M.O. 697

The Marine Observer

A quarterly journal of Maritime Meteorology

Volume XXXI No. 194

October 1961

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M.O. 697 AIR MINISTRY

THE MARINE OBSERVER

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

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Editorial

There are three cargoes in the carriage of which meteorology plays an exceptionally important part—grain in bulk, timber, and, to a lesser extent, iron ore. Coal out and grain home was the traditional bread and butter by which British tramp shipping earned its living prior to 1939. Since then coal exports from Britain seem to have disappeared from the picture but grain cargoes are still, and probably will always be, one of the main cargoes by which the tramp ship earns her living. Aboard liners, too, grain figures prominently in the cargo list. Many a shipping casualty has occurred owing to the unfortunate physical fact that grain has a relatively small angle of repose and is liable therefore to shift in the ship if it gets beyond that angle. This was recognised officially in the famous 1894 Merchant Shipping Act (Sections 452 to 456). It was there laid down that "where a grain cargo is laden aboard any British ship all necessary and reasonable precautions . . . shall be taken in order to prevent grain cargo from shifting". The Act went on to make special provision about feeders and shifting boards for grain in bulk, and shifting boards for grain in bags, for ships loading grain in the Mediterranean or Black Sea bound to ports outside the Straits of Gibraltar, or loading a grain cargo from ports on the coast of North America. If the grain was loaded in other areas (e.g. Argentina, Australia or India) nothing was laid down specifically about shifting boards or feeders, but "all necessary and reasonable precautions" nevertheless had to be taken. It was up to the master of the ship, in consultation with his owners and the local authority, to decide upon the actual precautions. These often consisted of the fitting of at least partial shifting boards, usually associated with carrying a proportion of the cargo in bags.

The special precautions laid down for ships bound from Mediterranean or Black Sea ports to ports outside the Straits of Gibraltar, or loading at ports on the coast of North America, seem to be a direct recognition of the stormy nature of the North Atlantic and North Pacific Oceans, but there is no actual evidence about this. A U.K.-bound ship loading at ports on the west coast of North America would, in those days, probably come home via Cape Horn—another danger spot for a grain cargo. As far as grain cargoes from Argentina or India were concerned, by the time a steam ship reached the temperate zone of the North Atlantic, on her homeward voyage, the consumption of coal during the voyage would assure her a reasonably high free-board, and would give stability, hence (presumably) the somewhat less stringent regulations for such voyages. But the danger of the grain cargo shifting nevertheless still remained. On the other hand, in 1894 much of the grain cargo must still have been carried in sailing ships. It is reasonable to suppose that the ports of the "Black Sea, Mediterranean and coast of North America" are specifically mentioned because there was probably not much grain being shipped from other areas. Another reason seems to have been that, prior to the 1894 Act coming into force, experience had shown that casualties had been more numerous with ships loaded with grain from these ports than elsewhere—and this may similarly be related to the quantity of grain cargoes loaded at these ports. Whatever the reason, the 1894 rules have broadly stood the test of time.

In 1906, the rules prescribed by the 1894 Act were made applicable to foreign ships discharging grain cargoes in U.K. ports.

In 1929, the British Board of Trade approved the special regulations drawn up by the Board of Underwriters of New York, and those drawn up by the Canadian authorities for ships loading at U.S.A. and Canadian ports respectively. These rules were considerably more stringent than those previously approved by the U.K. authorities. In 1913 and 1934, precautions were promulgated for ships in the Home Trade.

In the 1948 International Convention for Safety of Life at Sea, international regulations concerning the carriage of grain, which were binding on all nations signatory to the Convention, were introduced. [The previous (1929) Convention contained no such provisions.] The new regulations provided for all ships laden with a grain cargo, irrespective of the port in which it was loaded, being provided with shifting boards and feeders where holds were full, or for the surface being 'topped off' with bagged grain or other suitable cargo if the compartment was only partially filled.

The new (1960) Convention clarifies and modifies to some extent the regulations contained in the 1948 Convention. For example, for the first time, a concession is granted in the case of ships in which a metacentric height of 12 to 14 inches is maintained throughout the voyage (after correction for free-surface effect of liquids in tanks). In such a ship, a proportion of bagged grain in the square of the hatch, for example, can take the place of a feeder, provided the remainder of the grain in that hold is properly trimmed up to the deckhead. This new regulation has now been accepted by the U.K. Government, in advance of the acceptance of the whole Convention.

Despite the relatively large size of the average modern cargo ship, and the improved construction, stability, steering arrangements and navigational facilities compared with those of 1894, the danger of grain shifting in heavy weather still remains. The number of casualties due to this cause during recent years has, however, been small. Recently much grain in bulk has been carried in tankers.

In very heavy weather the master of the ship can usually manage to nurse her so that she does not suffer from excessive rolling. But the time may come when a ship is broken down, wallowing in the trough of a heavy sea; one of those unaccountable superimposed waves may come along and the ship may take such a heavy roll that her cargo shifts and then she is in real trouble. And it must be remembered that a ship loading grain in (say) Australia can encounter very heavy weather during the early stages of her homeward passage to (say) the U.K. These new international regulations can do nothing but good, by ensuring that proper precautions to prevent grain cargo shifting are taken aboard ships of all nations. Even if only one ship is saved as a result, it will be worthwhile (not only for the safety of life, but also in view of the value of the ship and her cargo).

How about timber cargoes? Owing to the perfectly reasonable prevalence of loading timber on deck, its connection with meteorology is fairly obvious. But 'green' lumber, even when loaded in a hold, may cause considerable damage due to sweating if mixed with other cargoes. As far as timber on deck is concerned, provided the ship has certain constructional and design features, and has special arrangements for securing the timber (and for releasing it in emergency) and safe access to crews' quarters, machinery space and other places necessary for the work of a ship and complies with a few other simple precautions, a reduction in freeboard is allowed to her under the International Load-line Convention. But the Convention includes one very important proviso "timber deck cargo . . . must not interfere . . . with the provision of a safe margin of stability at all stages of the voyage, regard being given to additions of weight, such as that due to absorption of water and to losses of weight such as those due to consumption of fuel and stores". As the bulk of the vessels carrying timber cargoes on deck are loaded in ports in North Russia, or in the Baltic, or in more northerly ports of Canada or U.S.A., a little knowledge of the meteorology of these regions makes the significance of this proviso fairly obvious even though few of the voyages concerned are made in the winter. Rain, snow or continuous spray in heavy weather can very soon increase enormously the weight of a timber cargo; hence the need for ensuring that the stability of the ship is very adequate. In coal-burning ships, the tendency was for a ship to get slightly stiffer as the voyage progressed, but with an oil-burning ship there is an obvious tendency (unless the oil tanks can be filled with compensating water) for the ship's 'natural' stability to decrease somewhat during the voyage so that an excess of moisture from the timber cargo might cause her to take a very heavy list. And, of course, there is also the ever present risk of a certain amount of deck cargo being lost overboard in heavy weather. The master of the ship laden with a large deck cargo of timber certainly needs to keep all his wits about him, watching the weather and nursing his ship so as to ensure that she doesn't get into trouble due to some meteorological cause. The number of ships that sustain a serious casualty due to loss of stability with a timber cargo, or to part of the cargo being lost overboard, seems to be quite small nowadays—and one likes to think that it is largely due to the precautions that are taken. As many of the ships which habitually carry timber cargoes are of small size, it seems that the regulations are probably adequate. But most seamen are familiar with the sight of a timber-laden ship arriving at a discharging port with an appreciable and most uncomfortable list. It doesn't take very much to make such a list a dangerous one if the metacentric height decreases appreciably for any cause. A relatively simple remedy (if water ballast cannot be used for any reason) is to jettison some of the deck cargo, but even this may not be particularly easy, and no master likes to do it if he can avoid it.

As far as ore cargoes are concerned, meteorology only comes into the picture insofar as it is the wind which causes the waves, which causes the ship to roll, which might cause the cargo to shift, if it is not properly stowed. Unhappily, in past years, a number of ships were lost due to ore cargoes shifting. Nowadays, owing to improved construction and ballasting arrangements, such cases are rare, but whatever the circumstances, it is difficult to avoid an ore carrier being uncomfortable in heavy weather, because of the difficulty of avoiding excessive stability. But here again, it is the skill of the master in handling his ship that ensures a relatively comfortable (and safe) passage.

Meteorologists can do nothing to alter the weather, or its effect on the sea or upon the cargo that the ship carries. But the radio weather bulletins which are issued nowadays by various meteorological services cover practically every part of the ocean, and also there are available to the shipmaster various climatological maps and atlases, as well as the general information about climatic conditions given in the Admiralty Pilot. By a relatively brief study of the relevant climatological maps, associated with the radio weather bulletins available to him, a shipmaster nowadays has at his disposal information that can be of considerable value to him in planning for the safety of the ship during her voyage. He may be unable to avoid going through an unpleasantly stormy area, although 'weather routing' may be fairly easy to carry out on some occasions, as experiments carried out by the U.S. authorities have shown. Weather routing often increases the distance to be sailed, but may add little to the time, while avoiding risk of damage to ship and cargo, and perhaps even saving some fuel. But even if a master has to proceed right through a stormy area, he can at least be forewarned, take reasonably seamanlike precautions for the safety and security of his ship and use his seamanship in nursing the vessel through the most stormy zone. Every shipmaster knows the feeling of satisfaction and relief which comes with the safe arrival of his ship and cargo at her destination after a long and stormy passage with a difficult cargo; a challenge to his skill as a seaman.

C. E. N. F.

THE MARINE OBSERVERS' LOG

October, November, December

These observations are taken from the logbooks of marine observers and from individual manuscripts. Responsibility for them rests with the contributors.

TROPICAL REVOLVING STORM 'MAMIE'

North Pacific Ocean

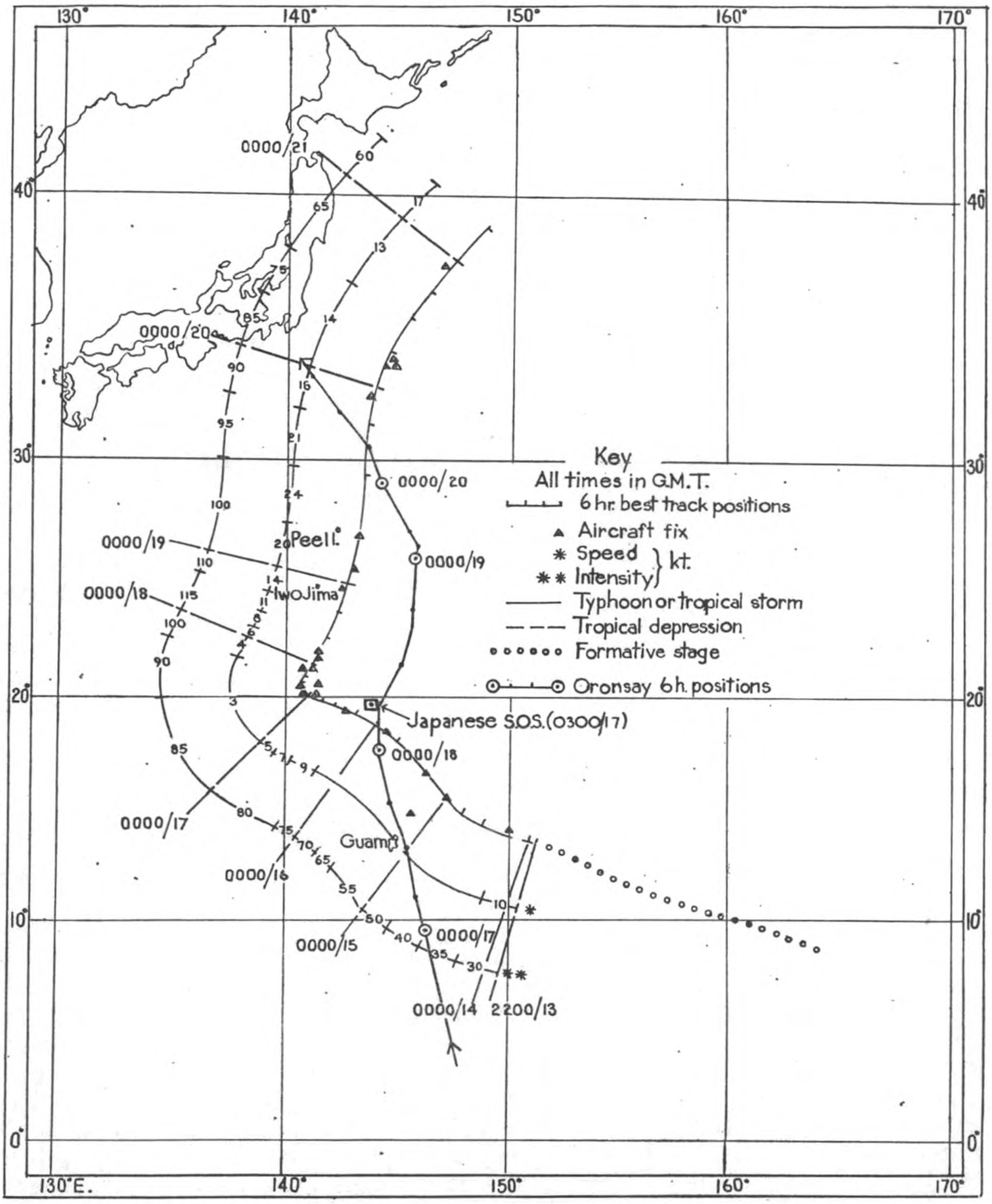
s.s. *Oronsay*. Captain R. W. Roberts, O.B.E., D.S.C. Rabaul to Yokohama.

17th October 1960. At 0230 GMT in approximately 9° 49′N, 145° 56′E, the first indication of the typhoon in the vicinity was given by a heavy NW'ly swell. Shortly afterwards Guam reported that typhoon 'Mamie' had been detected in 20° 00′N, 140° 48′E at 0258 GMT, this position being distant about 660 miles and bearing 333° from *Oronsay*. About this time the diurnal range on the barograph ceased and the trace flattened out almost horizontally. At the same time as the storm warning, a message was received from s.s. *Irish Oak*, in 19° 55′N, 146° 10′E, that she had received an S.O.S. from a Japanese fisherman in 19° 50′N, 144° 00′E, 110 miles away, but was unable to act on it as she was herself hove to in bad weather. The position of the stricken vessel was about 610 miles from *Oronsay* and fairly close to her course line. She therefore proceeded in answer to the distress call. She was thus obliged to keep to the eastward of the typhoon, although there was the danger of it re-curving towards the ship. *Oronsay*'s course 348°, speed 22·5 kt.; wind S'ly, fresh to strong.

During the afternoon and night the wind backed slowly and increased to force 7–8. Guam reported 'Mamie' was proceeding in a direction of 295°, speed 5 kt. As we proceeded to the N, the barometer, reasonably steady at first, commenced to fall at 0300 SMT on 18th October (GMT 1730/17th) and Guam, which had been passed at 1430 GMT, reported that the storm centre had re-curved to a direction of 350°.

At noon on 18th October (GMT 0230/18th), ship's position approximately 18° 48′N, 144° 09′E, the eye of the storm bore 308°, distant 230 miles, and was expected to move to the NNE. The sky was heavily overcast, a solar fix being impossible, but by DR the distressed Japanese vessel was 67 miles away. At 1315 (GMT 0345) an observation of the sun gave an estimated position, and course was re-set to take the ship to the distress position. The wind was now SW, force 9, increasing to force 10 by 1500 (GMT 0530) and nearly astern, barometer 992·7 mb.

At 1530 (GMT 0600) *Oronsay* was in the distress position but visibility was restricted due to frequent rain showers. The Japanese ship continued to be called by radio and the radar was in continuous operation on the 3, 10 and 40 miles scan in the hope of picking her up. By this time the sea had become very rough accompanied by a very high swell, and as we had so little to go on for 24 hours (and by this time the centre of the typhoon had curved to the NNE, and the wind had increased) I had perforce to think of the safety of my own ship. When we could not pick up anything on our radar or radio, I reluctantly had to bear away to the E and run to avoid the centre of the storm. We kept on calling the Japanese ship on radio but with no success.



Positions of *Oronsay*, and storm track data.

On the above map, the actual track and successive positions of Typhoon 'Mamie', as fixed or deduced, are shown by the easternmost line. The middle line gives the speed of the centre and the westernmost line represents the various wind speeds determined or deduced. Neither of the latter two lines has any geographical significance but they are spread out in this way to obviate a multiplicity of numbers on the one line. The lines crossing at right angles relate to all three lines at 0000 GMT on the date stated.

At 1900 (GMT 0930) a good radar position was obtained off the Farallon de Pajaros (20° 32′N, 144° 54′E) and *Oronsay* continued at 20 kt. with the barometer steadily falling and the wind increasing.

By 0330 on 19th October (GMT 1800/18th) with the wind at SE, force 11, barometer 991·9 mb., the eye of the storm bore 261°, distant 240 miles. *Oronsay* had over-taken it and it was hoped to pass ahead of it, but it accelerated and at 0900 (GMT 2330/18th) (ship's position 25° 54′N, 145° 36′E; barometer 993·0 mb.; wind 140°, 60 kt.) it bore 260°, distant 185 miles, closing on a steady bearing. By noon (0230 GMT) it was clear that I would not be able to get ahead of it with my speed and I therefore hove to with the wind about 2 points on the starboard bow and reduced speed to about 6 kt., continuing to ride the seas in reasonable comfort in this manner until 2315 (GMT 1345). The typhoon's nearest approach was at 1500 (GMT 0530) when it was 135 miles distant. Ship's position 26° 48′N, 146° 00′E; barometer 989·5 mb., rising slowly; wind 160°, 64 kt.

At 2315 (GMT 1345) I was able to proceed on course 327° and adjusted speed so as not to overtake the typhoon, which had now curved well over to the E of us. We were then able to continue our voyage in a left-hand semi-circle of the storm centre. At 0300 on 20th October (GMT 1730/19th) the typhoon bore 333°, distant 180 miles, travelling to the NNE at 17 kt. Ship's position 27° 12′N, 145° 30′E; barometer 999·6 mb.; wind 230°, 44 kt.

I heard later in Yokohama that the trawler in distress had managed to ride out the storm and make Imogima.

Note. Commander C. E. Tilden, U.S.N., Commanding Officer of the Joint Typhoon Warning Centre at Guam, comments:

"The first closed isobar was transcribed around the depression that was to become the largest typhoon of the season at 1800 GMT on 10th near Kwajalein. By the time the first warning was issued it was more than 1,300 miles in diameter, encompassing an area of more than 1,300,000 square miles. At 1800 on 17th the approximate area within the greatest closed isobar of this fully developed typhoon was 1,200,000 square miles, and the area of cyclonic circulation was twice that total. When the last warning was issued at 0600 on 21st, Typhoon 'Mamie' enclosed an area of only 324,000 square miles.

"The first warning was issued on 'Mamie' 370 miles E of Guam on 13th at 2200 GMT, when the maximum wind circulation about the depression was 25 kt. 'Mamie' moved along a WNW track at 11 kt., passing 175 miles NE of Guam at 0000 on 15th, with surface winds of 50 kt. near the centre. It became a typhoon at 1200 on 15th, about 220 miles NNE of Guam. The typhoon continued to a point near 20°N, 141°E, slowed to 3 kt., turned just E of N, and then accelerated rapidly to 24 kt. over a distance of 370 miles in a period of 36 hours. 'Mamie' was 70 miles E of Iwo Jima at 0000 on 19th and about 50 miles E of Peel Island at 0700 on 19th. The typhoon passed nearest Japan at 0600 on 20th, 275 miles ESE of Tokyo. The last warning was issued 24 hours later, after which 'Mamie' became extratropical. The surface winds were 60 kt. at that time.

" 'Mamie' travelled about 1,950 miles from the first to last warning, and lasted 8 hours longer than one week. The minimum speed was 3 kt. on 17th; the maximum speed was 24 kt. on 19th; the average speed was 11 kt. or 267 miles per day. Warnings were being issued simultaneously on Typhoons 'Lola' and 'Mamie'.

" 'Mamie' was probably intense enough to be a closed circulation at the 200 mb. level (corresponding with 40,000 ft. approx.). The Iwo Jima 200 mb. winds turned with the approach of 'Mamie': however, the last report was received at 0600 GMT on the 18th, due to equipment failure when the typhoon was 180 miles to the S. Consequently, reports with W wind components are not available. This was the only station along the track of 'Mamie' that could have provided this information.

" 'Mamie' was the largest typhoon of the 1960 season, comparable in size to the large ones of other years. To picture the area influenced by this typhoon, consider that the surface circulation was cyclonic, covering an area bounded by Japan, the Philippines, Truk, Marcus and then Japan.

"The observations received from *Oronsay* were used to excellent advantage by the Joint Typhoon Warning Centre, particularly with reference to defining the radius of 50 kt. winds, an important element of our warnings. Normally, as you are perhaps aware, three or four aircraft reconnaissance fixes are made every 24 hours on typhoons. The J.T.W.C. is thus enabled to accurately track typhoons: however, due to the dense cloud cover generally associated therewith, it is often difficult for aircrews to define the surface wind field by visual observations. In such cases, ship reports from the vicinity of typhoons are invaluable to us. Incidentally, almost all tropical cyclone reconnaissance is accomplished at the 700 mb. level (10,000 ft.).

"In his narrative, Captain Roberts indicated that 'Mamie' began to accelerate late on 18th. This was quite true, and by the following day 'Mamie' was moving to the NNE at more than 20 kt.

"I wish to thank you for forwarding Captain Roberts's report to us. Similar reports will always be welcomed by this command."

TROPICAL REVOLVING STORM

Indian Ocean

s.s. *Clan Mactavish*. Captain J. V. Findlay. Fremantle to Aden. Observers, the Master, Mr. D. I. McMinn, 3rd Officer, and other deck officers.

28th November 1960.

GMT

0000 In position 16° 30′S, 92° 00′E, a heavy E'ly swell was experienced, which remained remarkably steady in direction until noon on 30th.

0300 Wind steady from ESE: increased from force 4 to 6.

0800 'V'-shaped cirrus observed. Shortly afterwards the sky clouded over with nimbostratus and low scud. The overall length of the cirrus lay almost due north and south and the 'V'-shapes were thus pointing due E and W. About sunset, when the sky was covered with nimbostratus and some low scud, the clouds over the whole sky as far as the eastern horizon were lit up with a very dark red colour which, reflected off the sea surface, presented a very lurid and sinister appearance.

1700 Occasional light rain showers occurred from this time onwards, becoming more frequent until at 2200 heavy continuous rain began, which lasted until 0600 on 29th.

1800 Wind still steady from ESE, force 6–7, commencing to veer. Barometer 1011·0 mb.

29th November

0000 Wind SE, force 6–7. Barometer 1007·6 mb.

0600 In position 12° 16′S, 85° 54′E. Weather again became showery. Showers cleared at 1800 on 30th. Wind S'E, force 8–9. Barometer 1004·8 mb.

1200 Wind S'W, force 9. Barometer 1002·3 mb.

1400–1700 Lightning flashes seen towards the ESE.

1800 Wind SW'S, force 7. Barometer 1006·0 mb.

30th November

0000 In position 10° 18′S, 83° 24′E. Wind W'S, force 6. Barometer 1005·7 mb.

0600 Wind W, force 6, steady. Barometer 1008·1 mb.

1200 Wind W, force 4–5. Barometer 1006·7.

1800 In position 7° 48′S, 78° 36′E. Showers clearing. Barometer 1010·2 mb.

Note. Mr. P. R. Krishna Rao, of the Government of India's Meteorological Department, comments:

"Examination of our weather maps shows that on 29th November 1960 there was a depression centred in about 12°N, 86°E in the Bay of Bengal, practically as a mirror-image of the cyclonic storm in the southern hemisphere which *Clan Mactavish* reports. We have no information about the intensity of the northern hemisphere disturbance due to lack of observations from the area. The cyclone in the south moved westwards and weakened considerably by 30th November, but the disturbance in the Bay of Bengal remained nearly stationary for four days from 27th to 30th November. It maintained its intensity till about 3rd December and then weakened. Sufficient observations to enable a study to be made of any connections between the two disturbances are unfortunately not available.

"The Captain of *Clan Mactavish* deserves to be congratulated for reporting such useful and interesting observations."

DISCOLOURED WATER

Mediterranean Sea

m.v. *City of Johannesburg*. Captain A. L. Beckett. Port Said to Dunkirk. Observer, Mr. D. Bunt, 4th Officer.

5th December 1960. At 1815 GMT large greyish patches of some unrecognised substance were seen, causing discoloration of the water on either side of the vessel. Sea temperature 63°F. Wind S'ly, force 1–2. Very slight S'ly swell.

Position of ship: 37° 28'N, 6° 32'E.

Note. Dr. T. J. Hart, of the National Institute of Oceanography, comments:

"Although discolorations of many kinds have been observed off various coasts of the Mediterranean, they are not common far off shore and this report is from the middle of the western basin. Some form of plankton swarm is perhaps the most probable cause, but in that region dust from previous sirocco winds is also a possibility."

Red Sea

m.v. *Silverdale*. Captain G. F. Chivers. Bandar Mashur to Suez. Observer, Mr. W. L. G. Frith, 2nd Officer.

23rd December 1960. At 1215 GMT the vessel passed through a line of brown scum, resembling sand, which lay from 330° to 140° on the surface of the water. Sea temp. 79°F. Wind NW, force 2. Rippled sea.

Position of ship: 24° 23'N, 36° 22'E.

Note. Dr. T. J. Hart, of the National Institute of Oceanography, comments:

"This was almost certainly a bloom of the microscopic alga *Trichodesmium erythraeum*, the first of that planktonic genus to be described, and which is often encountered there and in the Indian Ocean. The concentration into line is a physical effect probably due to shallow eddies set up by the prevailing winds."

Australian Bight

m.v. *Port Wellington*. Captain C. A. Hodson. Brisbane to Albany. Observers, Mr. M. L. Coombs, Chief Officer and Mr. P. E. M. Kelway, 3rd Officer.

9th November 1960. At 0610 GMT a brick-red scum was seen floating on the top of the sea in the disturbed water of the ship's wake while, at the same time, in the undisturbed water further away there was no sign of discoloration. The scum was visible for a little over an hour, but in gradually decreasing amounts towards the end of the period. Samples of water taken showed no discoloration, or organic matter in suspension. Between 0530 and 0610 the sea temperature rose by 1·4° to 58·8°F. Wind, light and variable or calm.

Position of ship: 37° 10'S, 132° 12'E.

Note. Dr. T. J. Hart, of the National Institute of Oceanography, comments:

"*Port Wellington* was well off shore in the Australian Bight, in colder waters than those in which algal blooms are most commonly seen. The small but rapid rise in temperature suggests that there may well have been a shallow discontinuity layer, with dense plankton concentration below the surface but still lying shallow enough to be disturbed by the ship's passage. The colour suggests dinoflagellates as the organisms most probably involved, though I have seen a *Trichodesmium* bloom equally far south. That, however, was in the Atlantic sector."

UNIDENTIFIED PHENOMENON

Atlantic Ocean

s.s. *Pacific Envoy*. Captain A. H. Cooke. Panama to London. Observers, Mr. G. H. Deere, 2nd Officer, Mr. T. A. Tate, 3rd Officer, Mr. D. L. Smith, Radio Officer and members of the crew.

23rd December 1960. At 1815 GMT a patch of brilliant blue water was observed some 50 by 100 yd. in extent and oval in shape. The surrounding sea was dark grey in colour and had been so, for the past 24 hours. Sea temp. 82°F. Wind E'N, force 5. Rough sea and short E'ly swell.

Position of ship: 20° 40'N, 64° 51'W.

Note. Dr. T. J. Hart, of the National Institute of Oceanography, comments:

"Blue is the desert colour of the sea, and unless we are to assume that the surrounding dark grey sea was uniformly rich in plankton, and the blue patch barren, it is hard to see how it could have any biological explanation.

"The trade wind weather is usually fine, and plankton scanty in the Caribbean, except in winter close in to the Venezuelan coast, so far as we know."

VIOLENT SQUALL

Red Sea

s.s. *Hyrcania*. Captain G. D. Clarke. Marseilles to Persian Gulf. Observers, the Master and Mr. C. G. Daniels, 3rd Officer.

2nd November 1960. At 0720 GMT an intense squall was experienced which lasted for almost 20 min. It was heralded by Cb. and ragged low cloud giving frequent flashes of lightning, but no thunder was heard until the vessel entered the squall. At first the wind was from a northerly direction and very light, but it quickly backed to the south and within seconds reached gale force, gusting up to force 9. Visibility was seriously affected by the very heavy rain which fell. The barograph showed a 4 mb. drop as the squall reached the ship, followed immediately afterwards by a rise of 6 mb. Superficial damage was sustained by the vessel, new canvas awnings and wooden boat covers being torn away.

The master was of the opinion that this was the most violent squall he had experienced in 30 years trading around the Red Sea and the Gulf of Aden. At 0600: air temp. 83°F, wet bulb 76°, sea 84°.

Position of ship: 22° 37′N, 37° 18′E.

Note. This violent storm was probably associated with an outbreak of cold air from Russia via Arabia or the eastern Mediterranean. Warm, moist air of local origin probably interacted with the cold continental air to create the storm.

WATERSPOUT

North Atlantic Ocean

m.v. *Seattle Star*. Captain L. W. Evans. Panama to London. Observers, Mr. H. Gathercole, 2nd Officer and Cadet A. Thomas.

27th October 1960. At 1100 GMT approx., a large formation of Cb. was observed slightly to starboard moving directly towards the ship: 15 min. later a long narrow column descended from the under surface of the cloud to just above the water, which became considerably agitated. The column, which was revolving quickly, was 20–30 ft. across at the base: it had little density and was transparent up to a height of 100 ft. Above this level it had the normal appearance of a waterspout, bending slightly backwards along its length up towards the cloud base. By 1150 it had dissipated. At its nearest the spout was 400 yd. from the ship: no sound was heard which could be associated with its rotary motion. Air temp. 79°F, wet bulb 75°. Wind and sea calm.

Position of ship: 21° 53′N, 61° 44′W.

Note. This waterspout is unusual only in that it was transparent up to 100 ft. This suggests that the vortex was weak and not fully developed at its lower end.

ST. ELMO'S FIRE

Mediterranean Sea

m.v. *Dunera*. Captain B. A. Rogers, D.S.C., R.D. Famagusta to Malta. Observers, the Master, Mr. C. R. S. Monk, Chief Officer and Mr. P. S. Wilde, 3rd Officer.

9th December 1960. During violent thunderstorms associated with the passage of a cold front about 2130 LMT, St. Elmo's fire was clearly seen from the bridge to be surrounding the fore-truck and the tip of the port yard-arm. The yard lifts and the starboard yard tip were seen to be similarly affected, but to a lesser degree, when examined through binoculars. After about 30 min., during which time there was much lightning, the discharges ceased. The wind veered from SW, force 8 to NW, force 9. Air temp. fell from 58° to 57°F and the wet bulb rose from 53° to 54°. Sea 62·5°.

Position of ship: 37° 50′N, 9° 05′E.

UNIDENTIFIED PHENOMENON

Mediterranean Sea

s.s. *Malmo*. Captain M. D. Evans. Falmouth to Benghazi. Observers, the Master, Mr. J. B. Drinkall, 2nd Officer, Mr. A. B. Smith, 3rd Officer, Mr. O. Murphy, Radio Officer and Mr. M. B. Smith, Seaman.

4th December 1960. At 0830 GMT, as the ship was steaming through a calm to slight sea at 12 kt. on a course of 124° towards Benghazi, a strange-looking column of what seemed to be white Cu. cloud appeared to rise vertically from near the horizon, about 45° on the starboard bow, and vanished a few seconds later. The officer on watch believed his eyes to be deceiving him due to the sun's glare, but within a few minutes all the observers named above saw the column reappear. On examination with binoculars it was seen to be a jet of water rising into the air at regular intervals of about 2 min. 20 sec. Each spurt lasted for about 7 sec. and then disappeared. They were visible until the vessel left them far astern. The radar was switched on but no echo appeared on the screen; however, by sextant altitude and calculation the jets were found to be 494 ft. high; they resembled an underwater explosion but no such noise was heard.

Position of ship: 32° 08′N, 19° 32′E.

Note. An examination of synoptic charts has revealed few indications of the nature of this phenomenon. Conditions appeared anticyclonic and stable although minor fronts existed in the central Mediterranean at the time which could have given rise to phenomena similar to waterspouts.

EXCEPTIONAL VISIBILITY

Mediterranean Sea

s.s. *Clan Chattan*. Captain T. A. Watkinson. Algiers to Tilbury. Observer, Mr. J. B. Caley, Chief Officer.

13th November 1960. When the vessel was midway between Cap Ferrat and Cabo de Palos, about 1600 GMT, visibility was exceptionally good, the mountain tops of the Sierra Navada range being seen at a distance of over 100 miles. The mountain behind Cap Ferrat was also visible at 60 miles. Air temp. 59°F, wet bulb 52°. Wind sw'ly, force 1–2.

Position of ship at 1800: 36° 30′N, 1° 42′W.

m.v. *Port Macquarie*. Captain A. J. Braund. Port Said to Hull. Observers, the Master and all officers.

25th December 1960. During the morning the visibility was exceptionally good in the Malta-Pantelleria area, the following mountains being positively identified and used for navigational fixes: (*a*) Mount Etna (10,741 ft.), bearing 048° at 112 miles, (*b*) Monte Rosso, bearing 006° at 70 miles, (*c*) Cammarata (5,180 ft.), bearing 014° at 72 miles.

In the late afternoon (1500 GMT) the Island of Pantelleria was still visible when the vessel was off Cape Bon, about 48 miles away. During the preceding night, between 0000 and 0300, the glow of lights over Valetta was visible at 55 miles. At 0800: air temp. 57°F, wet bulb 50°, sea 61·5°. Wind W'N, force 2–3. 4/8 C_L2. Showers.

Position of ship at 0800: 36° 30′N, 13° 16′E.

Note. When very great visibilities occur they are usually associated with abnormal refraction caused by warm air flowing over a cool sea. This was not so on the occasion reported above. On checking the distances of the objects observed, it appears that abnormal refraction was not required to make them visible, but the atmosphere must have been exceptionally clear.

PHOSPHORESCENT WHEEL

Flores Sea

s.s. *Burnside*. Captain S. Rothery. Singapore to Torres Strait. Observer, Mr. P. Sturt, 2nd Officer.

18th July 1955. At about 2200 GMT (2 a.m. local time, 19th) I observed lines of light approaching the ship from right ahead, each one being at right angles to our course, and about 2 ft. wide. The lines were about 20 ft. or more apart, and moving very fast. They appeared to have a common source, on the horizon on the starboard bow, and thus seemed to be the near half of a phosphorescent wheel, rotating in an anti-clockwise direction. After about 5 min. they faded out. Course of ship, 117°.

Position of ship: 6° 30′S, 113° 15′E (off Madura Island).

Note. We are indebted to Captain Brett Hilder (who also has an observation printed below) for sending us this interesting observation by Mr. Sturt, which had only recently come to light.

PHOSPHORESCENCE

South Pacific Ocean

m.v. *Malaita*. Captain B. Hilder. Observers, the Master and Mr. R. D. Whittle, 2nd Officer.

4th March 1955. At 1707 GMT the vessel was bound north and in the vicinity of Savo Island when it passed through an area of oval patches of phosphorescence (see drawing opposite page 208). An amber light appeared to come from beneath the surface which was found to be pulsating 94 times per minute in direct time to the ships engine revolutions, but not simultaneously with them. The progressive form of the phenomenon was as follows:

1700 GMT	Radar in use; no phosphorescence observed.
1705	First patch sighted on starboard bow, about 1 mile distant, with appearance of breaking reef.
1707	Radar in use; an increasing number of flashes seen, covering a field up to 2 miles from the ship.
1710	Vessel surrounded by flashes of intense light and visibility reduced.
1715	Radar in use; fewer lights, less intense and dying out.
1725	Radar off; no phosphorescence visible.
1726	Radar in use; phosphorescence observed close to, and encircling, ship.
1730	Radar in use; phosphorescence diminishing.
1800	Radar in use; no phosphorescence observed.

At no time was any effect visible on the radar screen. The patches were about 50 ft. in length, and the strongest light came from the end furthest away. The ship passed close alongside some of these patches. Air temp. 76°F, sea 84°; baro. 1001·7 mb.; wind NW, force 3; sea slight; low Sc. cloud with rain in vicinity.

Position of ship: 9° 19′S, 159° 53′E (3 miles off Guadalcanal).

Note. A copy of this observation was sent to us back in 1955, but was apparently lost in transit. It is, however, such an unusual observation that we are glad to have had it brought again to our notice, so that we might publish it now.

Gulf of Oman

s.s. *British Energy*. Captain S. Bruce. Mena-al-Ahmadi to Suez. Observer, Mr. D. F. Thomson, 2nd Officer.

14th October 1960. At 2130 GMT three very fast outward-moving rings of light were seen emanating suddenly from three separate vortices which were spaced about three cables apart in a straight line parallel to the ship's fore and aft line, and about five cables distant on the starboard side: the positions of the vortices in the water appeared to remain unchanged. The first two appeared almost simultaneously and produced circular rings, at a frequency of about one second or slightly less. The third appeared a minute or so later and produced elliptical rings which were moving much faster than the others. They appeared about 2 points forward of the starboard beam and disappeared about 4 points abaft the beam. Their disappearance was more or less simultaneous.

Although the individual patterns tended to cut across and overlap each other in places, they did not become confused, nor were they stopped by the ship's hull, as the rings could be clearly seen to pass from starboard to port when in line with the bridge.

There was bright moonlight, and it was therefore fairly certain that there was no disturbance on the surface at any time, such as might be caused by jumping fish, etc.

The total time that the phenomenon was visible was about 5 min. There was no fading: the rings both appeared and disappeared instantly.

A vessel passing about three miles to port was contacted by lamp, but he reported that he had not seen anything.

The radar was not in use at any time during the observation.

The propeller (single screw steam turbine) was totally immersed throughout.

At the time of observation there was a very strong smell of decayed vegetation which passed immediately on clearing the area.

Position of ship: 25° 58′N, 56° 53′E.

ABNORMAL REFRACTION

Indian Ocean

s.s. *Orcades*. Captain J. D. Birch, D.S.C., R.D. Colombo to Fremantle. Observer, Mr. D. M. Swetnam, Junior 2nd Officer.

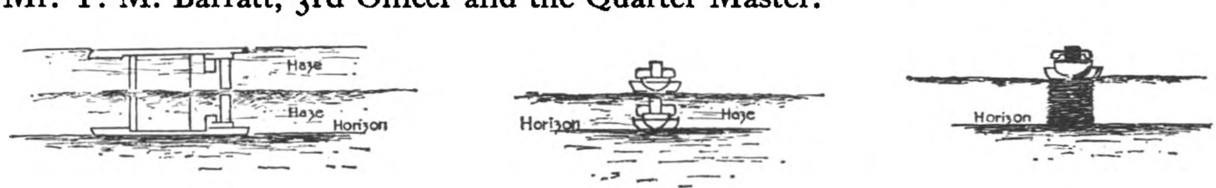
28th October 1960. Immediately before sunrise at 0340 GMT, what seemed to be the true sun was seen just above the horizon, but this appeared to sink as the real sun appeared, until the two overlapped. As the sun continued to rise it was seen to be mushroom-shaped for about 15 sec. when the 'stem' suddenly shrank upwards to unite with the disc which was oval shaped. Very soon afterwards the true circular shape was seen. Air temp. 78°F, wet bulb 76°, sea 80°. Slight haze. Moderate swell. Wind SE, force 5.

Position of ship at 0600: 9° 30′S, 92° 48′E.

Note. This interesting display is the result of the bending of light from the sun in its passage through the atmosphere due to the abnormal vertical variation of temperature. In this case probably both super lapse rates and inversions were required to produce such a complex phenomenon.

Mediterranean Sea

s.s. *Mahseer*. Captain J. Richardson. Port Said to Wilmington (Del.). Observers, Mr. T. M. Barratt, 3rd Officer and the Quarter Master.



(1) (2) (3)

1st November 1960. A tanker was observed at 0815 GMT at a distance of 12 miles, which had a perfect inverted image above it. As the two vessels closed, at 8 miles, the image righted and disappeared at 6 miles. Every detail, including the colours, of the tanker was plainly seen in the image. In the course of an hour numerous other ships showed similar images, two of which are included in the accompanying sketches. Air temp. 68°F, wet bulb 65°, sea 66°. Wind SSE, force 2. Visibility excellent. No cloud.

Position of ship: 37° 15′N, 4° 08′E.

s.s. *Clan Chattan*. Captain T. A. Watkinson. Algiers to Tilbury. Observer, Mr. B. H. Bowen, 2nd Officer.

14th November 1960. As the crescent moon was rising at 0155 GMT it was

(1) (2) (3)

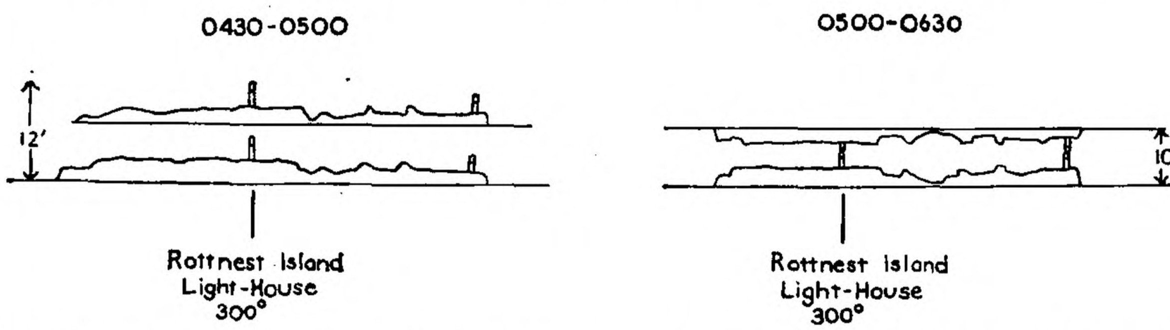
watched carefully, and sketches made of the changes in appearance which it underwent due to the effects of refraction and reflection; it resembled a ship on fire at a great distance. The three sketches cover a period of about 35 sec. At 0000: air temp. 58°F, wet bulb 48°, sea 59°. Wind SSW, force 1. Visibility excellent.

Position of ship: 36° 20′N, 3° 43′W.

Australian waters

m.v. *Port Townsville*. Captain J. S. Moate. Auckland to Fremantle. Observers, the Master and Mr. A. Spence, 3rd Officer.

21st December 1960. From 0430 to 0500 GMT an image of Rottnest Island was seen, the right way up, directly over the island itself, the top of the mirage being



12′ above the true horizon. At approx. 0500 the image became inverted, the angle subtended being now 10′. It continued until 0630 and then disappeared completely.

The two sketches show the appearance presented by the mirage. Air temp. 83°F, wet bulb 73°, sea 75°. Wind SW's, force 2. Sky cloudless.

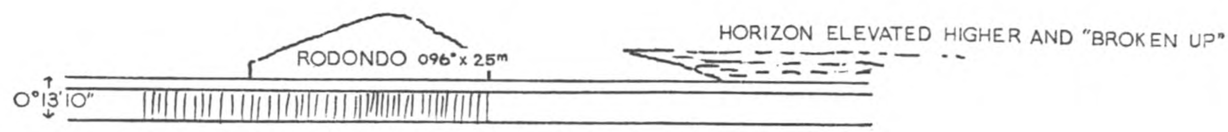
Position of ship: Gage Roads, 8 miles from Rottnest Island.

Note. The change in the mirage was probably due to a change in the air between the observer and the island. The inverted image was associated with warm air over a cool sea.

Bass Strait

s.s. *Helenus*. Captain M. J. Case, M.B.E. Albany to Sydney. Observers, the Master, Mr. J. B. N. Hodgson, 2nd Officer and Midshipman A. McD. Gameson.

27th December 1960. At 0445 GMT and for some time previously, while the vessel was approaching Wilson's Promontory, abnormal refraction was seen. At first this consisted of what appeared to be a fog bank extending all round the horizon, up to an elevation of 0° 13′ 10″. The island of Rodondo (1,150 ft.), which was observed at 0445 bearing 096° at 25 miles, lay on the upper 'horizon', while below it and extending upwards there were what resembled vertical cliffs streaked with a lighter shade of brown. To the south of the island, the horizon was somewhat broken up and shimmering. (See sketch 1.) At 0500, Cleft Island (371 ft.) had the appearance shown in sketch 2. Here again, 'cliffs' appeared to be below the island and extending upwards, while the horizon to the south was broken up considerably more than in the case of the observation made of Rodondo Island. A dark patch was seen to the right of Cleft Island which later turned out to be a tanker going the other way: the island was itself inverted. At this time the radar was giving an echo at 4 miles, showing a speckled effect over a large area: the



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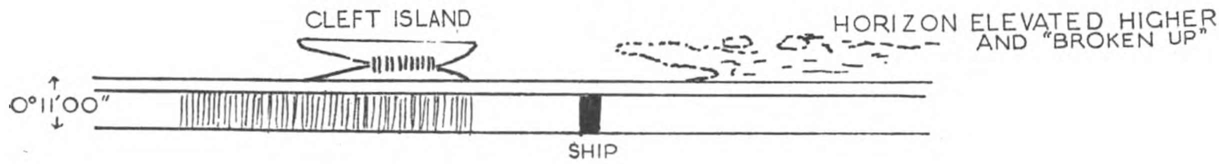

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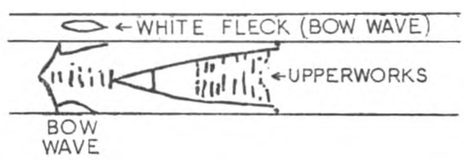

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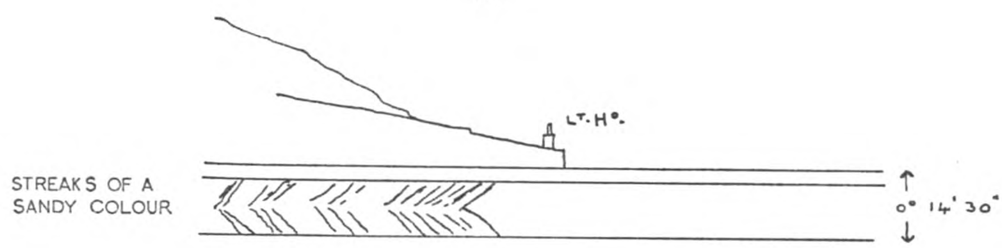


(4)

echo had no resemblance to those sometimes received from wave tops and perhaps may have been due to the signal being returned from atmospheric layers of different densities. This condition lasted only a short time and was not seen again. The ship shown in sketch 2 was 10 miles away by radar, at 0520: it was seen as an inverted image combined with the true one. The bow wave and white upperworks were seen quite clearly (see sketch 3). At 0523 the last observation was made, that of East Point lighthouse, and once again the land seemed to be distorted vertically, as shown in sketch 4. Throughout the period of the observations the horizon underwent constant changes and only its more striking aspects are shown in the sketches. From first to last the air temp. fell from 72·2°F to 70·8° and the wet bulb from 67·0° to 65·4°; the sea temp. was 68·5°. Wind, E's, force 2–3.

Position of ship: off Wilson's Promontory.

Note. Many spectacular displays of abnormal refraction have been reported from Bass Strait, see for example reports from s.s. *Paparoa*, m.v. *Port Launceston* and m.v. *Idomeneus* (*The Marine Observer*: page 16, January 1960; page 67, April 1960; and page 134, July 1960, respectively).

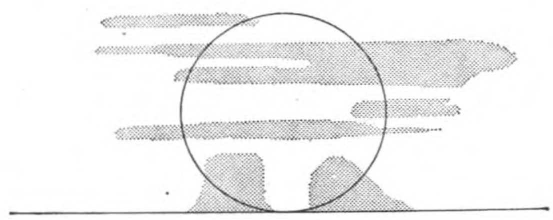
At the eastern entrance to Bass Strait the warm south flowing waters of the East Australian Coast Current converge with the cold waters of the Southern Ocean Current flowing eastwards through Bass Strait. Abnormal refraction occurs in this strait with easterly or north easterly winds when air of tropical origin flows on to the cold water of the Southern Ocean Current. The phenomena then observed are typical of warm air flowing over a cooler sea. It is however possible in Bass Strait for cool air flowing over warm water to produce a somewhat different type of abnormal refraction, e.g. as in *Idomeneus*'s observation mentioned above.

GREEN FLASH

North Atlantic Ocean

s.s. *Gothic*. Captain R. G. James, R.D. Port of Spain to London. Observers, Mr. M. Jenkins, 4th Officer and Cadet J. S. Allen.

22nd October 1960. In anticipation of a green flash, the setting sun was observed



through binoculars. Low on the western horizon were bands of lenticular Ac. and some large Cu., which divided the sun's disc into several small portions. Each of these areas turned a light green colour on passing out of sight behind the small bands of cloud. In all, ten separate green flashes were thus seen, and at one stage with the sun half set, the whole of the visible surface, with the exception of the parts crossed by the narrow bands of cloud, turned a bright green for about 2 secs. Air temp. 82°F, wet bulb 77°, sea 81·5°. Wind E, force 4. Cloud: 2/8 Cu., 3/8 Ac.

Position of ship: passing Barbados Island.

Note. Abnormal refraction probably caused such effective separation of the green rays from the rest of the solar colour spectrum.

CONTRAST OF LIGHT INTENSITY

Red Sea

m.v. *Silverdale.* Captain G. F. Chivers, M.B.E. Bandar Mashur to Suez. Observers, the Master and Mr. M. L. Brisley, 3rd Officer.

21st December 1960. At 1800 GMT (2100 LMT) a dark triangular area was seen directly under the moon—then in its first quarter and at an elevation of about 6°—which extended from the horizon up to an angle of approximately 10°. The sky was cloudless and the visibility excellent, the horizon line being well defined. The observers found, on looking away from the moon and the dark patch for a few seconds, that when they looked back again the shadowy area was not seen for an appreciable interval. This agrees with the comments in *Note* 1 accompanying the report by m.v. *Dartmoor* on p. 193 of the October 1960 issue of *The Marine Observer.* Air temp. 78°F, wet bulb 74°, sea 76°. Wind SW, force 2. Visibility excellent.

Position of ship: 16° 54'N, 40° 54'E.

Note. We are glad to have this further report of the phenomenon.

RADIO FADE-OUT

North Atlantic Ocean

s.s. *Consuelo.* Captain F. Metham. Middlesbrough to Montreal. Observer, Mr. D. Leeson, Senior Radio Officer.

12th November 1960. From 1630 GMT in 54° 45'N, 48° 05'W, to about 2200 on 13th when off Amour Point, a complete radio fade-out on the short waves was experienced. From 2200 onwards on 13th there were some signs of weak activity on the 36 and 49 metre wave bands, but signals were too weak to be of any use for communication, and stations within a radius of about 750 miles were not heard at all. No European stations were received, but Curaçao PJC and Rio de Janeiro PPR came in quite strongly.

Note. Mr. G. O. Evans, of the G.P.O. Engineering Department, comments:

"The short wave fade-out experienced by s.s. *Consuelo* on 12th November, coincided with a Dellinger fade-out which affected all radio circuits incoming to the United Kingdom. The disturbance noted on 13th was due to an ionospheric storm. These storms, which often follow Dellinger fade-out after a period of 18–36 hours, cause maximum disruption to circuits traversing the auroral zones. This is the reason why signals that were received from the south were normal while European signals were unheard.

"The probable reason for stations within 750 miles being unheard was that, during the ionospheric storm, the lowest frequencies radiated in the HF bands had skip distances greater than 750 miles. The disturbance was associated with a sunspot that was visible between 6th and 18th, with a measured area on 14th November of 1775 millionths of the sun's visible hemisphere, making it the largest sunspot to be reported during 1960."

Indian Ocean

m.v. *Rakaia*. Captain F. G. Bevis. Aden to Sydney. Observers, Mr. R. Birkinshaw, Chief Radio Officer and Mr. J. Russell, 2nd Radio Officer.

11th November 1960. A complete radio fade-out on the short waves was experienced from 0300 to 0500 GMT. Signals were again received at 0500 but they were exceptionally weak. It is thought that the fading was probably due to a large sunspot observed at this time.

Position of ship: 22° 51'S, 97° 29'E.

Note. Mr. G. O. Evans, of the G.P.O. Engineering Department, comments:

"The complete radio fade-out experienced by m.v. *Rakaia* on 11th November 1960, although unrecorded by receiving stations in the United Kingdom, coincided with a Dellinger fade-out reported by Hong Kong and Singapore between 0300 and 0500 GMT.

"A sudden radio fade-out, sometimes called a Dellinger fade-out, is caused by an intense burst of ultra violet radiation emitted from an area of spot activity on the sun's surface. This radiation affects the ionosphere, and therefore high frequency radio circuits, on the sunlit side of the earth only. The average duration of the Dellinger fade-out is about 50 minutes. Frequently, but not invariably, a different type of radiation, which is emitted from the sun at the same time as the ultra violet radiation but with a lower velocity, arrives in the ionosphere from 18 to 36 hours later. This radiation is concentrated by the earth's magnetic field into the auroral zones and causes interruptions to high latitude circuits, especially during the hours of darkness.

"The fade-outs reported by the *Rakaia* and *Consuelo* were two separate Dellinger fade-outs but were both associated with the large sunspot mentioned in my note on the latter's observation. The local sun times at which they occurred were 0930 and 1330 respectively.

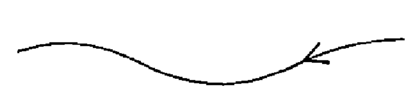
"The present trend of the sunspot cycle suggests that the number of Dellinger fade-outs likely to be observed during 1961 will be very small. No fade-outs of this type are likely to be recorded after the spring of 1962, and they will probably not re-appear until around 1966."

METEOR

Indian Ocean

s.s. *Hector*. Captain R. A. Hanney. Adelaide to Aden. Observer, Mr. J. H. Watterson, 2nd Officer.

14th November 1960. At 2046 GMT a meteor of unusual brilliance was observed ahead, and moving in azimuth from 310° to 295° approx. at a mean altitude of 4°. Its flight was slower than is usual, though it was in view for only 2 sec., but it was



nevertheless remarkable in that its track showed a dip and a climb, as shown in the accompanying sketch. Only $\frac{1}{8}$ C_L8 was present. There was a slight haze, making the horizon indistinct. Air temp. 80°F, wet bulb 75°, sea 83°.

Position of ship: 8° 49'N, 56° 00'E.

AURORA

Gulf of St. Lawrence

s.s. *Toronto City*. Captain W. Stoodley. Avonmouth to Montreal. Observer, Mr. C. R. Bishop, 3rd Officer.

28th October 1960. A striking display of aurora, of the form shown in the accompanying sketch drawn by Mr. Bishop, was seen from 0030 to 0330 GMT. The lower edge of the curtain reached a maximum elevation of about 9° and it lay between bearings of 300° and 045°. Maximum brilliance occurred around 0030,

[*Contd. on page 191*

The following notes and table have been received from Mr. James Paton, of the Aurora Survey:

"The observations of aurora made in ships during the period 1st October–31st December 1960 are listed in the accompanying table compiled at the Balfour Stewart Auroral Laboratory of the University of Edinburgh, where they are charted along with data from observers on land and in aircraft.

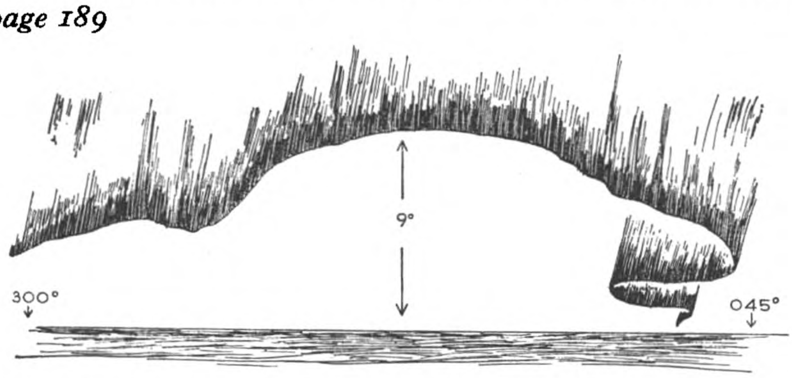
"As will be seen from this list, much activity was reported in the period 12th–16th November. On the night of 12th–13th November aurora was reported by land observers as far south as Portugal, and by an aircraft on a flight between Trinidad and Bermuda. Many ships reported extensive and colourful displays on these nights and as conditions were cloudy in much of Scotland, we are most grateful for these detailed descriptions."

Date (1960)	Ship	Geographic Position		Λ	Φ	I	Time (GMT)	Forms
2nd Oct.	*Carronpark*	47°30′N	62°30′W	010	60	+74	0400, 0800	L, P
5th	*Menastone*	65°02′N	35°03′E	120	60	+75	2115, 2240	HA, DS, R
6th	*Menastone*	65°02′N	35°03′E	120	60	+75	0001–0030	DS, R, C, P
	Potaro	45°10′N	40°22′W	040	55	+67	0045	RA
	Calgaria	54°30′N	41°00′W	040	64	+72	0400	HB
7th	*Ramore Head*	43°12′N	49°30′W	020	54	+69	0300, 0400	G, DR
	Birmingham City	53°18′N	42°20′W	040	63	+72	0400–0410	RB, R
	Calgaria	56°12′N	30°00′W	050	64	+72	0500	PB
8th	*Cairnforth*	52°40′N	18°20′W	060	59	+68	2030, 2100	G, R
16th	*Menastone*	68°06′N	40°30′E	130	62	+77	2200–2230	RB, DS, R
18th	*Menastone*	68°40′N	40°00′E	130	62	+77	0210	R
	Weather Reporter	52°34′N	20°02′W	060	59	+69	2050–2208	G, R, P
19th	*Menastone*	70°12′N	32°30′E	130	65	+78	1900–2300	L
	Bristol City	43°56′N	62°30′W	010	55	+73	0400–0700	HB, RB, R
20th	*Menastone*	70°05′N	35°25′E	130	65	+78	1800–1830	RB, R
21st	*Menastone*	70°05′N	35°25′E	130	65	+78	0001–0100	DS, R, P
							1745–1845	HB, RB, R, C
24th	*Menastone*	68°18′N	11°59′E	110	64	+75	1815–1910	HB or R
	Toronto City	54°00′N	38°00′W	040	63	+71	2310–2400	R
25th	*Cairnforth*	54°26′N	47°42′W	030	65	+73	0630–0700	RA
	Beaverford	52°44′N	49°25′W	030	63	+74	0630–0800	RB, R, S
	Trecarrell	37°46′S	126°58′E	200	−49	−70	1600–1700	G, R
	Weather Watcher	59°00′N	19°48′W	070	65	+72	2100–2400	RB, HB, R
	Menastone	63°24′N	08°12′E	100	63	+74	2300–2400	S
26th	*Menastone*	63°24′N	08°12′E	100	63	+74	0001–0250	HB, HA, R, S, P
	Weather Watcher	59°00′N	20°00′W	070	65	+72	0001–0600	RB, R
	Media	45°42′N	40°22′W	040	55	+68	0200–0300	G
27th	*Media*	48°16′N	31°16′W	050	57	+67	0400–0420	G
	Calgaria	56°30′N	31°15′W	050	65	+73	0500	PB
	Weather Watcher	58°50′N	19°50′W	070	65	+72	2100	G
28th	*Toronto City*	50°00′N	63°00′W	010	61	+75	0030–0330	RB
	Media	50°04′N	21°05′W	060	57	+67	0245–0256	G
	Weather Watcher	59°06′N	18°42′W	070	65	+72	0600	HB, RB, R, P
30th	*Ivernia*	53°46′N	41°09′W	040	63	+72	0500, 0530	L
	Weather Watcher	59°10′N	19°00′W	070	65	+72	2345	G
4th Nov.	*Weather Watcher*	58°50′N	19°10′W	070	65	+73	0215–0245	RB, HA
	Weather Watcher	58°50′N	18°50′W	070	65	+73	2340	R
8th	*Weather Watcher*	58°50′N	18°30′W	070	65	+73	2340–2350	HB, R
11th	*Weather Watcher*	58°42′N	18°50′W	070	65	+73	2340–2345	G, R
12th	*Apollo*	49°00′N	05°00′W	080	53	+66	1800–2400	G, R
	Ethel Everard	50°25′N	02°20′E	090	53	+66	1850–1935	L
	Weather Watcher	58°50′N	18°50′W	070	65	+73	1900–2400	RB, RA, S, G, P
	Milo	51°10′N	01°30′E	080	54	+67	2120	DR
13th	*Apollo*	49°00′N	05°00′W	080	53	+66	0001–0500	G, R
	Weather Watcher	58°50′N	18°50′W	070	65	+73	0001–0700	RB, R. S. G, P
							2112–2400	RB, G
	Media	40°30′N	69°28′W	360	52	+71	0020–0735	All forms
	Pacific Northwest	25°56′N	57°20′W	010	37	+59	0030–0045	G
	London Prestige	28°45′N	50°50′W	020	39	+60	0030–0130	
							0530	G, R
	City of Lucknow	25°45′N	75°15′W	350	37	+60	0035–0100	L
							0610–0630	G
							0930–0940	G
	Deerpool	46°50′N	38°00′W	040	56	+68	0130–0145	RA, DR, R, DS, G, P
							0615–0810	G, R
	Caslon	47°18′N	47°18′W	030	58	+70	0600	G, R, P
	City of Brisbane	49°00′N	60°35′W	350	35	+75	0620, 0640	G
	Rakaia	31°34′S	111°00′E	180	−42	−65	1500–1518	R
	Ayrshire	41°35′N	09°32′W	070	46	+59	2130–2230	G, R
14th	*Shuna*	58°10′N	05°35′W	080	62	+71	0001–0120	L, P
	Weather Watcher	58°50′N	19°40′W	070	65	+73	0001–0300	RB, RA, R, G, P
							2100	S
	Ayrshire	41°35′N	09°32′W	070	46	+59	0030–0050	G, R
	Consuelo	53°40′N	50°25′W	030	64	+74	0030–0700	HA, RA, DR, R, S, G
	Deerpool	48°00′N	32°30′W	050	57	+68	2000–2400	G

Date (1960)	Ship	Geographic Position		Λ	Φ	I	Time (GMT)	Forms
15th Nov.	*Weather Watcher*	58°50′N	19°40′W	070	65	+73	0600	G
							1830–2400	RA, RB, R, G
	Rialto	58°30′N	16°30′W	070	64	+70	0625–0635	HB, P
							1800–2400	RB, R, S, P
	Orsova	38°20′S	148°40′E	220	−46	−67	1530–1635	G
	Trecarrell	38°25′S	140°00′E	220	−48	−68	1730	R
	British Advocate	57°28′N	10°42′E	100	58	+70	1900–2200	RA, R
16th	*Rialto*	58°00′N	24°00′W	060	65	+73	0001–0600	RB, R, S, P
	Weather Watcher	59°20′N	18°45′W	070	65	+73	0001–0600	RB, RA, HB, R, C, G, P
	Shuna	57°34′N	05°40′E	090	59	+71	0001–0300	RA, R
	Orsova	38°20′S	148°40′E	220	−46	−67	0130–0220	S, R
	Rakaia	37°22′S	131°50′E	200	−47	−69	1345–1350	R
17th	*British Sailor*	38°32′S	139°57′E	210	−48	−69	1339–1342	S
	Weather Reporter	58°50′N	18°51′W	070	65	+72	2100	L
18th	*Weather Reporter*	58°58′N	19°08′W	070	65	+72	0300	G
							2100	G
	Weather Watcher	57°30′N	13°30′W	070	65	+73	0001	G
21st	*Weather Reporter*	58°57′N	19°27′W	070	65	+72	0600	G
	Orontes	31°47′S	114°09′E	180	−43	−66	1815–1930	RB, R
22nd	*Weather Reporter*	58°59′N	19°07′W	070	65	+72	0300–0600	R
24th	*Media*	50°42′N	30°00′W	050	59	+69	0120–0220	G
	Weather Reporter	59°03′N	19°12′W	070	65	+72	2205	R, P
25th	*Weather Reporter*	59°04′N	18°40′W	070	65	+72	2100	HB, P
26th	*Weather Reporter*	59°04′N	18°40′W	070	65	+72	0300	G
27th	*Weather Reporter*	58°56′N	19°05′W	070	65	+72	2100	G
1st Dec.	*Weather Reporter*	58°59′N	18°55′W	070	65	+72	1930–2015	RB
6th	*Weather Reporter*	59°12′N	18°48′W	070	65	+72	2035	DR, P
7th	*Weather Recorder*	53°36′N	15°18′W	070	59	+68	2100	G
	Weather Reporter	59°06′N	19°28′W	070	65	+72	2100–2400	HA, DR
8th	*Weather Reporter*	59°06′N	19°28′W	070	65	+72	0300	R
11th	*Weather Watcher*	58°50′N	19°00′W	070	65	+72	2400	G
12th	*Weather Watcher*	58°50′N	19°00′W	070	65	+72	2100	G
13th	*Port Brisbane*	43°50′N	27°40′W	050	52	+63	2300–2315	RB, HB
16th	*Weather Watcher*	58°58′N	18°50′W	070	65	+72	0001–0100	G, R, C, S, P, F
17th	*Weather Watcher*	58°58′N	18°50′W	070	65	+72	0001–0600	G
							2130–2230	G
18th	*Weather Watcher*	59°03′N	19°27′W	070	65	+72	2200–2400	HA, R, S, G, P
20th	*Weather Watcher*	58°47′N	18°34′W	070	65	+72	2215–2400	R, G, P
21st	*Weather Watcher*	58°47′N	18°34′W	070	65	+72	2100	G
22nd	*Weather Watcher*	58°47′N	18°34′W	070	65	+72	2230–2400	RA, R, G
23rd	*Weather Watcher*	58°47′N	18°34′W	070	65	+72	0001–0600	G
27th	*Weather Watcher*	59°04′N	19°10′W	070	65	+72	1910–1936	RA, RB, R, G
29th	*Weather Adviser*	61°10′N	29°40′W	060	69	+75	2340	RB
31st	*Weather Adviser*	62°05′N	33°00′W	060	70	+75	2335–2345	R

Λ = geomagnetic longitude Φ = geomagnetic latitude I = inclination
(See explanation of magnetic co-ordinates in *The Marine Observer*, July 1960, page 147.)

[*Contd. from page 189*



during moonlight, but the intensity waned and only a glow remained in the northern sky after the moon had set. The sky was cloudless.

Position of ship: off the north coast of Anticosti Island.

Meteorology in the Fishery Protection Squadron

(This article has been received from the Director of the Naval Weather Service)

From time to time in the last few years, public attention has been focused on the British distant-water trawlers which operate from Hull, Grimsby and Fleetwood, to fish in Icelandic and other Northern waters. As a result, the Fishery Protection Squadron ships, which during the year undertake patrols in waters adjacent to

Iceland and north Norway, and in the Barents Sea, have received unsought publicity. Their primary task is the protection of British fishing interests but they have traditionally provided other services such as aid in minor engineering and electrical repairs, and qualified advice or professional assistance from medical and other officers.

The waters in which these ships operate are notorious for the treachery of the weather. From the earliest days it was appreciated that unless meteorological advice was made available, the trawler skippers would be obliged to accept unnecessary and perhaps grievous risks.

Initially in the post-war era, the Fishery Protection Squadron was able to receive, in addition to the radio weather bulletins issued by the national meteorological authorities in Germany, Iceland, Norway and the United Kingdom, bulletins specially prepared and issued by the Admiralty Forecast Section in London. The ships of the Squadron then provided a service to the trawlers by passing on these Admiralty bulletins, as circumstances permitted. Whilst the quality of these bulletins evoked a reasonable degree of appreciation from the trawler users, it was recognised that the service could be considerably improved by a forecasting officer who was actually in the area of operation as has long been the practice aboard German fishery protection vessels. Apart from the handicap of forecasting in London for an area some hundreds of miles distant there was also, in this particular case, the disadvantage that very few observations are received from the sea areas concerned, whilst reports from the nearest land stations are both sparse and subject to excessive topographical influences which often make the observations misleading.

From the early 1950's it became the practice to send a Meteorological Officer, when circumstances allowed, to a ship about to undertake a Northern patrol.

On 26th January 1955, the tragic loss with all hands of two trawlers, caused by severe icing on the superstructure when caught in an intense storm to the north of Iceland, served to emphasise the dangers and the precautions required.

In September 1957, permission was given for a permanent Naval Weather Service meteorological unit to be borne in one of the ships of the Fishery Protection Squadron. From that time a regular service of on-the-spot weather forecasts and gale, storm, fog and ice warnings has been provided, as an additional protection to the trawlers. This meteorological unit consists of a forecasting officer and a trained assistant, and it is intended to be mobile, transferring from ship to ship as requisite to spend the maximum possible time actually on patrol.

The unit is equipped with some simple, portable meteorological instruments, and a selection of the appropriate books, atlases, diagrams and charts. In each ship in which the two are accommodated a small space is allocated as their working office. The basic meteorological data, information essential to the performance of their task, are specially transmitted by W/T from Whitehall in messages prepared within the Admiralty Forecast Section and include reports from trawlers in this area whenever they are available, which have been received by radio at Dunstable and passed to the Admiralty by teleprinter. For reception they have to rely on the standard communication facilities of the ship in which they are borne. Until recently these messages were sent by C.W. transmissions and had to be read by communication ratings, but radio teletype is now fitted in the H.M. Ships concerned. Unfortunately the actual reception of some transmissions is often difficult in these northern waters, and then the unit has to fall back upon such routine messages as can be picked up from other European sources of information.

Usually, however, the Whitehall broadcast permits four main hour synoptic charts and two upper air charts a day to be drawn, each with a good meteorological coverage of the North Atlantic. The unit also, as a matter of routine, makes regular observations of its own weather and transmits this information ashore for the benefit of other interested services.

From its weather charts, which include its own observations and relevant information from the trawlers, and using its acquired specialised knowledge about the weather peculiarities of the northern areas, the unit prepares at least two and sometimes three forecasts a day covering each of the several areas in which the trawlers operate or take haven. The forecaster also prepares gale, storm, fog and ice warning messages when he considers them necessary.

There remains only the problem of passing these important messages to the trawlers. The normal hours for broadcasting the routine messages are about 1000 and 1900 and the transmission is by voice on the trawlers' working radio frequency. Notice of the commencement of the broadcast is given, if necessary, over a standard reception channel. Urgent warning messages are broadcast in the same way immediately on issue and thereafter are repeated at regular intervals. The range at which these R/T broadcasts can be heard is of course limited and the meteorological unit cannot personally inform every trawler. Distant areas of operation and havens are accordingly usually catered for by transmitting on W/T the special messages appertaining to these areas to the local patrol ship, which then re-broadcasts them by R/T to the trawlers in the vicinity. It is also customary for the trawlers themselves to pass on the messages to more distant trawlers by re-broadcasting them on request.

Most trawlers are of course well aware of this Fishery Protection Squadron service, and also of similar services provided by ships of the Royal Canadian Navy and of the German Weather Service, each intended primarily for the benefit of their own fishing fleets. In times of necessity, provided only that the messages can be received, each of these services is available to all ships. All meteorological services, including the Icelandic Meteorological Service, co-operate to help one another in ensuring the safety of the trawlers and their crews. At present, about 40 British trawler skippers and their radio operators voluntarily make meteorological observations, sending them by radio to the United Kingdom or to other authorities ashore as convenient. These observations are eventually received on board the fishery protection ships by re-transmission from shore. It would be of great assistance to meteorological services if other trawlers would make observations whenever practicable. These should be passed direct to shore, but when this course is not possible, the observations can be sent by radio telephone to a fishery protection ship in the area.

There is one other aspect of the work of the Fishery Protection Squadron meteorological unit. The regular observations of the weather experienced are not only made and transmitted, but are also carefully recorded in meteorological logs. Each observation recorded must in due course contribute usefully to a detailed study of the climatology of these dangerous waters, from which observations are scanty.

The reference made above to R/T contact with the trawlers underlines the fact that the meteorologist serving in the Fishery Protection Squadron has an opportunity to measure his professional success in a way that is denied his colleagues ashore. He has the oral, and no doubt sometimes voluble, response of the trawler skippers to his efforts! The good relations which exist between the forecaster and his customers testify that these efforts are generally appreciated.

Editor's note—The skippers and wireless operators of certain British trawlers, on passage, and when fishing in Home Waters, off Iceland or Greenland or in the Barents Sea or White Sea area, voluntarily make and transmit visual, non-instrumental observations in Code Form F.M.23B, to radio stations in the United Kingdom, Canada, Iceland, Norway or the U.S.S.R. as convenient, thus providing valuable and otherwise unobtainable information.

The number of such reports has shown a spectacular increase in recent years: for the 12 months ending 31st March 1961 the total was 10,062 (28 reports per day), compared with a total of only 2,905 (about 8 per day) in the corresponding period in 1957–1958.

Awards are given annually, by the Director-General of the Meteorological Office, normally in the form of a world atlas, to the two trawler skippers and their wireless operators who send in the largest number of observations (up to a maximum of four per day per vessel) during the year.

Disastrous North Sea Storm of 6th–9th December 1959

By Janet M. Oliver

(Marine Climatology Section, Meteorological Office)

The severe gales that occurred during the early part of December 1959 led to one of the worst series of shipping disasters in the North Sea for many years. Winds reached force 10 (storm) at times. Seven ships were wrecked and over forty people lost their lives.

Fig. 1 shows the positions where the vessels foundered.

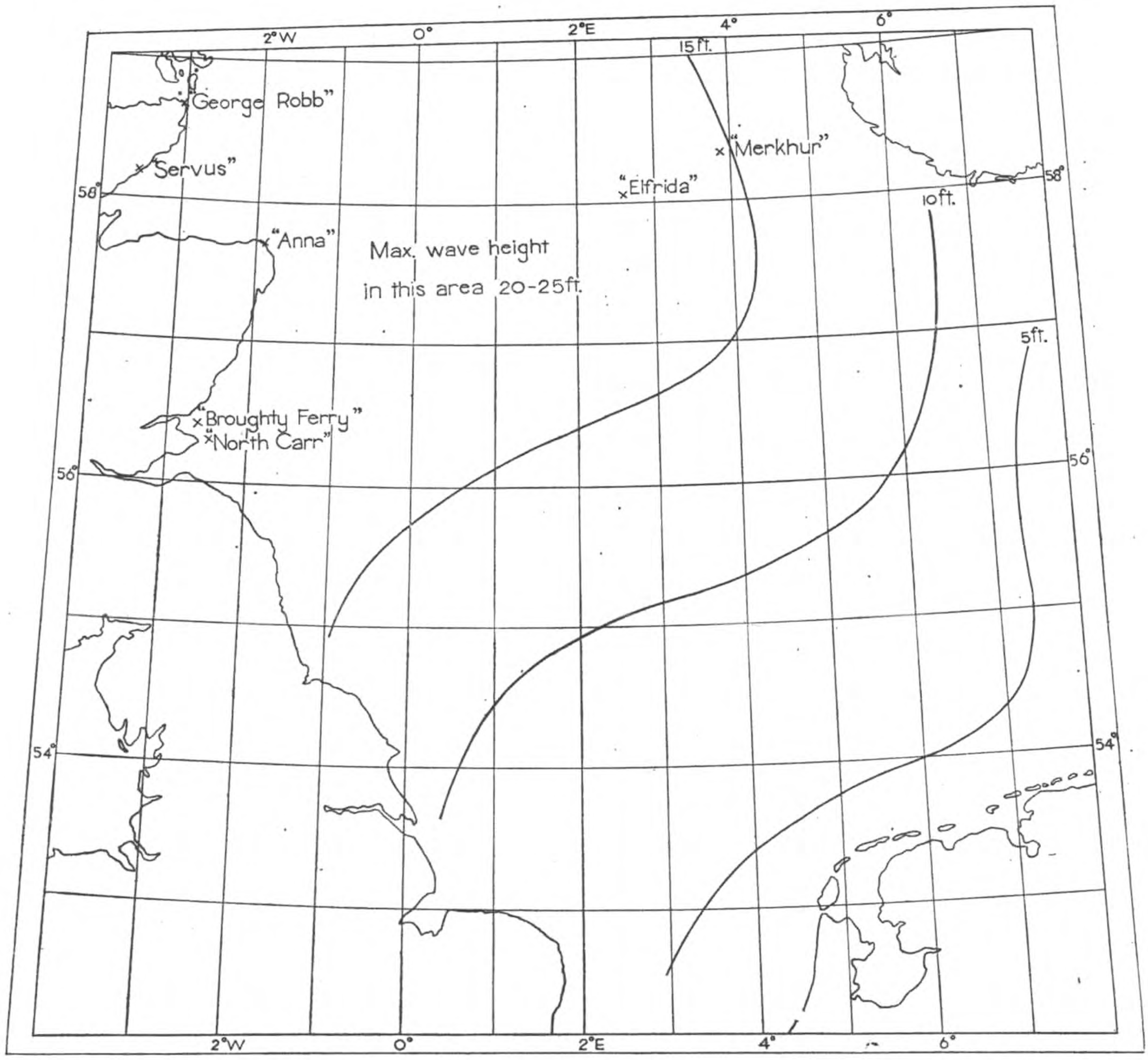


Fig. 1. Significant wave heights in feet, and positions of vessels which foundered.

At 2340 GMT on 6th December, the crew of the British trawler *George Robb* was lost when the vessel was driven ashore just north of the Stack of Duncansby, Caithness, whilst on passage to the Faroes fishing grounds.

The Finnish ship *Anna* left Riga on 1st December for Leith and Grangemouth and ran aground at St. Combs, Aberdeenshire (near Fraserburgh), on the night of 7th. The captain and crew were saved two days later. (See photograph opposite page 196.)

The British ship *Servus* left Methil at 1600 GMT on 5th December for Kirkwall. An S.O.S. was broadcast at 0831 GMT on 7th, 26 miles NE'E from Lossiemouth. Cromarty lifeboat took off the crew and the ship drifted ashore at Dunbeath, Caithness, at 0745 GMT on 8th.

Twenty Norwegian seamen were lost when the 2,500 ton *Elfrida* capsized in position 58° 07′N, 2° 35′E at 1009 GMT on 9th December. She had earlier sent an S.O.S. at 1728 GMT on 8th that she was in difficulties 35 miles SW of Lista Lighthouse (58° 03′N, 6° 41′E). She was on passage from Archangel to Denmark carrying timber.

The German ship *Merkhur* left Grangemouth at 1400 GMT on 3rd bound for Borgestad (59° 09′N, 9° 39′E). After broadcasting an S.O.S. at 1955 GMT on 7th from position 58° 00′N, 4° 30′E, she was reported foundered at 1651 GMT on 9th in 58° 27′N, 3° 54′E.

The *North Carr* light-vessel broke her moorings on 7th December. During the rescue operations the *Broughty Ferry* lifeboat sank and the crew of eight perished. Later, the crew of the light-vessel were rescued by 2 R.A.F. helicopters (see photograph opposite page 196).

The gales first developed during 5th December over the north-east of the North Sea on the south-west flank of an intense anticyclone centred over Finland. During 6th, an intense depression advanced NE'ward and reached a position off the Scilly Isles by midnight. The associated strengthening of the WSW–ENE pressure gradient between the two systems caused the gales to become widespread, and cover the whole of the North Sea. During 7th, the low moved slowly northward, resulting in a further tightening of the pressure gradient, giving severe gales over most of the

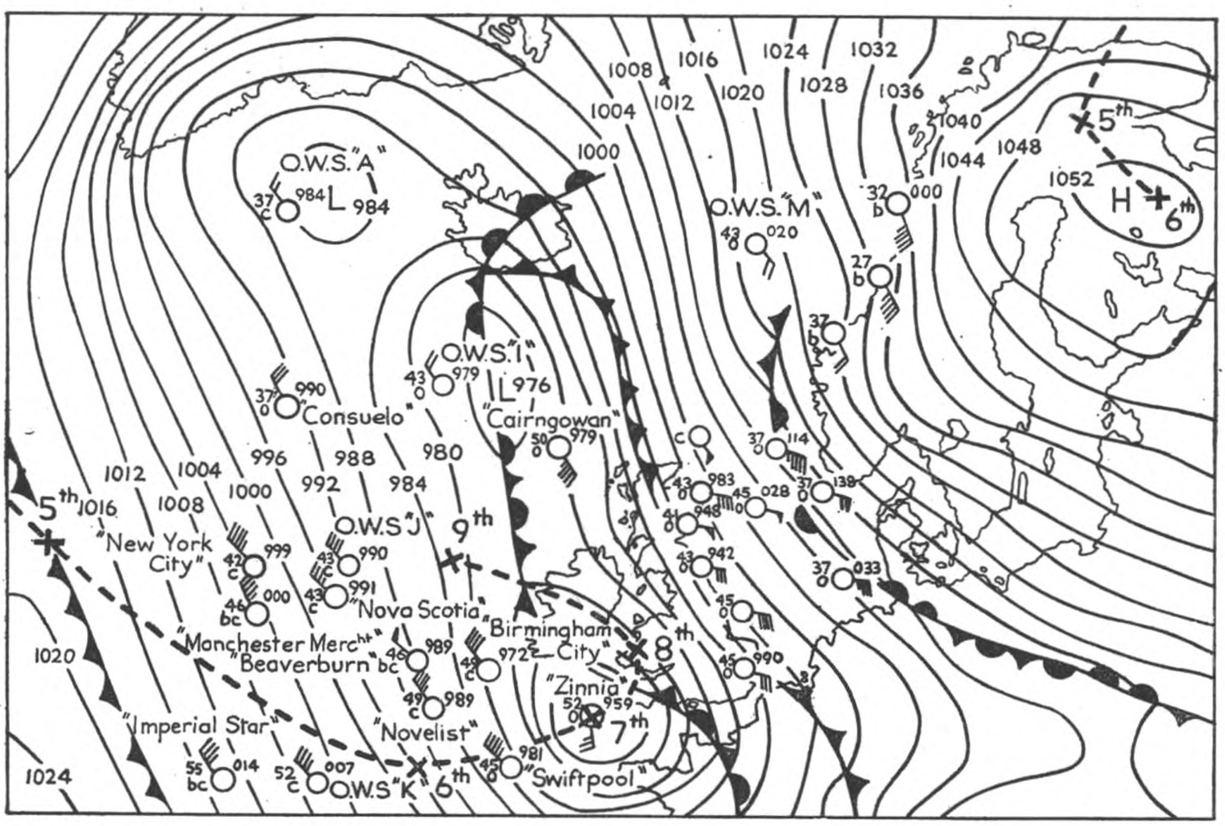


Fig. 2. Synoptic chart for 1200 GMT, 7th December 1959.

North Sea (Fig. 2). During 8th, the low filled steadily and moved away towards the west, being off north-west Ireland by midnight. This led to some relaxation of the steep pressure gradient, though gales were still affecting most of the North Sea at 0001 GMT on 9th.

The isopleths of significant wave height* shown in Fig. 1 have been derived

* The significant wave height is defined as the mean of heights of the highest third of all waves recorded. (The significant wave height is about two thirds of the maximum wave height.) Comparison of records from automatic wave recorders with the estimates made by experienced observers indicates that the estimated height and period agree fairly closely with the significant height and period.

from the gradient wind speed and the fetch of the wind, using a method employed by the Naval Weather Service.[1] An analysis of wave recordings made at Smiths' Knoll light-vessel[2] shows that in the North Sea the wave height is virtually independent of the fetch when the distance to windward exceeds 200 n. miles.

The isopleths show that all the disasters occurred within the region of highest waves in the northern part of the North Sea. In this region, the maximum wave height would be about 25 ft., which is only very rarely exceeded in the North Sea.[3]

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1 Admiralty, Naval Weather Service Department, 1958. Memo No. 135 B/58—Observing, Forecasting and Reporting Waves and Surf. London.

2 DARBYSHIRE, M. 1960. Waves in the North Sea. *Dock Harb. Author.* No. 481, Vol. XLI, pp. 225–228. London.

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NEW BRITISH WEATHER SHIP—"WEATHER MONITOR"

On 12th May, the third of the former 'Castle' class frigates to be converted to an ocean weather ship—H.M.S. *Pevensey Castle*—was renamed *Weather Monitor* at Blyth (Northumberland) by Mrs. A. C. Best, wife of the Director of Services of the Meteorological Office. (See photographs opposite page 197.)

The ceremony was performed in the dockyard of the Blyth Dry Dock and Shipbuilding Co., Ltd., which had carried out the work of conversion of this vessel. The ceremony was quite informal, but was attended by the Mayor and Mayoress of Blyth, and senior representatives of the Meteorological Office, Ministry of Aviation and Admiralty. The ship, which was lying at the riverside berth, was 'dressed' with the national flags of all the countries which operate ocean weather ships in the North Atlantic. Those members of the ship's company who had already joined her were lined up on the quay near her bows, and each of them was introduced to Mrs. Best and her husband.

Mrs. Best then went aboard the ship, accompanied by the temporary master, Captain A. A. Robinson, and cut a tape releasing a canvas cover disclosing her name and said "I rename this ship *Weather Monitor*. May God bless her and all those who sail in her."

The ceremony was witnessed by a large number of the men of the Blyth Dry Dock Co. who had done the conversion work.

The visitors then did a tour of inspection of the ship, accompanied by the Master, the Marine Superintendent of the Meteorological Office, and the General Manager of the shipyard.

After inspecting the ship, the visitors were entertained to luncheon by Mr. Mitcheson, General Manager of the shipyard. In a brief informal speech, Dr. Best said how impressed he had been with the good job that the shipyard had made of this conversion, and mentioned in particular the high quality of the woodwork and general layout of the accommodation. He emphasised the useful work that the weather ships have done and are continuing to do in the somewhat inclement waters of the North Atlantic: without the meteorological information provided by these ships, supplemented by that provided voluntarily by merchant ships, the job of the meteorologists in Europe would be made very much more difficult. Also, they provided very useful navigational aids and communications services for transatlantic aircraft. The North Atlantic weather ship scheme provided an outstanding example of effective international co-operation for entirely peaceful purposes, from which a large number of countries and individuals benefited. Mr. Mitcheson, in reply, said how pleased he was that his shipyard had had the opportunity of converting three of these ships (*Amberley Castle*, *Pevensey Castle*, and, still in the process of conversion, *Rushen Castle*). The general layout of *Weather*

(Opposite page 196)

Rescue by helicopter from the *North Carr* (see page 195).

Photo by courtesy of Aberdeen Journals, Ltd.

Rescue of the master of the *Anna* (see page 194).

(*Opposite page* 197)

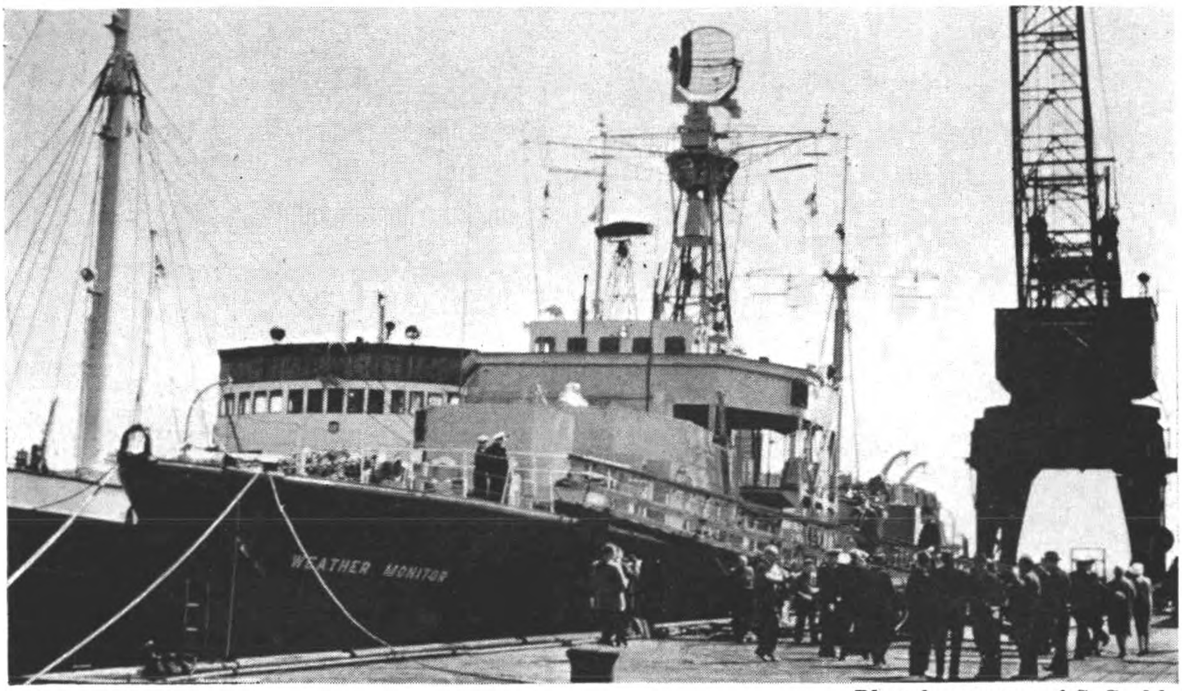

Photo by courtesy of S. Soulsby

The renaming of *Weather Monitor* (see page 196).

Photo by courtesy of F. Kirkham

Weather Monitor at sea (see page 196).

Monitor was almost exactly the same as that of *Weather Adviser*, which sailed on her maiden voyage as an ocean weather ship in September 1960 (see *The Marine Observer* of January 1961). Briefly, she is fitted with all the equipment necessary for her to perform her duty as an ocean weather ship, and the general standard of her accommodation is as good as would be found in any other ship of a similar size. Captain K. R. H. Wem, formerly master of *Weather Recorder*, now commands her.

Weather Monitor replaces the former 'Flower' class corvette *Weather Recorder* (formerly H.M.S. *Genista*), which has now been withdrawn from service after 106 voyages (14 years) as a weather ship in the North Atlantic. Launched in 1941, *Genista* saw service as an escort vessel during the last war, mostly in the South Atlantic and Indian Ocean areas, where she took part in the invasion of Madagascar. She was converted to an ocean weather ship in Devonport dockyard and sailed on her first patrol at an ocean station in October 1947. In addition to her normal duties as a weather ship, *Weather Recorder* showed her usefulness in other ways. In January 1948, while on her way out to an ocean station, she rescued the whole crew of the Norwegian steamer *Veni*, aground on the Isle of Islay. In August 1955 she stood by the disabled m.v. *Argobeam* for two days in heavy weather and directed tugs to her, to take her in tow. *Weather Recorder* did a good job generally, and although she was too small to provide much comfort in accommodation, many who sailed in her must have happy memories of her. (See photograph opposite page 208.)

C. E. N. F.

The Work of a Port Meteorological Officer

By J. C. MATHESON, Master Mariner, and CAPTAIN F. G. C. JONES

(Port Meteorological Officers at London and Cardiff respectively)

The Meteorological Office fleet lists published in each July issue of *The Marine Observer* show that the captains and officers of almost seven hundred vessels of British registry voluntarily co-operate with the Meteorological Office by observing and reporting elements of the weather throughout their voyages. This total of seven hundred is made up of about five hundred Selected Ships, fifty Supplementary Ships, one hundred coasters reporting sea temperatures and (in some areas) 'non-instrumental groups', forty-three trawlers giving information of ice and weather from the northern fishing grounds, and a number of cross-channel steamers making non-instrumental observations. All these ships have been recruited and equipped with instruments by the five Port Meteorological Officers (P.M.Os.) and three Merchant Navy Agents who are stationed at the main ports around our coasts, all men with many years of experience at sea behind them and who, in most cases, have held command of ships before taking up a shore appointment. These officers have all attended a course of training in meteorology at the Meteorological Office's training establishment at Stanmore, and since all have had experience of voluntary meteorological work at sea and have at least a foreign-going Master's Certificate, ships' officers can be assured that when visited by the port 'Met. Man' they are dealing with one who understands the problems and difficulties of life at sea and whose experience of the weather is not limited to tapping the hall barometer before deciding whether or not to face the day armed with umbrella or raincoat.

We realise that the meteorological work carried out by the captains and officers of observing ships is done on a voluntary basis for the good of all, and so the P.M.O. will do his best to see that these ships get the best possible service from the Port Meteorological Office, which exists for the purpose of maintaining liaison between the ship and the Meteorological Office.

Since good results cannot be expected from blunt tools, it is the duty of the P.M.O. when visiting a ship to make sure that the instruments which have been supplied on loan are examined for defects and replaced if necessary in order that accurate readings may easily be obtained. The reading of the mercurial barometer is checked by comparison with a standard instrument on shore, any small error found being noted on the barometer tag, but if this error should exceed 0·9 mb. the instrument is withdrawn and a new one supplied. The barograph is examined to make sure that the working parts are moving freely and that the pen is in good order and giving a fine trace; the clock may be adjusted for accuracy of time-keeping. The scales of all thermometers are checked to make sure that they are boldly marked for easy reading. The inspection of these instruments ensures that they are fully efficient for further use. As instruments are expensive to maintain, and deteriorate quickly in the salt-laden atmosphere at sea, advice on their care and maintenance is given to all new observers.

The siting of the instruments is of great importance if accurate results are to be obtained and this is one of the points always noted when inspecting them. Both the mercurial barometer and the barograph need to be in a place where they are clear of local heating, where there will be adequate light to read them and they will not be subject to transient variations of pressure due to draughts when doors are opened. Also, they must be safe from damage when the vessel is moving violently in heavy weather. All these conditions are hard to satisfy at times in the modern chartroom packed with the latest electronic aids to navigation, but a satisfactory compromise can usually be arrived at. With regard to the Stevenson screen, all mariners know that the lee side of the bridge, especially where there is an occasional back-draught from a funnel placed close abaft it, can be a comparatively comfortable spot in the worst of weather, but this is not the place from which accurate readings of the temperature and dew point of the air can be obtained. It is therefore our duty to make sure that the screen has been exposed in a suitable position to windward before observations are made. The condition of the bulb of the wet bulb thermometer is always examined for cleanliness, since accurate readings will not be obtained from a bulb encrusted with salt due to infrequent changing of the muslin cap or if distilled water is not used in the glass water container. These are all matters which the P.M.O. must note on the instrument inspection report he sends to the Marine Division headquarters, because any doubtful readings must be rejected for climatological purposes. Since the introduction of the new type of rubber bucket one rarely finds a ship where the sea temperatures are recorded from the engine room intake; such temperatures are not strictly reliable and no use is made of them for climatological purposes. But if on a very fast ship the intake is used, the P.M.O. will, where possible, compare the thermometer used in the engine room with a standard instrument and report on its accuracy.

Having ascertained that the instruments to be used are in good order and correctly sited, the P.M.O. then ensures that all the observing officers fully understand the work which they are undertaking; that they realise the importance of accurate reports to the forecaster, and of their records to the climatologist; and are acquainted with the organisation and network of communications which ensures that observations made on board ship at say 0000 in mid-Atlantic, are received in reasonable time at the Central Forecasting Office at Dunstable, plotted and assessed by the forecaster, and play their part in his weather forecast. This forecast is returned to the ship in the next Atlantic Weather Bulletin for shipping at 0930. It is also essential that the new observer be acquainted with the use which is made of the record of observations in the meteorological logbook after it has been completed and returned to the headquarters of the Marine Division at Bracknell. During the past century the present knowledge of climatological averages, winds and currents, etc., throughout the world has been built up from ships' observations. The need for accuracy in the observations and coding is thus apparent for the efficient continuation of this work.

Where instruction is needed in the correct coding of weather messages, such instruction is readily given. The ship's radio officer is a most important link in the chain of communications between the observer and the forecaster: without his goodwill and co-operation the whole system would fail. The P.M.O. will always endeavour to meet him, to thank him for his services, and to discuss any snags which he may have experienced in clearing messages and any suggestions he may have for improving the service. A visit is then made, when possible, to the ship's captain, to thank him for the co-operation of the ship, although due to pressure of ship's business ashore it is not always possible to contact him. Many shipmasters have a record of friendly co-operation with the Meteorological Office throughout their career at sea and it is always a pleasure to meet them. Many valuable suggestions for the improvement of meteorological services to shipping have been received from them.

It is intended in this article to describe a day's work at a Port Meteorological Office. All these offices are busy places and some have a very extensive area to cover, but the greatest volume of shipping is handled at the ports of London and Liverpool and we will therefore look into the work of the Port Meteorological Office at London where the P.M.O.'s round of duty comprises the area from Great Yarmouth to Dover, including the rivers Thames and Medway. In the office of the P.M.O. at London, situated in the King George V Dock, the day begins at 8.30 a.m. After the receipt of the latest forecast and discussion of the weather with the London Weather Centre the next task is to peruse the daily shipping papers for news of arrivals of ships in the area and to keep up to date the expected arrivals of observing ships at the various wharves and docks. After this has been done a programme for the day's work can be decided on. When possible, all observing ships are visited immediately after arrival, in order to contact the sailing officers before they proceed on leave. If these officers are not available, the P.M.O. tries again when they rejoin the ship for the next voyage. On the average, one hundred and twenty visits are made each month to ships from this office. In order to cope with this work and the attendant office-work the P.M.O. has two assistants.

On a recent day taken at random at the London office, it was found on going through the shipping periodicals that the observing ships arriving comprised a large passenger ship at Tilbury, a sugar carrier at Dagenham, four cargo liners at the Royal docks, a coaster at London docks and one cargo liner at West India docks. In addition, an appointment had to be kept on board H.M.S. *Worcester* during the afternoon in connection with the training of cadets in meteorology.

Travel is never easy in congested dock areas; to get through this programme, and to give each ship the attention which the importance of the voluntary observations to the Meteorological Office merits, the work was divided between the P.M.O. and his senior assistant. The four arrivals at the Royal docks were allocated to the latter to visit and to inspect the instruments, while the P.M.O. proceeded on his duty by car (suitably loaded with stationery and instruments) to Tilbury, then to Dagenham, on to West India and London docks, and then to H.M.S. *Worcester* at Greenhithe.

It is quite common when visiting a ship to find that the principal observing officer is leaving the ship for leave or promotion and that his successor is quite unfamiliar with the work. In this case all appropriate instruction is given to the new observer. The care and use of the instruments is described, followed by a complete run through the code groups and the procedure for compiling the meteorological logbook, and for filling in the weather message forms which are passed to the radio officer for transmission. Specimen messages are often completed and coded, and the use to which each observation is put both for forecasting and for climatological records is explained. The contents of the *Marine Observer's Guide* and *Handbook* are pointed out for future reference and the latest amendments to these publications are supplied. The correct procedure for completing the pages at the end of the logbook for ocean currents, additional remarks and ice reports is always explained, since it is often found that unless the observing officer knows exactly what is required he may waste his time in working out ocean current observations which are not acceptable to the Meteorological Office through being worked over too long or too short a period; also, valuable reports of phenomena experienced may be rendered useless by the omission of date, time and position of the occurrence. If required, the officer will also be instructed in the procedure for decoding and plotting the analysis bulletins. The regular plotting of these bulletins can be a great help to the mariner in assessing changes of weather to be expected in the vicinity of the ship, and it is a matter for regret that the other duties of a ship's officer and the time involved prevents many ships from using this valuable aid.

All the above instruction by the P.M.O. takes time, and ships' officers are busy men. We therefore have to be careful not to intrude upon other duties and always try to arrange an appointment when the ship's officer can spare the time to discuss these subjects.

Close touch is also maintained with navigation schools and nautical colleges, which provide courses in maritime meteorology for their students, from which come most of our future voluntary observers. These establishments are supplied with a full set of Meteorological Office instruments on loan as for a Selected Ship, and the P.M.O. at London, for example, arranges to give film shows on meteorological subjects and lectures. Visits to the Central Forecasting Office at Dunstable and other meteorological offices are also arranged.

In addition to these visits to regular observing ships, having in mind the requirements of meteorological services throughout the world, many visits are paid to ships not on the Meteorological Office fleet lists in order to invite the co-operation of the captain and officers as an Auxiliary Ship if the next voyage will take them through some of the less frequented waters of the world, or as a Supplementary Ship if the vessel regularly passes through the Indian Ocean where, due to the International Indian Ocean Expedition which is working in that area for the next four years, many more meteorological reports are required.

In order to keep the fleet lists to the required numbers during the year ended 31st March 1961, the five P.M.Os. between them recruited and equipped with instruments 92 ships, while 63 ships were withdrawn from the lists either when laid up or by reason of being sold abroad or broken up. The work of recruiting new ships to the fleet involves keeping in touch with shipowners and their superintendents, and since the sailing masters and officers of these ships must all be contacted, several visits may be necessary before a decision whether or not to equip the vessel with instruments can be made.

It is hoped that the service given by the Port Meteorological Offices to the observing fleet is considered adequate; any criticism or suggestions for improvement of the service will be gladly received. From the P.M.O.'s point of view the most rewarding feature of his work is to be greeted as a friend on board, and to be able to forward a ship's logbook which he knows the assessor at Headquarters will rate either 'excellent' or, better still, the 'excellent plus' standard which is necessary to merit an Excellent Award.

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NOTES ON ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM APRIL TO JUNE 1961

At end of April 1961

RELEVANT WEATHER FACTORS

During April 1961 atmospheric pressure was above normal over north-eastern Canada and Greenland. Many active depressions formed on the North Atlantic with tracks generally south of normal. Early in the month depressions moved north-eastwards from the Atlantic into the Barents Sea and to north of Russia; this was prevented late in the month by a ridge of high pressure forming from northern Greenland to Scandinavia causing depressions to move northwards from the western Atlantic into the Davis Strait and Baffin Bay. Arctic air flowed almost continuously into sea areas east of Greenland and north-east of Russia while a strong persistent north-easterly flow of maritime air impinged upon the Labrador and Newfoundland coasts.

Canadian Arctic Archipelago

Ice reconnaissances from these areas have not revealed any significant ice anomalies. The shallow areas of the Canadian Arctic Archipelago were covered mainly by winter ice with almost no open water. South of 70°N (i.e. including Hudson Bay, Hudson Strait and Foxe Basin), although there was much continuous fast winter ice over the shallow water of bays and inlets with areas of hummocked and pressurised ice there was also much open water. No reports of icebergs in Hudson Strait were received.

Baffin Bay

Pack-ice and areas of fast ice do not appear to have been significantly different from normal in Baffin Bay. There were large areas of very close pack-ice (mainly winter) with vast icefloes and many icebergs against the Canadian coast. Pack-ice was more open against the Greenland coast, while shore stations observed up to 200 icebergs.

Davis Strait

The east side of Davis Strait was almost clear of pack-ice apart from small amounts of open pack-ice west of Cape Farewell. Variable numbers of icebergs were observed by land stations of south-west Greenland. The area of pack-ice on the west side of the Davis Strait was below normal. The usual extensive southerly drift of both pack-ice and icebergs was narrowed and forced against the Canadian coast by the persistently strong east to north-easterly gradient winds. Many icebergs (i.e. more than 20 in a single sighting), some grounded, were observed all along this coast.

Belle Isle Strait

There was much close pack-ice in the Belle Isle Strait and probably numerous icebergs at its entrance. The pack-ice cleared from the Gulf side of the Strait at a rate that was greater than the seasonal normal, while the sea approaches well to the east of the Strait were unusually clear of both pack-ice and icebergs, but the entrance to the Strait was severely obstructed by both pack-ice and icebergs.

Great Bank

This has been a very unusual ice season in that both icebergs and pack-ice have been forced by the wind on to the Newfoundland coast and west of the Great Bank. Newfoundland ports have been particularly severely obstructed; icebergs were not allowed to follow their normal track along the eastern edge of the Great Bank and were forced against and on to the Newfoundland coast moving mainly towards the south-west along tracks south-east and south of Cape Race. Table 1 gives details of iceberg reports from ships for the months April to June 1961.

Table 1. Icebergs sighted by merchant ships in the North Atlantic

(This does not include growlers or radar targets)

Limits of Latitude and Longitude		Degrees North and West								
		58	56	54	52	50	48	46	44	42
Number of bergs reported south of limit	April	*	*	*	*	*	131	54	0	0
	May	*	*	*	> 73	> 73	> 67	35	0	0
	June	*	*	*	*	> 110	> 41	0	0	0
	Total	*	*	*	*	*	> 239	89	0	0
Number of bergs reported east of limit	April	*	*	*	37	2	1	1	1	0
	May	*	*	*	> 17	2	0	0	0	0
	June	*	*	*	*	55	7	2	0	0
	Total	*	*	*	*	59	8	3	1	0
Extreme southern limit	April	44°33′N, 54°50′W on 12.4.61								
	May	44°36′N, 52°27′W on 2.5.61								
	June	46°24′N, 54°02′W on 12.6.61								
Extreme eastern limit	April	45°06′N, 42°48′W on 25.4.61								
	May	49°26′N, 49°53′W on 29.5.61								
	June	48°50′N, 45°25′W on 16.6.61								

* The figures given in the table are totals of icebergs sighted in specific locations. Many more were sighted within large areas, but no specific positions were given; where this has occurred an asterisk has been inserted in the table.

> indicates 'greater than' where there is some doubt as to the actual number of icebergs at some of the sightings. The value given is likely to be lower than the true value.

GULF OF ST. LAWRENCE AND RIVER ST. LAWRENCE

Considerable amounts of pack-ice consisting mainly of small icefloes, but with hummocking, existed in the south-west of the Gulf in the vicinity of Prince Edward Island and north-east of Anticosti Island. Most of the Gulf, and the River St. Lawrence above Quebec, were clear of ice. The St. Lawrence Seaway opened for shipping on 15th April.

SEA AREAS OFF EASTERN GREENLAND NORTH OF 70°N

A large area of winter and polar pack-ice extended out, parallel to the Greenland coast, to beyond Jan Mayen in the south and to Spitzbergen in the north. This is approximately normal. Fast ice extended out beyond 50 miles from the coast in places, covering inlets and bays. Land stations observed up to 50 icebergs moving southwards in the pack-ice.

SEA AREAS OFF EASTERN GREENLAND SOUTH OF 70°N

Close winter pack-ice, consisting mainly of small floes with a clear distinct edge, existed along the coast. However, the area of pack-ice was well below normal. Land stations reported mainly small numbers of icebergs (i.e. less than 20) moving southwards off the coast.

SEA AREAS NORTH OF ICELAND, SPITZBERGEN, BEAR ISLAND AND THE BARENTS SEA

Considerable amounts of close pack-ice moved southwards off eastern Spitzbergen, causing the ice edge to extend beyond Bear Island although the west of Spitzbergen was mainly free of pack-ice. It is probable that considerable amounts of heavy close pack-ice existed south-east of the Barents Sea.

BALTIC SEA

At the beginning of April the areas of sea ice in the Baltic Sea were less than normal. Ice was confined mainly to the northern part of the Gulf of Bothnia along the Finnish coast as far south as Vaasa. There was remarkably little pack-ice in the Gulf of Finland. A rather cold period during April prevented any marked recession of the ice, but in the last week of the month the ice situation began to improve rapidly. Table 2 gives analyses of ice conditions in the Baltic Sea during April and May.

Table 2. Baltic Ice Summary, April–May 1961

	Length of Season		Ice Days			Navigation Conditions			Accumulated Degree-Days†	No ice has been reported this season at the following stations:
	A	B	C	D	E	F	G	H	I	
APRIL 1961										
Lulea	1	30	30	30	0	0	30	0	1,238	Aarhus
Skelleftea	1	8	8	0	0	0	0	0	—	Copenhagen
Roytaa	1	30	30	30	0	0	0	30	—	Stettin
Oulu	1	30	30	30	0	0	30	0	—	Gdansk
Yxspihlaja	1	30	30	30	0	0	30	0	—	Visby
Vaasa	1	30	30	20	0	20	0	0	456	Goteborg
Viborg	1	28	28	28	0	20	8	0	—	Oslo (Rauoy-fjord)
Leningrad	1	9	9	0	9	9	0	0	—	Kristiansand
MAY 1961										
Lulea	1	11	11	8	3	8	3	0	1,086	
Roytaa*	1	20	20	20	0	0	4	16	—	
Oulu	1	8	8	2	0	5	2	0	—	
Yxspihlaja	1	3	3	3	0	1	2	0	—	

* Last Finnish ice report on 20th May

CODE:

A First day ice reported
B Last day ice reported
C No. of days that ice was reported
D No. of days of continuous landfast 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 (°C)†

† These figures give a rough measure of first the probability of the formation of sea ice, and later the progress of the growth of the thickness of the ice. They are derived from observations taken at 0600 G.M.T., and are the sum of the number of degrees Centigrade below zero experienced at this time for each day during the period of sustained frost.

At end of May 1961

RELEVANT WEATHER FACTORS

Pressure during May was generally low from western Europe to northern Greenland. In the latter part of the month pressure was considerably below normal over north-east Canada, while the Azores high intensified and moved north-eastwards. Air temperatures over almost all sea areas south of 70°N, and adjacent to the North Atlantic Ocean, had risen steadily and were above freezing point everywhere. Air flowed from the Polar Basin into the Canadian

Arctic Archipelago, northern Greenland and sea areas from northern Greenland to east of the Barents Sea. Towards the end of the month warm maritime air penetrated far northwards into the Davis Strait and into the east of the Canadian Arctic Archipelago.

CANADIAN ARCTIC ARCHIPELAGO

Open water was reported in Lancaster Sound and locally among the islands, otherwise reports indicated few changes in the northern half of the area from conditions at the end of April, i.e. large areas of continuous mainly winter ice. The general condition of the ice therefore appeared to be less broken and heavier than normal. There was much open water in Hudson Strait and variable numbers of icebergs in its eastern half. There was open water in Foxe Basin, and pack-ice in Hudson Bay was clearing extensively in the shallow areas to the east and south-east.

BAFFIN BAY

The southern limit of ice in Baffin Bay was slightly west of normal while the amount of open water against the Greenland coast was greater than normal. The pack-ice generally had become more broken than at the end of April, but it remained heavier than normal. Large numbers of icebergs (more than 20) were observed on each side of Baffin Bay south of 75°N. There were no reports of icebergs north of 75°N.

DAVIS STRAIT

The character of the distribution of ice in this area was similar to that at the end of April. The seasonal increase in solar radiation caused the pack-ice against the Canadian coast to retreat northward to well north of Belle Isle Strait although the drift of icebergs southwards off the Labrador coast continued beyond the entrance to the Strait. There were icebergs off southern Greenland but there were no reports of icebergs northwards to the Arctic Circle.

BELLE ISLE STRAIT

The Strait was clear of pack-ice and navigable by 10th June, but many icebergs continued to obstruct the entrance, some icebergs moving through into the Gulf of St. Lawrence.

GREAT BANK

Only small amounts of pack-ice existed against the coast of Newfoundland and icebergs continued to move over the west side of the Great Bank to south-west of Cape Race. Table 1 shows that the number of icebergs moving south had decreased since the end of April, and that there was a decreasing tendency for them to move eastwards.

GULF OF ST. LAWRENCE AND RIVER ST. LAWRENCE

This area was clear of ice apart from some extensive areas of pack-ice north and east of Prince Edward Island which caused obstruction to navigation.

EASTERN GREENLAND, SPITZBERGEN, BEAR ISLAND AND THE BARENTS SEA

There was little change in the ice situation from that at the end of April apart from a seasonal break-up of ice in Russian coastal waters to the south-east of the Barents Sea. Reports indicate that the estuary of the River Divina was obstructed by ice in the latter half of May, causing serious flooding. Attempts were made to blow up the obstructing ice.

BALTIC SEA

The last remaining winter fast ice (mainly in the north of the Gulf of Bothnia) began to break up during early May leaving only a few patches of open pack which drifted into the open sea and gradually melted. The last report of ice was received on 24th May.

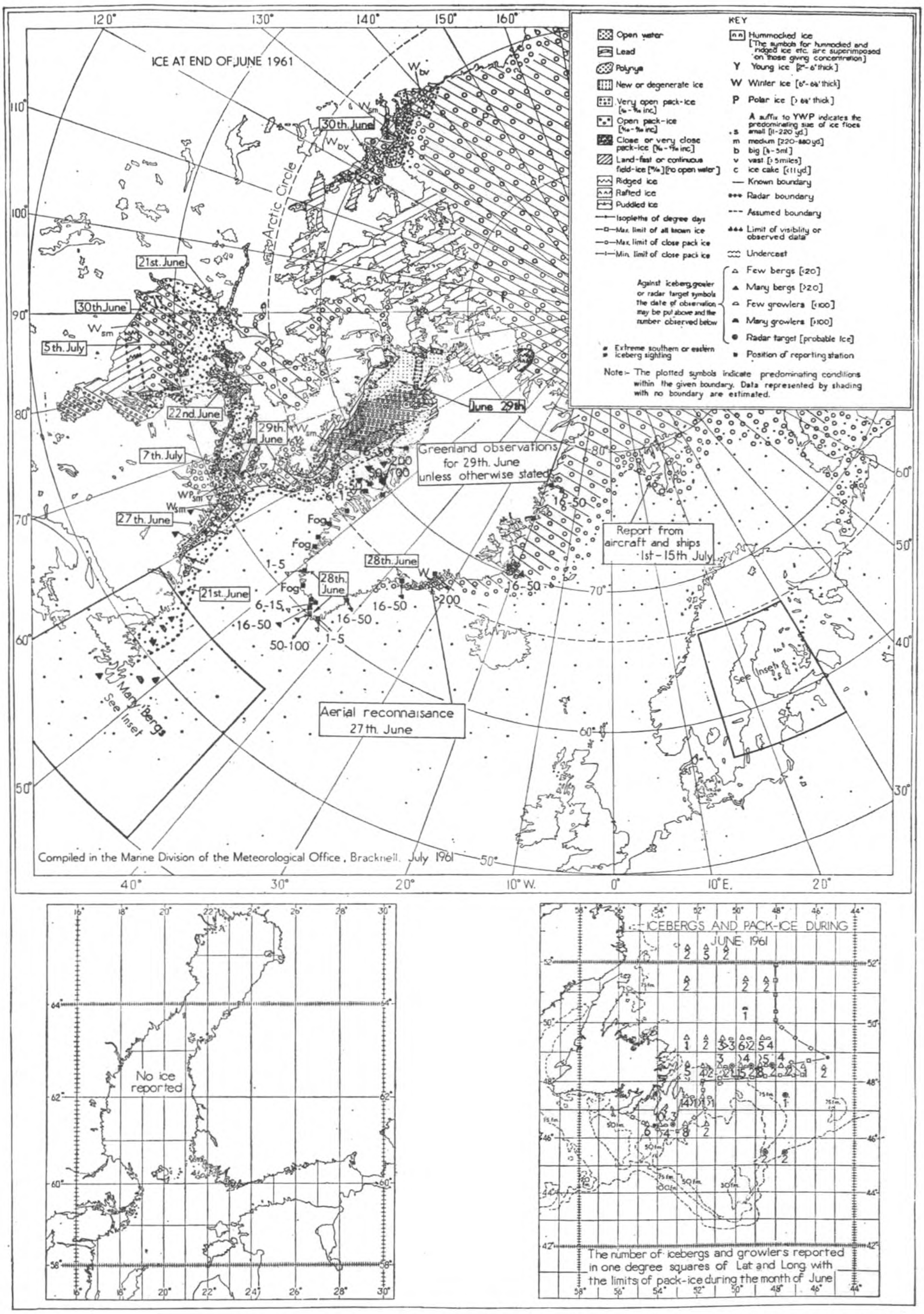
At end of June 1961

RELEVANT WEATHER FACTORS

Over the whole of June pressure was below normal from north-eastern Canada to Scandinavia. Early in the month the lowest pressure was south of Davis Strait. At the end of the month the lowest pressures were between Greenland and northern Scandinavia. During June there were large scale exchanges of warm and cold surface air between the Arctic and southerly latitudes, particularly over Baffin Bay and Davis Strait. Temperatures were above normal over north-western Russia, and below normal over and south of Greenland and north and east of Iceland. Sea areas south of 70°N adjacent to the Atlantic experienced atmospheric temperatures on average above 32°F.

CANADIAN ARCTIC ARCHIPELAGO

Ice reconnaissances showed a rapid seasonal progress in the break-up of ice in most of the Canadian Arctic. There were large areas of open water north of Hudson Bay and in Hudson Strait. Large amounts of pack-ice existed in this area south of 60°N, a good deal of



which had drifted into open water observed at the end of May. Open water was reported in the Beaufort Sea off the north coast of Canada. Although there was a good deal of open water in the islands of the Archipelago in the far north, much continuous heavy ice remained.

Baffin Bay

Although the sea areas connecting Smith Sound with the Polar Basin remained full of almost continuous pack-ice (ridged and hummocked) the amount of open water in the east and north of Baffin Bay was increasing rapidly. There was, however, a great area of very close pack-ice between 60 and 70°W with a wide area of fast ice in and around the bays and inlets of Baffin Island. The pack-ice off the Labrador coast and the entrances to Hudson Strait and Lancaster Sound was clearing rapidly. The area of open water off western Greenland was also increasing rapidly, although in areas north of 75°N coastal fast ice remained. Large numbers of icebergs were reported off the Greenland coast towards 70°N; some land stations reported observing more than 200. Although large numbers of icebergs were reported along the Canadian coast (more than 20 at a sighting) the numbers off Cumberland Sound and Hudson Strait appeared to be less than normal.

DAVIS STRAIT

Few icebergs and no pack-ice were reported off south-west Greenland, i.e. few land stations reported observing more than five icebergs. The drift of icebergs southward off the Labrador coast continued, but there was no pack-ice south of 55°N. There appeared to be very little evidence of landfast ice in bays and inlets on this coast, and there was a large amount of open water between the main mass of pack-ice drifting southwards and the coast of Labrador.

BELLE ISLE STRAIT AND GREAT BANK

Considerable numbers of icebergs obstructed the shipping route into Belle Isle Strait, although the Strait was available to shipping. There was no pack-ice over the Great Bank. Icebergs were beginning to move towards the eastern edge of the Great Bank although the great majority continued to move south-westwards on tracks south-east of Newfoundland. No icebergs were reported south of 44°N.

GULF OF ST. LAWRENCE AND RIVER ST. LAWRENCE

On 19th June Cabot Strait was clear of ice and the St. Lawrence River and Gulf were also clear.

SEA AREAS OFF EASTERN GREENLAND NORTH OF 70°N

Areas of coastal fast ice and pack-ice off the coast of eastern Greenland at the end of June were more extensive than normal, but were probably less extensive in area than at the end of May. Moderate or large numbers of icebergs (16–50) were reported moving southwards in the pack-ice by land stations.

SEA AREAS OFF EASTERN GREENLAND SOUTH OF 70°N

Area of pack-ice off eastern Greenland was very extensive towards 70°N at the end of June (it approached Jan Mayen) but there was no pack-ice observed off this coast south of the Arctic Circle. This is well below normal. Large numbers of icebergs were reported by land stations, moving south-westwards off south-east Greenland (i.e. mainly 16–50 but locally more than 200).

SEA AREAS NORTH OF ICELAND, SPITZBERGEN, BEAR ISLAND AND BARENTS SEA

Pack-ice extended out from eastern Greenland almost to Jan Mayen and therefore approached north-west Iceland. Polar pack-ice was reported by ships and aircraft west of Spitzbergen. Climatic conditions suggest that areas south-east and east of the Barents Sea were largely clear of ice although considerable amounts of polar pack-ice were likely to have existed east of Spitzbergen.

BALTIC SEA

The Baltic Sea was ice-free.

G. A. T.

Note. These notes are based on information plotted on ice charts each month, similar to the map for June on page 204, but on a much larger scale (39 in. × 27 in.). They are available as issued, on application to the Director General, Meteorological Office (M.O.1), London Road, Bracknell, Berks.

SPECIAL LONG-SERVICE AWARDS

This is the fourteenth successive year in which special awards are being made to the four voluntary marine observers whose long and zealous work at sea on behalf of the Meteorological Office is considered as deserving special recognition.

A personal record card is started in the Marine Division of the Meteorological Office for every officer as soon as the first meteorological logbook bearing his name is assessed. Thereafter every meteorological logbook he sends us is entered on his card, together with the character awarded to it.

Every officer whose record card shows him to have observed in 15 or more years, and who has sent in at least one meteorological logbook during the preceding year, comes within the orbit of the special award. The number of such officers varies year by year—this year it was 50—and their records are worked up mathematically on the basis of their number of years voluntary service and the quality of their individual logbooks. This effectively places them in an order of merit and the first four are selected to receive the special award.

This year the Director-General of the Meteorological Office is pleased to make the special awards to the following shipmasters:

1. CAPTAIN K. D. G. FISHER, G.M. (Shaw Savill Lines), who sent us his first meteorological logbook from the *Euripides* in 1926. Since then, he has in 17 years sent us 40 logbooks, 34 of them being classed 'excellent'.

2. CAPTAIN B. FORBES-MOFFATT (Shaw Savill Lines). A voluntary marine observer since 1929, when we received his first meteorological logbook from the *Matakana*. In 18 years, Captain Forbes-Moffatt has sent us 35 logbooks, 25 of them being classed 'excellent'.

3. CAPTAIN H. C. SMITH (Shaw Savill Lines), whose first meteorological logbook came from the *Mahana* in 1926. Of the 31 logbooks which Captain Smith has sent us in 17 years of observing, 24 have been awarded the 'excellent' classification.

4. CAPTAIN P. S. CALCUTT (New Zealand Shipping Co., Ltd.), who commenced his voluntary observing in 1923 when in the *Hororata*, since when he has in 16 years sent us 28 logbooks, 25 of them being classed 'excellent'.

We congratulate these four captains on the recognition of their valuable voluntary work over many years. They will be personally notified of the award which will, as in past years, take the form of a suitably inscribed barograph, and of the arrangements which will be made for its presentation.

CANADIAN EXCELLENT AWARDS

(The following statement has been received from the Director of the Canadian Meteorological Branch)

We have recently chosen the names of the officers and ships in the Canadian Voluntary Weather Observing Fleet who are to receive Excellent Awards for marine weather observing carried out in the year 1960. (See list below.)

NAME OF VESSEL	OBSERVING OFFICER	RADIO OFFICER	COMPANY
Baffin	A. R. Turnbull	G. J. Mason	Govt. of Canada.
Bluenose	H. Whitehead		Govt. of Canada.
Cyrus Field	G. C. Dale	G. A. Rayne	Western Union Telegraph Co.
Ellen Bakke			Knutsen Line.
Emerillon	G. Bush		Shell Canadian Tankers, Ltd.
Imperial St. Lawrence	W. P. Murphy	V. Dykeman	Imperial Oil, Ltd.
Kapuskasing	J. F. Bourgeois		Govt. of Canada.
Lakemba	G. F. Goodwin		Pacific Shipowners, Ltd.
Lakonia		H. Roderick	Donaldson Line, Ltd.
Lord Kelvin	L. K. Eavis	C. Jackson	Western Union Telegraph Co.
Princess Helene	W. J. Goodwin	C. F. MacMillan	Canadian Pacific Railway Co.
Rincon Hills	C. A. Bradshaw	J. Weir	Shell Canadian Tankers, Ltd.
Suva	D. M. Dodds	N. J. Nelson	Pacific Shipowners, Ltd.
Thorsriver		W. Hanssen	A/S Thor Dahl.
Waihemo		C. Ward	Union S.S. Co. of New Zealand.

This is the thirteenth in our annual marine award series. Thirty-four awards, in the form of books, were presented to captains, principal observing officers, and radio officers of ocean-going ships, who made an especially noteworthy contribution to the Canadian ship weather programme.

A copy of the book *Maclean's Canada* was presented to the masters of the twelve ships in our observing fleet which had done the best overall work during the year. This book was also presented to the ship which had shown the greatest improvement in its meteorological programme over the previous year. This was the m.v. *Ellen Bakke*, a Norwegian registry vessel operating out of Vancouver.

Eleven awards were made to the principal observing officers whose weather records were judged to be the best in the year 1960. They received a copy of *Discovery and Exploration—An Atlas History*, by Frank Debenham.

Ten radio officers received an award of the book *Northern Lights*, a collection of short stories by Canadian authors.

Sixty ships were engaged in weather observing last year, and they made a total of approximately 14,000 reports. In choosing the recipients of the annual awards, both the number of observations made and their quality is considered, but quality is given more emphasis.

INDIAN EXCELLENT AWARDS

We have been informed by the Deputy Director-General of Observatories (Forecasting) of the India Meteorological Department that Excellent Awards, for outstanding meteorological work during the year 1959–60, are being given by the Department to the officers named below.

Name of Vessel	Captain	Observing Officer(s)	Radio Officers	Company
State of Bombay	S. K. Kaikobad	M. S. Naik .. N. Krishnamachari	C. D. Joshi S. M. Villait	Eastern Shipping Corporation, Ltd.
Rajula	G. A. Brignall	D. H. Cain .. R. Mortlock ..	I. Jaffery .. W. Hall ..	British India S.N. Co., Ltd.
Amra	A. G. Smythe	P. C. S. Jackson .. B. J. B. Biddick ..	K. J. Bourke W. Martin	British India S.N. Co., Ltd.
Karanja ..	H. W. Harwood	C. S. Robinson ..	E. McGinty P. Chapman	British India S.N. Co., Ltd.
Mozaffari ..	A. Shirrefs ..	I. H. Glen .. B. Nazareth ..	S. D. Warke G. B. Bhagat	Mogul Line, Ltd.

The awards, which are in the form of books, are made to captains, observing officers and radio officers who have been in the ships concerned for six months or more during the award year. The Deputy Director-General states that the useful work put in by the other officers who served on the ships listed for lesser periods than six months is also very much appreciated.

THE NATIONAL OCEANOGRAPHIC COUNCIL—ANNUAL REPORT

This report (published by Cambridge University Press, price 5s.) concerns the activities of the National Institute of Oceanography during the year 1st April 1959 to 31st March 1960. The programme of this Institute is always of interest to the Marine Division of the Meteorological Office, because we benefit from its work and researches, and frequently consult the members of its staff. We have been able, from time to time, to help directly in its work.

The report acknowledges help from many scientific institutes (including the Meteorological Office) and from the masters and crews of ships.

Voluntary observers may be interested to know that Dr. Deacon the Director of the N.I.O. has been appointed a member of the Meteorological Research Committee by the Secretary of State for Air and the Meteorological Office is represented on the National Oceanographic Council.

Marine physics

The institute has continued its surveys of the ocean floor, sea water conditions, subsurface currents and tidal streams, but is particularly interested in the testing of new ideas and conclusions.

A considerable effort has been put into observational and theoretical investigations of ocean waves. These include: statistical analysis of wave records from instruments on buoys, ships, and at coastal stations; theoretical studies of the small steady currents associated with wave motion, and the patterns of light reflection from wavelike surfaces. Advice has been given to the Meteorological Office in the development of wave forecasts for the more efficient routing of merchant ships. The Institute co-operated with the National Physical Laboratory in the analysis of ships' reactions to sea waves. The Ocean Weather Ship *Weather Reporter* took part for a month in this work.

Work has continued on the measurements, to within a few centimetres, of sea level differences across the English Channel by measuring voltage gradients set up by ocean currents.

Tide gauges at Stornoway and Lerwick continue to be used in the investigation of the relationships between long waves and surges in the sea and those in the atmosphere.

Very interesting measurements have been made of subsurface currents, off Bermuda, in co-operation with the Woods Hole Oceanographic Institution. At all depths currents proved to be faster and more variable than expected, with directions of flow mainly between west and south.

Simple but ingenius devices have been used to measure currents on the sea bed in many parts of the world.

Marine biology

The utilisation by plankton of radiant energy incident on the sea surface has been studied. It has been found that the increase in light immediately before a cloud obscures the sun can cause the amount of light received at the sea surface on some cloudy days to exceed that received on days of clear sky.

The marking and reporting of whales, and studies of their reproduction, have helped to establish relationships between their reproductive rhythms, their breeding and feeding migrations, and their general distribution.

R.R.S. 'Discovery II'

During the period under review, the ship steamed 15,000 miles over 1,374 hours. Arrangements are in hand to replace *Discovery II* by a new specially designed ship. All those interested in the science of the sea will be interested in her progress. She is planned to be an all-purpose, ocean research ship capable of working in the Arctic regions and the tropics. The maximum range is to be 15,000 miles, cruising speed 9–10 kt., full speed 13–14 kt., overall length 260 ft., breadth moulded 43 ft., and loaded draught 18 ft. She will have strengthening for navigation in ice and will be fitted with a bow propeller giving transverse thrust. It is hoped to have the ship in service by 1962.

G. A. T.

PORT METEOROLOGICAL AGENT AT MELBOURNE

(This note has been received from the Australian Director of Meteorology; similar notes, regarding the Agents at Perth/Fremantle and Sydney, appeared in the previous number of this journal)

Captain E. P. L. Wall, a former shipmaster, has been engaged as the Port Meteorological Agent for Melbourne.

Captain Wall's marine and meteorological background is most extensive. On the marine side he has served in overseas ships for fifteen years and is the holder of a Foreign-Going Master's Certificate. He has also conducted a school of navigation and is at present local representative of the Merchant Service Guild of Australia.

During World War II Captain Wall served as an instructor in meteorology and navigation in the R.A.A.F., with the rank of Squadron Leader. Since then he has been a relief navigator for airline companies on both internal and overseas air routes.

(*Opposite page 208*)

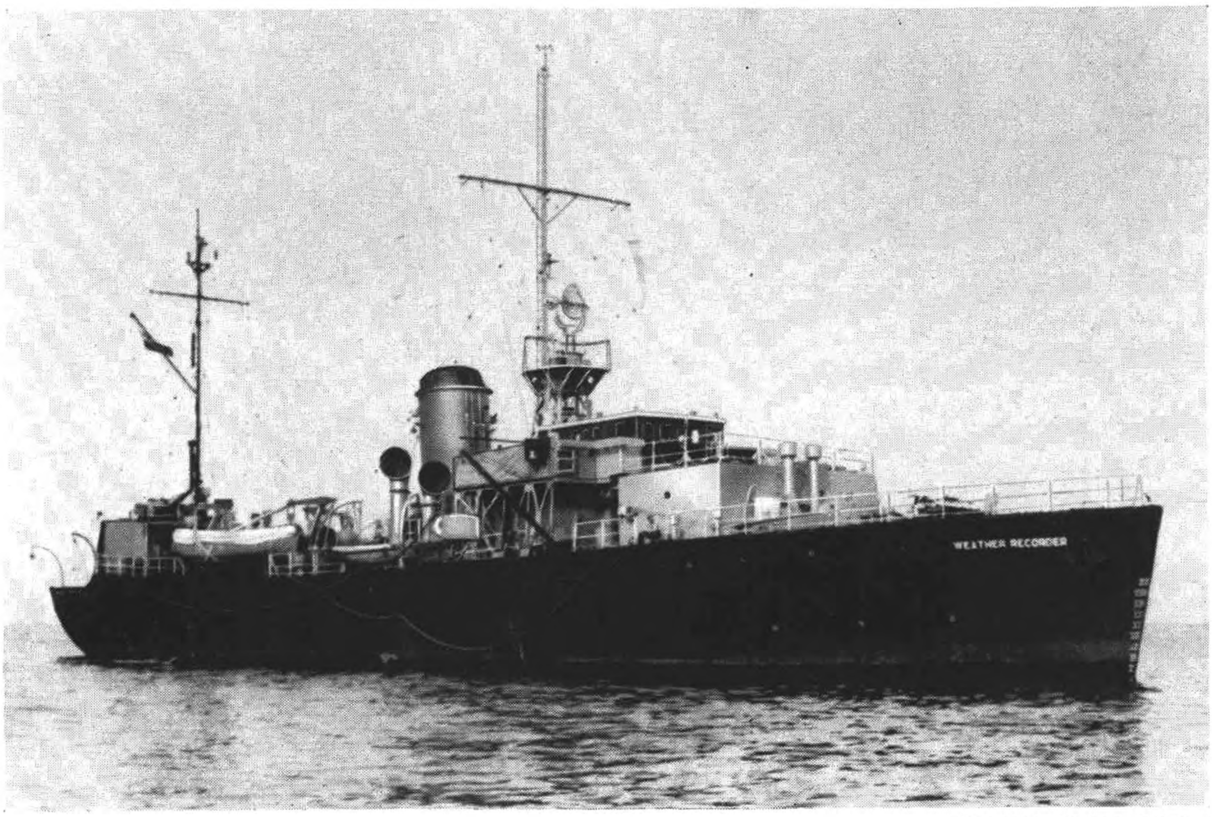
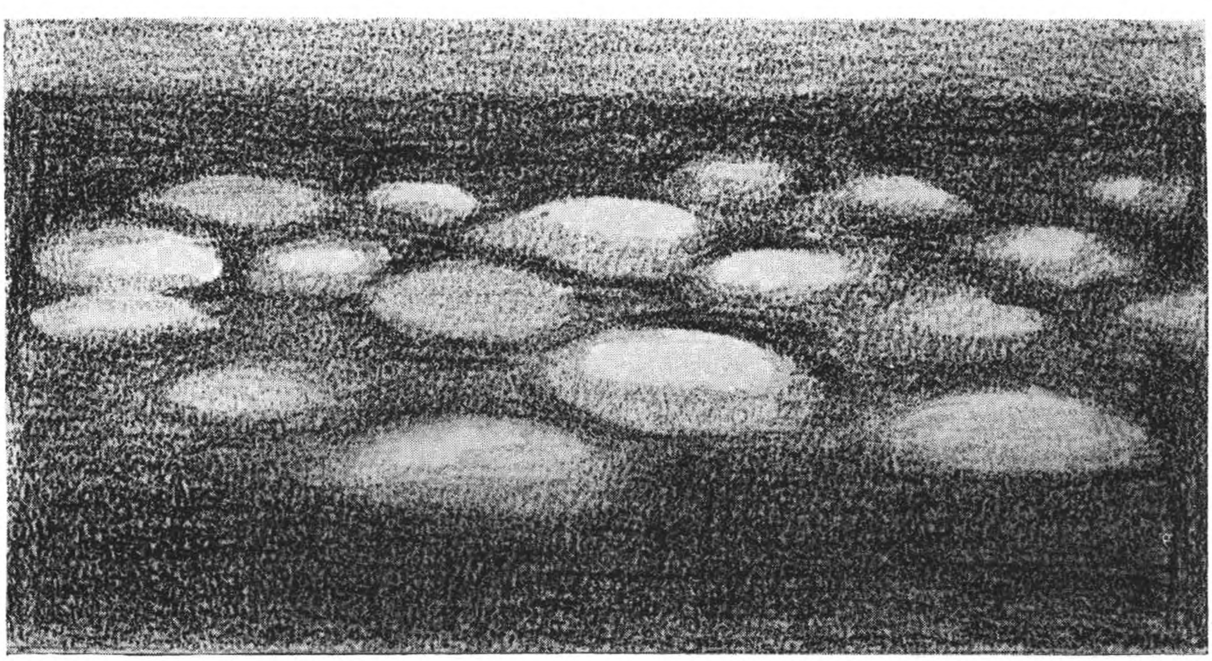


Photo by O. M. Ashford

Weather Recorder (see page 197).



Phosphorescence observed from m.v. *Malaita* (see page 184).

(Opposite page 209)

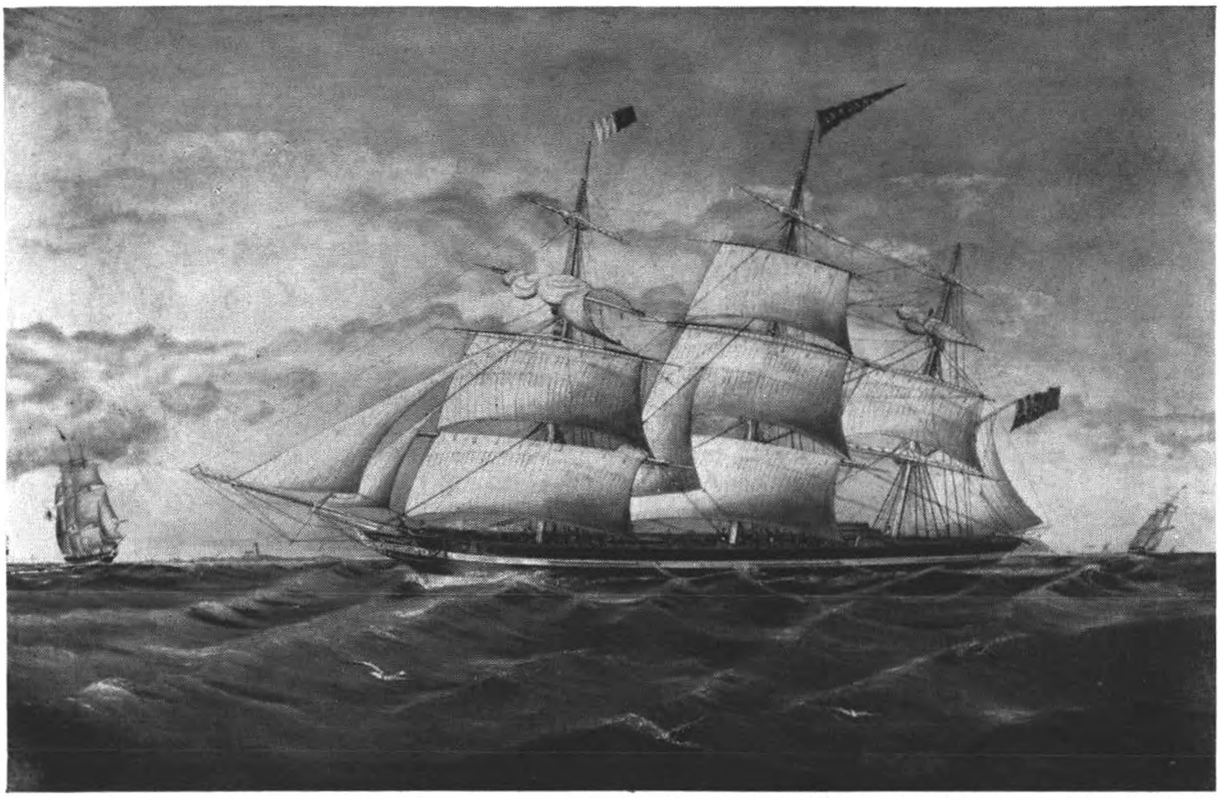
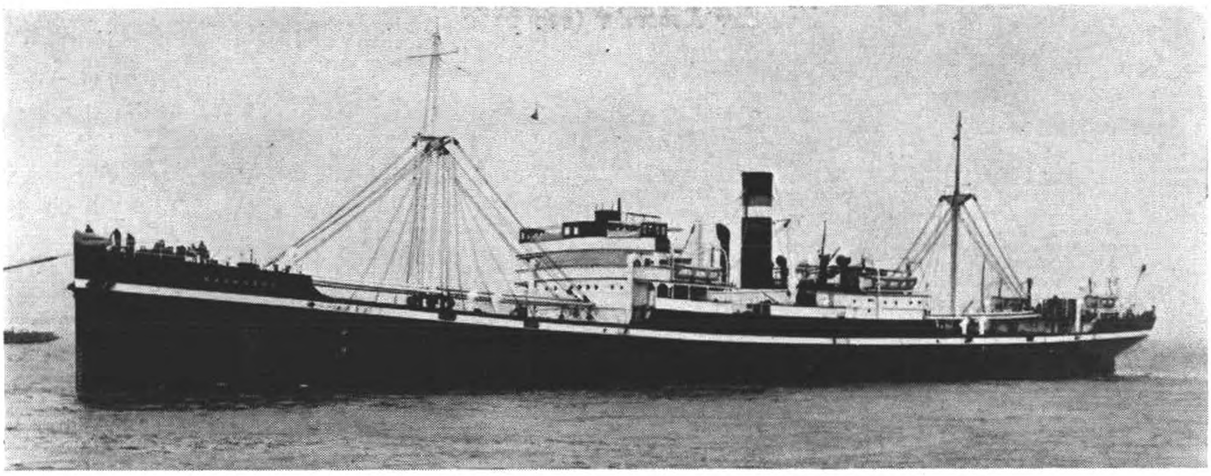


Photo from an oil painting by courtesy of Brocklebank's

Aracan, 1854–1874.



Second *Mandasor*, 1920–1941.

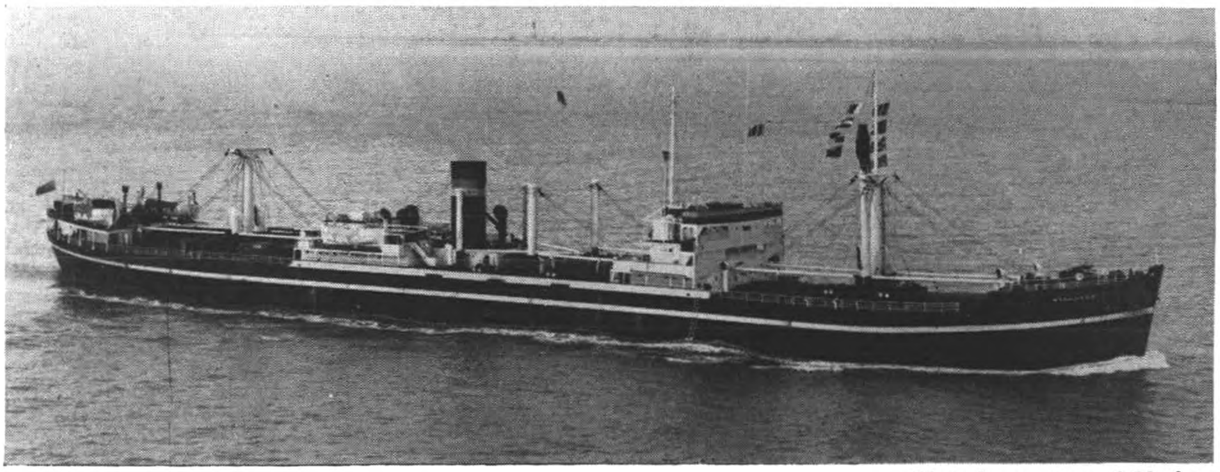


Photo by courtesy of Skyfotos

Third *Mandasor* (ex Empire Malacca), 1944—

The three ships of Thos. & Jno. Brocklebank referred to on page 209.

Observing ships calling at Melbourne requiring assistance can contact Captain Wall on telephone number 67-1205 or through the Bureau of Meteorology (phone 34-9021).

THOS. AND JNO. BROCKLEBANK, LTD.

For the past five years, the October number of *The Marine Observer* has carried a photograph of a present-day observing ship, together with photographs of two of her predecessors of the same ownership, and whenever possible of the same name, which have also in their time been observing ships.

One of the oldest shipping companies with which we have been associated is Messrs. Thos. and Jno. Brocklebank and on the opposite page we publish three photographs of their ships in continuation of the series.

In their long life, Brocklebank's have repeated many of their names and of the nine ships now observing for us, three have had two predecessors of the same name. Unfortunately for our original scheme, however, in each of the three cases only one of the two predecessors has been an observing ship and we have therefore had to make an exception in the photographs, which nevertheless span more than a hundred years.

The first picture is of the *Aracan.* A wooden full-rigged ship of 864 tons, built by Brocklebank's at their Whitehaven Yard, she was a contemporary of the Meteorological Office, for both were launched in 1854. She was one of our early voluntary observing ships and her first meteorological logbook was received here on 26th April 1860. It covered a return voyage to Calcutta when she was commanded by Captain T. Selkirk, 99 days out and 111 days home. She was the fastest ship built at Whitehaven and on one occasion raced and beat the famous clipper *Fiery Cross.* She met a tragic end, for in March 1874, whilst outward bound, she collided in poor visibility off Portland with the steamer *American,* homeward bound from the Cape. She foundered in little more than half an hour.

Our second picture is of the second *Mandasor* (the first ship of that name was not an observing ship). A steamer of 5,144 tons, she was built at Port Glasgow in 1920 and first sent us a meteorological logbook in July 1921 when she was commanded by Captain R. Kershaw. She was still observing for us at the outbreak of the Second World War, wherein she was one of Brocklebank's 14 war casualties (more than half their fleet), being sunk by a German raider in the Indian Ocean in February 1941 when 11 days out of Calcutta, homeward bound.

Our third picture shows the present *Mandasor.* She was built for the Ministry of War Transport at West Hartlepool in 1944 and named *Empire Malacca.* Brocklebank's operated her for the Ministry until 1946 when they bought her and changed her name to *Mandasor.*

We first put our instruments aboard her in September 1946 when she was commanded by Captain L. E. Jeans and she is thus now one of our more senior observing ships.

The House of Brocklebank was already eighty years old and owned 33 ships when the Meteorological Office was born. It was thus natural that in looking for shipmasters to help him in his task of collecting observations from sea, Admiral FitzRoy, the first Director, should turn to those of such a well established and respected company. During the first five years of our operation, we received meteorological logbooks from no fewer than eleven Brocklebank ships, *Aracan, Arachne, Florence Nightingale, Hindoo, Martaban, Patna, Patriot Queen, Robert Pulsford, Sumatra, Thomas Brocklebank* and *Valparaiso,* those from the *Robert Pulsford* now being held on permanent loan by the owners.

We are indebted to Messrs. Thos. and Jno. Brocklebank, Ltd. for the photographs which we publish, and for the information about their present and past fleets.

The time is not inappropriate to mention the debt which we owe to their shipmasters and officers who, from the inception of the Meteorological Office 107 years ago, have been so consistent in sending us their meteorological observations. Today, out of a fleet of 29 ships, nine are observing for us.

L. B. P.

SOUTHAMPTON PORT OPERATION AND INFORMATION SERVICE

The following example, taken from a brochure published by the Southampton Harbour Board entitled *Port Operation and Information Service*, clearly shows the advantage, in conditions of poor visibility, of the Harbour Radar and Port V.H.F. R/T Communications System at Calshot Signal Station, which was inaugurated in January 1958.

When a passenger vessel over 28,000 tons was due to enter the Thorn Channel to berth at Southampton Docks, the visibility at the docks was 50–100 yards with variable visibility in the port approaches. The use of the R/T Communications System enabled the inward pilot to ascertain the docking pilot's opinion on the berthing prospects. Information was also passed to the ship that there were no major movements taking place in the port area and that the controlled anchorage was clear for her to anchor if this was considered necessary.

The ship entered the Thorn Channel and information obtained from the harbour radar was passed to her by R/T as to her position in the dredged channel when negotiating the turn at Calshot Spit light-vessel and approaching the Fawley area.

After the docking pilot had boarded, the company's offices were kept fully informed of the master's and pilot's intentions as to docking. It was decided, due to reduced visibility, that the vessel would berth starboard side to and not swing to berth port side to, as was originally intended.

The Port R/T Communications System facilitated close co-ordination of all concerned, to ensure that this large passenger vessel maintained her scheduled docking time in difficult circumstances.

A number of other examples giving the R/T messages which passed between ships and Calshot Radio Station give further evidence of the usefulness of this service, which saves so much valuable time in the movement of shipping.

Copies of this brochure are obtainable from the General Manager and Clerk, Southampton Harbour Board, Harbour Offices, Town Quay, Southampton.

A. D. W.

WEATHER CHARTS FOR SHIPPING IN THE CLYDE AREA

As a result of consultation between the Meteorological Office and local shipping interests, in which the advice of the Port Meteorological Officer played a prominent part, weather charts and written forecasts for shipping have been available at the Glasgow Weather Centre, 93 Douglas Street, Glasgow, since Monday 15th May.

These charts may be collected every day, except Sunday, from 8.30 a.m. onwards. In exceptional circumstances arrangements can be made to have them ready earlier if ample notice is given. Most shipping companies and agents have arranged to collect a stipulated number each day; this number can be exceeded on any day if extra charts are required. A master can obtain the charts through his owners or agents or by calling personally at the Weather Centre.

The charts issued in Glasgow cover the same area as those issued in London and Liverpool, which is Home Waters, and the eastern North Atlantic to 35°W, between 40° and 67°N. The chart gives the actual synoptic situation at midnight the previous night, a forecast chart for midnight of the day of issue, and statements of the general synoptic situation, gale warnings in operation at the time of issue, sea area forecasts for Viking, Forties, Cromarty, Forth, Tyne, Dogger, Fisher, Shannon, Irish Sea, Rockall, Malin, Hebrides, Fair Isle and Bailey. A forecast for the Clyde area is also included. These forecasts cover a period of 24 hours from 0700 clock time on the day of issue. The changing weather situation is, however, under constant review and the meteorological officer in charge at Glasgow Weather Centre, or one of his staff, will be pleased to discuss any development which may have taken place since the chart was drawn up, either by telephone or through a personal visit to the Weather Centre. For example, should a shipmaster receive a chart at 9.0 a.m., and his sailing time be late afternoon, it would no doubt be of assistance to him to discuss with one of the staff of the Weather Centre the situation shortly before sailing, particularly if there are signs of a deterioration in the weather. The forecaster will be glad to discuss weather development over any specified route from the Clyde.

The Meteorological Office hopes that full use will be made of this new service, which should be of particular interest to the many small ships proceeding north-about when bound for N.W. European ports or to the Hebrides. There is no doubt that the master of any ship, large or small, can profit by making use of this service —thus enabling him to make the passage as economically and comfortably as possible, and at times even avoiding damage to his ship and her cargo by careful routing.

Shipmasters and others concerned with shipping are invited to avail themselves of these charts one or two days before sailing, as well as on the actual day of departure, and to discuss them with the forecaster when his advice is needed.

The Glasgow Weather Centre lies at the junction of Douglas Street and St. Vincent Street, on the S.W. corner, and the telephone number is CITY 3451. Mr. McNaughton of the Centre works in close association with Captain Reid, the Port Meteorological Officer for Glasgow, whose office is still at 136 Renfield Street, and who is always available to discuss with shipmasters or others any practical aspects concerning these maps.

Three ports in the U.K.—London, Liverpool and Glasgow—are thus provided now with an organisation whereby up-to-date weather maps are made available to the masters of departing ships in accordance with one of the recommendations of the 1960 Convention on Safety of Life at Sea (which has not yet come into force officially).

Book Reviews

Knight's Modern Seamanship, revised by Captain John V. Noel, Jr., U.S. Navy. 9¼ in. × 6¼ in. pp. 192. *Illus.* D. Van Nostrand Co., Inc., Princeton (New Jersey) and London, 13th edn., 1960.

First published in 1901, this book's survival through 13 editions is, perhaps, evidence of its quality. The first edition was produced under the direction of Rear Admiral Knight of the United States Navy, and was intended as a book on seamanship in steam vessels as opposed to sailing vessels. It was written with the viewpoint of the naval officer and the officer of the merchant service in mind—in fact, the masters of some thirty merchant ships were consulted and gave advice.

In this new edition, prepared under the direction of Captain J. V. Noel of the U.S. Navy, the text has been extensively revised and modernised.

Although much of its content has a naval bias, and some of it is rather specialised, it contains such practical seamanship that any Merchant Navy officer could hardly fail to benefit from reading it.

It is divided into four parts:

Part 1—"Ships and Boats" (182 pages)
Part 2—"Ship Handling" (115 pages)
Part 3—"Rules of the Road" (124 pages) and
Part 4—"Weather" (117 pages).

It is refreshing to find so many pages devoted to "Ship Handling" and "Rules of the Road"—subjects of such fundamental importance to the seaman. And the inclusion of 117 pages on "Weather" emphasises, perhaps, the modern approach.

Part 1 of the book attempts to cover such a large field that many of its chapters are necessarily brief and elementary, and somewhat unsatisfying. But it does contain some useful condensed advice of a practical nature concerning stability and damage control, and the chapter about "Ground Tackle, Anchoring and Mooring", in contrast to the other chapters, goes into considerable detail and is very valuable and practical. The last chapter in this Part, concerning cargo handling, includes much detail about 'replenishment' and refuelling at sea.

Part 2 is almost solidly practical seamanship, titles of its chapters being "General Principles of Control", "Docking and Unmooring", "Tonnage and Salvage", "Boat Handling" and "Ice Seamanship". There is nothing superfluous in this part; the subjects discussed include handling of steamers in heavy weather, and man overboard procedures. The author suggests that, in very heavy weather, it is often preferable for a ship to lie stopped with the wind on the quarter, or run slowly with the wind on the quarter, in preference to the conventional 'Heaving to', depending on the type of ship, her trim and her cargo. (North Atlantic weather ships have found, from experience, that they do lie relatively comfortably, in very heavy weather, with the wind on the quarter and the engines stopped.)

Part 3 deals with Rule of the Road very adequately, is well illustrated, and includes useful extracts from Court decisions on this subject. For the international reader, it is confused a little by the inclusion of much detail about 'inland rules' in the United States. Advice about the use of radar aboard ships in fog is given briefly and adequately.

Part 4 contains useful theoretical and practical information about the atmosphere and its circulation, clouds, fog and stability, instruments and weather reports, weather in the middle latitudes, and tropical storms, and a chapter on "Waves and Surf". The maps and diagrams are adequate, and there are some useful tables showing heights of waves produced by winds of various strengths blowing over different fetches, and relative frequency of waves of different heights in different regions. There is a very brief paragraph on ocean currents, which seems rather inadequate in view of the rather detailed discussion on general meteorology. From the mariner's viewpoint, this part could have been much improved if a little more had been said about the practical value of radio weather messages, synoptic charts prepared aboard ship, climatological maps and information concerning waves, from the navigator's viewpoint. Very little is said about the value of the Selected Ship scheme. The chapter on "Tropical Storms" tends to concentrate on the West Indian hurricane and it is noted that the only visual hurricane warnings that are mentioned are those used in the United States. The Beaufort wind scale does not include the amendments to the descriptive terms which came into force internationally in 1958 ('near gale', 'gale', 'storm' and 'violent storm').

At the end of the book are useful appendices concerning rope and cordage, knotting and splicing, and mechanical appliances aboard ship.

The whole book is very adequately illustrated with photographs and diagrams.

C. E. N. F.

The Ocean, by F. D. Ommanney, PH.D. 6¾ in. × 4⅜ in. pp. 244. *Illus.* Oxford University Press, London, 2nd edn., 1961. 8*s*. 6*d*.

During recent years there has been a great increase in national and international interest in oceanography; this is perhaps emphasised by the number of books on the subject, quite a few of which are of a 'popular' nature and readily understandable by the average intelligent person.

Thus the general public are being made aware of the practical importance of oceanographical research; the popularity of 'skin diving' as a sport, and of the underwater films made by men like Jean Cocteau, have done much to stimulate that interest.

Dr. Ommanney is very much the practical oceanographer and has a pleasant literary style as was shown in his *North Cape* and *South Latitude*. In this second edition of *The Ocean* he shows that he does not waste words, for he manages to cover, in a reasonably comprehensive way, all fields of oceanography in 230 small pages. Short sentences and simple words seems to be his answer and yet he manages to provide some quite delightful English prose. In Chapter 2, "Life in the Sea", for example, he reminds us that the sea was the birthplace of life on this earth, from which "the entire great tree of life arose and spread its branches throughout the earth. Its crowning branches are under Heaven . . . for there stands man himself . . . , but the roots of the tree are in the ocean and there its first seeds . . . may still be traced. Forgotten and left behind in the race the lowly and humble forms remain as living witnesses, gazing upwards unenviously, we may believe, at their more lofty cousins and descendants in the upper branches. For, humble though these creatures of the sea may be, they are perfectly adapted to their environment. . . . they have found the answer."

The book is divided into 10 chapters: The Ocean Basin; Life in the Sea; The Plankton; The Open Ocean; The Seashore; The Continental Shelf; The Abyss; Sea Fisheries; Whales and Whaling; and Instruments and Methods. These titles alone indicate the scope of the book. The illustrations—maps, diagrams and drawings—of marine fauna and flora are adequate.

It is only in "The Ocean Basin" that meteorology and its intimate relationship with oceanography is directly mentioned but, as the author explains, this relationship is so fundamental that further direct reference to it seems almost superfluous. He refers to the constant exchange of gases between the hydrosphere and the atmosphere, the effect of water vapour caused by evaporation from the sea surface, which descending as rain, associated with the action of frost and wind, causes erosion which spreads new layers upon the sea bottom. Meanwhile, all animal and plant life is nourished and supported by the atmosphere either directly or indirectly. Nothing could be much more fundamental than that! And in most chapters we are reminded of the important part that sunlight, and hence the seasons, play in the life of the oceans' inhabitants (fauna and flora). The subsidiary effects of the oceans' currents (which are, after all, largely caused by the wind), are also adequately discussed in about two pages; the tides and the winds are satisfactorily dealt with in about a page each! The chapter on "Life in the Sea" is devoted to a general discussion of this subject and tells us of the mechanism under which the life process goes on in the ocean. There is one small error on page 37 where a change of sea temperature of 10°C is equated to a change of 50°F. This chapter stresses the important part that relatively minor changes of sea temperature play in the life of sea animals.

A whole chapter is devoted to plankton, presumably in view of the importance of this in the life of so many fish which "graze upon these ocean meadows". In fact the plankton might be classed as the hero of the book, so frequently does he appear. The chapter on the "Open Ocean" deals mainly with the upper layers thereof, while the deeper layers are discussed under the title of "The Abyss". "The Sea Shore" and the "Continental Shelf" are obviously contiguous chapters and contain fascinating details about the physiological problems of the inhabitants of the former region, due to the great changes in pressure and environment resulting from the rise and fall of the tide, whereas the other has no such complications. The chapters about "Sea Fisheries" and "Whales and Whaling" are perhaps naturally related, as they both have such a practical and commercial importance. The author leaves us with no delusions as to the struggle for existence that these ocean inhabitants have—preyed upon by each other and also, until quite recently, to an almost reckless extent by mankind. In the final chapter on "Instruments and Methods", the author describes the recent advances made in oceanography whereby the scientist hopes to learn a bit more about this little-known science, and thereby to help mankind to use the harvest and other resources of the ocean in a rational manner.

At the price of 8*s.* 6*d.* this book seems to be a bargain.

C. E. N. F.

Alone Across the Atlantic, by Francis Chichester. 8¾ in. × 5¾ in. pp. 192. *Illus.* Geo. Allen & Unwin, Ltd., London, 1961. 21*s.*

On 11th June 1960, five yachts left Plymouth on a 'single-handed' race across the Atlantic. The winner was Francis Chichester, in his *Gypsy Moth III*, who completed the passage to New York in 40½ days, and this book tells how he did it. His nearest rival, Col. H. G. Hasler (well known as the 'Cockleshell Hero', leader of the commando raid on Bordeaux), was the originator of this race, and did the passage in 48½ days in his *Jester*: the other competitors took 56, 63 and 74 days respectively.

A note at the beginning of the book reminds us that this was the first single-handed transatlantic race and that it was the first yacht race of any kind from east to west across the Atlantic. But this is not the author's only claim to fame; he is an accomplished aviator and navigator and made the first east to west solo flight from New Zealand to Australia across the Tasman Sea in 1930, and the world's first long distance solo sea plane flight, from New Zealand to Japan, in 1931. He is thus used to doing things on his own initiative.

At the beginning of the book is a map of the North Atlantic, showing the track chart of each of the yachts. This map shows that *Gypsy Moth* followed very closely the Great Circle Track from Lizard to Cape Race and thence more or less by Rumb Line to Nantucket. *Jester* (48½ days) kept well to the north, crossing the 30th meridian in about 57°N (about 500 miles north of *Gypsy Moth*) before heading down for the Grand Bank. *Eira* (63 days) and *Cape Horn* (74 days) kept well to the south, towards the Azores (the 'Flying Fish Route') whereas *Cardinal Virtue* (56 days) kept slightly north of *Gypsy Moth*, following roughly the 50th parallel to about 40 west before heading down to Cape Race.

The book has some excellent photos of *Gypsy Moth* in action, as well as general arrangement drawings and a rough sail plan. The author's respect for Sable Island, which his route was bound to take him near, was emphasised by the inclusion of a large scale map of the island showing the incredible number of wrecks that have occurred there since 1800.

Gypsy Moth is 40 ft. long overall (waterline length 28 ft. with a beam of 10 ft. 1¾ in. and Thames measurement 13 tons). Her mainmast is 55 ft. in length and the total sail area, with mainsail, is about 380½ sq. ft. The self steering arrangement, which the author has christened 'Miranda', consists of a 45 sq. ft. mizzen sail, which 'weather cocks' with the wind; on two arms at the foot of the mast, tiller lines are fed to the tiller and control it in a similar manner to that used in model boats. The author designed the wind vane himself; he tells us it is 4½ times the area of the rudder which it has to drive. 'Miranda' is a prominent character throughout the book—having her as a member of the 'crew' seems to have enabled him to have many a peaceful night's sleep.

The first three chapters are devoted to the preparations for the race: storing the ship; practising single handed sailing and, in particular, practising with 'Miranda'; and planning the route. The remaining nine chapters cover the race itself, and very enthralling chapters they are. At the end of the book is an epilogue, rather after the style of a 'post-mortem', details of sail changes during the passage, and a glossary of yachting terms.

The text shows us that the author has a good sense of humour, which is surely an essential for a lone crossing of the Atlantic in a relatively small vessel; he never seems to make the mistake of taking things too seriously. But he is obviously very much a sailor man; it is interesting to note that whenever he is working on deck he is secured to a life-line (a promise to his wife)! His literary style is easy and intimate and so graphic that one can almost feel that one was aboard the ship with him. He doesn't waste words:

"1st July. 2230. If this wouldn't give you the willies, whatever would? Rain, fog, gale squalls, capricious, nasty and very forceful seas, grey skies, grey seas with white horses. Everything wet. And then people have the nerve to run down British Isles weather."

"4th July. At present I am doing 1½ knots in a direction I don't want to go with a current of ½ knot against me from the direction in which I do want to go."

5th July. In thick weather off the southern tongue of the area where bergs might be encountered he writes, after consulting the Pilot, "I've made up my mind that it is reasonable to press on. I shall put my trust in the Almighty who I am convinced has it all arranged anyhow. I will now fetch out the stout."

One small criticism concerns his rather annoying habit of repetition of certain phrases (e.g. 'Black Bearded Viking', a nick-name for one of his rivals in the race). But generally it is a very pleasing book to read.

It is obvious that meteorology plays a big part in a book of this nature. From the navigational viewpoint, in the first chapter and in the epilogue the author mentions that although the U.S. Pilot charts which he consulted showed 10% fog probability over 1,600 miles of the route, he didn't expect that he would have to sail through 1,400 miles of fog. This pilot chart shows that although there is 10% likelihood of fog east of 30° west, this percentage increases quite rapidly further west, to a maximum of about 40% crossing the bank. The British *Climatological and Sea Surface Current Chart of the Atlantic* indicates a somewhat lower percentage likelihood of fog east of 30° west, but similar conditions to the westward. It surely isn't so very surprising that he encountered quite a lot of fog during the passage. He also seems surprised that he had head winds for 2,600 miles of sailing. The wind roses on the British monthly chart of the Atlantic referred to above indicate, in addition to the strength and direction of wind, its constancy, and show that there would be nothing very unusual in the wind conditions which he did in fact experience.

His comments about wind and weather are at times very entertaining, for example: "If there is one thing I like less than fog to sail through it is fog stuffed with ice."

He seems to have had his fair share of gales; on one occasion he estimated a wind of force 12.

He describes in considerable detail his navigational methods, including the use of D.F. bearings (he had radio and DF reception apparatus aboard and an R/T transmitter) and occasional 'sights'. When he got his first time signal, on 1st July from St. Johns, Newfoundland, he tells us that his watch was 28 seconds out. When he got within range of the Canadian and U.S. radio stations, he was able to take advantage of radio weather bulletins, but he seems to have found these rather a mixed blessing on occasions. (Largely because a slightly misleading forecast tended to interfere with potential sleeping periods, which are so important to a lone navigator.)

Bearing in mind the relatively large size of his vessel (13 tons) and her extensive sail area there is no doubt that Chichester, at 58 years of age, carried out a remarkable achievement. He comments in the epilogue "the 9 tonner is the ideal size, in my opinion" (for a solo transatlantic race). C. E. N. F.

Personalities

RETIREMENT.—CAPTAIN R. D. S. ECKFORD retired on 16th June last after 45 years at sea, all spent in the service of the Pacific Steam Navigation Company.

Robert Douglas Stoddart Eckford, after 2½ years in the Training Ship *Mercury*, served his apprenticeship with the Pacific S.N. Co., his first ship being the *Potosi* in 1916. Two years of his time, however, were spent as a Midshipman R.N.R. in H.M.S. *Excellent* and on ocean escort duties in *Orvieto*.

After obtaining his 2nd Mate's certificate in July 1919 he rejoined the Pacific S.N. Co. as 3rd Officer of the *Acajutla*. Later this ship was to be his first command, in 1940. Captain Eckford subsequently commanded *Samothrace*, *Laguna*, *Cuzco*, and his last command from 1958 to 1961 was the *Potosi*, a namesake of his first ship in 1916.

Captain Eckford spent the years 1944–1950 ashore in Liverpool with the Marine Superintendent. In addition to campaign medals for two wars, Captain Eckford was awarded the Coronation Medal in 1953.

Captain Eckford's record with the Meteorological Office dates back to 1924, and in 22 years' observing he has sent in 86 logbooks, 62 of which were classed Excellent. On 12 occasions he has received Excellent Awards, and in 1952 was presented with an inscribed barograph in recognition of his long and valuable service to the Meteorological Office.

We wish him health and happiness in his retirement. J. R. R.

RETIREMENT.—CAPTAIN E. W. JENKIN retired from the sea in January last, after 44 years' service.

Ernest Wakeham Jenkin first went to sea as a wireless operator with the Postmaster-General's 1st class certificate in April 1918, when he joined s.s. *Baron Polwarth*. The ship was employed carrying horses from Canada to the battlefields of France.

After the war he left the sea for a time, but then signed indentures with Messrs. H. Hogarth & Sons of Glasgow. On his last voyage as an apprentice in 1923 his ship, the *Baron Vernon*, was sunk in collision with the C.P.R. liner *Metagama* off Dumbarton Rock in the Clyde. He passed for 2nd Mate and joined the Clan Line as fourth officer of their *Clan Skene* in the same year.

During the Second World War, whilst he was Chief Officer of the *Clan Chattan*, the ship was bombed and sunk on 14th February 1942 whilst on a convoy to Malta. Captain Jenkin was appointed to his first command, the 'Liberty' ship *Adolph S. Oths*, in August 1944, and in her saw service on convoys to North Russia.

His record with the Meteorological Office commenced in 1948 when he was in command of the *Clan MacNair*, and during the last 14 years he has sent in 29 logbooks, 20 of which were classed 'excellent'. He received Excellent Awards in 1952, 1958 and 1961.

We wish him health and happiness in his retirement. J. C. M.

OBITUARY.—We regret to record the death of Mr. A. B. PILKINGTON, radio officer, which occurred at his home at the age of 61 whilst on sick leave during the month of March 1961.

Mr. Pilkington was employed in the service of the International Marine Radio Co., Ltd. for nineteen years prior to his death, and had had ten years' previous service at sea before joining that company. During the last eight years of his service at sea he was employed as radio officer in the S.S. *Birmingham City*, of the Bristol City Line of steamships. His total sea service included employment on a variety of vessels, from passenger ships of the Cunard Line to tankers and vessels on general trades throughout the world. The International Marine Radio Co. have expressed their regret at losing one of the most reliable and conscientious radio officers in their employ.

Mr. Pilkington was interested in wireless from its early days. One of his first achievements was to receive the news of the Carpentier-Dempsey fight in 1920, direct from the U.S.A. on a home-made set, which brought to his home town, Bolton, the distinction of being the first town to publish the result in a local paper.

During his career at sea Mr. Pilkington co-operated wholeheartedly with the Meteorological Office in the efficient transmission of weather messages from voluntary observing ships. The first logbook bearing his name was received in 1949 from m.v. *Essex Trader* and, in all, thirteen logbooks have been received from ships where he served as senior radio officer. Ten of these books were classed 'excellent' and, of these, five qualified for an Excellent Award in recognition of the high standard maintained.

Mr. Pilkington was a widower. We extend our deepest sympathy to his sister, his nearest relative.

F. G. C. J.

Notice to Marine Observers

NAUTICAL OFFICERS AND AGENTS OF THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE, GREAT BRITAIN

Headquarters.—Commander C. E. N. Frankcom, O.B.E., R.D., R.N.R., Marine Superintendent, Meteorological Office (M.O.1), London Road, Bracknell, Berks. (Telephone: Bracknell 2420, ext. 282.)

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Lieut.-Commander L. B. Philpott, D.S.C., R.D., R.N.R., Nautical Officer. (Telephone: Bracknell 2420, ext. 283.)

Mersey.—Captain J. R. Radley, Port Meteorological Officer, Room 709, Royal Liver Building, Liverpool 3. (Telephone: Central 6565.)

Thames.—Mr. J. C. Matheson, Master Mariner, Port Meteorological Officer, South Side, King George V Dock, Silvertown, London, E.16. (Telephone: Albert Dock 3931.)

Bristol Channel.—Captain F. G. C. Jones, Port Meteorological Officer, 2 Bute Crescent, Cardiff. (Telephone: Cardiff 21423.)

Southampton.—Lieut.-Commander E. R. Pullan, R.D., R.N.R., Port Meteorological Officer*, 50 Berth, Old Docks, Southampton. (Telephone: Southampton 24295.)

Clyde.—Captain R. Reid, Port Meteorological Officer, 136 Renfield Street, Glasgow. (Telephone: Glasgow Douglas 2174.)

Forth.—Captain G. N. Jenkins, "Fairwind", Kings Road, Longniddry, East Lothian. (Telephone: Longniddry 3138.)

Humber.—Lieut.-Commander W. H. Carr, R.N.R., c/o Principal Officer, Ministry of Transport, Trinity House Yard, Hull. (Telephone: Hull 36813.)

Tyne.—Captain P. R. Legg, c/o F. B. West & Co., Custom House Chambers, Quayside, Newcastle upon Tyne. (Telephone: Newcastle 23203.)

ADDENDUM

The Marine Observer, July 1961.

Page 131, line 19 from foot of page—

Our attention has been drawn to the fact that since the range of air temperature in August quoted in the article refers to Dover (from 69°F in the day to 56°F at night), it is not representative of conditions over the Channel itself. Whilst the range at Dover amounts to 13°F, observations taken at the East Goodwin light-vessel give a figure of about 4°F (from 65°F in the day to 61°F at night), and in mid-Channel the difference might well be a little less. At Ocean Weather Station 'J' (52° 30′N, 20°W) the diurnal range amounts to only 1°–2°F.

In the English Channel, much would depend upon the direction of the wind.

* *Shortly moving to* Southampton Weather Centre, 160 High Street below Bar, Southampton. (Telephone: Southampton 28844.)

With predominantly NE'ly or WSW'ly winds, i.e. with winds having a long fetch, the range would be smaller than it would be in the case of air coming from off the Continent, when the fetch is short.

ERRATA

The Marine Observer, October 1960.

Page 208—

The Thames Navigation Service, paragraph 1, line 4: *for* Amplification of Frequency Modulation *read* Amplitude or Frequency Modulation.

The Marine Observer, April 1961.

Page 84—

Captions under middle and lower diagrams—*for* Fig. 6(b) *read* Fig. 6(c), *for* Fig. 6(c) *read* Fig. 6(b).

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[*Subjects of* Book reviews, Editorials, Notices to marine observers, *and* Photographs *are indexed under those general headings.*]

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