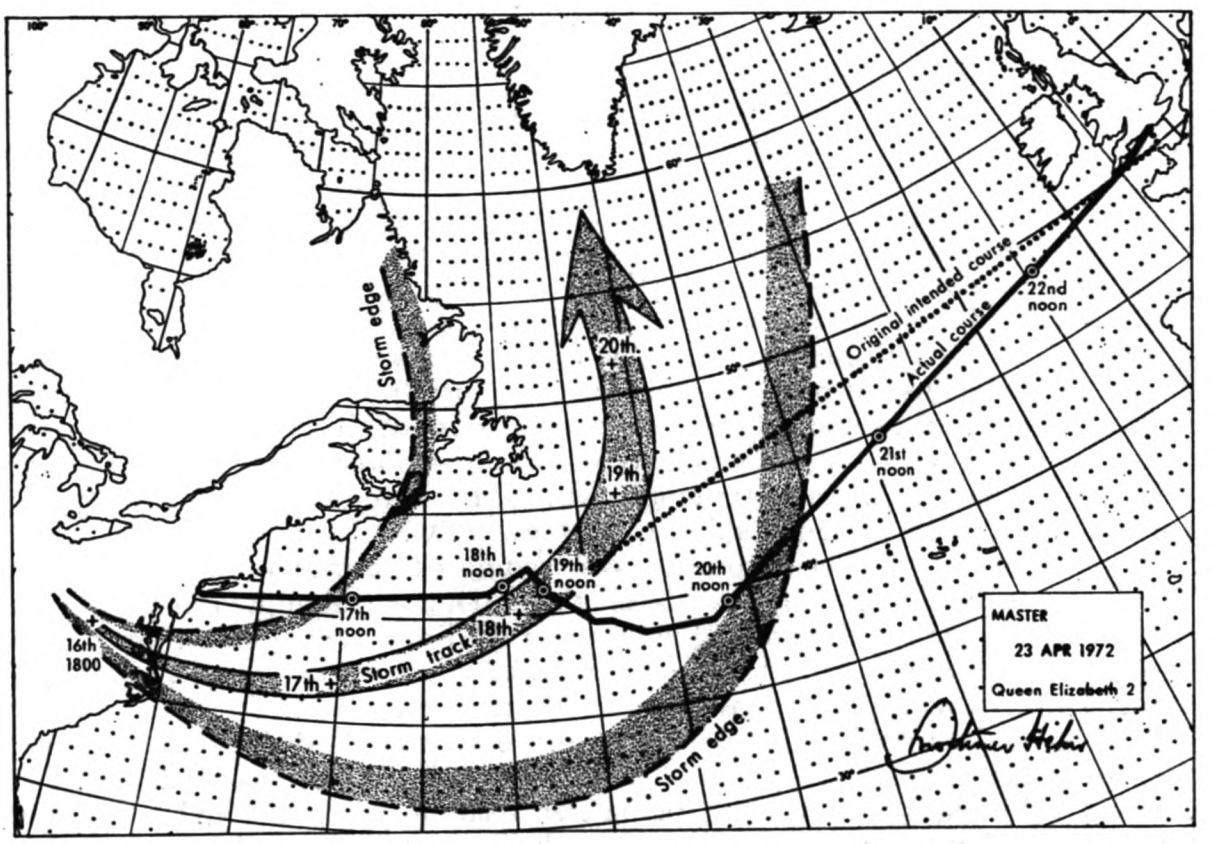
This is to record that on her North Atlantic voyage, leaving New York on the 16th April 1972, for Southampton, England, RMS QUEEN ELIZABETH 2, of 65,863 gross tons, encountered exceptionally severe weather in position Latitude 42°18′ North, Longitude 55°52′ West.

During this storm, winds reached speeds in excess of 100mph. Combined with a heavy swell, waves were encountered of 50 feet in height.

This weather caused even the QUEEN ELIZABETH 2, with her exceptional size and sea-keeping qualities, to lie hove to for 21½ hours between 17th and 19th April 1972, until the storm abated.

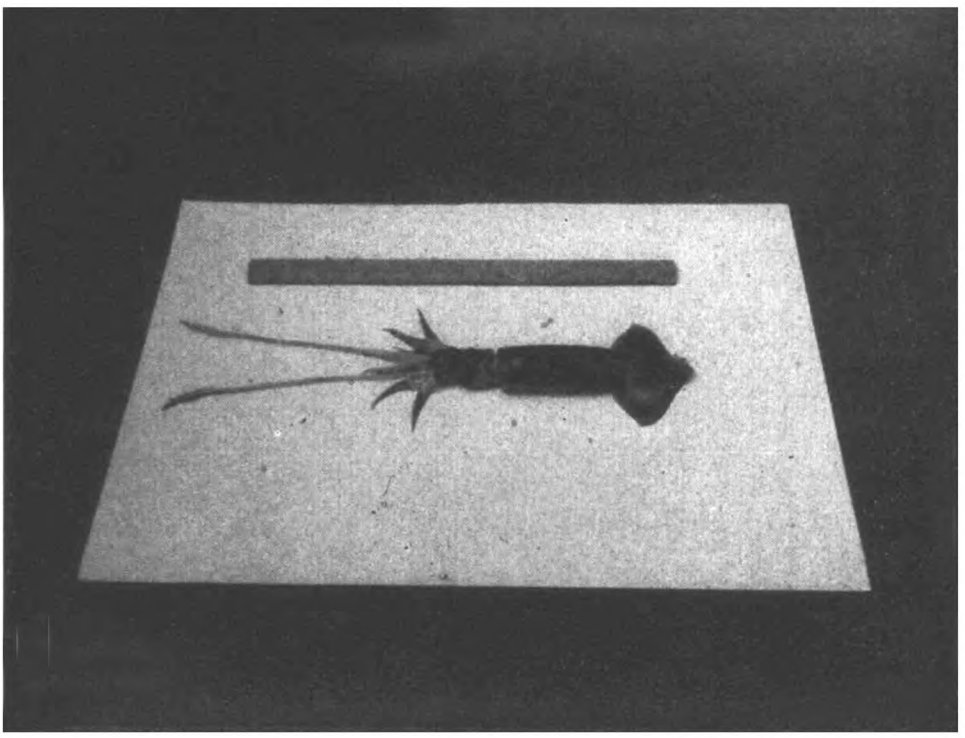
I commend all passengers in sharing this unique experience with great cheerfulness and calm.

Captain

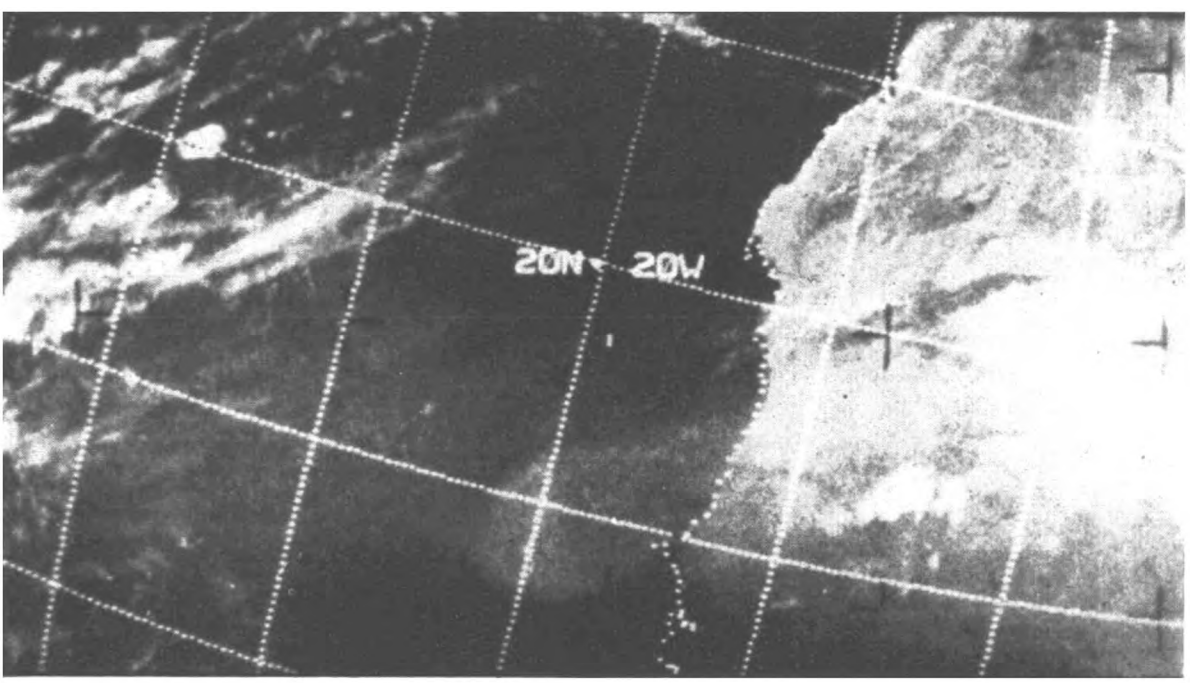


Note. When the *Queen Elizabeth 2* docked at Southampton on 23rd April, two days late, the passengers were presented with a 'storm certificate' and a souvenir chart showing the tracks of the ship and the storm, as reproduced above. Newspaper accounts gave details of the storm's effect aboard the ship, including 3 pianos badly damaged and £2,500 worth of glass and crockery smashed. Her Master was quoted as saying, "It was the worst weather I've ever experienced, not so much in its intensity as in its duration."

(*Opposite page* 56)

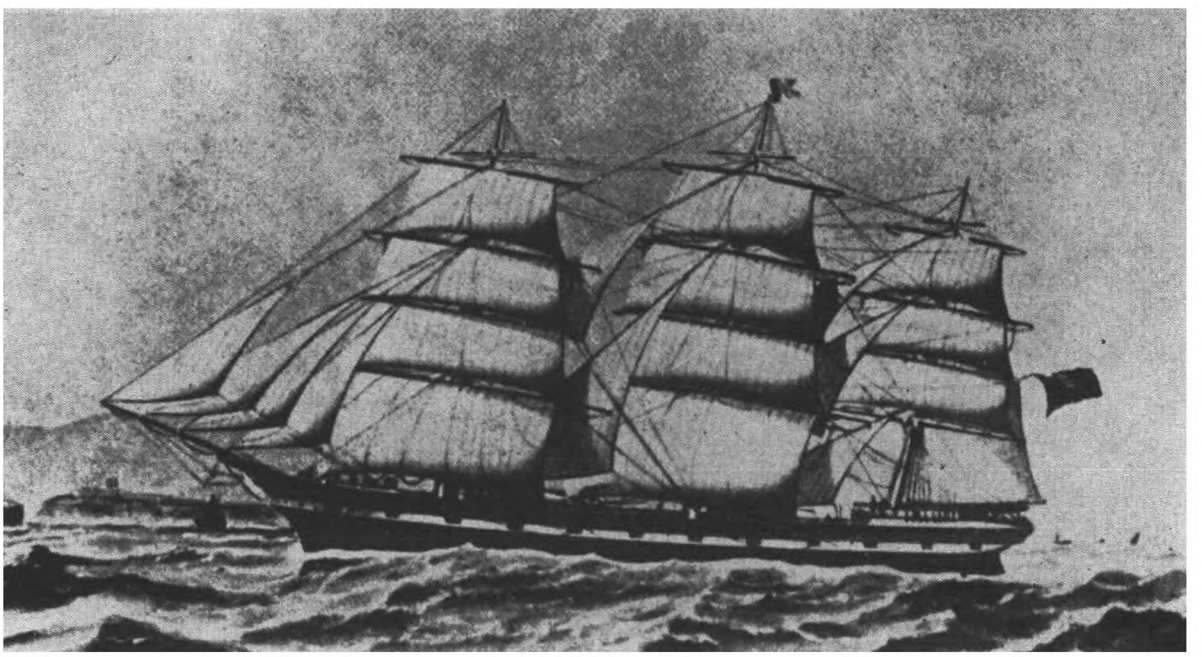


The squid found on board the *Hadra* (*see* page 67).

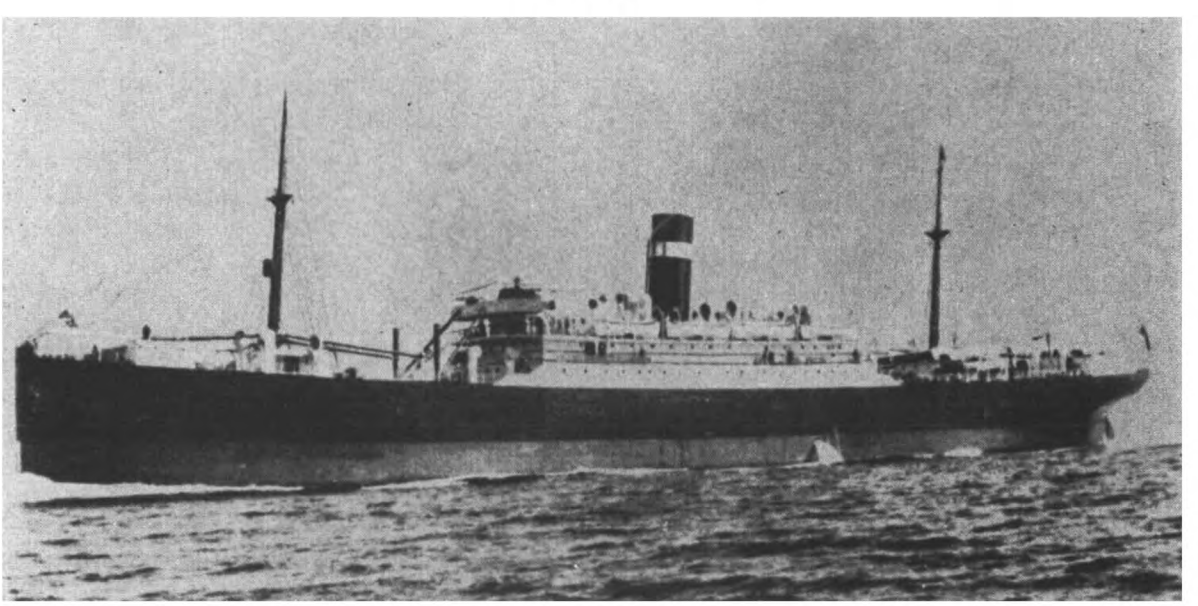


Duststorm off the Senegal coast on 1st May 1972 as seen from ESSA 9 satellite (*see* page 58).

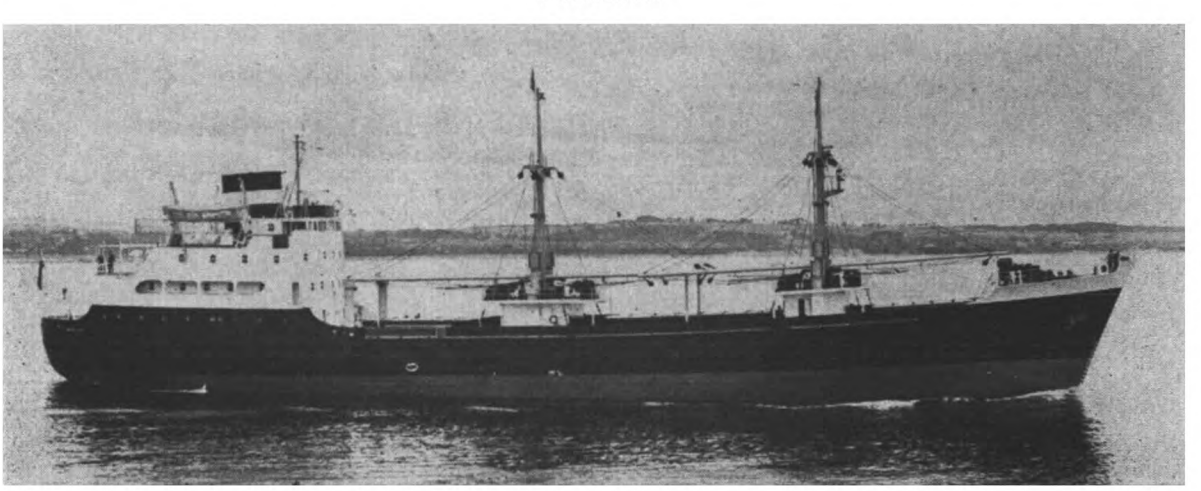
(*Opposite page* 57)



Santona



Cassandra



Santona

THREE SHIPS OWNED BY THE DONALDSON LINE (*see* page 86).

LIGHTNING

Indian Ocean

s.s. *Flinders Bay*. Captain R. A. Wilson. Fremantle to Flushing. Observers, the Master, Mr. D. G. Sinclair and Mr. D. R. Embery, 2nd Officers.

12th–13th April 1972. The following was recorded during the passage of a cold front with severe associated electrical disturbances along its entire visible length.

12th April

GMT

2030: Lightning detected ahead of the vessel low on the western horizon. Wind NE, force 6. Barometer 1016·0 mb, falling slowly. 6/8 cloud increasing from the north-west with patches of Cb visible amongst the lightning.

2255: After continuous sheet lightning and some fork lightning ahead of the vessel and with the barometer falling quickly and steadily (1·5 mb in an hour), the vessel encountered continuous moderate rain. Lightning surrounded the vessel with vivid fork lightning very near the ship. Loud thunder was heard almost continuously. Barometer 1012·2 mb. Air temp. 24·0°C, wet bulb 23·0°, sea 27·0°.

2316: Very heavy rain, with vivid lightning and loud thunder. Wind NE'N, force 7.

2325: Rain ceased, with fork lightning now astern, but sheet lightning still persisting all over sky. Wind NNE, force 6. Barometer 1011·6 mb and falling steadily. The Decca Navigator was rendered absolutely useless by the interference from the almost continuous lightning. The standard compass was also affected slightly, it being deflected 3°.

13th

0001: Barometer 1010·8 mb and falling more slowly. Wind N'ly, force 6. Another front of rain (lying N/S) was observed on the radar, bearing 270° at 4·0 miles, with more fork lightning coming from it, accompanied by continuous sheet lightning.

0015: Start of very heavy rain (6 miles in depth as observed on radar), with more lightning and occasional thunder. Wind N'ly, force 5.

0021: Rain now slight and continuous.

0030: Wind backed to NW'W, force 5.

0035: Very heavy rain which ceased at 0040 with some breaking up of cloud. Barometer 1009·5 mb and falling more slowly. Wind WNW, force 5–6.

0100: Patches of clear sky now discernible. Lightning now to eastward and astern. Wind W'ly, force 5–6. Barometer 1009·0 mb and steady. Air temp. 22°, wet bulb 20·4°, sea 25·0°. The barometer then began to rise rapidly and the cloud broke up slowly. Course 270°T at 20·5 kt.

Position of ship at 0001 on 13th: 33° 34'S, 29° 30'E.

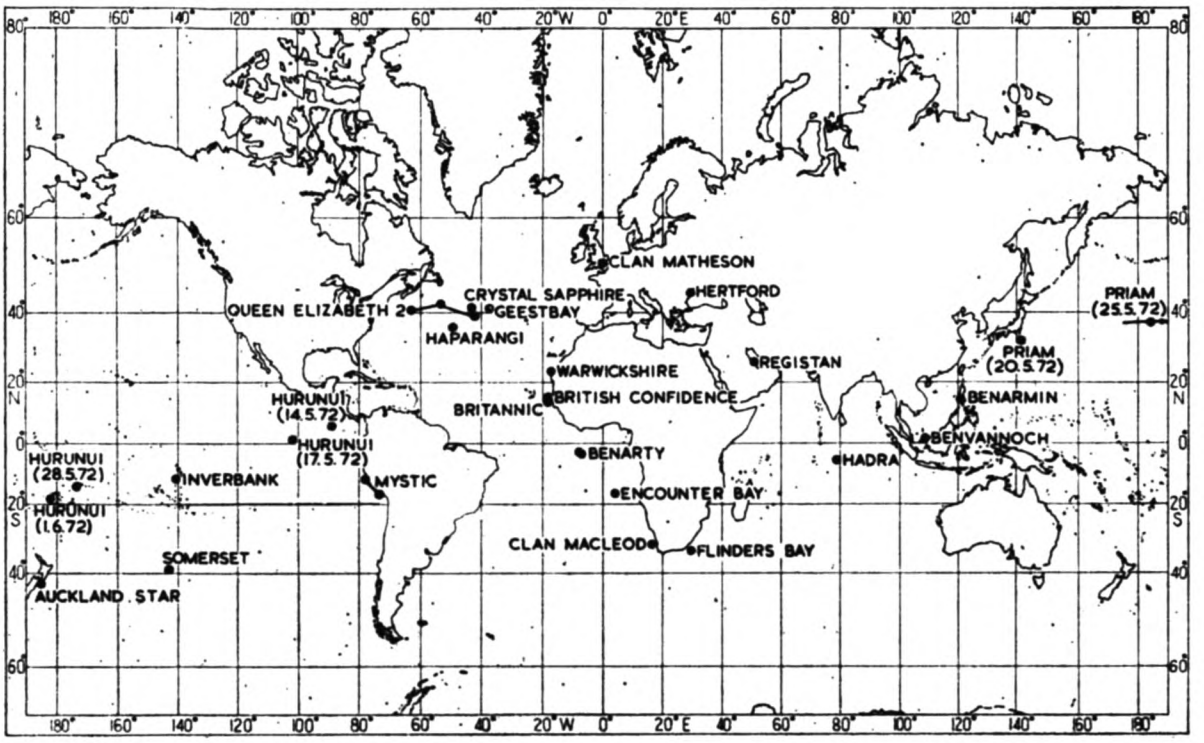
VESSEL STRUCK BY LIGHTNING

Persian Gulf

m.v. *Registan*. Captain R. B. Arthur, M.B.E. Dubai to Bahrain. Observers, the Master, Mr. N. Stokes, 3rd Officer, Mr. P. Small, Chief Engineer and ship's company.

9th May 1972. At 1635 GMT, as we approached Bahrain, the vessel passed under a line squall of towering Cb. Heavy rain reduced visibility to 200–400 m. There was a considerable amount of forked lightning; sheet lighting was also present but less frequent. At 1642 the vessel was struck by fork lightning on top of the mainmast approx. 36 m above water level. A loud report was heard and shock wave felt (also recorded on the barograph). Sparks were seen to fall from the mast on to the deck. The barometer rose sharply, 2 mb in approx. 2 min. At 1645 the vessel cleared the line squall. No effect on magnetic compass or chronometer was noted.

Position of ship: 26° 25'N, 51° 01'E.



Positions of ships whose reports appear in "*The Marine Observers' Log*".

DUST HAZE

off Senegal

s.s. *British Confidence*. Captain D. W. Powell. Forcados, Nigeria to Wilhelmshaven. Observers, Mr. P. Taylor, 3rd Officer and Mr. B. V. Kemp, 2nd Officer.

30th April 1972. From the early morning, as the vessel was passing Dakar heading north for Land's End, we encountered dust haze which extended upwards from the sea to a height of approx. 240 m and extended out from the coast for about 100 miles. Visibility was severely restricted. Wind was variable, force 3. Little or no cloud. By 1600 visibility was less than a mile but by 2300 the haze was beginning to disperse, with visibility up to 9 miles.

Position of ship at 1200: 15° 04′N, 17° 33′W.

Note. Dust in suspension off the Senegal coast is by no means uncommon but on this occasion it was sufficiently thick and widespread to register on satellite pictures during the period 28th April to 3rd May. (A satellite picture for 1st May is shown opposite page 56.) The occurrence of raised dust during this period was due to strong NE'ly winds on the northern side of a disturbance on the Inter-tropical Convergence Zone which advanced north overland to about latitude 15°N on 28th April and retreated south on 3rd May. The upwind limit of raised dust occurring in late April was about 300 miles inland, while the downwind limit lay at least 1,000 miles off shore on 3rd May.

Several other Selected Ships were in the vicinity during the period: the *Author*, *Glenpark*, *King George*, *Serbistan* and *Yewbank*; all reported deteriorating visibility due to dust. The *King George* also reported that the vessel had been covered in brown dust during the night of 1st/2nd May.

RADAR ECHOES

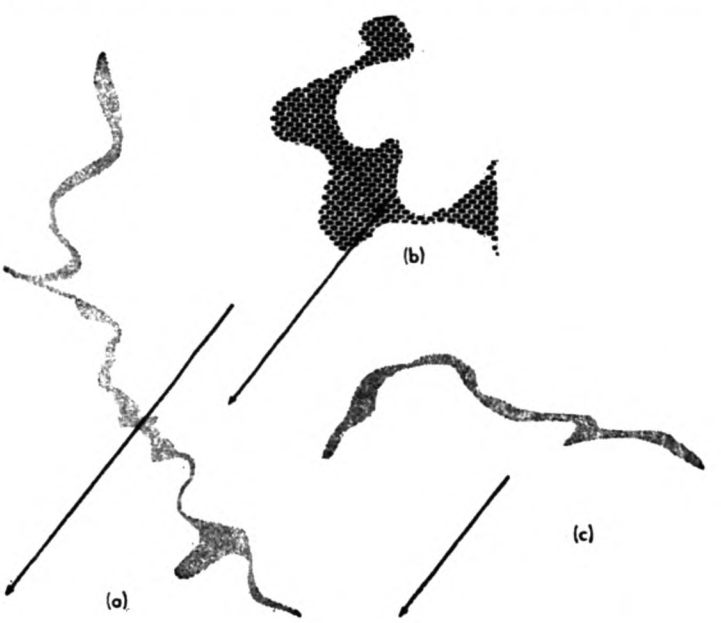
New Zealand waters

s.s. *Auckland Star*. Captain P. W. W. Hunt. Auckland to Timaru. Observers, the Master and Mr. T. Mackay, 3rd Officer.

22nd April 1972. At about 1240 GMT a strange echo became apparent on the PPI. The set was operating on the 48-mile range at the time and no echoes of the New

Zealand coastline were displayed although it was expected that land echoes would shortly appear on the screen. The strange echo hardened and became very distinct, taking the outlines of an apparent coastline. At this stage the radar was operating on the 24-mile range. Gyro and magnetic compasses were checked and the echo-sounding machine was run on all scales. A D.R. position at this time placed the ship 47 miles off the east coast of South Island in about 460 m of water. This position was later verified as being correct when the actual coastline appeared on the radar screen and distances and bearings were taken. The vessel passed through this false coastline which faded as the vessel moved away and finally disappeared astern at about the same distance that it had been sighted ahead.

Captain Hunt had a similar experience (which he reported) in about September 1968 when serving on the *Australia Star* off the West African coast. On that occasion the apparent false coastline remained a constant distance ahead of the vessel, thus appearing to move with it. She never actually passed through the echo.



The sketches show the radar echoes and ship's course on the 22nd: (a) 1300 GMT, radar running on 24-mile range, course 220°T at 18½ kt; (b) 1325 GMT, radar on 12-mile range; (c) 1340 GMT, radar on 24-mile range.

During the period there was no change in temperatures or pressure. Air temp. 15·1°C, wet bulb 14·1°, sea 15·0°. Pressure 991·1 mb. Wind SSW, force 4. Visibility about 30 miles. Small amounts of Ci and Ac.

Later, between 1410 and 1420 the pressure dropped sharply to 997·5 mb and the wind increased to force 5. Air temp. 17·2°, wet bulb 13·2°, sea 15·0°.

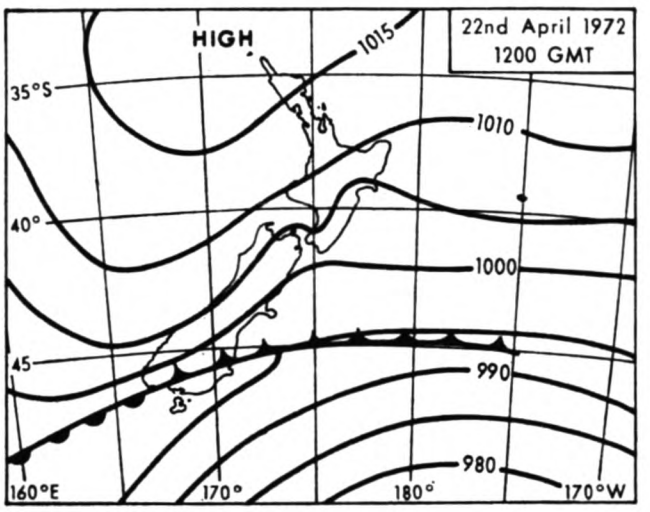
Position of ship at 1300: 42° 31′S, 174° 53′E.

Note. The Assistant Director (Research), New Zealand Meteorological Service, comments:

"Reports of long or sausage-shaped echoes have been made in several parts of the world when there has been no visible terrestrial or meteorological phenomena present. They usually have appeared ahead of a frontal or non-frontal line of precipitation and move with or faster than the precipitation line.

"In this case a cold front was moving north-east over eastern coastal districts of the South Island. Although the mechanisms producing the echoes are not fully understood it is believed they are associated with steep lapse rates and consequent relatively strong vertical currents. If the air in the vertical currents is not carried as high as its condensation level, cloud is not formed and there is no visible sign of the cause of the echoes.

"The dew-point at the ship dropped from 13°C to 9°C between 1410 and 1420 and the wind freshened, indicating the passage of the weak cold front. This front was producing low cloud



and some drizzle on the coast but evidently was not a prominent feature out to sea. A portion of our synoptic map for 1200 GMT on 22nd April shows the position of the cold front."

BIRDS

at London

m.v. *Clan Matheson*. Captain M. Storrier. In S.W. India Dock, London. Observer, Mr. P. Masters, 3rd Officer.

8th May 1972. At 2010 GMT, while investigating a splashing sound between the ship's side and a barge (a space of 15 cm), it was noticed that two Mallard ducks were apparently trying to drown a third bird. At first I thought it was a cormorant because I could only see its long neck. The two Mallard were cloaking the third bird with their wings and one was forcing the third bird's head under the water with its bill; the other Mallard was pushing the other two birds along like a boatman, rowing with its wings. When the three birds reached a piece of floating dunnage, clear of the ship's side and barge, the third bird managed to break free and flew off, followed by the other two. It was then noticed that the third bird was also a Mallard duck. The bird that was being attacked was completely submerged for most of the time, including its head, by the two other ducks' bodies and wings. I was the only observer of this incident which lasted about 3 min.

Position of ship: 51° 30′N, 00° 05′W.

Note. Captain N. B. J. Stapleton of the Royal Naval Birdwatching Society comments:

"The above report was of great interest. This 'urge to mate' is often seen but not so well described as in the above report. Curiously enough I witnessed the same behaviour at Swanbourne Lake, Arundel on 22nd March 1972."

North Atlantic Ocean

m.v. *Haparangi*. Captain D. E. Moran. Curaçao to Hull. Observers, Mr. B. Harris, 1st Electrician and ship's company.

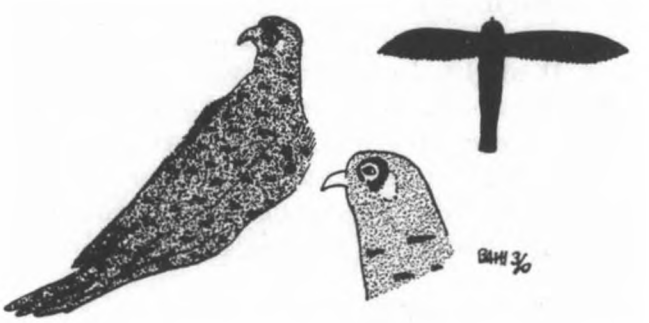
5th April 1972. At 1330 GMT a very bedraggled and exhausted Peregrine Falcon alighted on the crosstrees of the foremast. It stayed there for about 5 min and then flew off in a NW'ly direction. The wind at the time was NW'W, force 5. The bird was not expected to survive in this wind (nearest point of land was Cape Race, Newfoundland) but two hours later the Falcon returned and perched itself once again on the crosstrees.

Position of ship: 36° 31′N, 49° 10′W.

Note. On receiving this report Captain Stapleton mentioned the wide range of this bird. Formerly common, it is now much reduced in numbers, apparently due to the effects of poisonous chemicals on its prey.

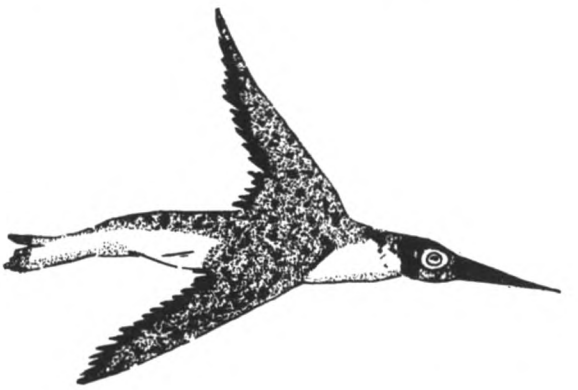
m.v. *Benarty*. Captain J. R. Milne. Port Kelang (Swettenham) to London. Observers, the Master, Mr. J. Atkinson, 2nd Officer, Mr. B. A. Hammett, 3rd Officer, Mr. S. Morrison, Radio Officer and Mr. J. Beggs, Cadet.

20th April 1972. At 0900 GMT a smallish bird was seen to approach the ship from a SSE'ly direction and alighted on the port topping lift block of a heavy derrick by way of No. 3 hatch. The wind was SSE, force 3 at the time. It appeared to be about 23–30 cm in length when in flight. Having settled and rested for half an hour, it set about sprucing its feathers. Unfortunately, due to the distance from the bridge, the darkish appearance of the bird and the angle of view, it was at no time possible to see its feet or approach it and it was also difficult to ascertain with absolute certainty the various markings on it. However, it appeared to be mustard-brown with short dark or black dashes on the upper parts of its body. The under part was white;



the beak was buff-coloured and was hooked in shape rather like a hawk. The eyes were set in predominant black patches which appeared to have whitish marks behind them. The 2nd Officer then joined me on the bridge and mentioned that it resembled a sparrow hawk. The bird left the vessel at 1010, heading eastwards. At 1430 this bird was again observed approaching the ship, landing in the same place. It definitely appeared to be some type of small hawk.

At 1400 a rather unusual bird was observed approaching the ship from a SE'ly direction. It circled the ship for about 20 min and then flew off towards the north, making no attempt to land on the ship. It flew with very rapid beating of its wings. The head and beak were a dark chocolate-brown, the beak being darker than the head with a reddish tinge. The tops of its wings and its back being a mixture of light brown and white. A very noticeable white band divided the body from the head.



The underside of its body and the tail were white, the tail appearing too small for the body which was very streamlined, ending in a long pointed beak. The beak was straight without any hooked effect. The wings also gave the effect of being set too far back on the body. The over-all length appeared to be about 65 cm, the beak and head being at least 24 cm long.

It appears that the vessel must have been in the path of certain types of migratory birds, other unidentified birds also being observed.

Position of ship at 0900: 3° 39′S, 7° 18′W.

Position of ship at 1400: 3° 19′S, 7° 41′W.

Note. Captain N. B. J. Stapleton comments:

"The bird mentioned in the first report can be identified as a Western Red-footed Kestrel (*Falco vespertinis*) which is 28–30 cm in length. It is a migrant from Europe and feeds on insects, locusts, grasshoppers, etc. It occurs right through South Africa as far as Cape Province. It nests in holes in trees in Europe. It was probably on a northward migration.

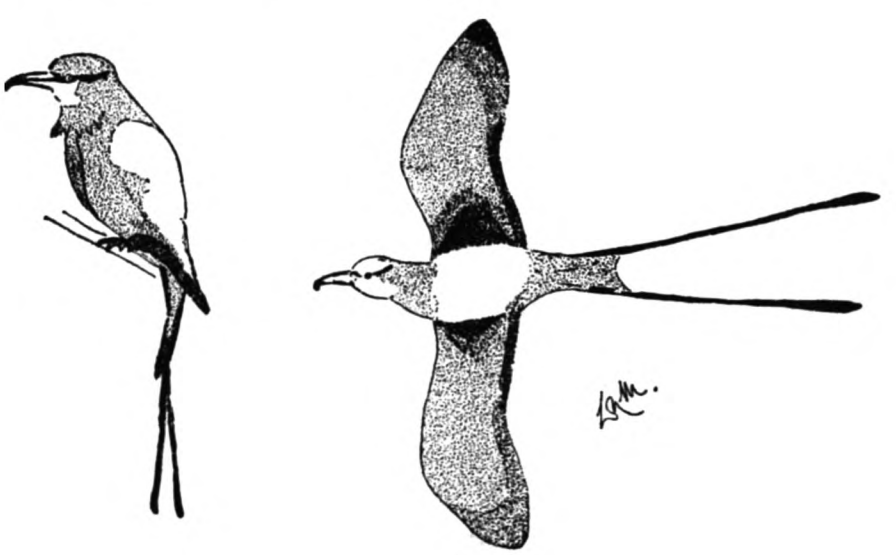
"The second bird is rather difficult to identify but we think it was a Pomarine Skua in the normal pale phase."

off Cap Vert

m.v. *Britannic*. Captain W. A. Murison. Southampton to Port Elizabeth. Observers, the Master and Mr. R. Knight, 3rd Officer.

29th April 1972. At 1000 GMT a brightly-coloured tropic land-bird was observed flying round the vessel. It alighted on the forward derrick topping lift wires and remained with the ship for about two hours, occasionally circling the ship. The primaries and secondaries were navy blue, the throat and mid-wing an iridescent turquoise with a paler head and chin and a black 'mask'. The inner wings were of Winsor blue, the back golden brown, its undersides bluish-green with yellow feet. It was similar in flight to a European magpie but without the characteristic dip when gliding.

Position of ship: 14° 37′N, 17° 46′W.



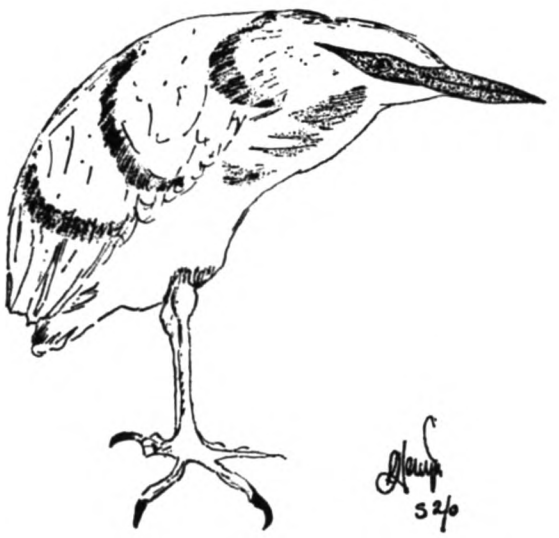
Note. Captain G. S. Tuck, Chairman of the Royal Naval Birdwatching Society, comments:

"From the sketch it appears that this was an Abyssinian Roller (*Coracias abyssinica*). It is closely related to the European Roller (*Coracias garrulus*) but is brighter in general colouring and has longer outer tail feathers. It is distributed in tropical Africa from Senegal eastwards to Ethiopia. Rollers have the habit of perching on some vantage point such as a telegraph pole or protruding dead branch, watching for large insects which form their principal food. Unlike the European Roller which migrates southwards off the bulge of north-west Africa, the Abyssinian Roller is a resident species."

North Pacific Ocean

m.v. *Priam*. Captain R. Moore. Pusan to Balboa. Observers, the Master, Mr. R. H. Henry, Senior 2nd Officer, Mr. R. J. Dakin, 2nd Officer and Mr. D. A. Best, Cadet.

20th May 1972. At 0300 GMT a large bird alighted on a derrick. It was approx. 50 cm long and brown with light-fawn patches on the underside. The bird bore a



close resemblance to the British Bittern in that it had a stubby tail, dark bars on the wings and back with a darker brown barring from throat to chest. Its bill was black and this dark colour seemed to extend round the eyes, finishing at the back of the head. The eyes were bright red with a dark centre. The legs were fawn in colour; the feet were not webbed and had three toes at the front and a hind toe shorter than the rest. After about a two-hour rest it flew off to the north with a slow, easy wing beat. Wing span approx. 90–100 cm with the legs extending beyond the tail feathers when tucked in for flight.

Later the same evening, while the Cadet was doing his rounds, he saw a bird approx. 25 cm long in the starboard main deck alleyway. All attempts to catch the bird were to no avail as it could move a lot faster than the Cadet. The bird, from his report, resembled a Redshank; its legs were red, bill about 7·5 cm long and red. The body colouring was brown to white, dappled on the chest, mainly brown on the back and wings with white markings. The feet were not webbed.

Position of ship: 30° 59′N, 134° 39′E.

21st–29th May 1972. Ever since the ship passed the islands of Tori Shima and Sumisu Tō on the 21st a number of sea birds became our constant companions. These birds resembled the southern hemisphere albatross in many ways although lacking the grace in flight. Their plumage was mainly dark brown on the upper body and wings, light tan on the under side, white bar at the base of the tail, a light grey hood and some had a white collar. The bill was similar to that of the albatross, approx. 9 cm long and curved over on the upper tip and very pale yellow in colour. As we can find no records as to the migration of albatross as far as 33°N and this is our maximum latitude on our great circle track, much speculation has ensured whether in fact these birds are closely related to the albatross. Photographs were taken [and forwarded to Captain Tuck] and, although the birds were quite a distance off and not too clear, we hope you may be able to enlighten us as to the origin of this species.

Later that day a bird similar in appearance to the others joined the group. It seemed from its markings—white underneath, dark brown on tail and upper side of wings, white head with pinkish bill—that the latest follower was a bird of the same species but in its second winter plumage, the others being in their first. The birds left us during the night of the 29th.

Position of ship at 1200 on 25th: 32° 48′N, 175° 12′W.

Note. Captain G. S. Tuck comments:

"I agree that the bird which came aboard the *Priam* on 20th May corresponds to the Bittern (*Botaurus stellaris*); it could have come from the mainland.

"The bird which was seen later that day may have been a Redshank but one cannot be certain from the description.

"The birds which accompanied the vessel for several days were immature Black-footed

Albatrosses (*Diomedea nigripes*) and the bird which joined the group later was a Laysan Albatross (*Diomedea immutabilis*).

"The *Priam*'s report calls attention to the general distribution of albatrosses. Of the thirteen species, nine are confined to the Southern Oceans; one, the Waved Albatross, is endemic to the Galapagos Islands and three are confined to the North Pacific. Of these three, the two which constantly follow ships and range between latitudes 30°N and 50°N right across the North Pacific are the sooty-brown Black-footed Albatross and the Laysan Albatross. The latter, however, has a white head, neck, rump, upper tail-coverts and underparts and a brown end to its white tail; the back and upper-wings are sooty-brown. The Black-footed species is the bolder in closely following ships. Its white facial pattern, dark reddish-brown bill and black feet are diagnostic in adults, but immatures also show a white area over the rump. The third species, the considerably larger Short-tailed or Stella's Albatross, is very rare—probably only some 50 specimens at present breeding only on Tori Shima. Adults are principally white except for some dark upper-wing surfaces, a dark tail and flesh-coloured bills and legs; immatures are very similar to immature Black-footed Albatrosses but show no white facial pattern or white rump."

Peruvian waters

m.v. *Mystic*. Captain D. R. G. Taylor. Between various ports on the west coast of South America. Observer, Mr. C. G. G. Hawken, 2nd Officer.

May 1972. During the month about 40 dead pelicans were passed between Callao and Matarani. Various people in Peru say that many hundreds have died this year due to lack of fish.

Position of ship at Callao: 12° 00′S, 77° 00′W.

Position of ship at Matarani: 16° 50′S, 72° 10′W.

Note. During 1972 there was a steady decline in the number of anchovies in Peruvian coastal waters and official reports stated that it was the lowest ever recorded, probably amounting to only about a seventh of the average. Abnormal climatic factors, including a sudden warming of the coastal current, have apparently driven the fish to cooler waters further south. The Peruvian fish-meal industry, the largest in the world, was seriously affected; in a normal year 2 million tons are exported.

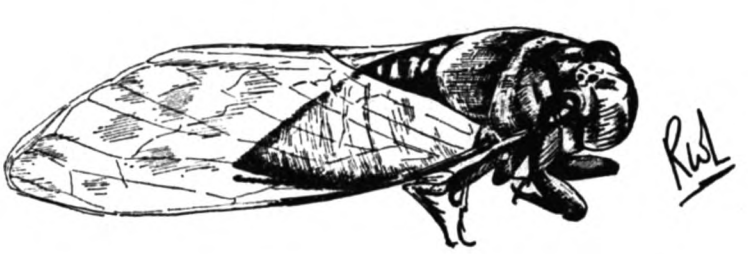
INSECTS

at Rajang, Sarawak

s.s. *Benvannoch*. Captain J. R. Rodger. At anchor. Observers, the Master, Mr. W. Sinclair, 2nd Officer and Mr. R. W. Lawrie, Cadet.

5th–10th May 1972. During the ship's stay in Rajang, where we were anchored while loading cargo, three insects and a moth were caught. Two of the insects were sketched by Mr. Lawrie [one of the cicadas and the beetle].

Position of ship: 2° 09′N, 111° 15′E.



Note 1. Mr. P. S. Broomfield, of the Department of Entomology, Natural History Museum, comments:

"Two of the insect specimens sent to us have now been identified; they are *Pomponia merula* Dist. and *Dundubia intemerata* Walker. These species of Cicada (Homoptera) are found fairly commonly in the Far East, but I should like, if I may, to keep them for the Museum collection as they are in good condition."

Note 2. Mr. R. D. Pope, Officer-in-charge of the Coleoptera Section, Department of Entomology, Natural History Museum comments:

"I have examined the beetle and find it to be a member of the subfamily Dynastinae of the family Scarabaeidae. Its scientific name is *Clyster itys*. It is generally distributed through Java, Borneo, etc. I have searched the records to some extent but am unable to find any definite statements about the life history of the species. It is likely that the grub feeds on vegetable matter of one kind or another. Some dynastines are pests of various crops but *Clyster* has not been numbered among these, so far."

Note 3. Mr. R. I. Vane-Wright of the Rhopalocera Section, Department of Entomology, Natural History Museum, comments:

"The specimen of the 'moth' submitted is in fact a butterfly, *Amathusia phidippus* subspecies *dilutus* Frukstoufer (female). The group to which this insect belongs (Nymphalidae: subfamily Amathusiinae) includes a number of crepuscular species, which, flying at dusk or in the early morning, may be attracted to light. *A. p. dilutus* is a common Borneo species."

North and South Pacific

m.v. *Hurunui*. Captain J. F. Milner. Balboa to Suva. Observers, Mr. D. J. Robertson, 2nd Officer, Mr. G. Eddy, Radio Officer, Mr. T. Lyttle, A.B. and Mr. D. Kershaw, Chief Cook.

14th May 1972. At 2200 GMT, during the course of a birthday celebration in the bar, a light was discovered careering drunkenly across the bar top at the end of an insect. We were unable to see if the insect flew as shortly after having captured it its light went out and it moved no more. The 6th Engineer said he had found one a couple of trips back, eating cockroaches. This story must not be taken too literally due to the state of the teller and the size of the insect. The insect was duly bottled in formalin to await our arrival in New Zealand.

Position of ship: 5° 20′N, 88° 52′W.

17th May 1972. At 0130 GMT, half-way through the last watch of the day, from beneath the main receiver a cricket jumped out onto the radio log. The insect was duly captured and placed in a matchbox. Half an hour later, when showing the cricket to a sailor, it escaped and considerable trouble was taken to effect a recapture. Apparently periods of confinement have no effect on a cricket's jumping ability.

Position of ship: 2° 05′N, 102° 18′W.

28th May 1972. A long green insect was captured in the Chief Cook's cabin shortly after leaving Apia, Western Samoa, not without some difficulty as it seemed to have boundless energy. It was duly stored away for our arrival in New Zealand along with the other finds.

Position of ship: 14° 30′S, 174° 08′W.

1st June 1972. While the vessel was alongside at Suva a moth was captured in the forward fan space by the 2nd Refrigerating Engineer. As it was too large to go into the bottle along with the other insects it was kept in an empty cigarette packet. It took quite a lot of coaxing before it finally died but gave us little trouble in trying to escape.

Position of ship: 18° 00′S, 178° 20′E.

Note. All the specimens were handed over to the Marine Meteorological Officer in Wellington and the following comments were received later from the Dominion Museum, Wellington:

"The small insect found on the *Hurunui* on 14th May is a species of the lampyridae family, commonly known as fireflies. These small beetles have luminescent organs on the fifth or sixth abdominal sternites and the light is emitted in a series of controlled flashes which are assumed to have sexual significance. Some tropical species even exhibit synchronization of the flashes of a large number of individuals. The adult beetles are said not to feed but the larvae are all carnivorous, preying mainly on snails. The specimen sent in for identification was a male having fully developed wings but the females of many species are wingless, resembling larvae, and are consequently known as glow-worms in Europe. These are not related in any way to our New Zealand glow-worm which is a flying larva.

"The large insect found on 17th May is *Teleogryllus oceanica*, the oceanic field cricket. This insect is widespread in Oceania from the Malay Peninsula eastwards, extending to Easter Island. It eats almost any vegetable matter available and is considered a pest in Hawaii, attacking pineapples and sugar cane.

"The insect collected at Apia belongs to the same family of locusts, crickets and grasshoppers; it is a long-horned grasshopper *Euconocephalus roberti*. It is apparently quite common in Samoa and has also been found in Fiji and Tonga but not in New Zealand. Long-horned grasshoppers are so called because of their very long, slender antennae, thus distinguishing them from the short-horned grasshoppers and locusts which both have very short antennae.

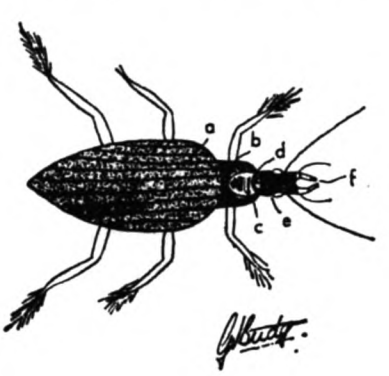
"The moth from Suva is a species of Sphingidae or Hawk Moths, called *Chromis erotus eras*. These moths have pointed wings and are extremely strong, fast fliers, hovering over flowers as they feed on the wing. Most are night flying. It is a mainly tropical family and is found in Samoa, Nuie and Tonga as well as Fiji.

"I have added these interesting specimens to our collection."

Black Sea

m.v. *Hertford*. Captain A. Britain. Durban to Constanta, Romania. Observers, Mr. G. A. Bridge, 3rd Officer and Mr. A. J. Rose, Chief Radio Officer.

31st May 1972. At 1000 GMT, while the ship was at anchor off Constanta, a seaman found a beetle whilst washing down the boat deck; he captured it and brought it up to the bridge. It was about 25 mm long and jet black. Body parts a, b and c were rigid together, all head movement being about the collar (d). The two pairs of feelers and the pincers (f) were in continual movement.



This seaman also made me aware of the presence of a cricket which was hiding itself just outside the Captain's accommodation, also on the boat deck. A cricket had sailed with us from Australia, making its home on the boat deck down inside the scupper just outside the Radio Officer's cabin. Mr. Rose had fed the cricket regularly with small pieces of bread which disappeared each time, so it was assumed that it enjoyed them. On inspecting the scupper at the above time the cricket was found to be missing so it was also assumed that this cricket was the same one. It was never seen again after this occasion so a further assumption is that it settled down to a new life in Romania.

Position of ship: 44° 10′N, 28° 39′E.

Note. Mr. P. M. Hammond of the Department of Entomology, Natural History Museum, comments:

"It is not possible to indicate with any certainty what species of beetle was observed from a study of the sketch, but it is likely that it belongs to the family Carabidae and quite possibly to the genus Carabus."

SOUTHERN RIGHT WHALE DOLPHINS

South Pacific Ocean

m.v. *Somerset*. Captain S. W. Lambrick. Gisborne, N.Z. to Balboa. Observers, the Master, Mr. R. C. Anderson, Chief Officer, Mr. R. Dowse, 2nd Officer, Mr. S. Walker, Extra 4th Engineer, Mr. P. Douel, Asst. Engineer and Mr. A. I. Scott, Cadet.

16th September 1972. At 2315 GMT a school of about 50 Southern Right Whale Dolphins was sighted ahead of the ship heading in a SE'ly direction. There was no mistaking them due to their lack of dorsal fin and their distinctive black and white markings. Also their beak-like snouts and finely tapered tails left no room for doubt. Identification was confirmed by reference to the article by Messrs. Jeffrey Boswall and Roderick Dobson in the July 1969 issue of *The Marine Observer*.

They appeared to be moving faster and jumping higher than the average dolphin. As the ship moved through the school, those on the port side stayed quite close to the ship for several minutes before heading off in a northerly direction. However, those on the starboard side kept right on in the same direction. Air temp. 10·2°C, sea 11·2°. (The sketch is by Mr. Scott.)

Position of ship: 38° 41'S, 142° 49'W.

Note. The report from the *Somerset* was sent to Mr. S. G. Brown of the Whale Research Unit, National Institute of Oceanography, who discusses this and other sightings in his article on page 78.

SQUID

Indian Ocean

s.s. *Hadra*. Captain J. D. Baty. Durban to Singapore. Observers, Mr. R. W. P. Jones, 3rd Officer, Mr. B. Pattemore, A.B. and Mr. J. Smith, 2nd Steward.

11th May 1972. At 0400 GMT the wind was SE'ly, force 4 and the vessel was shipping seas on deck. A squid was found just abaft the midship house, washing back and forth on deck, and was thought to have been there an hour or so as it was nearly dead. The sailor who found it brought it up to the bridge where, upon arrival, it was noticed that the nerves in the end of its tentacles were still functioning. It was laid upon a piece of chart paper alongside an 18-inch ruler and photographed by Mr. Smith with a polaroid camera (*see* photograph opposite page 56).

The length of the squid was 53 cm from its rear end to the end of its tentacles. The tentacles themselves measured 33 cm. The squid's body was dark mauve in colour tinged with brown whilst the underside was nearly white except for two or three streaks of mauve. In addition to the two long tentacles it had six others measuring about 9 cm. The main body and tail measured 19 cm and breadth 6 cm whilst the tail outspread measured 15 cm across. The weight of the creature was approx. 0·5 kg. It was later boiled and eaten by its captor.

Position of ship: 5° 50'S, 79° 00'E.

Note. Mr. J. F. Peake of the Department of Zoology, Natural History Museum, comments:
"The specimen has been identified as a young ommestrephid of the species *Symplectoteuthis ovalaniensis* which is the common squid coming to the surface at night in the Indian Ocean. Its near relatives occurring in the Atlantic are known to jump out of the water and glide."

SHARK

South Pacific Ocean

m.v. *Inverbank*. Captain A. J. Whiston. Panama to Auckland. Observers, the Master and ship's company.

6th June 1972. At about 1930 GMT, whilst the vessel was stopped and drifting, a shark was caught by the crew. It weighed 36 kg and was just over 180 cm in length from snout to tip of tail. It was dark grey/black with white under-belly and we think it may have been a female about to give birth. At about 1950 it was put back in the water and after some 5–10 min was seen to swim away in a SE'ly direction. The shark's skin was covered with many old scratch scars and healed cuts, most of these being just behind the head. No other shark sighted. Air temp. 30·0°C, sea 27·9°. Wind N'ly, force 3. Sea state slight with low S'ly swell.

Position of ship: 12° 13'S, 140° 40'W.

MARINE LIFE

North Atlantic Ocean

m.v. *Geestbay*. Captain G. Foster. Cristobal to Hamburg. Observer, Mr. J. R. Durnford, 2nd Officer.

17th May 1972. During the course of the morning and afternoon the calm conditions revealed an abundance of marine life. The ship was continually passing through areas containing large numbers of Portuguese men-of-war, both large and small. Their six tentacles were easily observable in the clear water close to the ship; those of the larger animals appeared to have tentacles some 120–150 cm long. Small fish and white objects appeared hovering around the tentacles. The sea surface was also covered with white objects resembling pieces of chalk and chalk-like pebbles. These varied in size from dots to about 10–12 cm long. In places they had gathered so as to form a scum on the surface.

Position of ship at 1800 GMT: 41° 12'N, 37° 00'W.

m.v. *Crystal Sapphire*. Captain D. Patrickson. Salt River, Jamaica to London. Observer, Mr. R. Newton, 3rd Officer.

21st–22nd June 1972. At 1920 GMT on the 21st several pods of pilot whales were observed, mainly in groups of 2 or 3 with many young whales; also a dead octopus, approx. size 107 cm, gulf weed in small fronds, shoals of flying fish and several Portuguese men-of-war on port tack heading west. Sea temp. 21·1°C. Course 058°T.

At 0800 next morning many individual Portuguese men-of-war were observed passing down both sides of the ship. Half an hour later the numbers began to increase and by 0840 the vessel passed through a patch of literally hundreds of these creatures, after which only the odd one or two were seen.

There was no surface wind at the time and only a very low, long swell, thus observation was easy. The majority of these creatures were between 8–15 cm in length, where the sail passed through the water surface. The top edges of this sail had a puckered appearance and rose about 6 cm above the surface and was of a light pink whereas the remainder was a transparent milky colour with dark vertical membranes. The main body directly beneath the surface seemed to be quite firm in substance though somewhat spread out. Tentacles, some of them quite thick, extended downwards for at least 90 cm, the whole of this portion being a bright deep purple. All the sails were set in the same direction; those that were touched

by the bow wave collapsed quickly. The leading edge of the convex side of the sail pointed to the westward. Sea temp. 22·2°C. Course 058°T.

Position of ship on 21st: 40° 17′N, 46° 28′W.

Position of ship on 22nd: 41° 45′N, 43° 15′W.

Note. Dr. P. F. S. Cornelius of the Department of Zoology, Natural History Museum, comments:

"The sightings of the Portuguese men-of-war are in normal latitudes for this species, but we are nevertheless pleased to have them so that one day they can be analysed along with other records."

Eastern North Atlantic

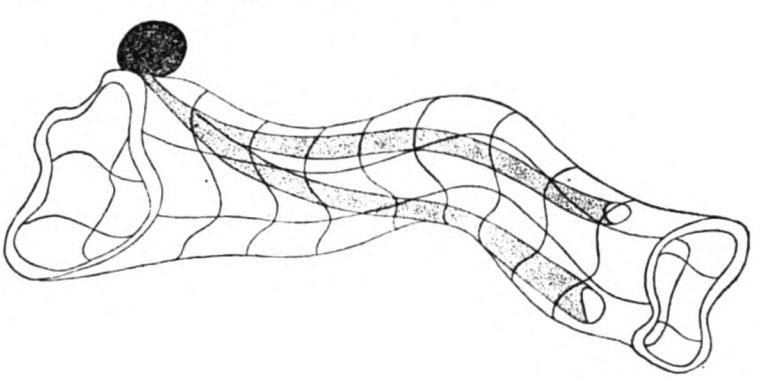
m.v. *Warwickshire.* Captain A. Hudson. Durban to Glasgow. Observer, Mr. R. Kuczynski, 3rd Officer.

27th April 1972. At 1300 GMT, while the vessel was stopped, several jelly-fish were observed in the immediate vicinity and one was caught. Length 23 cm; body diameter 5 cm when contracted, 10 cm when expanded. It was tubular in shape and approx. 46 cm thick. The head was spherical, 2 cm in diameter. When the 'jelly-fish' was in its natural habitat the head was seen as a tiny dark-brown ball attached to a faint rectangular shape (the body) which, on closer examination, proved to be tubular, composed of a jelly-like substance.

As shown in the sketch, the two opaque tubes which tapered towards and were attached to the head extended to within 2·5 cm of the opposite end of the protective transparent body. The head was identical in construction to the yolk of an egg but much firmer. The body was similar to a honeycomb pattern and, to the touch, there was a definite ridge of jelly as if the whole had been glued together piece by piece.

When floating, the head was lowest in the water while the body extended upwards to within about 2 cm of the surface. Propulsion was by contraction of the body; this appeared to be governed by the two opaque tubes, the ends of which touched when the body contracted to its smallest diameter.

Position of ship at 1200: 23° 39′N, 17° 12′W.



Note. Miss A. M. Clark of the Echinoderm and Protochordate Sections, Department of Zoology, Natural History Museum, comments:

"The 'jelly-fish' was in fact a large salp. These animals have an alternation during their life history from solitary form to aggregate form and I think that the specimen observed was one of the latter since the nucleus (described as the head) was projecting from the side of one end. It contains the coiled gut. The two 'opaque tubes' leading from it are the gill bar and the endostyle which, respectively, circulate the sea-water flowing through the tubular body and produce mucus to trap edible particles in the water, then passed back to the gut. The whole body is propelled by circular muscles (shown as lines in the drawing) which contract in collaboration with closing of the anterior terminal opening or siphon to produce a form of jet propulsion.

"I cannot make any guesses about the genus involved from this drawing. Most of them have a very wide distribution. Thank you for the information. I was interested in the observation about the honeycomb-like construction. I have never had the chance to see large salps alive and, after years in formalin, I do not go out of my way to handle them."

BIOLUMINESCENCE

Eastern South Atlantic

m.v. *Clan Macleod*. Captain E. E. R. Everitt. Lobito to Cape Town. Observers, the Master, Mr. A. J. Blackler, Chief Officer, Mr. M. J. Phillips, 3rd Officer and Mr. M. R. Line, Cadet.

30th May 1972. At 1545 GMT the sea was observed to have many streaks of dark-brown discoloration which subsequently became reddish until it became the colour of international orange paint. A sample was taken in the sea-temperature rubber bucket and poured into a clean beer glass. When a light was placed under the glass and the chart-room magnifying glass placed above, small jelly-like particles (transparent) and small hair-like objects about 5 mm long were observed floating in suspension in the water. After sunset and as twilight progressed, marine bioluminescence of a very natural green began to taint the edges of the wake and bow wave. As the vessel passed through the areas of discoloration, bioluminescence of such a deep green appeared and was at first taken to be a change in the colour of the water discoloration. It would become apparent some distance from the leading edge of the bow wave below the surface and become more distinct as it broke surface in a line along the leading edge. As darkness approached, the colour became a blinding brilliant green in the bow wave and wake. Further samples were taken when the discoloration was green/red and when it was full brilliant green. The same objects were noticed and in the darkness of the wheelhouse could be caused to 'phosphoresce' by knocking the glass. At times the colour of the bioluminescence changed from green to a turquoise-aquamarine in the bow wave. The radar and echo sounder were switched on and neither had any effect; the Aldis lamp was shone on the sea surface without effect.

Amongst the discoloration it was observed that there were many seals along with kelp, wood and grass. Bird life, however, which had been in profusion during the day, was now absent. A strong fishy smell was noticed at the onset of the discoloration but disappeared almost completely after dark. At 1905 the wind increased from calm to variable, force 1 and the ripples also showed brilliant flashes of light as they were flurried by the breeze. At 1713 the luminosity suddenly ceased. Sea temp. by bucket 17·0°C, by condenser intake 17·8°C. The samples were bottled and stored, awaiting the addition of formalin. Sample 1 was taken at 1555, sample 2 at 1620 and sample 3 at 1640. Sunset was at 1550.

After arrival in Cape Town the 3rd Officer telephoned Captain Smit of the Port Meteorological Office and was put in touch with Dr. Van Decker of the Marine Biology Department who kindly supplied the ship with a bottle of 38% formalin. A few drops of this were added to each sample at 1100 on 1st June.

Position of ship at 1550 on 30th: 32° 12'S, 17° 05'E.

Note. Dr. G. T. Boalch of The Laboratory, Citadel Hill, Plymouth, comments:

"The samples were taken off the west coast of South Africa, an area of upwelling and well known for its dense phytoplankton blooms. The most common organism in the samples was the dinoflagellate *Ceratium furca*. This belongs to a group of dinoflagellates which are known to be luminescent but it is unlikely that this organism could have caused the vivid displays described in the account from the *Clan Macleod*. There were some cells of the dinoflagellate *Noctiluca scintillans* present and this is known to cause extensive luminescence. Under calm conditions this organism floats close to the surface or even in the surface film and it may be that, when taking samples with a bucket from a moving ship, the surface film is swept out of the bucket and most of the *Noctiluca* lost. It is also possible that most of the *Noctiluca* in the sample died and disintegrated before the preservative was added next day.

"*Noctiluca* is illustrated in Plate IIIa and described on page 87 of *The Open Sea—The World of Plankton*, by A. C. Hardy, New Naturalist Series, Collins, London. It certainly appears as small jelly-like spheres and, when very abundant, gives a dirty-pink to rusty-brown colour to the water. It can be caused to luminesce by any mechanical disturbance such as tapping the sides of a vessel containing it.

"It may be worth adding here that most of the phenomena reported deal with organisms

on or near the surface film and these are difficult to sample from moving vessels and may even be lost when the sample bottles are filled from the bucket. Perhaps this problem should be mentioned to the officers of ships provided with sample bottles."

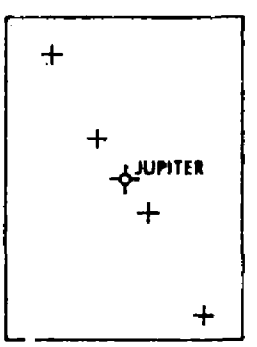
JUPITER'S SATELLITES

Eastern South Atlantic

s.s. *Encounter Bay*. Captain K. E. Howard. Hamburg to Fremantle. Observers, Mr. A. J. Fee, 2nd Officer, Mr. R. B. Redhead, Radio Officer and Mr. J. Bastable, Leading Seaman.

28th May 1972. At 2100 GMT (and SMT) Jupiter's four moons were observed clearly through binoculars, despite a full moon at the time. Their disposition around the planet was as shown in the sketch below. Altitude at time of observation was 23° 20′ approx., that of the moon 61° 00′ approx. These moons were observed clearly for at least 30 min through various optical aids before increasing cloud ($C_L 2$) obscured the planet. No medium or high clouds. Air temp. 21°C, wet bulb 17·2°.

Position of ship: 16° 42′S, 04° 09′E.



Note. Jupiter has twelve known satellites. The four brightest, reported in this observation, were the first new bodies discovered by the telescope and are normally bright enough to be seen easily with a good glass. They were discovered independently by Galileo and by Simon Marius in January 1610. The diameters of these four satellites are from about 4,000 to 38,000 km; the mean diameter of Jupiter itself is 139,700 km. The orbits of these four satellites are practically in the plane of Jupiter's equator and almost circular. There is evidence that they rotate at such a rate that they present the same face towards the planet and that the two larger ones may have thin atmospheres.

The fifth satellite was discovered by Barnard at the Lick Observatory, Mt. Hamilton, California in 1892; its diameter is probably about 160 km.

The other seven satellites were all discovered photographically between 1904 and 1951.

With the exception of the first four, the others are comparatively small bodies ranging from about 20 to 160 km in diameter. These small bodies are difficult to see at best, and the tenth and twelfth have never been observed except photographically. When Jupiter is nearest the Earth, these two are said to be about as bright as a candle flame at a distance of 5,000 km.

AURORA

The following notes have been received from Mrs. Mary Hallissey of the Aurora Survey:

"We acknowledge with thanks the auroral reports and sketches which we have received at the Balfour Stewart Auroral Laboratory of the University of Edinburgh from British ships for the three months April–June 1972. These are listed briefly below.

"There were two periods of notably high geomagnetic activity during these months, 15th–16th May and 17th–19th June, the index figure 8 being recorded in each instance. But, at both times, lack of darkness limited the amount of observation possible and cloudy conditions hampered observations from those mid-latitudes where there was a period of complete darkness.

"On 15th/16th May the aurora appeared as a short-lived outburst, associated with a sudden upsurge of magnetic activity in the seventh 3-hourly period of 15th June. Reports received were all from land-based observers between 2220 h and 0020 h, red rays being seen to the zenith over southern Scotland.

"The activity of 17th–19th June was more prolonged, dying down midway through the 19th, and giving an unexpected last kick early on 20th June. A convinced observer's report of aurora from central England at 0100 h on 20th June was at first assumed to refer to a display of noctilucent cloud, widely reported at the time, but a conveniently timed photograph by another observer proved our assumption to be wrong and the observer's conviction well founded.

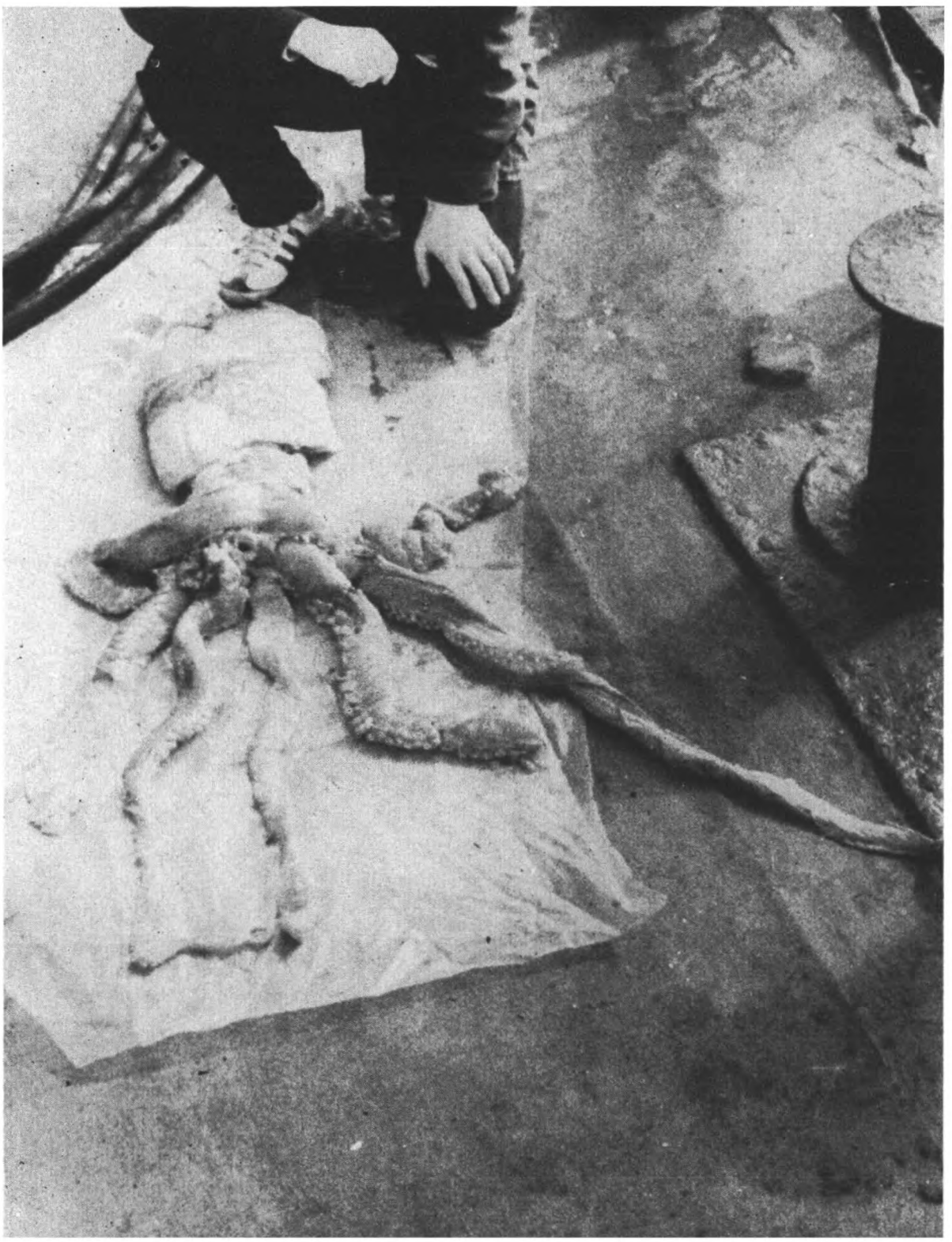
"The quiet homogeneous arc observed by the 2nd Officer of the *Acavus* and the quiet arc with a burst of rayed activity observed from the *Orenda Bridge* were associated with only low and moderate activity respectively. Height measurements from the observers for the quiet arcs enabled us to assess their overhead position—in each case somewhat south of the auroral zone—while the height of the rayed form placed it a further two degrees (geomagnetic) to the south. Cloudless skies and excellent visibility provided the viewing conditions we would all wish to experience."

Date (1972)	Ship	Geographic Position		Λ	Φ	I	Time (GMT)	Forms
1st April	*Weather Surveyor*	58°59′N	19°42′W	070	65	+73	2330–0015	N
2nd	*Weather Surveyor*	58°47′N	19°10′W	070	65	+73	2241–2333	N
7th	*Weather Surveyor*	59°00′N	19°00′W	070	65	+73	2239–2327	N
9th	*Weather Surveyor*	59°00′N	18°45′W	070	65	+73	0042–0222	N
13th	*Weather Surveyor*	58°55′N	18°40′W	070	65	+73	2233–0015	N
2nd May	*Orenda Bridge*	49°19′N	64°28′W	010	61	+76	0215–0230	RB, HA
3rd	*Weather Adviser*	58°36′N	18°54′W	070	65	+73	0001	N
24th	*Acavus*	48°56′N	67°51′W	360	61	+76	0500–0630	HA

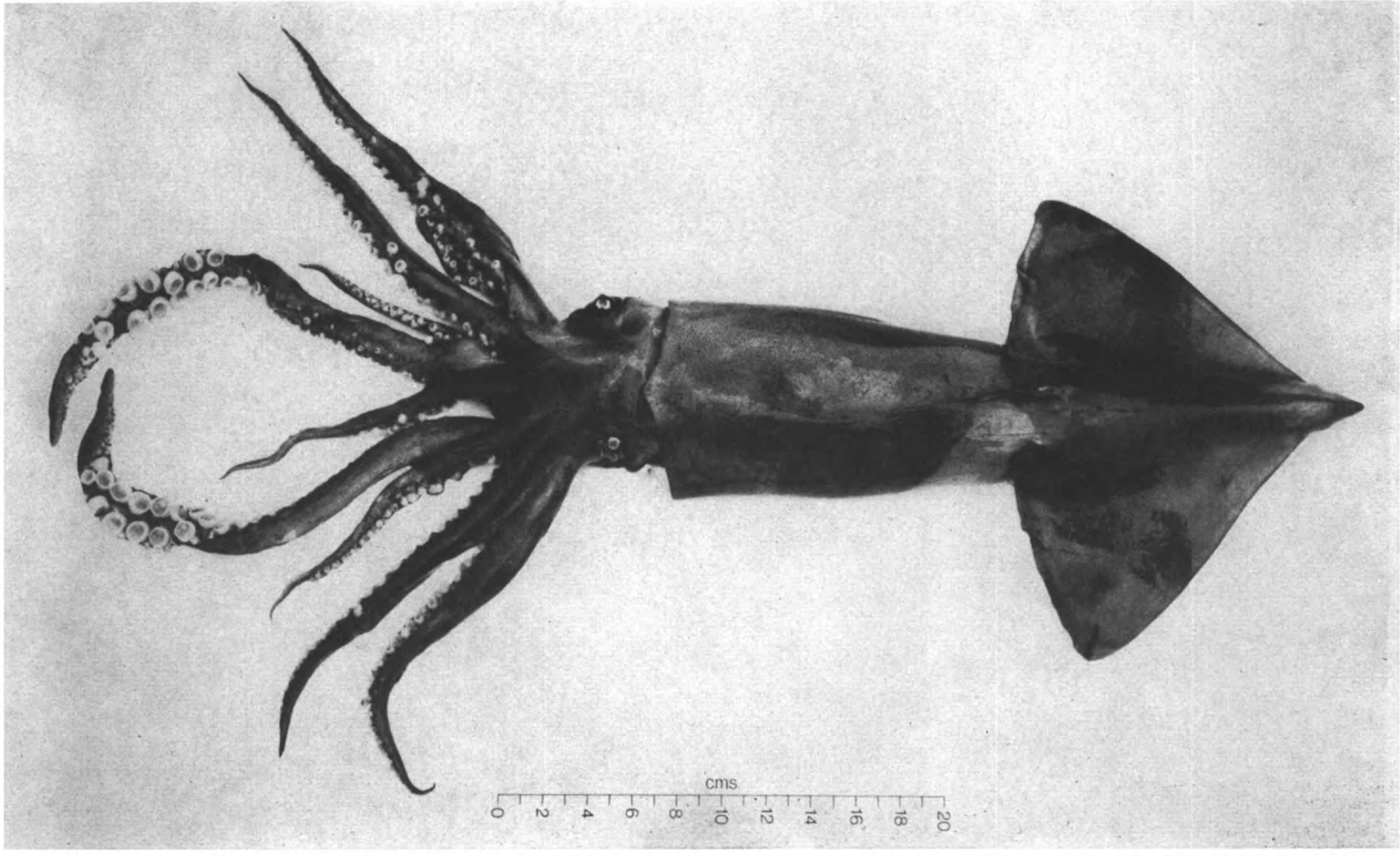
Key: Λ = geomagnetic longitude; Φ = geomagnetic latitude; I = inclination; HA = homogeneous arc; RB = rayed band; N = unidentified auroral form.

(*Opposite page* 72)

The Longhurst/Hardy Plankton Recorder being launched from an Ocean Weather Ship (*see* page 76).



Giant Squid (*Architeuthis dux*), actual size *c.* 183 cm (*see* page 76).



A Squid (*Todarodes sagittatus*), actual size 61 cm (*see* page 77).

Photo by T. S. Bain

(*Opposite page 73*)

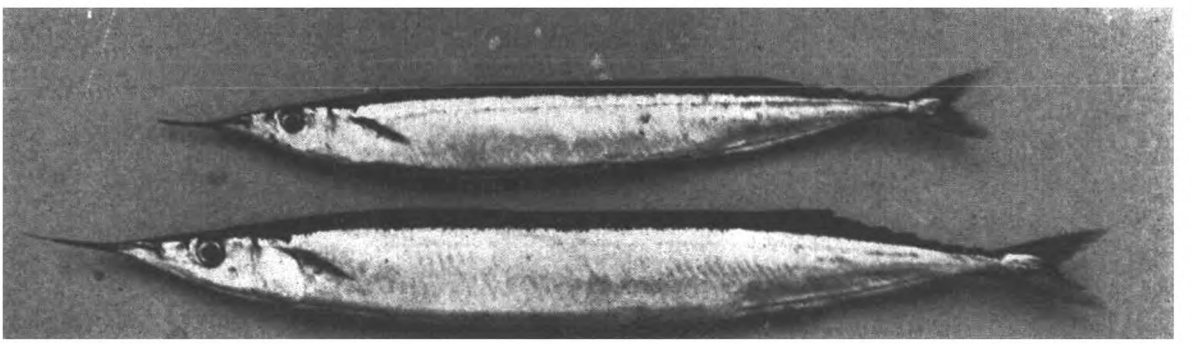


Photo by T. S. Bain

Saury Pike or Skipper (*Scombresox saurus*), actual size 20–25 cm (*see* page 77).

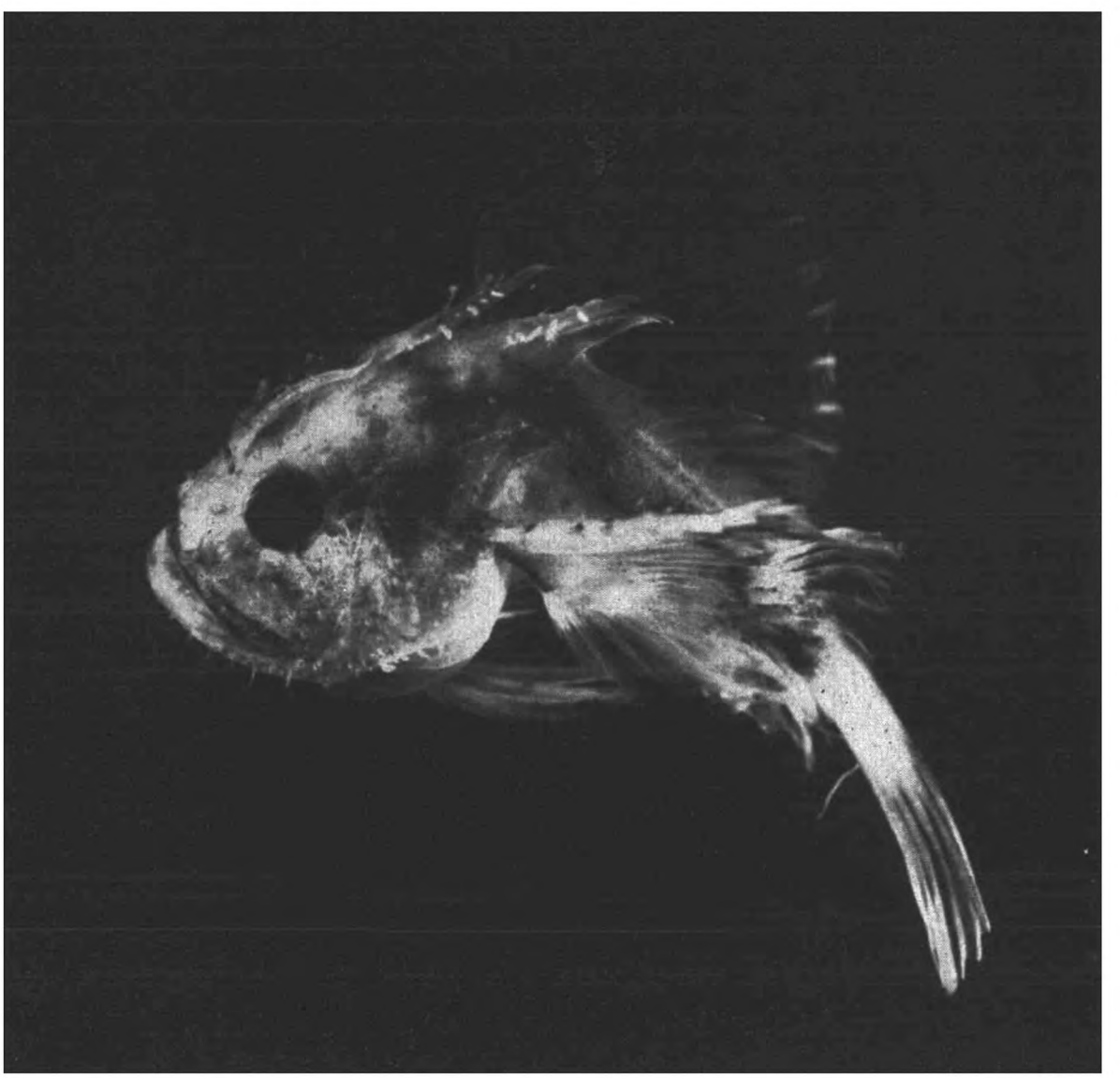


Photo by T. S. Bain

A young Angler Fish (*Lophius piscatorius*), actual size 6 cm (*see* page 77).

551.507.22:577.413

Marine Biology and the Ocean Weather Ships

By D. H. Jones
(Institute for Marine Environmental Research, Edinburgh)

A scientific partnership began in a small way twenty-five years ago. On the one hand there was the Ocean Weather Ship service of the Meteorological Office, interested in synoptic surveys of the atmosphere and, on the other hand, the Department of Oceanography of the University of Hull, interested in synoptic surveys of plankton in the sea. The friendly co-operation between them has not only continued up to the present day but, over recent years, it has expanded to the point where research biologists studying the ecology of plankton in the North Atlantic have sailed frequently on British Weather Ships during their routine tours of duty to Station 'India'.

In 1950 the work of the Department of Oceanography at Hull was transferred to the Scottish Marine Biological Association who established the Oceanographic Laboratory at Edinburgh. This, in turn, became the first unit of the Institute for Marine Environmental Research (IMER) which was formed in 1970 by the Natural Environment Research Council (NERC).

The primary objective of the laboratory during the whole of this period has been to study changes in the abundance, distribution and composition of plankton in samples collected each month along standard shipping routes in the North Sea and the North Atlantic. The apparatus used to collect these samples is based on a machine originally designed by Sir Alister Hardy for collecting plankton in the Antarctic seas during a cruise of the *Discovery* between 1925 and 1927. It filters out of the water a continuous sample of plankton for a distance of up to 500 miles without requiring any attention and is called the Hardy Continuous Plankton Recorder (see Fig. 1).

The initial steps in the development of a synoptic survey of marine plankton began during the decade before World War II and sampling was confined to the North Sea with the exception of a few brief months in 1939 when, in addition, samples were taken on a route between the north of Scotland and Reykjavik. When the survey recommenced after the war it became apparent that the Weather Ship service was ideally placed to be of considerable help in the collection of regular samples from the eastern Atlantic. Not only were the stations well situated, but the ships that manned them travelled out to station and back to base at intervals of roughly one month, a factor of the greatest importance to the routine nature of this survey.

In November 1947 the *Weather Recorder* collected the first samples on a voyage out to Station 'Juliett' and in January 1948 she repeated the procedure on her voyage to Station 'India'. During subsequent years not only other British Weather Ships, but ships of the Dutch and Norwegian Weather Services joined in this invaluable work and enabled samples to be collected at monthly intervals throughout each year between British or European coastal waters and all five weather stations in the eastern and north-central Atlantic (see Fig. 2).

These Weather Ship routes provided the first major expansion of the survey into the North Atlantic although further routes have subsequently extended sampling westwards and, more recently, southwards into the northern edge of subtropical waters. Extension of the survey into these areas was made possible through the co-operation of commercial shipping companies who maintain regular services between Europe and North America and also through the co-operation of American Coast Guard Cutters on passage to weather stations in the western Atlantic. From its small beginnings in the North Sea, when the Continuous Plankton Recorder was towed for just a few thousand miles each year, the survey has grown annually until, in 1971, the equivalent figure was 130,000 miles.

An interest in life in the sea has always been widespread amongst the crews of

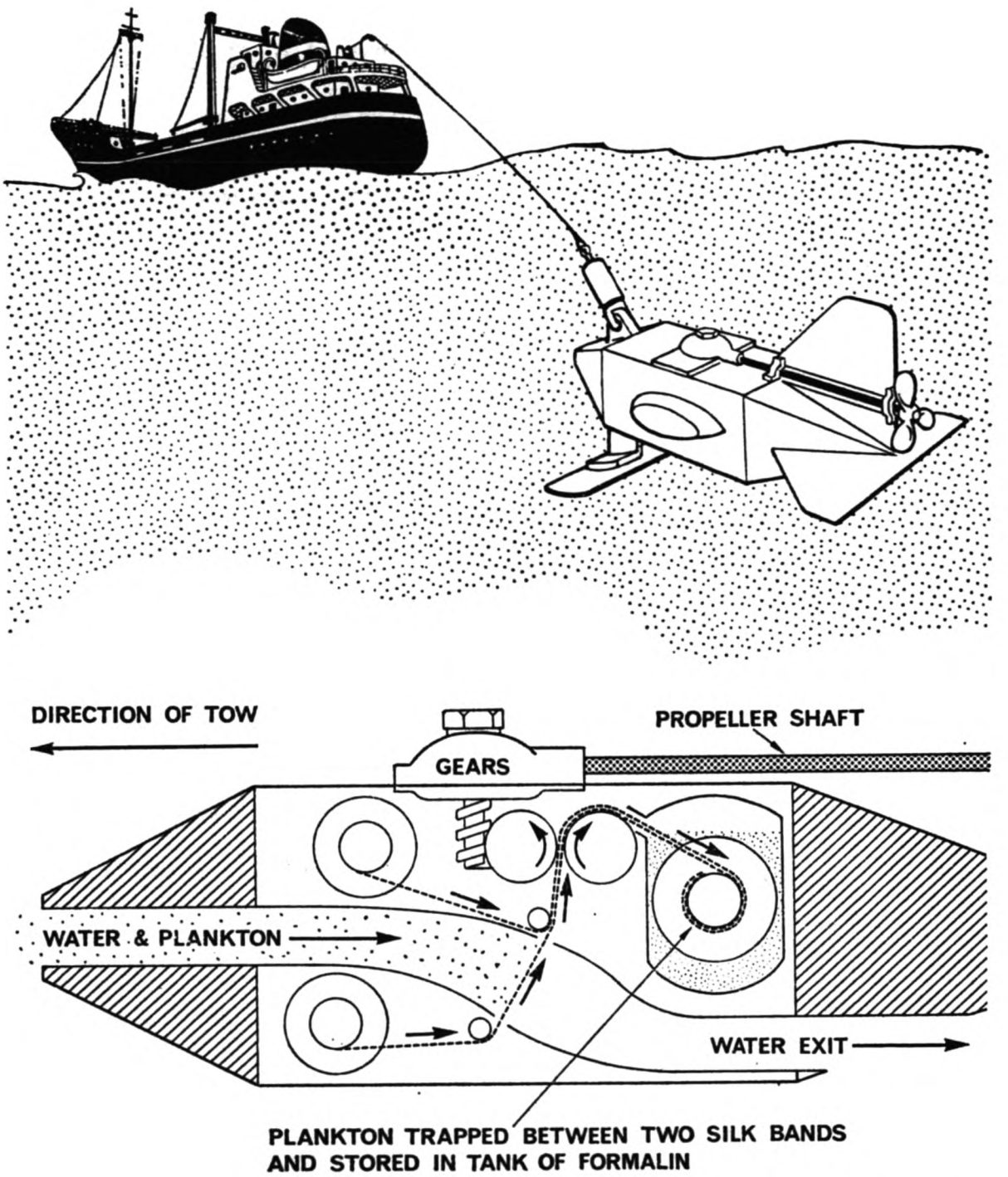


Fig. 1. The Hardy Continuous Plankton Recorder: (above) **being towed from the stern of the ship at the standard depth of 10 m and** (below) **showing the method by which the machine filters plankton from the water and stores it in a tank of preservative.**

Weather Ships and this may well have been stimulated by the towing of the Continuous Plankton Recorder and may also have been encouraged by watching the weekly collection of net samples on station. The latter were taken on behalf of the Ministry of Agriculture, Fisheries and Food for many years, although now they are taken for IMER. Certainly, something stimulated a growth of interest in plankton and fish because, from the early days of co-operation between the Weather Ship Service and the Oceanographic Laboratory, there has been an exchange of question and answer between ship and shore and, over the years, much valuable information and many interesting specimens have been provided through the efforts of the officers and crews.

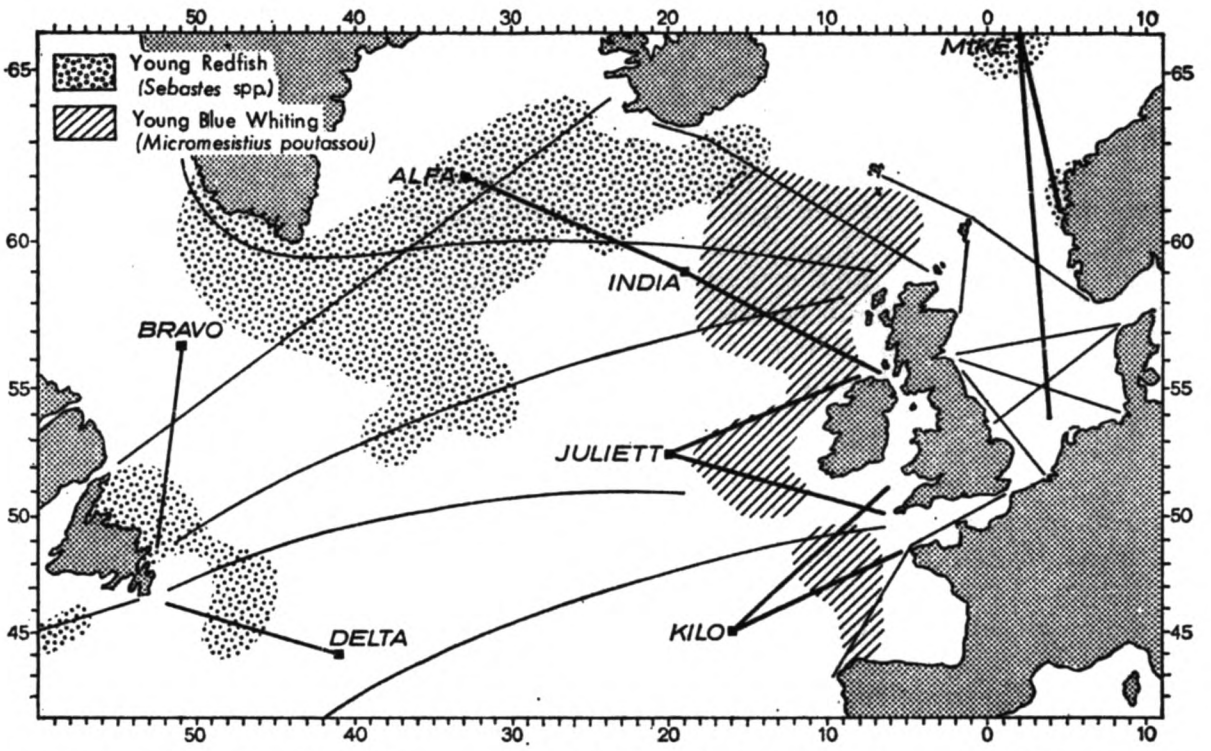


Fig. 2. A chart of the North Sea and North Atlantic to show the routes along which the Continuous Plankton Recorders are towed every month, and to show the areas in which young Redfish and young Blue Whiting are abundant.

Among the most exciting revelations that have resulted from the collection of continuous plankton samples has been the discovery in the North Atlantic of two very extensive fish spawning grounds, one of the Blue Whiting (*Micromesistius poutassou*) and the other of Redfish (*Sebastes* spp.). The former extends from south of Station 'Juliett' to the north and east of Station 'India' and the latter from west and north of Station 'India' to west and south of Station 'Alfa'. The samples taken by weather ships between the Clyde and Stations 'India' and 'Juliett' and those taken between Station 'India' and Station 'Alfa' have played an extremely important part in determining the extent, density and seasonal occurrence of these young fish (see Fig. 2). A doubt concerning the correct identification of the young Redfish arose about 1960 and, hearing that the Norwegian Weather Ship crews had successfully fished for adult Redfish on Station 'Alfa', a programme of regular angling for these fish was planned by the Oceanographic Laboratory, believing that the fish caught there must be the parent stock of the young specimens found in the plankton samples. With the generous and willing co-operation of the whole Weather Ship Service (British, Dutch, Norwegian and French) this programme was maintained through every month between April 1962 and March 1965. The perseverence of the crew who acted as fishermen under what at times were very miserable and uncomfortable conditions was well rewarded and a considerable amount of very useful and valuable information was obtained about the life-history, structure, food, parasites and reproduction of the Redfish. This is the kind of information needed by scientists in order to assess the importance of a fish stock in the biological economy of the sea.

It was during this angling programme that the first member of staff from the Oceanographic Laboratory was signed on for a cruise and learnt something of the pleasures and the discomforts of a month at sea in the North Atlantic. This cruise to Station 'Alfa' was made during the sub-Arctic summer and provided some insight into the severe conditions that are likely to occur at these latitudes during the depths of winter. This occasion turned out to be a further stage in the development of closer co-operation between the two organizations and heralded an increase in the collection and delivery of specimens and in the return of answers to queries. Much

of this was done by letter or telephone, but the rare visits of biologists to the Weather Ships were treated as occasions for an inquisitorial grilling by some of the crew—in the pleasantest manner, of course.

Visitors were liable to find themselves incarcerated in a cabin, surrounded by enthusiastic questioners and plied with a rapid-fire series of enquiries, many of which showed a penetrating insight into the ways of life in the sea and some of which may have given the interrogated scientist a new angle of approach to a problem.

Recently, however, the development of a 'Weather Ship Programme' of research at the Edinburgh laboratory has, on many occasions, provided the crew with a captive scientist for the whole of a voyage to Station 'Juliett' or to Station 'India'. The full programme began in 1971 under the leadership of Mr. R. Williams and was continued through 1972, one member of staff from the Oceanographic Laboratory remaining on board for the duration of each of six cruises to Station 'India' in each year. The purpose of this programme is to carry out biological, chemical and physical sampling both 'on passage' and 'on station'. Such sampling includes the collection of plankton from depths down to 500 metres, the estimation of 'primary production' by measuring the uptake of radioactive carbon by phytoplankton and the collection of further samples of plankton and fish to be tested in the laboratory for pesticide residues and other toxic materials. Like the special studies of Redfish, the objective here is to advance our knowledge of the economy of the sea by estimating the balance sheet of materials and energy involved in biological production in mid-ocean.

To carry out this extensive programme it has been necessary to take on board at the beginning of each cruise a variety of equipment of which the most sophisticated was a modified continuous plankton-sampling device (the Longhurst/Hardy Plankton Recorder, *see* photograph opposite page 72). This takes discrete samples at a fixed time interval and records at the same time the temperature and depth at which the samples are collected.

Other equipment used includes standard plankton nets and a series of reversing water bottles which take samples of water from a range of 9 depths (surface to 200 metres) the samples being used for the measurement of salinity, for chemical analyses of nutrients and other substances and for providing samples of phytoplankton. The work involved in using such equipment makes it necessary to have considerable help from the Captains, Chief Officers and various members of the crew so that it is possible to co-ordinate the biological, physical and chemical programme with the main programme of meteorological work, the principal function of the Weather Ships. One cannot speak too generously of the way in which everyone aboard the ships helps to do this. If initially some of them were dismayed, as well they may have been, by the vast amount of equipment delivered to the quayside, all supposedly for the use of one biologist, they hid their thoughts well. Adequate working space, a very necessary part of the biologist's requirements, was readily made available and also, that most important part of the exercise to the laboratory-orientated scientist, ship's hospitality in all senses of the word was generously offered.

In addition to the knowledge gained from these long-term programmes, the Oceanographic Laboratory has been provided with considerable interest and much information from the unusual or the genuinely rare specimens that have been caught and sent to them, generally from waters that are not fished commercially and which are rarely, if ever, sampled by research vessels. Examples of such specimens include young Gadoid fish from Station 'India', previously recorded in the North Atlantic only from east Greenland waters; specimens of young fish thought to belong to the family Moridae that have apparently never before been seen or described; a Dagger-Tooth (*Anotopterus pharao*) and a Deep-Sea Angler (*Ceratias holboelli*)[1] from Station 'Alfa', both of which are considerable rarities. Last year, at Station 'India', a dead specimen of the Giant Squid, *Architeuthis dux* was found floating

and partially eaten by Fulmars (*see* photograph following page 72). This was only a young, small specimen, something over 183 centimetres long and weighing perhaps 45 kilograms when alive; had it been full-grown it might have weighed ten times this, or more. Besides all these rarities, many specimens of fish and plankton of better-known species have been received at the laboratory and have proved very useful for investigations carried out there or have been passed to experts at other establishments such as the British Museum (Natural History), the Royal Scottish Museum or the National Institute of Oceanography. In this way the Oceanographic Laboratory has been able to act as a clearing house, discovering who is interested in specimens of a particular type or from a particular area and dispatching those sent from the Weather Ships to the appropriate place and person. (Some specimens are shown in the photographs following page 72 and opposite pages 73, 80 and 81.)

Marine biology has thus benefitted in two ways from the help given by the Weather Ship Service; first, by the non-routine collection of a variety of material and information by enthusiastic and interested individuals, and second, by the long-term routine collection of plankton and water samples during the voyage and on station.

The contribution made by the Weather Ships to the North Atlantic plankton survey is so great that it is practically immeasurable. The programme has attracted world-wide recognition and a considerable part of the success that it has gained stems from the close co-operation between the Edinburgh Laboratory and the Marine Superintendents, Shore Captains and their staff, Captains, Officers and crews of all the ships, each of whom has helped in various ways to maintain the necessary programme of sampling over many years.

In the present time of change in the mercantile shipping world where both routes and individual ships are frequently altering by reason of sale, charter and containerization, the consistency of routes, ships and personnel provided by the Weather Ships has ensured the all-important continuity of sampling which is the basis of the plankton survey.

Weather ships are research platforms of the greatest possible importance in many aspects of oceanography—biological, physical and chemical. At a time when we are all becoming increasing conscious of the need to monitor pollutants throughout the world, it may be that Weather Ships have a new and increasingly useful role to play in this sphere; indeed, the collaborative programme at Station 'India' has started a few exploratory steps in this direction.

The staff of the Oceanographic Laboratory take this opportunity to acknowledge the debt that they owe to the Service, offering to everyone concerned their sincere thanks for all their help in the past and at the same time looking to continued and expanding co-operation in the future.

REFERENCE

1. JONES, D. H. A rare deep-sea Angler Fish from Weather Station 'Alfa'. *Mar Obsr, London*, **42**, No. 235, pp. 24–26.

599.5

Recent Sight Records of Southern Right Whale Dolphins in the Pacific Ocean

By S. G. Brown
(Whale Research Unit, National Institute of Oceanography)

In July 1969 *The Marine Observer* published an account by Boswall and Dobson[1] of a sighting of Southern Right Whale Dolphins (*Lissodelphis peroni*) in the Indian Ocean, together with two photographs of the animals at sea and stranded on a beach. This account doubtless stimulated observers to keep this species in mind when sighting dolphins and two records from the west coast of South America followed.[2,3] We have since received two more records of this species in the Pacific Ocean and it seems appropriate to list these recent sightings and to see what additional information on the distribution and biology of the species they may provide. Table 1 includes details of the four records concerned, together with an earlier sighting from H.M. Yacht *Britannia* noted briefly in the comment on the first record in the table.[2]

Table 1. Sightings of Southern Right Whale Dolphins in the Pacific Ocean

Ship	Date	Position	Estimated No. of Animals	Sea-surface Temp. °C
s.s. *Pizarro*	31 Jan. 1970	29° 35′s, 71° 45′w	20	18·3
s.s. *Pizarro*	17 Sept. 1970	18° 53′s, 71° 43′w	50	17·9
m.v. *Hertford*	15 Dec. 1971	46° 42′s, 155° 08′w	20	11·0
m.v. *Somerset*	16 Sept. 1972	38° 41′s, 142° 49′w	50	11·2
H.M.Y. *Britannia*	20 Dec. 1956	49° 28′s, 163° 56′w	14	—

There is no doubt that these five sight records all refer to the Southern Right Whale Dolphin. The observers of the four most recent records all provided detailed descriptions of the appearance and behaviour of the animals, and in one case (the *Somerset*) a sketch (see page 67), and they all checked their observations against the photographs published by Boswall and Dobson, or previous accounts. The animals sighted from the *Britannia* were identified from photographs published by Fraser.[4]

Distribution

Fraser's account of the species lists and plots on a chart all the records known to him from the first published description in 1804 up to 1952. He suggests that this dolphin probably ranges round the world in the southern hemisphere and that while "not entirely restricted to the West Wind Drift it appears to have some predilection for it, because, as shown in Fig. 4 [his chart], those records to the north of the Sub-tropical Convergence are for the most part close to that boundary, and except for one sight record there is no evidence that it penetrates into the Antarctic Ocean."

The sea-surface temperature at the Sub-tropical Convergence, the boundary between sub-tropical water to the north and sub-Antarctic water to the south, is approximately 11·5°C in the winter and 14·5°C in summer according to Deacon.[5] The records from the *Hertford*, *Somerset* and *Britannia* all lie close to the position of the convergence as plotted on Fraser's chart, the *Somerset* record being just to the north of it and the other two just to the south. The two recorded surface temperatures also agree in being below the boundary values.

The brief comments already published[2,3] on the two sightings off the west coast of South America from the *Pizarro* indicated that these two records lie further north than any previously published well-authenticated occurrences of the species,

and the presence of a cold current along the west coast was mentioned in this connection. Gunther, in his account of the Peru Coastal Current,[6] notes that the Sub-tropical Convergence, which lies along the 30°/32°S parallels in 95°/105°W, curves northwards on approaching the Chilean coast, being found as far north as 24°/26°S in 70°/71°W at the time of his survey (June 1931). The Peru Coastal Current itself extends northwards as far as about 5°S, with sea-surface temperatures of less than 18°C (approximately) close to the coast. The two *Pizarro* sightings are clearly from their positions and the recorded surface temperatures within the Peru Coastal Current, while the reported frequent occurrences of the species further south off the coast of the province of Concepción, Chile (approximately 36°S)[7] lie to the south of the Sub-tropical Convergence. It would be of considerable interest to know if the species occurs in the waters of the current throughout the year or whether there is a seasonal migration along the coast. Since the current extends as far north as 5°S, records from even more northerly positions than the present two would seem to be possible.

Fraser's account of the distribution of the species in relation to the Sub-tropical Convergence, together with the four recent records with sea-surface temperature data, indicate that this dolphin occurs in waters with a surface temperature of less than 11°C to about 18°C. However, he also gives records in the region of Cape Horn in positions on and south of the Antarctic Convergence (surface temperature 2°–5°C). Gaskin[8] lists sightings of twelve schools in the south-west Pacific Ocean in waters with surface temperatures ranging from 9° to 17°C and mentions large schools in New Zealand waters associated with surface temperatures of 15°–17°C. He also suggests that the distribution of this species, among others, off the east coast of New Zealand is "closely associated with certain temperature ranges and consequently with specific water masses and convergence regions". Assuming that these various records fully indicate the range of surface temperatures favoured by this species, they suggest that it may possibly occur in other regions of the southern hemisphere, similar to the Peru Coastal Current, where relatively cold water occurs well to the north of the Sub-tropical Convergence as, for example, in the Benguela Current off the South West African coast. There are, however, apparently as yet no records of the occurrence of this dolphin in South African waters, apart from a skull from the Cape of Good Hope which is doubtfully identified as belonging to this species.

Numbers in schools

The five sightings in Table 1 all include estimates of the number of animals present. The smallest number was 14; there were two schools of 20 and two of 50 animals, giving a mean school size of 30 animals.

Gaskin[8,9] gives some details of the number of animals present in schools of this species sighted in the south-west Pacific Ocean. Twelve schools contained 86 animals, a mean school size of 7 animals. Off New Zealand another twelve schools included numbers ranging from 3 and 5 animals to four schools estimated to contain over 200 (two schools), about 800, and over 1,000 animals. Boswall and Dobson's school included more than 500 and possibily up to 1,000 individuals.

It is evident that there can be a wide range of numbers of animals present in schools of this species. It would be interesting to know if the larger schools recorded are temporary aggregations of a number of smaller schools or whether they have a more permanent basis.

Behaviour

All the observers provided information on some aspects of the behaviour of this species. The behaviour of the animals in the presence of the vessel is mentioned in each case. Two of the schools were first sighted moving away from the vessel and they continued to do so while under observation. The other three schools approached

the vessels closely. In one case the dolphins approached closely on the port bow but did not cross the vessel's track. Another school passed alongside the vessel. The third school was sighted ahead of the vessel and moving in a south-easterly direction. As the ship moved through the school, the animals on the port side stayed quite close to the ship for several minutes before moving off in a northerly direction, while those on the starboard side continued on their south-easterly course.

In two instances the observers mentioned that the animals appeared to be moving faster and jumping higher out of the water than other dolphins they had seen. The observers of a third school thought that the animals were leaping to about the same height as other dolphins but much more frequently. It may be that these impressions are correct but it seems possible that the sleek appearance of the animal resulting from the absence of a dorsal fin, and the striking black and white colour pattern may produce an impression of greater speed of movement and higher jumping that is in fact the case.

A possible aberrantly coloured individual

The school of 20 animals seen from the *Hertford* included "one which was pure white all over". The colouring of the other animals in the school was normal. It is possible that this animal was a single individual of some other species, e.g. Risso's Dolphin (*Grampus griseus*) swimming with the school. However, it seems equally likely that it was a Southern Right Whale Dolphin with an aberrant colour pattern and it may have been an albino. Tobayama *et al.*[10] have recorded an abnormally coloured specimen of the Northern Right Whale Dolphin (*Lissodelphis borealis*) captured in a school of normally coloured animals in Japanese waters, and there are records of albinistic individuals of other dolphin species.

Acknowledgments

The author wishes to thank the masters of the vessels and all the observers concerned with these sightings; he much appreciates the trouble they have taken to provide detailed records. He is also indebted to Lt. Commander L. B. Philpott for his interest and for extracts from the meteorological logbooks of the vessels.

Dr. F. C. Fraser and Dr. N. A. Mackintosh very kindly read and commented on the typescript.

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(*Opposite page* 80)

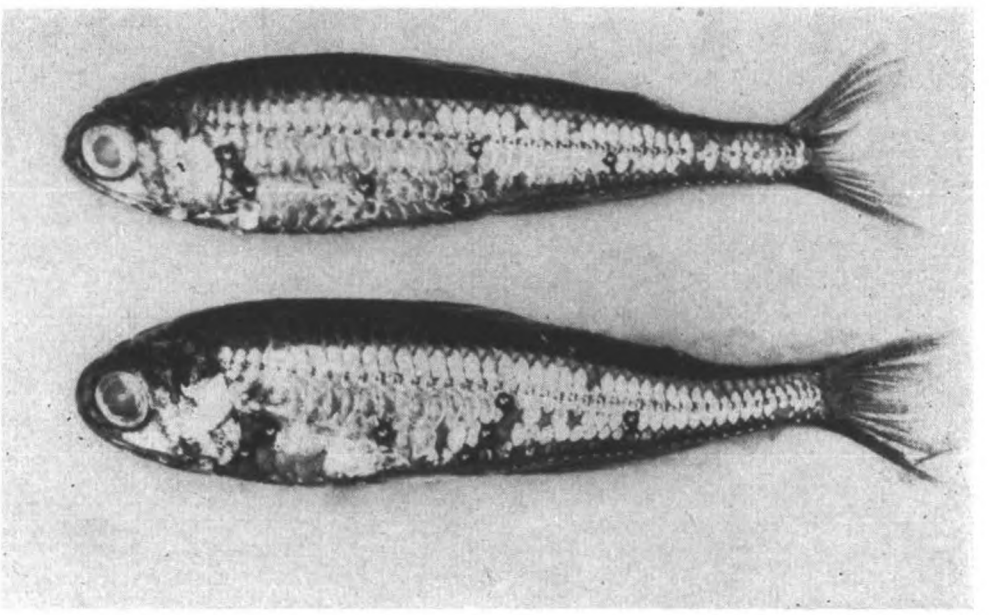


Photo by T. S. Bain

Lantern Fish (*Myctophum punctatum*), actual size 8–10 cm (*see* page 77).

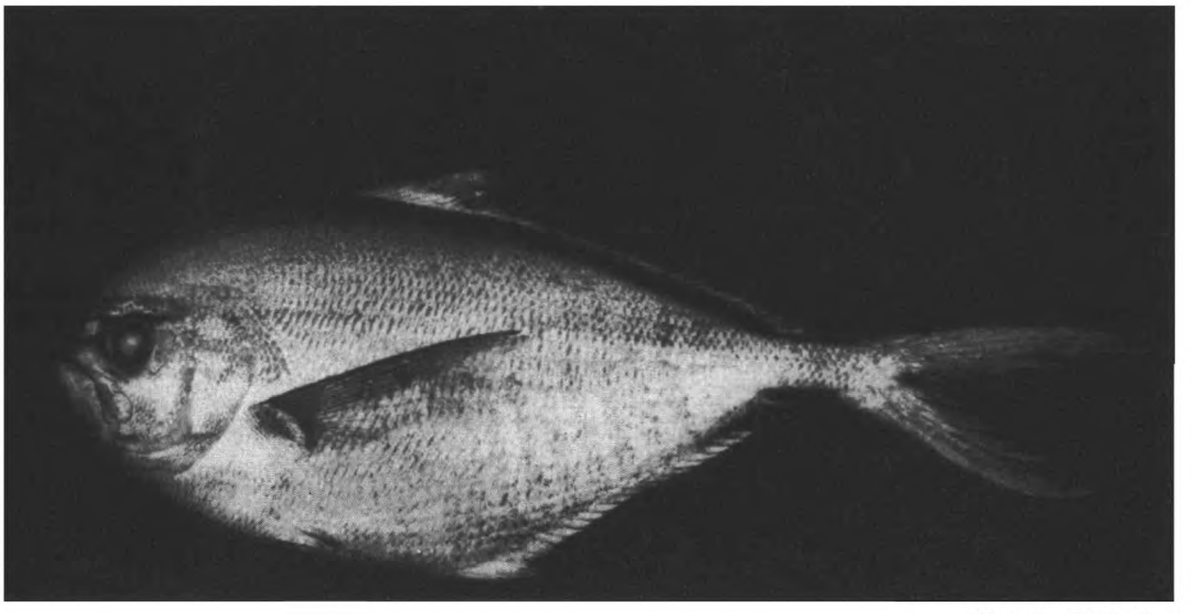
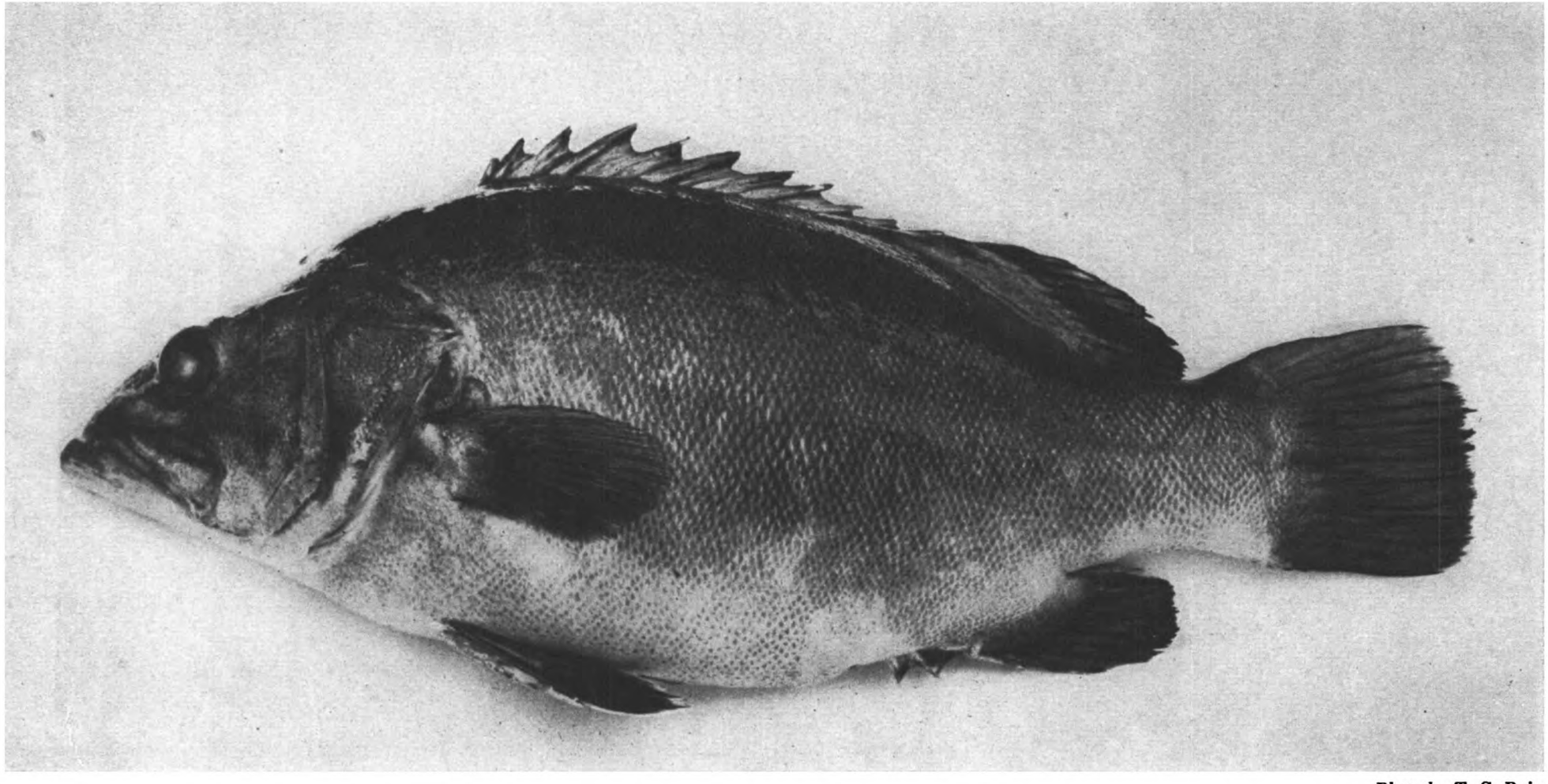


Photo by T. S. Bain

Ray's Bream (*Brama brama*), actual size *c.* 60 cm (*see* page 77).



(*Opposite page* 81)

Photo by T. S. Bain

A Wreck Fish (*Polyprion americanus*), actual size 76 cm (*see* page 77).

551.5:629.12:639.2

Support Vessels off Iceland during September and October 1972

By J. E. Bannister
(Meteorological Office)

A full account of the weather service to British trawlers off Iceland provided from the *Orsino* during the winter of 1968/69 has been given by D. P. Smith in *The Marine Observer*, January 1970. This 1,500-ton stern freezer trawler served as support ship off north-west Iceland for two successive winters, but in 1970 the Board of Trade (now the Department of Trade and Industry) purchased the *Miranda* for this purpose.

A ship suitable for operating off Iceland throughout the winter was difficult to find and, after several vessels had been rejected, the *Miranda* was eventually purchased in 1970 in Rotterdam at a relatively low cost. She is an ex-sailing ship built in Sweden, of approximately 1,500 tons with a strengthened bow, and had only shortly before had her large sailing masts removed. The extensive structural alterations required for her new role were carried out in Hull and early in 1971 the *Miranda* commenced her duties as support ship to distant-water British trawlers off Iceland. She bears little resemblance to her former graceful appearance as a sailing ship, although the beautifully flared bow still serves as a reminder of her original shape. A new and much enlarged bridge was constructed aft with a spacious Operations Room and extra accommodation was added with a completely new hospital built on the foredeck with sufficient beds for eight patients. No alterations could be made to the engine room and, although sufficient power is available for normal operating, a more powerful main engine would be an undoubted advantage in the really severe winter weather encountered at times off north Iceland. Her stability, in even the roughest weather, is never in doubt although the angle of roll was typical of that of a sailing ship and the excessive motion is a little alarming for the first few days on board.

In order to provide the meteorological services from the *Miranda* a number of instruments have been installed. An anemometer and wind vane are mounted on the main mast, with dials in the Operations Room. Dry- and wet-bulb resistance thermometers are mounted in screens on either side of the bridge, being read on a meter inside the Operations Room; in addition, mercury thermometers are also installed in the screens as a stand-by. A distant-reading hull sensor provides a means of obtaining the sea temperature. Two precision aneroid barometers and an open-scale barograph are also installed in the Operations Room. All these instruments provide the basis for the observing work carried out. In addition to this the forecaster on board the *Miranda* takes daily bathythermograph deep-sea temperature soundings which are undertaken primarily for the requirements of oceanographers; also, the results from a wave recorder are sent to the National Physical Laboratory.

A facsimile recorder in the Operations Room receives the latest analysis and forecast charts transmitted by the Meteorological Office from Bracknell. The radio room is very well equipped with powerful transmitters and receivers to enable a constant stream of meteorological data to be received throughout the 24 hours and the charts plotted from these data, together with the *Miranda* observations and facsimile charts, provide the basis for regular forecasts.

Under normal circumstances the *Orsino*, and later the *Miranda*, having weather as their prime concern, have been required during the winter months only when the combination of severe gales and sub-zero temperatures produce hazardous ice accretion. The season of operation has usually been five months, from the beginning of December to the end of April. During this period, whenever weather is forecast which would be dangerous for normal fishing operations, the Captain of the support

ship, who is an Inspector of H.M. Coastguard, keeps in close contact with British trawlers in the area and advises when and where to shelter. During the average winter off north Iceland any trawler in these waters may expect to spend at least one or two days sheltering during each two weeks' spell of fishing.

During 1972 circumstances changed because the Icelandic Government claimed to have extended the fishing limits off Iceland to 50 miles with effect from 1st September 1972. It remains the view of the United Kingdom Government that this extension has no basis in international law, and British trawlers have continued to fish in this area in accordance with the ruling given by the International Court of Justice on 17th August 1972 in response to the United Kingdom Government's application for interim relief measures.

British trawlers cannot now enter Icelandic ports without incurring the risk of almost certain arrest and a heavy fine. In effect they are denied the use of Icelandic shore-based facilities. The Government has therefore undertaken to ensure that two Safety/Medical Support Ships are constantly on station off Iceland to provide medical facilities for sick or injured trawlermen, and repair unserviceable equipment which is essential to the safety of the vessel. Under these conditions it was considered that the forecast service which would be provided by a meteorologist on board a support ship would make a very significant contribution to the safety of the trawlers operating in this area at all times of the year.

Until suitable ships could be refitted for the task the two Research Vessels *Cirolana* and *Scotia* were provided by the Fisheries Departments. Together with the *Miranda*, these three ships were deployed during September to the best advantage. In the meantime the *Othello* from Hull (a stern freezer of the same class as the *Orsino*) and the *Ranger Briseis* from North Shields (another freezer) had been chartered on behalf of the Ministry of Agriculture, Fisheries and Food and were undergoing various stages of refit to enable them to take over from the *Cirolana* and the *Scotia*, to allow these ships to return to their normal role of fisheries research.

Towards the end of August the *Miranda* sailed from Hull to take up station in the north-west and the *Cirolana* sailed from Grimsby for eastern Iceland. A temporary hospital had been constructed on the *Cirolana* and both vessels carried a doctor and nurse on board as well as specialist Electronics Officers to carry out repairs to electrical equipment essential to the safety of the trawlers. Although it was appreciated that the weather at this time was not so critical as during the winter a full complement of specialist officers, including a Meteorological Office forecaster, was carried from the start of the operation. In the event no meteorologist sailed on the *Miranda* from Hull but I volunteered to join the ship as early as possible in September.

My previous experience on the *Miranda* had been during January and February of the previous winter. As my full sea-going career prior to that had been limited to a few crossings on the Isle of Man steamer I originally volunteered for the job with some trepidation. However, I soon found that the excessive rolling motion did not cause any great discomfort. I enjoyed the work on board, the daily contact with the trawler skippers and, above all, being in close touch with the weather. The winter of 1971/72 was one of the mildest for 50 years, with the ice edge remaining nearly 60 miles off north-west Iceland, and no severe icing was experienced by any trawler around Iceland throughout the whole winter but similar conditions could hardly be expected again for 1972/73.

Under the circumstances, no support vessels could call at an Icelandic port for other than an emergency and, consequently, it was not possible for me to fly to Iceland to join the *Miranda*. British United Trawlers generously offered a passage on one of their trawlers and on 4th September I boarded the *Kingston Jade* in Hull. She departed at 1600 hours but when clear of the dock I discovered that, due to a misunderstanding, the *Kingston Jade* was bound for south-east Iceland, whereas my destination was the north-west. So at 1800 hours I found myself on the pilot boat

back in Hull. Three days later I boarded the *Lorenzo* and once again set off for Icelandic waters. I was made very welcome by the skipper, Mr. George Smith, from whom I learnt much about fishing during the next few days, and I was glad of this opportunity to see the workings of a small side-trawler for the first time. The *Lorenzo* is typical of so many of the 20-year-old side-trawlers which have formed the backbone of the British fishing industry for many years but which are now being gradually replaced by stern-trawlers.

Encountering rather rough weather around the Faeroes, the journey took nearly four days to eastern Iceland, where many trawlers were fishing, but the *Lorenzo* kept steaming northwards, intending to proceed along the north coast towards the area in which the *Miranda* was operating. However, whilst off the north-eastern tip of Iceland, which was completely clear of trawlers, Skipper Smith reckoned that there might be large shoals of cod arriving at that time of the year. So, when fish were picked up on the fishgraph, he lost no time in putting his net down. For the following two days the *Lorenzo* had the area virtually to herself and, although I was interested to be able to watch the catching of fish, it was also a frustrating time, being close to the *Miranda* but unable to get on board. I had been in contact with her but, as she was unable to proceed out of her allotted area off north-west Iceland, I then contacted the *Cirolana*. She was with the larger number of ships in the east but was, at that time, steaming northwards towards us, along with these ships.

I transferred to the *Cirolana* on 12th September and a rendezvous was arranged with the *Miranda* for the following day, work permitting. Most of the fishing fleet had now moved into the Melrakka area off north-east Iceland and early next morning the *Cirolana* received two calls for medical assistance, both patients being taken on board. My transfer to the *Miranda* had been arranged for 1600 hours that day but, due to the deterioration of one of these patients, this arrangement was cancelled and the *Cirolana* had to proceed to the nearest hospital at Akureyri. No British support vessel had yet called at an Icelandic port since the dispute began and we were naturally uncertain as to what our reception might be, although this could be classed only as an emergency visit. It was after midnight by the time the long fjord approaching Akureyri had been negotiated; no welcoming party was apparent but the requested ambulance was waiting on the quayside. The patient was quickly transferred to hospital and, half an hour after arriving, the *Cirolana* was making her way back to the main fleet, towards which the *Miranda* was steaming.

The rendezvous with the *Miranda* took place on the evening of 14th September, ten days after I had left Hull for the first time. I was glad to find that many of the crew were those with whom I had sailed the previous winter and I was cordially welcomed aboard by Commander Charles Adams. The total crew strength of the *Miranda* numbers 35, of whom 28 are supplied by Ellerman Lines. The exceptions to these are the Commander, who is a senior Coastguard Officer, the radio staff of four, supplied by Marconi and very ably led by the Electronics Officer, Mr. R. Vinall, a doctor and myself.

The general routine of work was much as I had experienced previously, with the exception that twice-daily round-ups of all trawlers were not now carried out. Although the earlier practice of painting out their names and identification numbers had ceased, the trawlermen understandably did not wish to advertise their presence and position too openly to the Icelandic coastguards. The meteorological data were received by W/T on a selected wave-length from Portishead. This information, which was received throughout the 24 hours, consisted of three-hourly observations from Iceland, Greenland, Jan Mayen, Faeroes, Ocean Weather Stations 'Alfa', 'Bravo', 'India' and 'Mike', together with any other reporting ships in the Iceland area. These observations were collated by the Communications Branch at Bracknell and then sent by land-line to Portishead, together with a short forecast and outlook prepared by the Central Forecasting Office at six-hourly inter-

vals for the following 12 hours around Iceland. Good communications were the most essential part of the whole operation and it is to the credit of all the radio staff that a complete breakdown of the system was never experienced.

The observations were plotted on board and a continuous sequence of three-hourly charts drawn up; in addition, the meteorological information was supplemented by the radio facsimile on which the programme from Bracknell GFE was taken. Forecasts were prepared specifically for the areas in which the ships were known to be operating, and were broadcast personally to the trawlers twice daily at 0940 and 2140, or more frequently if the situation warranted this action. The forecast was issued in the form of a brief résumé of the synoptic situation, an informal chat about probable developments and the general confidence in the weather prospects, followed by a formal forecast at dictation speed. At times of poor radio reception the forecast was passed in morse to the support ship on the eastern side, and re-broadcast at 1003 and 2003 respectively. Any other weather queries were then dealt with. These were usually requests for forecasts for the homeward voyage covering four days, for which the latest Bracknell medium-range forecast proved helpful. Meteorological observations were taken every three hours and, in addition to Bracknell, these were also passed to the Meteorological Office at Reykjavík. Relations between the British and Icelandic Meteorological Services have always been extremely good and I saw no reason why the present dispute should alter that relationship. The observations did, of course, supply the Icelandic coastguards with an easy way of checking *Miranda*'s position, but this was considered to be of no importance since the Support Ships are engaged on humanitarian operations concerned with the safety of life at sea and do not infringe the Icelandic regulations.

The first few days on the *Miranda* passed without incident. Several calls were received for medical treatment but there were no serious cases and all were dealt with by the doctors being transferred to the trawlers. Winds remained south-westerly, Force 4–7 during this time and, although winds of this strength cause no trouble to normal fishing operations, the difference between a Force 5 and Force 6 or 7 can be quite critical for transfers at sea. Hence a great interest was taken in the forecasts. With a sea track, winds could be forecast with a fairly high degree of accuracy but, with winds blowing from the mountainous land, local effects could be very marked and in such cases the local knowledge I had gained during the early part of the year proved useful.

The first call for assistance from a foreign ship was received on 16th September when the Færoese trawler *Skalaberg* reported her radar unserviceable and requested help from the *Miranda*. This was soon put in order by the Electronics Officer, who returned with large quantities of cigarettes and an enormous halibut which must have been worth over £50 at current market prices.

Although Icelandic gunboats had been active prior to my joining the *Miranda*, all remained quiet until 20th September when the *Odinn* steamed into the north-west area and ordered all skippers to cease fishing west of 23°W (i.e. west of Cape Horn). Despite threats of having their nets cut, the trawler skippers refused to haul in their gear; meanwhile the *Miranda* remained close to both the trawlers and the gunboat, at the same time ensuring that her position could not be misconstrued as protecting the trawlers involved. After dark the *Odinn* returned towards Ísafjördhur and was not seen again for two days. On the 22nd the *Miranda* was keeping close company with seven trawlers off Kópanes, south-west of the Cape, and had carried out a radar repair during the afternoon when the *Odinn* arrived to issue warnings once again. That evening, after further warnings had been ignored, the *Odinn* made an unsuccessful attempt to cut the warps of the *Starella* but succeeded in cutting those on the *Kennedy*. The *Wyre Captain* was then caught on her own and the *Odinn* cut both her warps before returning to within the 12-mile limit. These incidents had been unpleasant to watch but, as support ship, we were unable to take any protective action, such as placing ourselves between the trawlers and gunboat because such action would have exceeded the duties of the support vessels and prejudiced

the success of the support operation. Our role was to report the facts as quickly and accurately as possible to London.

Next day all trawlers had deserted the north-west and so the *Miranda* followed the ships towards the north-east area where the majority of the ships were operating. Several icebergs were noticed off the north coast, which I found rather surprising at this time of the year, especially in view of the previous exceptionally mild winter. These bergs were now melting quickly and appeared to be well anchored to the bottom as their positions had remained constant during the previous ten days. The sea temperatures were very high on the western side of Iceland, where the warm Irminger Current had brought a tongue of warmer water, being between 9° and 10°C as far north as Cape Horn; consequently there was a marked sea-temperature gradient along the north coast. An interesting sea-temperature anomaly occurred to the west of the Cape in the warmer water, where a narrow tongue of water between 2 and 3 degC colder than the surrounding sea was recorded. At first this was assumed to be just an isolated patch of cold water, probably caused by a large melting iceberg, but when this persisted in the same place throughout the next week another explanation was sought. The position coincided with a deep narrow trench on the sea-bed, where the depth increased from 128 to about 238 metres and hence it was assumed that this was an example of upwelling.

On 24th September the *Scotia* relieved the *Cirolana* in the eastern area and steamed north to meet the *Miranda*. For the previous four weeks the *Miranda* had been acting as support ship in the north and north-west and during her spell of duty 63 visits had been made to trawlers. She was now due for a refit in Hull before sailing again for Icelandic waters towards the end of November.

I transferred to the *Scotia* on the 25th with no break in the normal forecast routine. As for a brief period she would be the only British support vessel around Iceland it was decided that we should remain amongst the main fishing fleet on the eastern side. Several German support ships were operating in the area at this time and their three-hourly observations proved very useful, but their exact role was never clear as few, if any, German trawlers appeared to be within the 50-mile limit.

The *Scotia* is a well-appointed ship, barely one year old, which normally undertakes fishery research for the Ministry of Agriculture and Fisheries for Scotland. The meteorological equipment on board was similar to that on the *Miranda*. I was welcomed aboard by Captain G. M. Coull and lost no time in getting down to the normal routine of plotting charts and maintaining a continual watch on the weather throughout the 24 hours. Strictly speaking, of course, this is an impossible task for one man; when the weather was fairly settled, the usual daily routine began about 0700 hours with the plotting of the overnight data in preparation for the 0940 forecast, and ended at 2200 hours after the evening forecast had been broadcast. The observations between midnight and 0600 were carried out by the bridge watch-keeping officers; however, if any severe weather was occurring or the forecast was much in doubt, it was always advisable to have a further check (which could be lengthy) during the middle of the night.

About 62 trawlers were reported to be operating around Iceland at this time and all but two or three were on the eastern side. Consequently, with such a large number of ships so close together, much of the time was taken up with medical visits or essential safety repairs. On 2nd October one patient had to be transferred to the nearest hospital, which was at Nordfjord, a small town on the easternmost tip of Iceland. The patient was sent on the pilot boat which had come out to meet us and within three hours of transferring the casualty the *Scotia* was back amongst the main fleet.

I soon found that the weather was quite different from that experienced around Cape Horn and it seemed that almost any wind blowing from between south-east and south-south-west soon produced fog banks—a phenomenon rarely experienced at this time of year in the north-west. Local effects were again very noticeable, particularly with strong winds from a south-west or westerly direction which are either

diverted by, or blow over, the Vatnajökull ice-field. This vast area of permanent ice covers much of south-east Iceland, rising to a height of 2,073 metres. A good example of this local effect occurred on 30th September when a strong, mild, south-westerly flow covered much of Iceland as a depression transferred across the country from the west; on the *Scotia* south-westerly winds of Force 8 to 9 were experienced for most of the day, whereas several trawlers some twenty miles to the north reported winds of Force 2 or 3 only.

On 7th October the *Cirolana* returned to eastern Iceland and on the 9th the *Scotia* received orders to proceed towards the north-west position where about eight trawlers were known to be operating. No gunboats had been sighted since the 22nd September and, although the *Odinn* had been observed patrolling in the area since 12th October, no further incidents took place. The last week was one of almost continuous gales as a succession of depressions moved north-eastwards through the Denmark Strait, causing many trawlers to seek shelter. After the five weeks of relatively good weather which we had experienced it appeared that winter was beginning to close in on north-west Iceland. After handing over to the *Othello* at 1000 hours on 16th October, the *Scotia* made quick progress on the homeward journey, aided by a quiet spell of anticyclonic weather, and my tour of duty ended when she finally berthed at Leith on the morning of 19th October 1972.

Apart from the general satisfaction that one has when a useful and at times difficult job has been successfully completed, the voyage in general was an experience that will long remain in my memory. The genuine appreciation shown by many of the trawler skippers was reward enough in itself.

A CENTURY OF VOLUNTARY OBSERVING—THE DONALDSON LINE

Our annual pictorial series of ships of one ownership covering a century of voluntary observing is continued opposite page 57 with three pictures of observing ships belonging to the Donaldson Line.

Our association with this company goes back to 15th August 1870 when our instruments were put aboard the *Santona*, the subject of our first picture.

She was an iron ship of 855 gross tons, built in 1869 by Dobie & Co. of Govan. Donaldson's trade in those days was mainly between the Clyde and Valparaiso, general cargo out (and it is written that the standing orders were that the holds had to be so well stowed that there was to be "no room left for even one matchbox") and wool, grain, hides and nitrates home. It was on such a voyage that the *Santona* was lost with all hands when rounding the Horn in 1891. Her first meteorological logbook had been received here on 4th August 1871.

In those days, more than a century ago, we also had one other Donaldson Line ship observing for us; she was the *Colorado*, a composite barque of 546 tons built in 1865 by A. McMillan & Son of Dumbarton; she also was lost in the vicinity of the Horn, in the Straits of Le Maire in July 1887.

Our second photograph, representing a middle period of about 50 years ago, is of the *Cassandra*. She was a steamer of 8,135 gross tons, built in 1906 by Scotts Shipbuilding & Engineering Co. Ltd. of Greenock. Her trade was between the Clyde and Canada, she had accommodation for 250 cabin passengers and 950 emigrants and had a trial speed of 14¾ knots. During World War I she rescued from Tory Island 700 passengers who had got ashore from the torpedoed *Californian*. She was later converted to a cargo ship and fitted for the carriage of cattle, her name being changed to *Carmia*. Her last meteorological logbook was received here in December 1924 and in December 1929 she was sold out of the company.

The Donaldson Line is happily still represented in our Voluntary Observing Fleet by their one ship, a second *Santona*, the subject of our last picture taken when she was leaving Aberdeen for Glasgow on her trial voyage. She is a steamer of 3,218 gross tons, built in 1958 by Messrs. Hall Russell & Co. Ltd. of Aberdeen. She joined the Voluntary Observing Fleet in 1966 and is employed on the trade between U.K. and the Canadian Great Lakes.

We would like to place on record our appreciation of the voluntary services which so many masters and officers in the Donaldson Line have given us over the past century. When they went into the West Coast of South America trade, the meteorology of their run was virtually unknown whilst since they went into the Canadian trade and especially since the coming of wireless telegraphy 60 years ago, their Western Ocean observations have been invaluable. It is worthy of note also that three of our present six Port Meteorological Officers served in Donaldson Line ships.

We would thank the company also for the loan of their house history from which, with their permission, we have copied the pictures of the first *Santona* and the *Cassandra* together with the text relating to all three ships. For the photograph of the second *Santona* we are indebted to Messrs. Hall Russell & Co. Ltd., her builders.

L. B. P.

ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM OCTOBER TO DECEMBER 1972

The charts on pages 89 to 91 display the actual and normal ice edges (4/10 cover), sea-surface and air temperatures and surface-pressure anomalies (departures from the mean) so that the abnormality of any month may be readily observed. (The wind anomaly bears the same relationship to lines of equal pressure anomaly as wind does to isobars. Buys-Ballot's law can therefore be applied to determine the direction of the wind anomaly.) Southern and eastern iceberg limits will be displayed during the iceberg season (roughly February to July). In any month when sightings have been abnormally frequent (or infrequent) this will be discussed briefly in the text.

The periods used for the normals are as follows. Ice: Eurasian sector, all data up to 1956,[1] North American sector, 1952–56 (for north of 68°N)[1] and all data up to 1963 (for south of 68°N).[2] Surface pressure: 1951–66.[3] Air temperature, 1951–60.[4] Sea-surface temperature: area north of 68°N, 1854–1914 and 1920–50,[5] area south of 68°N, 1854–1958.[2]

October

As a natural consequence of a cold summer season over eastern and central Canada and due to the cold north-westerly wind anomaly throughout this month, excessive ice conditions became established in Hudson Bay and Strait. The excess off south-east Baffin Island is attributed to the fact that last winter's ice failed to clear in this region, thus facilitating the rapid formation of new ice under the influence of a cold south-westerly anomaly. The deficit in the north of Baffin Bay is due to the warm southerly anomaly over that region. The presence of large quantities of glacier ice has probably contributed to the early formation of ice off south-east Greenland where a cold south-westerly anomaly prevailed.

The main ice deficit is located in the Barents and Kara Seas where a warm westerly anomaly predominated.

November

The persistence of very cold conditions over eastern Canada is reflected in the excessive ice conditions which are yet again a feature of this region. The excess in the Denmark Strait is simply due to the effect of the northerly wind anomaly. A strong south-easterly anomaly prevailed over the Barents Sea so that, although ice conditions in the south-east recovered to near normal, a considerable deficit was maintained in the north.

DECEMBER

Over eastern Canada even colder conditions became established as the north-westerly wind anomaly increased in strength, resulting in a substantially increased ice excess. The ice edge off Newfoundland is not only far beyond normal, it lies about 120 miles further south-east than any known extreme limit. It is of interest to note that last winter's severe conditions off eastern Canada began in December when, although the meteorological conditions were similar to those of this month, the ice edge limit off Newfoundland lay about 250 miles further north-west!

Under the influence of an easterly wind anomaly the ice edge retreated near to its normal position in the Denmark Strait. Though normal (north-easterly) wind conditions prevailed over the Barents Sea, air temperatures remained above normal, thus maintaining the deficit in that region. The prevalence of a warm west to north-west anomaly accounts for the ice deficit in the White Sea and in the Baltic.

R. M. S.

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2. Washington, D.C., U.S. Naval Oceanographic Office. Oceanographic atlas of the North Atlantic Ocean. Pubn. No. 700, Section III: Ice, 1968.
3. London, Meteorological Office. Various publications.
4. Washington, D.C., U.S. Department of Commerce Weather Bureau. World weather records, 1951–60. Vol. 1: North America, 1965.
5. London, Meteorological Office. Monthly meteorological charts and sea surface current charts of the Greenland and Barents Seas. Met.O.575, 1966.

Baltic Ice Summary: October–December 1972

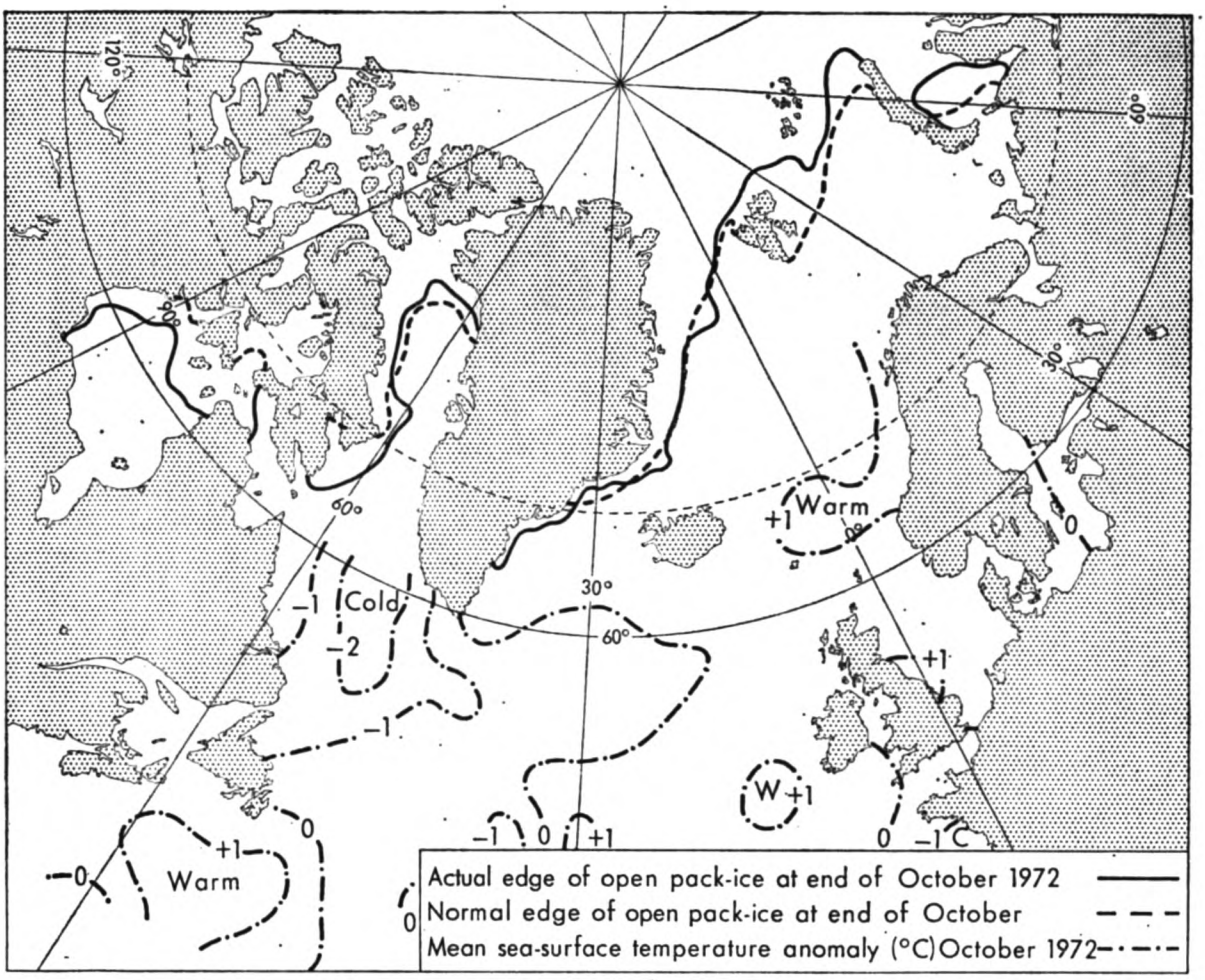
No ice was reported at the following stations during the period: Riga, Pyarnu, Ventspils, Tallin, Mariehamn, Turku, Mantyluoto, Roytaa, Bredskar, Sundsvall, Stockholm, Kalmar, Skelleftea, Göteborg, Visby, Emden Lubeck, Hamburg, Bremerhaven, Kiel, Flensburg, Gdansk, Stralsund, Rostock, Aarhus, Copenhagen, Oslo, Kristiansandfjord.

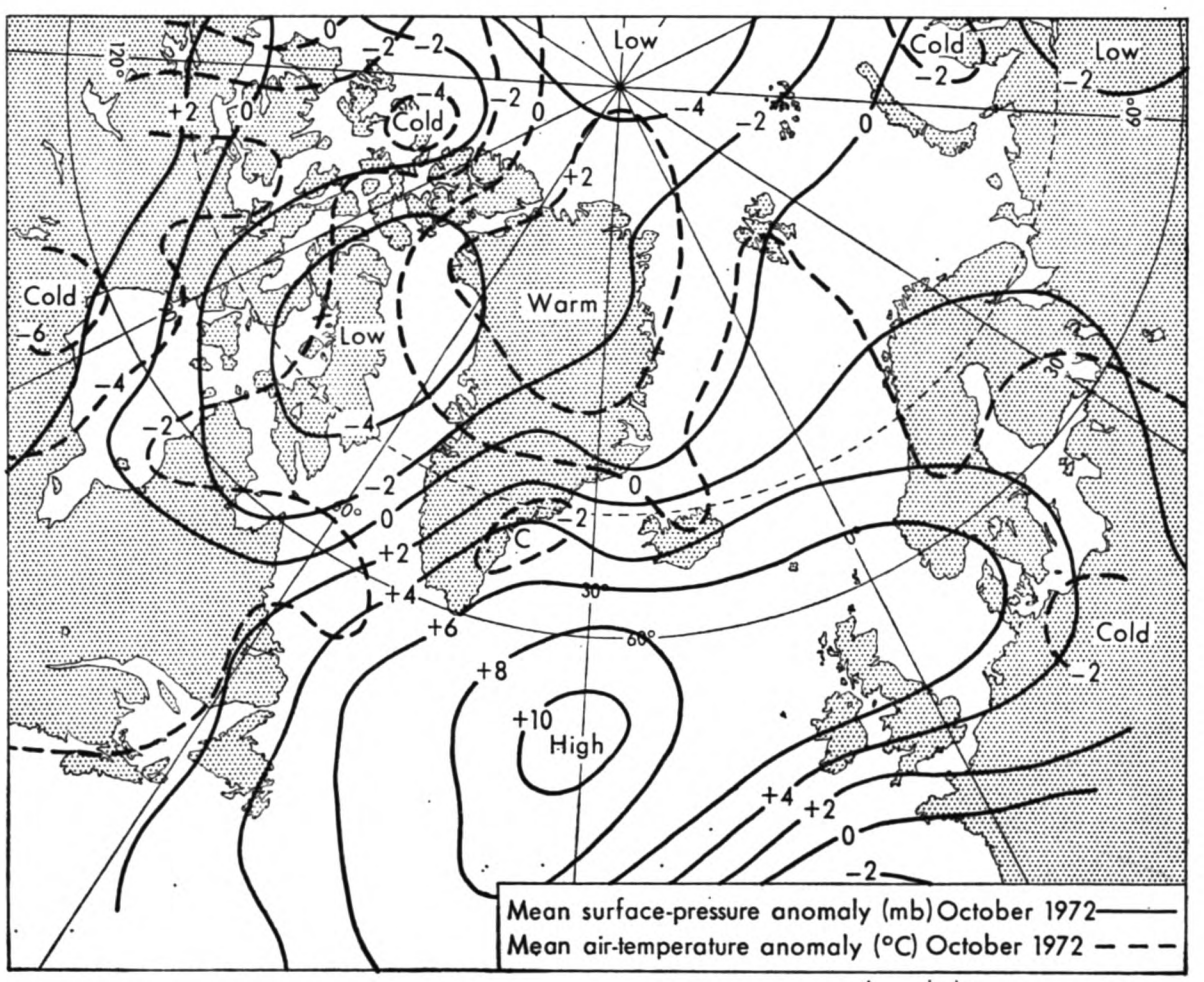
No ice was reported at any of the stations during October.

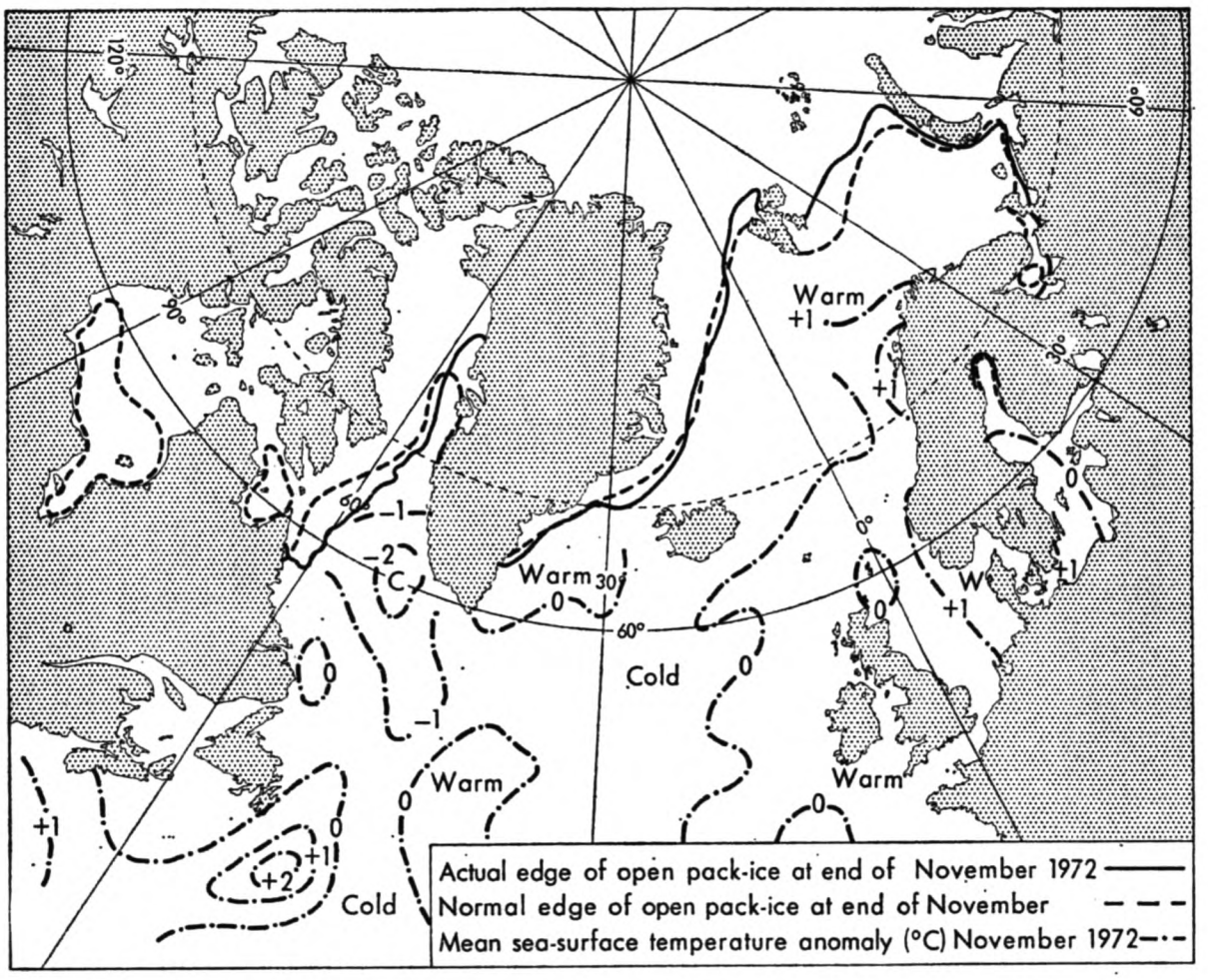
Station	November									December							
	Length of Season		Ice Days			Navigation Conditions			Accumulated Degree Days	Length of Season		Ice Days			Navigation Conditions			Accumulated Degree Days
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Leningrad ..	0	0	0	0	0	0	0	0	—	4	31	7	0	0	7	0	0	17
Viborg ..	0	0	0	0	0	0	0	0	—	4	31	7	4	0	7	0	0	—
Klaipeda ..	0	0	0	0	0	0	0	0	—	28	30	3	0	3	3	0	0	23
Helsinki ..	0	0	0	0	0	0	0	0	—	26	27	2	0	0	0	0	0	12
Vaasa ..	24	30	7	0	0	0	0	0	46	1	30	8	0	0	0	0	0	—
Oulu ..	15	30	15	7	0	4	6	0	162	1	31	31	31	0	0	31	0	157
Lulea ..	24	30	7	7	0	5	2	0	136	1	31	31	31	0	0	31	0	182
Stettin ..	0	0	0	0	0	0	0	0	—	28	31	4	0	0	1	0	0	33

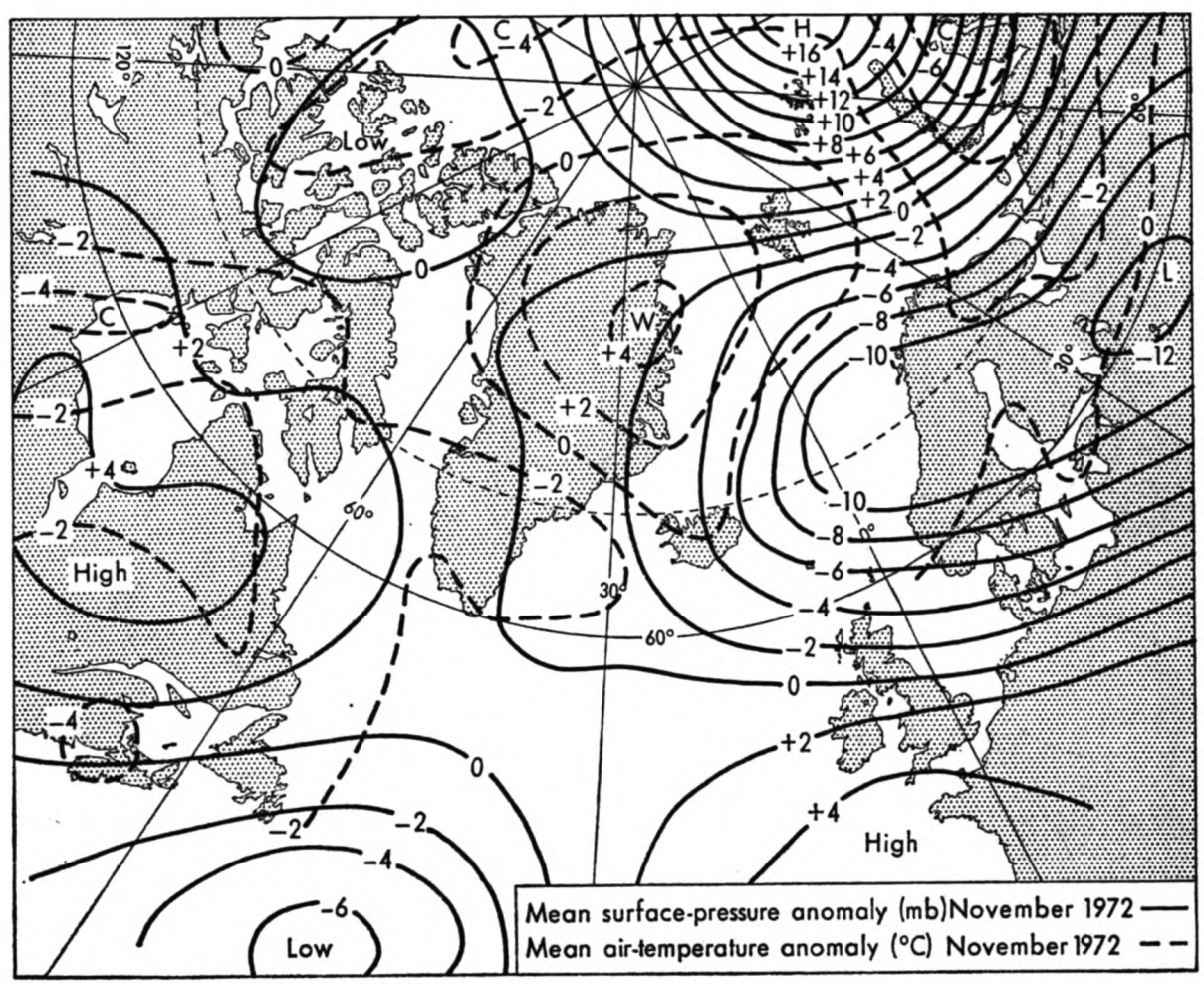
CODE:
A First day ice reported.
B Last day ice reported.
C No. of days that ice was reported.
D No. of days continuous land-fast ice.
E No. of days of pack-ice.
F No. of days dangerous to navigation, but assistance not required.
G No. of days assistance required.
H No. of days closed to navigation.
I Accumulated degree-days of air temperature (°C) where known.*

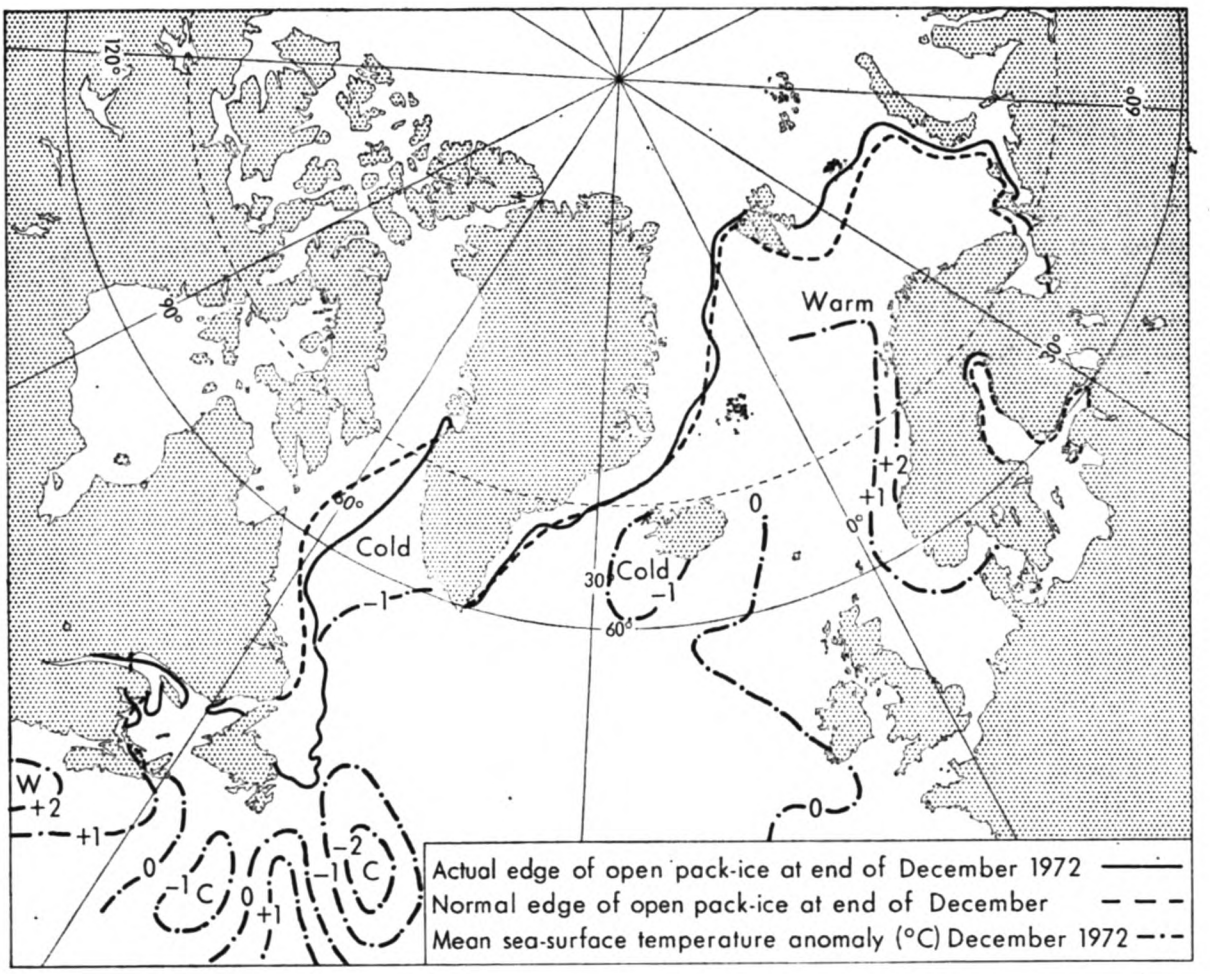
* These figures give a rough measure of the first probability of the formation of sea ice, and later the progress of the growth and its thickness. They are derived from daily averages of temperature (00 + 06 + 12 + 18 GMT) and are the sum of the number of the degrees Celsius below zero experienced each day during the period of sustained frost.

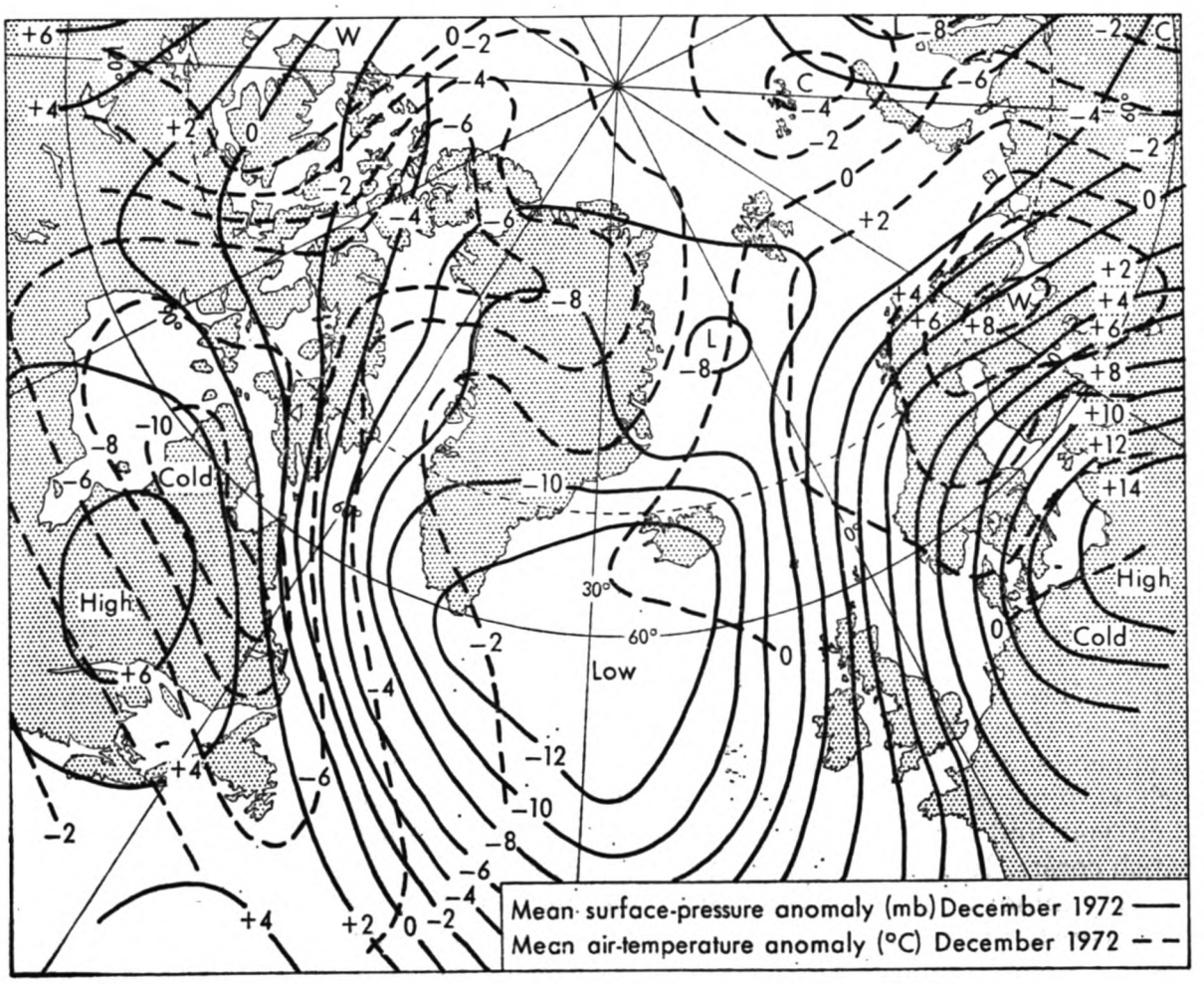

120°
60°
30°
Warm
Cold
+1
-1
-2
0
W
C
Actual edge of open pack-ice at end of October 1972
Normal edge of open pack-ice at end of October
Mean sea-surface temperature anomaly (°C) October 1972


Low
Cold
Warm
High
C
120°
60°
30°
Mean surface-pressure anomaly (mb) October 1972
Mean air-temperature anomaly (°C) October 1972


Warm
Cold
Warm
Warm
Cold
Warm
Actual edge of open pack-ice at end of November 1972
Normal edge of open pack-ice at end of November
Mean sea-surface temperature anomaly (°C) November 1972


Low
High
Low
High
Mean surface-pressure anomaly (mb)November 1972
Mean air-temperature anomaly (°C) November 1972


Warm
Cold
Cold
Actual edge of open pack-ice at end of December 1972
Normal edge of open pack-ice at end of December
Mean sea-surface temperature anomaly (°C) December 1972


Cold
High
Low
High
Cold
Mean surface-pressure anomaly (mb) December 1972
Mean air-temperature anomaly (°C) December 1972

Book Review

The Wreck Detectives, by Kendall McDonald. 222 mm × 146 mm, pp. 392, *illus.* George G. Harrap & Co. Ltd., 182–184 High Holborn, London WC1V 7AX, 1972. Price: £3·50.

The genesis of this book lies with the popularity of skin diving, an activity which opens up a whole new romantic world beneath the sea surface, not solely an ecological world but, around the coasts of the British Isles especially, a world of nautical history, for here have been located wrecks from the time of the Roman Emperor Domitian, identified by a coin minted in A.D. 88 or 89, through to the Torrey Canyon of 1967.

The popularity of the new sport naturally led to the formation of clubs in various towns, not necessarily by the sea, and these in turn led to the formation of a co-ordinating body, The British Sub-Aqua Club. In the 19 years of its existence, this body has produced 60,000 trained divers, all amateurs and all dedicated to the task of bringing to the surface and documenting all the knowledge which had been left on the sea bed in the sunken ships for, the author tells us, "No book or shipwright's plan now known can replace the underwater history books that lie untouched around the coasts of Britain."

Well might these enthusiasts be called wreck detectives for there is a lot more to it than diving, finding, hooking-on and bringing to the surface. To take the first case in the book (for no reason except that it comes first): after a wreck had been located in Mullion Cove, Cornwall, "we methodically covered every possible source of information, not only in Cornwall, but the whole country and several places in France and Germany. We covered manor rolls, court rolls, fine rolls, port books, letters in the Duchy of Cornwall office, papers in the Public Records Office relating to Admiralty rights of wreck, correspondence relating to Lord Admirals of Devon and Cornwall, patents concerning the manufacture of pins and a hundred and one other things. None of this brought us a single step nearer finding out what the ship was or when she sank but slowly a picture of what we had found emerged. We had located the wreck of a large, armed merchantman, one that had carried at least 26 guns of which 23 were 9 ft long, 22 pounders." This is a fair sample of the beginning of an adventure.

The author has not confined himself to the seeking and finding of a wreck, in most cases he gives us the story also of the circumstances which led to the disaster. There is, for instance, an admirable account of the gales of October 1707 in which Admiral Sir Cloudesley Shovell's ships were, almost without exception, driven ashore on the Scilly Islands with the loss of some 2,000 lives. Two hundred and fifty years later here was a rich field indeed for the skin diver. The Spanish Armada, too, has a large share in this book.

There are some wrecks which hold too many poignant memories to be touched as yet. In particular there are the submarines M1, lost off Start Point in 1925 and M2 lost off Portland in 1932. Skin divers do sometimes visit these hulls for practice but "take nothing from the wreck. They are only with them briefly, and when they have gone the steel tomb remains, a great pale outline in the gloom of the deep water."

The detective aspect of the book is maintained by the chapter headings which all, agreeably with those found in detective stories, bear such titles as The Case of the Spanish Treasure, The Case of the Scilly Shambles, The Case of the Nameless Ones, etc. It is indeed an admirable book, carrying in addition to the thirteen 'Cases', six appendices giving advice on sources of wreck location, identification of cannon, anchors, pins and bottles, the law relating to diving, what to do with your wreck when you find her, together with a bibliography and a list of wrecks around the British coasts. It is illustrated by 33 photographs and 19 diagrams.

A very minor irritation is that the author tends to spend too much time over some of the courts-martial and other enquiries which so often provide the wreck detectives with clues; indeed some passages concerning the later ones really seem as if

they were lifted straight out of a newspaper report. For instance: "At this stage the coroner told Mrs. Jacobs, who was sobbing bitterly, that if the evidence was distressing her she could leave the court. Mrs. Jacobs did so." The narrative did not really want that.

L. B. P.

Personalities

OBITUARY.—We regret to record the death of CAPTAIN W. F. T. DAN which occurred aboard his ship, the *Haparangi*, in New Plymouth, New Zealand. A memorial service was held at St. Augustine's Church, New Plymouth and the ashes were scattered from the *Haparangi* at sea.

William Francis Thomas Dan was born at Devonport and went to sea as apprentice in the New Zealand Shipping Company in January 1946; the last eighteen months of his apprenticeship were spent as an uncertificated 4th Officer and, on passing for 2nd Mate, he was appointed certificated 4th Officer with the Company in January 1950.

He spent all his sea service with the New Zealand Shipping Company which was latterly merged into the General Cargo Division of the P. & O. Company. He passed for Master in 1956 and was appointed to his first command, the *Pipiriki* in February 1961.

Captain Dan's first meteorological logbook came here from the *Paparoa* in 1948 and in his 24 years of observing he had sent us 32 meteorological logbooks. He received Excellent Awards in 1965, 1967, 1969 and 1970; in 1967 he received the special award of a barograph.

We offer our sincere sympathy to his widow.

L. B. P.

OBITUARY.—We regret to record the death of CAPTAIN R. W. L. CRAWFORD, Master of the *Star Acadia*, knowledge of which came to us in a meteorological logbook recently received from her. The death occurred aboard the ship whilst in the Persian Gulf during a voyage which Mrs. Crawford was making with him.

Robert William Leckie Crawford joined the Anchor Line in 1938, being appointed 3rd Officer of their *Circassia*. He subsequently served in most of the Company's ships and was appointed to his first command, the *Sicilia*, in 1965.

Captain Crawford sent us his first meteorological logbook in 1939 when he was in the *California* and, in eleven years of voluntary observing, had forwarded 17 meteorological logbooks. He received an Excellent Award in 1968 whilst Master of the *Sicilia*.

Captain Crawford is survived by his widow and a son to whom we extend our condolences.

H. M. K.

RETIREMENT.—CAPTAIN G. C. W. MELDRUM, M.B.E., R.D. has retired after 43 years at sea.

George Charles Wilson Meldrum was born in Liverpool of seafaring stock. His father had command in sail before joining the Pacific S.N. Co. about the beginning of the century and his personal record card which we still have in the Marine Division shows us that between 1924 and 1926 he sent us several meteorological logbooks when in command of the *Losada*.

The younger Meldrum was educated at Merchant Taylor's School, Crosby and signed indentures with the Lamport & Holt Line in 1929; his first ship was their *Delambre*.

He passed for Second Mate in 1929 and then joined Sir Robert Ropner & Co. of West Hartlepool as 3rd Officer of their *Thirlby*. In 1936 he found temporary employment with Moss Hutchison & Co. of Liverpool and in 1937 he joined the Royal Mail Lines.

Captain Meldrum had joined the Royal Naval Reserve in 1934 and was called into the Royal Navy for World War II. For the first two years of this he commanded the anti-submarine trawler *Northern Duke* on the Northern Patrol for which services he was awarded the M.B.E. This was followed by command of corvettes in the Western Approaches Escort Force and in 1943–44 he was on the instructional staff of H.M.S. *Lochailort*, a Combined Operations establishment. He saw the end of the war as an anti-submarine training officer with the British Pacific Fleet.

Returning to the Royal Mail Lines after the war, Captain Meldrum passed for Master in 1946 and in 1954 was appointed to command the *Tweed*.

Captain Meldrum is a Member of the Honourable Company of Master Mariners and sits on the Executive Council of the Mercantile Marine Service Association.

His record of voluntary observing for us goes back to 1938 when he sent us his first meteorological logbook from the Royal Mail's *Natia* and in 20 years of active observing he has sent us 36 meteorological logbooks. He received an Excellent Award in 1968.

We wish him health and happiness in his retirement.

L. B. P.

THE LIGHTER SIDE

Found pasted on the cover of a 'rough' meteorological logbook from the *Diomed*:

When Columbus sailed the seas
Weather reports and things like these
Were unknown to the Jolly Jack.
He sailed on guess, and luck, and knack
But times have changed since Hood or Drake.
The Meteorological Office now doth make
Detailed reports of sea and swell,
Temperature, pressure and wind as well
And send these messages across the air
Free gratis to the Mariner.
In appreciation we repay
With met. reports throughout the day.
True reports they're supposed to be,
Done with care and accuracy.
So Mr. . . ., please take note
And check your figures, you clumsy dolt.
The things you send would make the strongest rave
And turn poor Fitzroy in his grave.

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