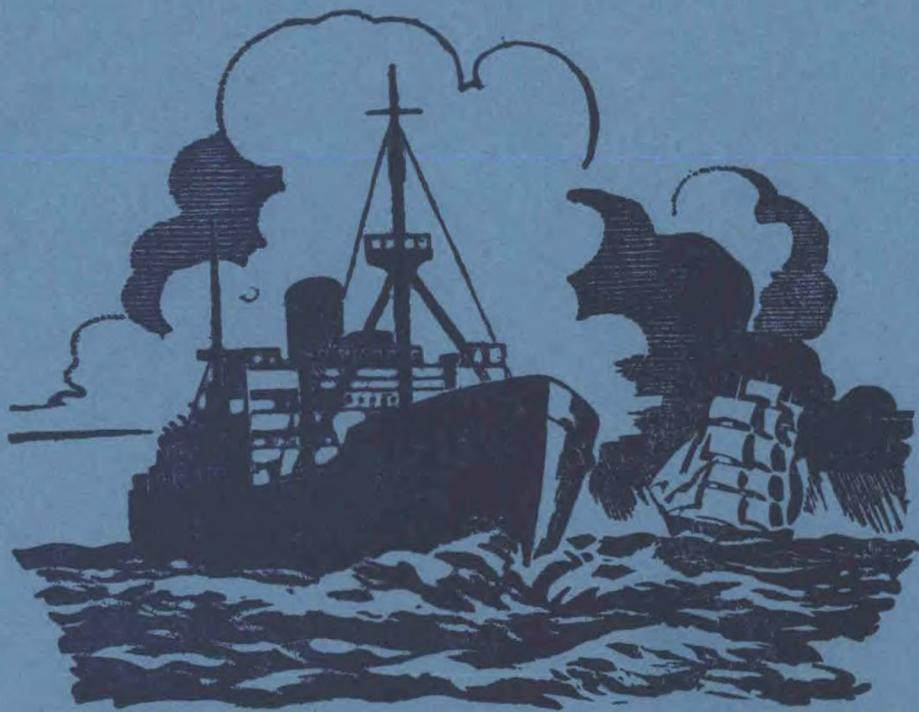


M.O. 608

# The Marine Observer

*A quarterly journal of Maritime  
Meteorology*



Volume XXVI      No. 173

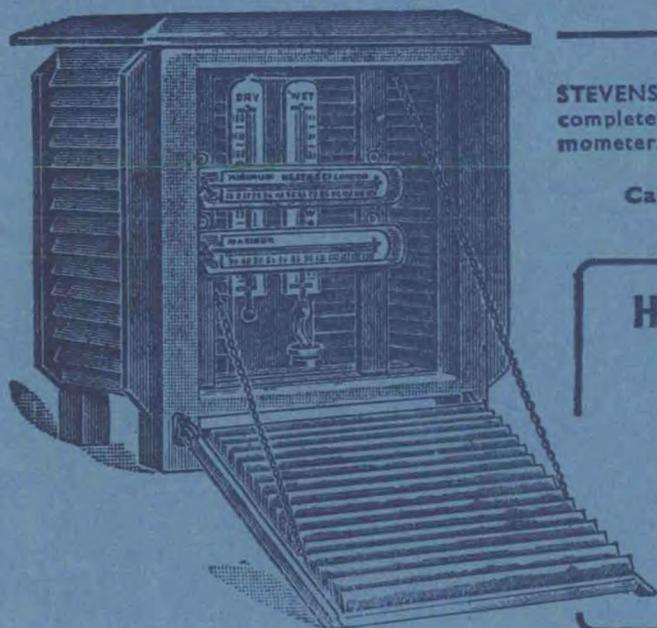
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# THE MARINE OBSERVER

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

VOL. XXVI

No. 173

JULY, 1956

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## Editorial

The shifting of the B.B.C. Weather Bulletin for coastal shipping, from the Home Service to the Light Programme on 22nd April, 1956, and the consequent increase in the length of these bulletins, was introduced after careful consideration and consultation between the Meteorological Office and the B.B.C. and the various authorities representative of the shipping industry, with the object of providing a better weather service for shipping around the British coasts. When considering the possibility of introducing this service a representative of the B.B.C. interviewed masters of coasting vessels and skippers of trawlers at certain United Kingdom ports to seek their views about the practical value to the seamen of these radio weather bulletins. After the introduction of this new service a B.B.C. representative did a voyage in a deep-water trawler from Grimsby in order to learn something at first hand about the impact of weather upon the trawling industry. It is considered by the B.B.C. experts that the Light Programme transmissions on 1500 metres provides a better coverage for shipping all round the British coasts than the Home Service transmissions on various frequencies, particularly during daylight. The fact that these new Light Programme weather bulletins are entirely confined to shipping and thus separated from the "land bulletins" which remain on the Home Service, enables them to be longer and more comprehensive. At the same time, it enables the land bulletins, which remain on the Home Service, to be more comprehensive in their turn. Thus the B.B.C., in association with the Meteorological Office, has contrived to provide a much better service both for shipping and for people ashore. The timing of these new bulletins enables listeners who are really interested in the weather to form a very comprehensive picture of the situation at sea and ashore. Thus the mariner can receive the shipping bulletin from 0645 to 0650 on the Light Programme, and at 0755 he can receive the shore bulletin on the Home Service to complete the "picture". Similarly he can receive the shipping bulletin on the Light Programme from 1200 to 1205 on a Sunday and 1340 to 1345 on a weekday and the shore bulletin at 1255 to 1300 throughout the week on the Home Service. He can receive the final shipping bulletin for the day on the Light Programme from 2400 to 0005. The different times at which some of the bulletins are issued on Sundays compared with weekdays are for administrative reasons and are unavoidable.

At the same time the coastal bulletins for shipping continue to be issued by G.P.O. coast stations by w/T and R/T at scheduled times between 0800 and 0900 and between 2000 and 2100. If the mariner wishes to go further in his study of the synoptic situation he only needs to listen to the Atlantic Weather Bulletin issued by the G.P.O. station Portishead Radio at 0930 and 2130 G.M.T. and he thus has available the means of plotting a complete weather map out to longitude 40°W.

When the B.B.C. and G.P.O. transmissions are considered together it will be seen that the maximum interval between bulletins is 6½ hours (7½ hours when British Summer Time is in force), during the night-time (between 0005 and 0645), and about 7 hours in the day-time on Sundays (between 1205 and 1928).

The wording of the synopsis combined with the inclusion of a selection of actual reports from certain coast stations, which form part of the "5 minute" B.B.C. broadcast for shipping, are designed to provide the mariner with as complete a picture as possible in a few words of the current weather situation, not only round the British Isles but out into the Atlantic. It is hoped that he will thereby be better able to interpret the forecast for the various coastal areas. Gale warnings, when in force, continue to be included in all weather bulletins for shipping, but the B.B.C. have now agreed that interruption of the Light Programme for the issue of sudden gale warnings will take place as close to the hour as possible. This should be more convenient for those mariners who do not listen continuously to this programme.

Both in the B.B.C. and in the G.P.O. bulletins certain changes have been made to the names and limits of the areas in the North Sea. Thus the area which has

been referred to for many years as Heligoland is now called German Bight, and this has been extended a bit into the Dogger area. The eastern part of the Dogger area and part of the Forties area have been incorporated into a new area called Fisher; to the eastward of Fair Isle a new Viking area has been introduced. These particular areas should now be common to all the European countries which issue forecasts for the North Sea and this will make things easier for the mariner. These changes were introduced as a result of a Conference of the meteorologists of North Sea countries which took place at De Bilt (Netherlands) in 1955 with the object of achieving more international uniformity in the names of these areas. In the coastal bulletin the area previously called Iceland is now called South-east Iceland; forecasts for the remainder of Icelandic waters are now included in the Atlantic bulletin.

It was in 1919 that the first general weather bulletin for coastal shipping was issued by radio from the G.P.O. station at Poldhu. This included a forecast for the western seaboard and coded reports from Stornoway, Blacksod, Holyhead, Scilly and Dungeness. In 1925 the first bulletins for shipping were issued by the B.B.C., and these included an inference and forecasts of wind and visibility for the areas Heligoland, Clyde, Shannon, Mersey, Severn, Channel, Wight, Shetlands, Tay, Forties, Hebrides, Dogger and Thames. The bulletins were issued from Daventry at 1030, and on a regional basis from Liverpool, Bournemouth and Newcastle at 2220. In 1927 all the above bulletins were transferred to the Daventry transmitters. In 1932 the times of the B.B.C. bulletins were changed to 1300, 1645 and 1830 (Sunday 1500) and the areas Faeroes, Orkney and Shetland were added.

All bulletins for shipping ceased during the war but they were resumed again in 1945, and in 1948 the areas were revised with the addition of Bailey, Rockall, Malin, Lundy, Sole, Finisterre, Biscay and Plymouth—the bulletins being issued on the Home Service.

As we have mentioned before in these pages, meteorologists cannot do anything about changing the weather, but it is the aim of the responsible authorities in the United Kingdom to provide the mariner with as complete a picture as possible of the existing weather situation and as accurate notice as possible of impending changes. The accuracy of the information which is issued will inevitably be related to the number of radio weather messages which the Meteorological Office receives from ships in the Atlantic, North Sea and far northern waters.

As will be seen on page 126 of this journal, the number of reports received from ships on the general trade routes in the Atlantic Ocean is very satisfactory. There is still, however, a need for considerably more reports from ships in the North Sea and particularly in far northern waters. All ships passing through such areas are therefore requested to send even a brief radio weather message to the appropriate shore station whenever circumstances permit. The more reports which are received, the better the synoptic map the meteorologist can draw and the more accurate the forecast he can issue.

The report which follows this editorial gives, as is customary in the July number of *The Marine Observer*, a review of the work done by British voluntary observing ships during the year. It shows that the voluntary co-operation between British shipping and this Office which has been in force for so many years has continued in an admirable manner. The contents of the "Marine Observers' Log" gives an indication of the diverse and interesting phenomena reported by observers, and we have been delighted to publish from time to time during the year photographs and drawings and humorous sketches received from voluntary observers. All those deck and radio officers who take part in this scheme can feel assured that they contribute in no small measure to the benefit of international meteorology, and after all there is nothing which affects the comfort of any of us as much as the weather, no matter in what country we live.

On page 132 we publish a list of those officers who have been awarded Excellent Awards for the particularly high quality of their work during the year.

On behalf of the Director of the Meteorological Office we congratulate all those

who have gained these awards and we thank all our voluntary observers for the meteorological work which they have done on our behalf during the year.

In the January 1956 number we referred to the international race for sail-training ships, from Torbay to Lisbon, which is scheduled to take place in July this year. Plans are now going ahead apace and the entries include 13 vessels of over 100 tons (from Belgium, Britain (two), Denmark, Germany, Holland, Norway (two), Portugal, Sweden (three) and Turkey). In the "small class" are entries from Argentina, Britain (six), France, Italy and Portugal. The vessels assemble at Dartmouth on Saturday, 30th June, for an inshore regatta and sail from Torbay on Saturday, 7th July.

Among the tasks which the committee have to undertake is the difficult one of working out the handicaps for the very varied classes of vessels taking part in the race.

The weather will inevitably play an important part in this race and the contestants will no doubt be glad of all the meteorological information which is available. The winners will be those who, by their skill as seamen, get the most out of the sailing capabilities of their craft and who thus use the winds, which nature provides, to the best advantage.

MARINE SUPERINTENDENT

## WORK OF THE MARINE DIVISION OF THE BRITISH METEOROLOGICAL OFFICE AND THE VOLUNTARY OBSERVING FLEET DURING THE YEAR ENDED 31st MARCH, 1956

### 1. Voluntary Observing Ships

Port Meteorological Officers at London, Liverpool, Glasgow, Southampton and Cardiff, and Merchant Navy Agents at Newcastle, Hull and Leith, made over 4,000 visits to voluntary observing ships and other merchant ships during the year. In addition to recruiting new ships for this work, every endeavour is made to visit every voluntary observing ship at least once a quarter, not only to inspect the instruments and supply logbooks and stationery but also to answer queries and give any necessary instructions to the voluntary observing officers. These visits establish a sense of personal contact between the Meteorological Office and the ships. Reports arising from these visits show that despite the changes in officers which occur so frequently aboard merchant ships nowadays, our voluntary observers show great interest in their meteorological work.

The British Voluntary Observing Fleet, as shown in Table 1 on page 125, is comprised as follows:

- (a) *Selected ships.* These make meteorological observations four times daily and transmit them by wireless telegraphy to specified Meteorological Services in whatever ocean the vessel is situated, using the International Meteorological Code.
- (b) *Supplementary ships.* These differ from selected ships in that they use an abbreviated code when transmitting their observations four times daily.
- (c) *Coasting vessels.* Averaging about 90 in number these ships make observations of sea temperature (MARID observations) in home waters and transmit them in a coded form once daily by radio-telephone to Dunstable, via G.P.O. coast stations. When in the North Sea, certain other non-instrumental observations are included in the message.
- (d) *Lightvessels.* By courtesy of Trinity House 13 of these vessels make observations of wind, waves, visibility and air and sea temperature twice daily. The coded reports of 11 of these vessels are sent by radio-telephone to Dunstable, via G.P.O. coast stations.

1955

1956

	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
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Table 1. Number of British Observing Ships

No. of Selected Ships on Fleet List	504	500	498	497	497	499	501	504	503	503	502	497
No. of Supplementary Ships on Fleet List	59	63	64	63	62	63	64	66	67	67	67	65
No. of Marid Ships on Fleet List	94	94	94	94	93	94	94	94	94	94	93	92
No. of Lightvessels on Fleet List	13	13	13	13	13	13	13	13	13	13	13	13
No. of Trawlers on Fleet List	30	30	30	30	30	30	30	32	32	31	31	31
No. of Non-Instrumental Ships on Fleet List	4	4	4	4	5	6	6	6	6	6	6	6

Table 2. Ships' Radio Weather Messages received at Dunstable

1. <i>British Selected Ships</i>												
No. reporting to Dunstable	307	324	286	318	321	323	319	342	308	301	293	319
No. of messages received	3,112	3,664	2,976	2,982	3,149	3,365	3,349	3,512	3,247	3,041	3,080	3,650
No. of groups (excluding address and ship's name)	25,815	30,155	23,951	24,717	26,736	27,562	28,028	29,223	27,091	25,152	25,479	30,561
Daily average of messages	104	111	96	96	102	112	108	108	105	98	106	118
2. <i>British Marid Ships</i>												
No. reporting to Dunstable	49	51	56	53	54	34	48	48	42	47	50	54
No. of messages received	317	334	328	428	422	347	323	293	270	305	266	304
Daily average of messages	11	11	11	14	14	12	10	10	9	10	9	10
3. <i>Foreign Ships</i>												
No. reporting to Dunstable	157	115	95	105	102	101	92	91	76	73	95	101
No. of messages received	568	509	381	565	417	481	359	357	302	308	355	453
No. of groups (excluding address and ship's name)	4,370	3,943	2,984	3,300	3,348	4,111	3,059	3,039	2,559	2,635	3,023	3,852
Daily average of messages	19	16	12	18	13	16	12	12	10	10	12	15
4. <i>Lightvessels</i>												
No. reporting to Dunstable	11	11	11	11	11	11	11	11	11	11	11	11
No. of messages received	827	847	823	844	848	816	838	810	826	824	749	845
Daily average of messages	28	27	28	27	27	27	27	27	27	27	26	27

Table 3. Instrumental Equipment on Loan to British Voluntary Observing Ships

1. <i>Selected</i>												
(a) Full set of M.O. instruments	497	494	492	491	491	493	495	498	497	497	496	491
(b) Full set of M.O. instruments except barograph	4	4	4	4	4	4	4	4	4	4	4	4
(c) Full set of M.O. instruments except aneroid	2	2	2	2	2	2	2	2	2	2	2	2
(d) Full set of M.O. instruments except aneroid instead of mercurial barometer	1	0	0	0	0	0	0	0	0	0	0	0
Mercurial barometer	94	94	94	94	94	94	94	94	94	94	93	92
Lightvessel. Set of instruments	13	13	13	13	13	13	13	13	13	13	13	13
Supplementary set	57	61	62	61	60	61	62	64	65	65	65	63
Supplementary set, except aneroid instead of mercurial barometer	2	2	2	2	2	2	2	2	2	2	2	2

- (e) *Trawlers*. Non-instrumental observations are made by these ships (engaged in fishing in the North Sea and in far northern waters) and are sent in code by wireless telegraphy or radio telephony, as convenient to British, Norwegian or Icelandic shore stations.
- (f) *North Sea traders*. Six such ships make non-instrumental observations and send them to British radio stations.

A full set of meteorological instruments supplied to selected ships comprises mercury barometer, barograph, portable screen and thermometers and canvas sea-water bucket. Supplementary ships are not supplied with barograph or bucket. Table 3 on page 125 shows the number of "sets" of instruments on loan to voluntary ships.

The meteorological observations made aboard selected and supplementary ships are recorded in special logbooks and are forwarded to the Marine Division for climatological analysis.

Among their other activities selected and supplementary ships make observations of whales on behalf of the National Institute of Oceanography and of aurora for the Department of Natural Philosophy, Edinburgh University. Special radar observations are also made aboard ships so fitted.

Table 4 below gives an indication as to the trades in which British selected ships are engaged.

**Table 4. Numbers of British selected ships on main routes from and to the United Kingdom**

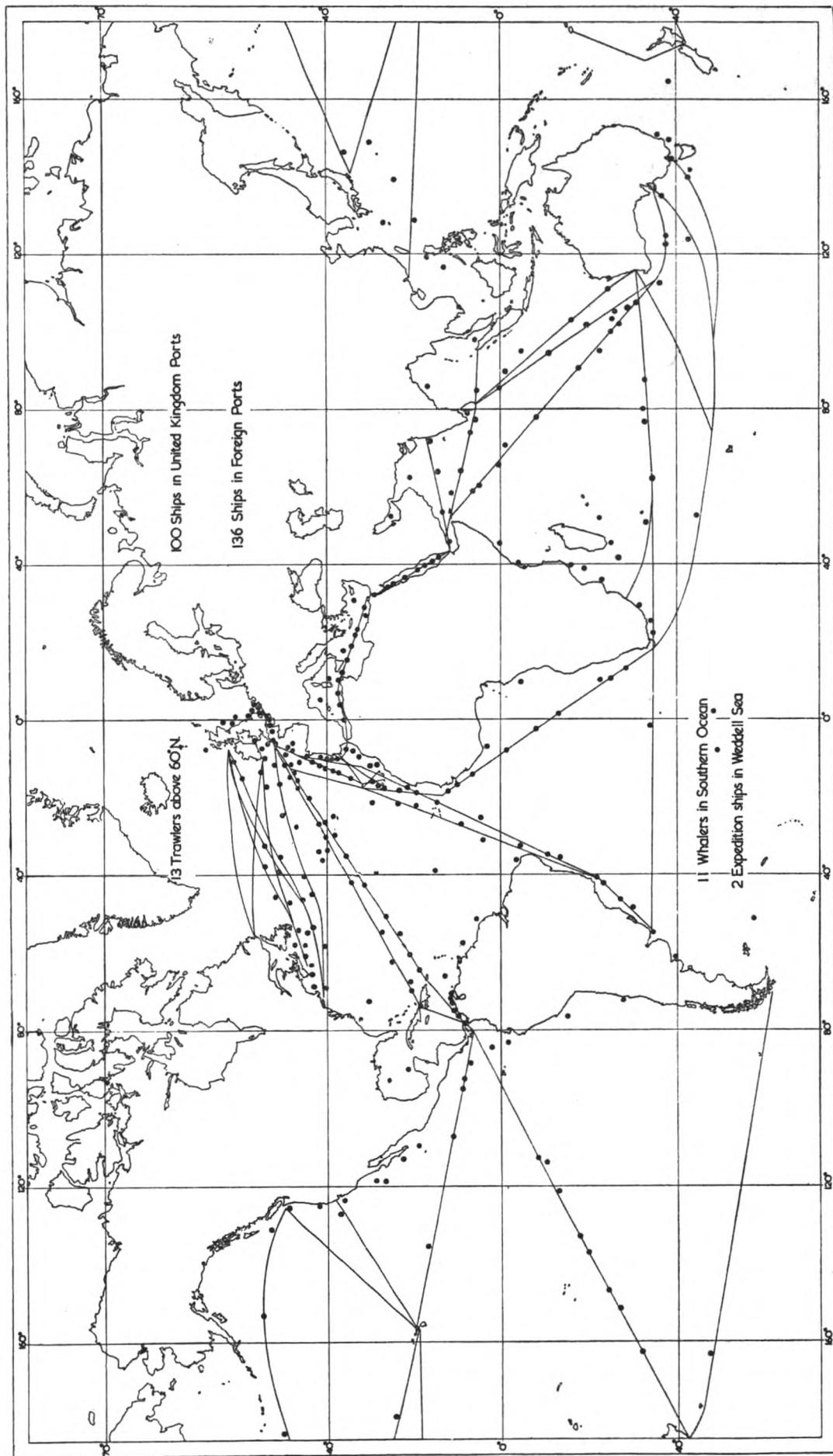
Australasia, mainly via Suez .. .. .	37
Australasia, mainly via Panama, Suez or the Cape ..	77
Far East .. .. .	64
Persian Gulf .. .. .	23
South Africa .. .. .	27
North Atlantic .. .. .	97
West Indies .. .. .	21
Atlantic coast of South America .. .. .	58
Pacific coast of South America .. .. .	16
Pacific coast of North America .. .. .	31
North-west Europe .. .. .	6
Trooping service .. .. .	4
Falkland Islands and Antarctic .. .. .	14
World-wide "tramping" .. .. .	136

Foreign ships and ocean weather ships operated by other nations in the North Atlantic also send radio weather messages to Dunstable regularly throughout the year (see Table 2 on page 125).

Included in the number of selected ships above are 12 British whaling ships which were recruited to make observations in the Antarctic. Radio weather messages, with the ship's position given in cipher, are routed through South African or Australian radio stations depending on the area in which the ship is located at the time.

The meteorological logbooks received during the year have generally been compiled accurately and neatly. An increasing number of drawings and photographs have been received and reports of many unusual and interesting marine phenomena of various types. The logbooks show that in most cases radio weather messages are regularly transmitted to the appropriate authority. There is not much evidence of difficulty in clearing messages to radio stations; if such difficulties are reported they are promptly investigated. An average of about 110 logbooks have been received monthly.

Given at Table 2 on page 125 is a summary of radio reports received at Dunstable from ships in the eastern Atlantic and North Sea excluding reports received from



The positions of British ships which made observations on 31st January, 1956 (a day picked at random).

ocean weather ships. It is not possible to produce similar figures for other parts of the world, but the map on page 127 shows the general distribution of British selected ships on a day picked at random. Of reports received from ships in the eastern Atlantic, a 12-monthly check revealed that approximately 54% were received within one hour and 75% within two hours of the observation. There is evidence that the number of reports received from ships in the North Sea and far northern waters have been somewhat greater than in previous years, but there is still need for more reports from ships in those areas.

As mentioned in the January 1956 number of *The Marine Observer*, daily forecast charts are now issued to all ships sailing from the Port of London.

## 2. Ocean Weather Ships

Each of the British ships have completed eight years' service and currently man stations A, I, J and K in rotation with French and Netherlands ships.

Stations were manned for from 352 to 362 days each, and were vacated as follows:

- A: Three days to land a patient to hospital and one day due to late arrival of relief ship in very bad weather.
- I: Twelve days on search operations, one day due to shortage of fuel because of bad weather and one day due to the relief ship being delayed due to a crew shortage.
- J: Four days to land a patient to hospital and two days due to relief ship being delayed for boiler repairs.
- K: Seven days due to repairs to relief ship and three days whilst landing a patient to hospital.

A full programme of meteorological work was carried out by these ships, and search and rescue exercises were conducted whenever possible, in co-operation with aircraft of R.A.F. Coastal Command. During these exercises mail, newspapers and urgently required stores were dropped in watertight containers. Opportunity was also taken by R.A.F. aircraft on navigational exercises to drop mail to British and foreign ships on stations I and J and to British ships only on stations A and K. The ships' navigational aids are used regularly by both civil and military aircraft; 7,076 aircraft (about the same number as last year) made use during the year of the facilities provided by British ships. Radio contact was made frequently with weather ships at the other stations.

Special observations of the sea-water temperature gradient by means of a bathy-thermograph, installed by the Admiralty, were made in all British ships, and observations by means of an electronic wave recorder, loaned by the National Institute of Oceanography, were continued aboard *Weather Explorer*. Oceanographical work was continued on behalf of the Ministry of Agriculture, Fisheries and Food, and the Fisheries Division of the Scottish Home Department; this included the towing of plankton recorders and the taking of samples of sea-surface water. On behalf of the Hydrographic Department of the Admiralty magnetic variation swings were carried out whenever weather conditions allowed.

Logbooks and upper-air data were received from all weather ships operating on stations A, I and J, as the climatological work for these stations is the responsibility of the British Meteorological Office. Microfilmed copies were made and sent to all nations signatory to the North Atlantic Ocean Stations Agreement. British ships, when operating on station K, record their observations on forms supplied by the French Meteorological Service.

In connection with the Meteorological Office centenary celebrations, *Weather Recorder* visited Edinburgh from 12th to 14th June and *Weather Explorer* was at Cardiff from 27th to 29th August. During these periods over 3,400 visitors were conducted round the ships.

*Weather Recorder* in August 1955 gave assistance to the S.S. *Argobeam* when in distress with a serious fire in her engine room and stood by her until a salvage tug

took her in tow. *Weather Explorer* while on passage to ocean station in October 1955 went to the assistance of the Icelandic S.S. *Einar Olafsson* but resumed her passage on the arrival of other vessels at the scene. *Weather Observer* and *Weather Recorder* between them spent 12 days off station I on search operations for the Icelandic S.S. *Holmaborg* in February 1956.

### 3. Marine Climatology

The number of meteorological logbooks received from selected and supplementary ships totalled 1,325 or an average of 110 per month. Logbooks and upper-air data have also been received regularly from ocean weather ships operating on stations A, I and J. Microfilm copies of observations made at other ocean stations have also been received.

Observations from all logbooks as well as logbooks received from naval ships have been punched on to Hollerith cards. The total number of observations punched was 273,580, including some from logbooks received from Canadian, South African, Norwegian, Netherlands and French ships. The number of cards in the Marine Division now totals about 12,500,000 and the use of these cards, by machine methods, makes it possible to undertake climatological investigations on a world-wide basis.

### 4. Special Work

(a) Meteorological and ocean current statistics for ocean stations I and J for 1954 were completed. Work on the preparation of similar statistics for 1955 with the addition of those for station A were commenced.

(b) An analysis of observations made during a series of simultaneous radar wind finding measurements between pairs of ocean weather ships during 1953-54 was completed and published. Substantial progress was made with the analysis of data obtained by ocean weather ships and H.M.S. *Vidal* for investigating errors due to differences in screen exposures using ordinary and resistance thermometers respectively.

(c) An investigation of the relationship between the surface and 900 mb wind at ocean station I and at United States ocean stations is in progress, as is an investigation into the secular variation of temperature over the tropical Atlantic.

(d) Trials are being conducted in *Weather Recorder* of electrical resistance thermometers mounted on a dan buoy to measure simultaneous air and sea temperature gradients close to sea levels, and of rainfall observations aboard the ship. It is only in association with a weather ship that special observations of this nature can be made.

(e) Co-operation in wave studies was maintained with the National Institute of Oceanography.

(f) Papers were produced on the following subjects:

- (i) Some aspects of variations of air and sea temperature in short periods at ocean stations I and J of significance to the synoptic climatologist.
- (ii) Meteorological aspects of the loss of *Lorella* and *Roderigo*, affecting the operation of trawlers to north of Iceland in winter.
- (iii) Ice accumulation upon trawlers in northern waters.
- (iv) Air temperatures during snowfall at ocean station I.
- (v) Wave heights and periods at ocean stations I and J.
- (vi) The eruption of Krakatau, 1883.
- (vii) A discussion on a paper entitled "The programme and objectives of the International Geophysical Year" was opened by R. F. M. Hay. Mr. Hay will be writing about this subject in a later number of *The Marine Observer*.

(g) Information, including statistical tables and charts of marine data, was supplied on request to the Naval Weather Service, other Government Departments,

scientific institutions, commercial firms and private individuals. Examples included dry and wet-bulb temperature and sea temperature data with wind frequencies for three areas in the North Atlantic and North Pacific; information on the recurrence of large wave heights; sea and air temperature data, 1880 to 1954, for five light-vessels around the British coasts; and the supply to the World Meteorological Organisation of data concerning thunderstorm activity over the oceans.

(h) In connection with investigations into serious shipping casualties information was supplied to the Ministry of Transport and Civil Aviation. A meteorologist for the Marine Division gave expert evidence at the formal investigations into the losses of the trawlers *Lorella* and *Roderigo* (capsized due to an accumulation of ice on deck near the Denmark Strait, January 1955) and *Tresillian* (foundered in very heavy weather south of Cork Harbour, November 1954). Information was supplied for preliminary investigations into the casualties of the ships *Playmates* and *Evelyn Rose*.

(i) Various other enquiries included probable frequency of occasions of high wind sufficient to cause spray to be lifted to a great height; information in connection with damage by spray to a block of flats at Hove, Sussex; occurrence of fog in the Antarctic for planning whaling operations; and temperature and humidity data for the shipping route United Kingdom to Far East for research into damage to sugar cargoes due to "cargo sweat".

During the year some 40 enquiries necessitating certified statements of weather conditions were answered.

## 5. Currents and Ice

Preparation of the atlas of surface currents of the eastern North Pacific is well advanced. Work on the computation of current data for the eastern South Pacific has continued.

All observations received of ice in the Antarctic region have been plotted with the view to revision of Antarctic ice charts.

## 6. Admiralty Pilots and Charts

Sections relating to currents and ice in seven volumes of Admiralty Pilots have been revised and the revision of the meteorological sections of these Pilots was co-ordinated with the World Climatology Branch. Meteorological charts for these publications were prepared in the Marine Division.

Information relating to surface currents was sent to the Admiralty to be placed on 23 new or revised Admiralty navigational charts covering widely separated parts of the oceans.

## 7. Publications

Quarterly numbers of *The Marine Observer* were published in April, July and October 1955 and January 1956. The contents included such subjects as the history and development of the Meteorological Office, wave statistics, observations of aurora, the eruption of Krakatau, meteorological conditions in ships' holds and their effect on cargoes, pilot balloon ascents from ships, cloud observations, insects found at sea, shipping operations in Hudson Bay and weather charts plotted at sea.

A new edition of *International Meteorological Code-Decode for the use of Shipping* was published. A new publication *Meteorology for Mariners* is now in the process of being printed and it is hoped that it will be published before the end of this year. Also in the course of printing are a revised edition of the atlas *Monthly Meteorological Charts of the Greenland and Barents Seas*, and a new publication *Climatological and Sea-surface Current Charts of the North Atlantic*. The atlases *Monthly Meteorological Charts of the Atlantic Ocean* and *Monthly Meteorological Charts of the Eastern Pacific* are being reprinted.

## 8. International Co-operation

The Marine Superintendent, in his capacity as President of the Commission for Maritime Meteorology, attended the Second Congress of the World Meteorological Organisation at Geneva in April 1955.

A Yugoslav meteorologist received one week's instruction in maritime meteorology.

## 9. Awards

The meteorological logbooks received from selected and supplementary ships are subjected to a very careful scrutiny and are classified by a nautical officer. Prizes, in the form of books, are presented to the masters, principal observing officers and radio officers of 100 of those ships whose records are classed as excellent. The books selected are 200 copies of *The Silent World* by J. Y. Cousteau and 100 copies of *The University Atlas*, and a list of the recipients is to be found on page 132.

As reported in full in the October 1955 number of *The Marine Observer*, inscribed barographs were presented during the year to four master mariners who have been responsible for doing consistently good meteorological work at sea for a period of 15 years or more.

MARINE SUPERINTENDENT

## OBSERVATIONS OF SUNSPOTS

Solar activity is now greatly on the increase. The period of minimum activity, when spots were absent or small and infrequent, was at about the middle of 1954. Many more spots have been observed in the last few months, a number of them being large enough to be seen with the naked eye, using suitable protective screens. For a few days after the middle of February no less than six spots were so visible at the same time. The next maximum of solar activity is expected in 1957.

A number of sketches showing the position of spots on the sun's disc have been received in recent meteorological logbooks. The purpose of this note is to make it clear that while it is no doubt interesting to the observer to see the spots and to watch their general increase in size and number as time goes on, it is not necessary to go to the trouble of recording the observations in the logbook. The daily appearance of the sun is photographed at one or other of the many astronomical observatories in various parts of the world, and these photographs afford a much more accurate and detailed representation of the position and shape of the spots than can be given by a rough sketch. Furthermore, such sketches do not distinguish between the two factors which affect the apparent position of spots on the disc. The first of these factors is that a sunspot which is brought into sight round the east limb of the sun by the solar rotation will appear to cross the disc to the west limb in about 14 days, if it lasts so long, as is usually the case with a spot of any considerable size. It may of course show changes of shape or size during this period. The paths across the disc traced out by successive daily positions of one spot may be straight, or curved upward or downward, at different times of year. This depends on the varying way in which the tilt of the earth's axis is presented to the sun in different months, which is also the cause of the seasons.

The second factor depends on the time of day at which the observation is made, since the observer's angle of view is constantly changing. The imaginary line forming the horizontal diameter of the sun at noon appears to be tilted upward between sunrise and noon and downward between noon and sunset, the most extreme tilting occurring at sunset and sunrise. Some observers have thought that this change of angle represented a real motion of the spots on the sun's disc.

E. W. B.

## EXCELLENT AWARDS (Year ending 31st March, 1956)

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	SENIOR RADIO OFFICER	OWNERS
<i>Andria</i>	A. N. Sargent	P. A. A. James	P. Byrne	Cunard Steamship Co., Ltd.
<i>Apollo</i>	G. V. Barnes	H. G. Mowat	P. J. Wright (c/o)	Bristol Steam Navigation Co., Ltd.
<i>Arabistan</i>	D. L. Cook	D. G. Mason	P. Murphy	F. C. Strick & Co., Ltd.
<i>Argentina Star</i>	E. R. Pearce, O.B.E.	D. Newlin	N. Cragg	Blue Star Line, Ltd.
<i>Arundel Castle</i>	D. D. Mackenzie	R. J. Grice	— Kilminster	Union Castle Mail S.S. Co., Ltd.
<i>Australia Star</i>	J. A. Hoppé	G. C. Williams	L. Cooper	Blue Star Line, Ltd.
<i>Avondene</i>	F. Moorcraft	J. W. B. Morgan	J. T. W. Moody	Dene Shipping Co., Ltd.
<i>Baron Murray</i>	J. Pearson	J. Budka	A. P. Oliver	H. Hogarth & Sons, Ltd.
<i>Begonia</i>	R. Reekie	J. B. Barker	J. E. B. Sams	J. Robinson & Sons
<i>Bellerby</i>	F. Tate, O.B.E.	W. E. N. Gordon	J. Blaylock	Sir R. Ropner & Co., Ltd.
<i>Bellerophon</i>	H. H. Sanderson	M. Nall	A. E. Holman	A. Holt & Co.
<i>Brasil Star</i>	G. E. Barnard	D. Robertson	G. Dyson	Blue Star Line, Ltd.
<i>Carnarvon</i>	G. Percy	K. A. Murray	D. W. Cook	Cairns, Noble & Co., Ltd.
<i>Caledonia</i>	D. Blair	D. Barclay	J. McConnell	Anchor Line, Ltd.
<i>Cambridge</i>	P. P. O. Harrison	L. Fancett	D. Field	Federal Steam Navigation Co., Ltd.
<i>Ceramic</i>	F. A. Smith	D. G. Model	— Waterhouse	Shaw, Savill & Albion Co., Ltd.
<i>Cingalese Prince</i>	B. R. Simons, M.B.E.	A. C. Farrar-Hare	K. McGuire	Prince Line, Ltd.
<i>City of Johannesburg</i>	R. J. Ricketts	D. W. Asquith	V. Manning	Ellerman & Bucknall S.S. Co., Ltd.
<i>Clan Davidson</i>	T. A. Watkinson	J. M. Brackenridge	G. Ainslie	Clan Line Steamers, Ltd.
<i>Clan Forbes</i>	I. C. Scott	R. H. Snape	P. H. Cottrill	Clan Line Steamers, Ltd.
<i>Clan Macdonald</i>	A. J. Hogg	R. W. Bathgate	G. Martyn	Clan Line Steamers, Ltd.
<i>Condesa</i>	A. MacEwan	A. Millie	J. Bishop	Furness-Houlder Argentine Lines, Ltd.
<i>Corinthic</i>	A. C. Jones	G. B. Broom	— Lilles	Shaw, Savill & Albion Co., Ltd.
<i>Dallas City</i>	R. Dodds	P. Whitecross	J. M. Robson	Sir William Reardon Smith & Sons, Ltd.
<i>Delphic</i>	C. L. Carroll, D.S.C., R.D., Lt.-Cdr. R.N.R. (Retd.)	D. A. Rogers	A. Morris	Shaw, Savill & Albion Co., Ltd.
<i>Devon</i>	J. M. James	R. G. Hollingdale	T. E. Partridge	Federal Steam Navigation Co., Ltd.
<i>Devonshire</i>	A. N. Williamson	G. F. Risley	A. Jones	Bibby Bros. & Co.
<i>Dominion Monarch</i>	B. Forbes Moffatt	R. L. Reid	F. V. Harford	Shaw, Savill & Albion Co., Ltd.
<i>Durham</i>	A. Hocken	E. D. Jones	P. Dickson	Federal Steam Navigation Co., Ltd.
<i>Edward Wilshaw</i>	R. W. Porter-Reynolds	A. Miller	J. Wade	Cable & Wireless, Ltd.
<i>Egida</i>	D. Barclay	R. Watt	F. Blyth	Anchor Line, Ltd.
<i>Essex</i>	L. W. Fulcher	P. J. Sedgwick	R. F. Baker	Federal Steam Navigation Co., Ltd.
<i>Essex Trader</i>	R. E. Bennett	A. A. Findlay	F. Wilson	Trader Navigation Co., Ltd.

<i>Esso Glasgow</i>	R. O. Webb	..	J. R. Lewis	J. Moran	..	Esso Petroleum Co., Ltd.
<i>Eucadia</i>	W. MacVicar, M.B.E.	..	J. S. Watson	D. Sproat	..	Anchor Line, Ltd.
<i>Fresno City</i>	D. L. Beynon	..	J. S. Randall	A. S. Ferguson	..	Sir William Reardon Smith & Sons, Ltd.
<i>Garvelpark</i>	A. McF. Allan	..	I. M. Ramsay	J. McI. Robertson	..	J. & J. Denholm, Ltd.
<i>Gloucester</i>	D. A. G. Dickens	..	L. E. Howell	A. Wake	..	Federal Steam Navigation Co., Ltd.
<i>Harpalycus</i>	J. Wharton, M.B.E., D.S.C.	..	J. Parnall	N. Cockayne	..	J. & C. Harrison, Ltd.
<i>Hesione</i>	F. D. Bonney, M.B.E.	..	B. Middleton	N. Burnitt	..	Houston Line, Ltd.
<i>Highland Brigade</i>	T. Powell	..	R. A. New	T. Desboro, M.B.E.	..	Royal Mail Lines, Ltd.
<i>Hinakura</i>	N. L. Warren	..	R. A. Wilson	G. Miller	..	New Zealand Shipping Co., Ltd.
<i>Inshouven Head</i>	H. N. Clarke	..	S. Thompson	A. E. Adams	..	G. Heyn & Sons, Ltd.
<i>Ixon</i>	R. Blakey	..	P. A. Hartnett	N. J. Wilkinson	..	A. Holt & Co.
<i>John Biscoe</i>	W. Johnston	..	J. P. Morley	P. W. King	..	Government of Falkland Islands
<i>Latia</i>	J. Davison	..	W. I. Simpson	N. G. Armstrong	..	Shell Tankers, Ltd.
<i>Laurentia</i>	T. S. Graham	..	T. B. Scott	D. Murray	..	Donaldson Bros. & Black, Ltd.
<i>Leicestershire</i>	E. D. Brand	..	R. Humphreys	J. E. Unsworth	..	Bibby Bros. & Co.
<i>Linga</i>	W. Anderson	..	W. Kelly	G. K. Paterson	..	Shell Tankers, Ltd.
<i>Linguiat</i>	W. Weatherall	..	J. O. Dickinson	E. T. A. Shillabeer	..	T. & J. Harrison, Ltd.
<i>Malayan Prince</i>	E. G. Jones	..	P. R. Cable	M. D. Johnson	..	Prince Line, Ltd.
<i>Mandasar</i>	G. A. Jackson	..	R. H. Wills	B. Beecham	..	T. & J. Brocklebank, Ltd.
<i>Marna</i>	L. B. Anderson	..	J. Carnie	W. G. Morison (c/o)	..	Chr. Salvesen & Co.
<i>Mataroa</i>	R. G. James, R.D., Capt. R.N.R.	..	T. Hicks	E. L. Boyce	..	Shaw, Savill & Albion Co., Ltd.
<i>Media</i>	J. D. Armstrong, D.S.C., R.D., Lt.-Cdr. R.N.R. (Retd.)	..	L. W. Crump	A. F. Crosby	..	Cunard Steamship Co., Ltd.
<i>Menastone</i>	S. Sheasby	..	A. R. T. Todd	J. Devitt	..	Western Carriers, Ltd.
<i>Nestor</i>	J. M. Anderson	..	P. K. Macdonald	H. Roberts	..	A. Holt & Co.
<i>New Australia</i>	J. W. Hart	..	A. S. G. L'Estrange	W. Miller	..	Shaw, Savill & Albion Co., Ltd.
<i>Newfoundland</i>	C. Kenyon	..	P. W. Warne	T. Cahill	..	Johnston Warren Lines
<i>Nicania</i>	S. A. Greenaway	..	L. F. Money	C. R. McAnerney	..	Shell Tankers, Ltd.
<i>Oakland Star</i>	J. F. Byrne, O.B.E.	..	D. N. Murray	L. Hodge	..	Blue Star Line, Ltd.
<i>Paparoa</i>	J. D. Guylor	..	R. P. B. Manson	I. T. M. Barber	..	New Zealand Shipping Co., Ltd.
<i>Parima</i>	T. Fraser, D.S.O., R.D., Capt. R.N.R.	..	H. J. Perkins	W. R. Graham	..	Royal Mail Lines, Ltd.
<i>Paringa</i>	E. J. Kerridge	..	P. W. G. Everett	C. Jameson	..	P. & O. Steam Navigation Co.
<i>Pipiriki</i>	S. R. Harding	..	J. Charlesworth	A. McInnes	..	New Zealand Shipping Co., Ltd.
<i>Port Adelaide</i>	W. B. Craig	..	D. J. Evans	P. Kelly	..	Port Line, Ltd.
<i>Port Brisbane</i>	F. W. Bailey, M.B.E.	..	P. D. Holloway	D. Don	..	Port Line, Ltd.
<i>Port Dunedin</i>	E. W. Dingle, M.B.E.	..	A. A. Gough	T. A. Cameron	..	Port Line, Ltd.
<i>Port Jackson</i>	P. S. Ball	..	M. S. Box	M. Sharman	..	Port Line, Ltd.
<i>Port Lincoln</i>	J. L. Porter	..	L. J. Brown	W. Patterson	..	Port Line, Ltd.
<i>Port Napier</i>	C. R. Townshend	..	G. W. Norris	T. Hargreave	..	Port Line, Ltd.
<i>Port Phillip</i>	L. Copeland	..	B. E. Crabb	R. Robertson	..	Port Line, Ltd.
<i>Port Vindex</i>	E. E. Roswell	..	B. Collier	R. C. Crompton	..	Port Line, Ltd.
<i>Rangitata</i>	G. Kinnell, O.B.E.	..	H. C. Hynard	J. Grant	..	New Zealand Shipping Co., Ltd.

EXCELLENT AWARDS (continued)

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	SENIOR RADIO OFFICER	OWNERS
<i>Rangitiki</i> ..	A. E. Lettington, O.B.E., D.F.C. ..	I. Excell ..	F. W. Fowler ..	New Zealand Shipping Co., Ltd.
<i>Regent Royal</i> ..	R. Armstrong ..	J. A. Cresswell ..	J. A. Jackson ..	Regent Petroleum Co., Ltd.
<i>Reynolds</i> ..	W. Kyne, M.B.E. ..	J. Parsloe ..	G. Haywood ..	Bolton Steamship Co., Ltd.
<i>Rialto</i> ..	H. Greenhill ..	D. J. Pengelly ..	D. McQueen ..	Ellerman's Wilson Line, Ltd.
<i>Ruahine</i> ..	F. Loughheed ..	A. Dorkins ..	J. Heath ..	New Zealand Shipping Co., Ltd.
<i>Runa</i> ..	L. Loose ..	T. Henry ..	A. Corless ..	Glen & Co., Ltd.
<i>Sacramento</i> ..	J. E. Robinson, M.B.E. ..	P. J. S. Bishop ..	G. Power ..	Ellerman's Wilson Line, Ltd.
<i>San Velino</i> ..	I. G. Goldsworthy ..	G. J. Hughes ..	T. Murray ..	Eagle Oil Shipping Co., Ltd.
<i>Scottish Eagle</i> ..	R. R. Baxter ..	M. W. Scott ..	H. Arnold ..	Scottish Tanker Co., Ltd.
<i>South Africa Star</i> ..	R. M. T. Jones ..	R. J. Webb ..	W. G. Houghton ..	Blue Star Line, Ltd.
<i>Southern Cross</i> ..	Sir David Aitchison, K.C.V.O. ..	I. P. N. Cameron ..	H. Matthews ..	Shaw, Savill & Albion Co., Ltd.
<i>Southern Opal</i> ..	A. F. Baikie ..	A. Wiseman ..	T. Johnston ..	Chr. Salvesen & Co.
<i>Sussex</i> ..	E. H. Hopkins ..	J. Newsham ..	D. James ..	Federal Steam Navigation Co., Ltd.
<i>Tasmania Star</i> ..	R. White, D.S.C. ..	C. E. Leatham ..	C. V. James ..	Blue Star Line, Ltd.
<i>Telemachus</i> ..	A. Lane ..	W. B. Bannerman ..	F. M. Shannon ..	A. Holt & Co.
<i>Tenagodus</i> ..	W. Broughton ..	F. I. Bodger ..	E. Hutchinson ..	Shell Tankers, Ltd.
<i>Trevorlas</i> ..	I. M. Price ..	M. F. Kennett ..	D. A. Mackenzie ..	Hain Steamship Co., Ltd.
<i>Treviader</i> ..	F. G. Bolton ..	W. R. Clipson ..	A. G. Evans ..	Hain Steamship Co., Ltd.
<i>Twickenham</i> ..	S. E. Hooper ..	D. Dickson ..	J. Rayner ..	Watts, Watts & Co., Ltd.
<i>Tyrone</i> ..	N. Fraser ..	J. G. C. Campbell ..	L. A. E. Laval ..	Avenue Shipping Co., Ltd.
<i>Umali</i> ..	F. E. J. O'Hea ..	G. M. Cozens ..	S. Hewitt ..	Bullard, King & Co., Ltd.
<i>Umsinto</i> ..	R. Harber ..	J. G. Campbell ..	R. Marchant ..	Bullard, King & Co., Ltd.
<i>Waipawa</i> ..	A. S. D. Masters ..	D. S. James ..	H. L. Hall ..	Shaw, Savill & Albion Co., Ltd.
<i>Wakvis Bay</i> ..	A. Donald, O.B.E. ..	W. E. Campbell ..	J. R. Martin ..	Sir R. Ropner & Co., Ltd.
<i>Warkworth</i> ..	N. Thompson ..	D. Oates ..	R. Munro ..	R. S. Dalglish, Ltd.
<i>Worcestershire</i> ..	F. C. Brooks ..	R. W. Barton ..	W. G. Fletcher ..	Bibby Bros. & Co.

# THE MARINE OBSERVERS' LOG



**July, August, September**

*The Marine Observers' Log* is a quarterly record of the most unusual and significant observations made by mariners.

The observations are derived from the logbooks of marine observers and from individual manuscripts. Photographs or sketches are particularly desirable.

Responsibility for each observation rests with the contributor.

## **DISTURBED WATER**

### **Eastern Pacific Ocean**

S.S. *Pacific Northwest*. Captain F. H. Perry. Balboa to Los Angeles. Observer, Mr. D. L. Lloyd, 3rd Officer.

7th September, 1955, 1900–2130 G.M.T. From 1900 to 2000 wind veered from WSW. to NW., force 3, at 2000 the vessel started to pass through alternate bands of calm and disturbed water which ran in an E.–W. direction. The bands of disturbed water occurred at intervals of a minimum 500 ft (ship's length) to a maximum of  $\frac{1}{2}$  mile; wind in the disturbed bands was SSE., force 3. Bands of calm water then disappeared and gave place to a confused sea, composed of patches of calm and rippled water. Throughout the above changes there was an increase in the activity of marine life. The presence of sting rays was noted (jumping from water) and the number of other species seen increased notably.

Position of ship:  $9^{\circ} 58'N.$ ,  $87^{\circ} 43'W.$

*Note.* Mr. N. B. Marshall of the Fish Section of the Natural History Museum comments on this observation as follows:

“ Conditions like this have been reported from the Galapagos area (up to latitude  $5^{\circ}N.$ ). Increased activity of marine life has also been observed. Striping of the ocean, foam lines, boiling, alternative bands of calm and active water have been described. Although I have not seen reports of such activity off Costa Rica the position given is in a region where divergence of currents might be expected. This would give rise to turbulent upwelling conditions.”

## **DISCOLOURED WATER**

### **Caribbean Sea**

S.S. *Ariguani*. Captain R. W. Lundy. Trinidad to Kingston (Jamaica). Observers, the Master and Mr. J. M. Quinlan, 3rd Officer.

28th September, 1955, 1515 G.M.T. The ship entered a large patch of discoloured water extending over the area of about  $\frac{1}{4}$  square mile. It had the appearance of fine grains of golden sand suspended on the surface of the water. Interspersed with the discoloration were small isolated pieces of seaweed. A sample of this water was taken in the canvas bucket and what had appeared to be sand was found to be minute pieces of pulverised seaweed. Further discoloration in patches less extensive and less dense were noted within the area. There had been a hurricane (Janet) in this area three days previously. Sea temp.  $82.5^{\circ}F.$

Position of ship:  $13^{\circ} 20'N.$ ,  $66^{\circ} 05'W.$

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

"It sounds to me like *Trichodesmium*, the rafted bundles of which do give precisely the appearance of small fragments of larger thallose algae, but the presence of isolated weed fragments and the preceding hurricane make the pulverised seaweed suggestion quite plausible. Three other recent records of discoloration from very near this area have, however, reached me and one of these was accompanied by samples in which *Trichodesmium* predominated. It looks as though this alga tends to local abundance there."

## WATERSPOUT

### North Atlantic Ocean

S.S. *Planter*. Captain H. T. Wells. London to Port of Spain. Observers, the Master and Mr. F. R. Robinson, Chief Officer.

14th July, 1955, 2130 G.M.T. A large waterspout was observed coming from anvil-shaped Cb; height about 4,000 ft. The spout caused abnormal disturbance on the sea surface; the diameter of the disturbance was 18–20 ft. The phenomenon continued until 2148. (See drawing opposite.)

Position of ship: 36° 48' N., 34° 42' W.

## SEA FOG

### Great Australian Bight

S.S. *Nuddea*. Captain H. F. Collinson. Observer, Mr. R. F. Dolby, 3rd Officer.

7th September, 1955. The photograph opposite was taken by Mr. Dolby at 1630 S.M.T. He gives the approximate height of the fog as 300 ft. The conditions prevailing at the time were as follows: barometer 1017.4 mb (uncorrected), rising; wind NNE., force 2–3. Air temp. 60°F, sea 56°. Cloud, fair weather Cu 2/8. Rippled sea with short low swell.

Position of ship: 37° 50' S., 135° 00' E.

## PHOSPHORESCENCE

### Indian Ocean

S.S. *Leicestershire*. Captain E. D. Brand. Colombo to Aden. Observer, Mr. L. D. Conway, 3rd Officer.

25th July, 1955, between 2145 and 2210 G.M.T. Patches of phosphorescence appeared suddenly as if from below the surface; they spread out evenly into four patches each about 100 ft across. The blue light which was emitted died away after about 10 sec. Overcast with light rain, occasional distant lightning.

Position of ship at 2200: 7° 45' N., 72° 37' E.

M.V. *Sussex*. Captain E. H. Hopkins. Melbourne to Aden. Observers, Mr. J. Newsham, 3rd Officer, and Mr. D. Turner, 4th Officer.

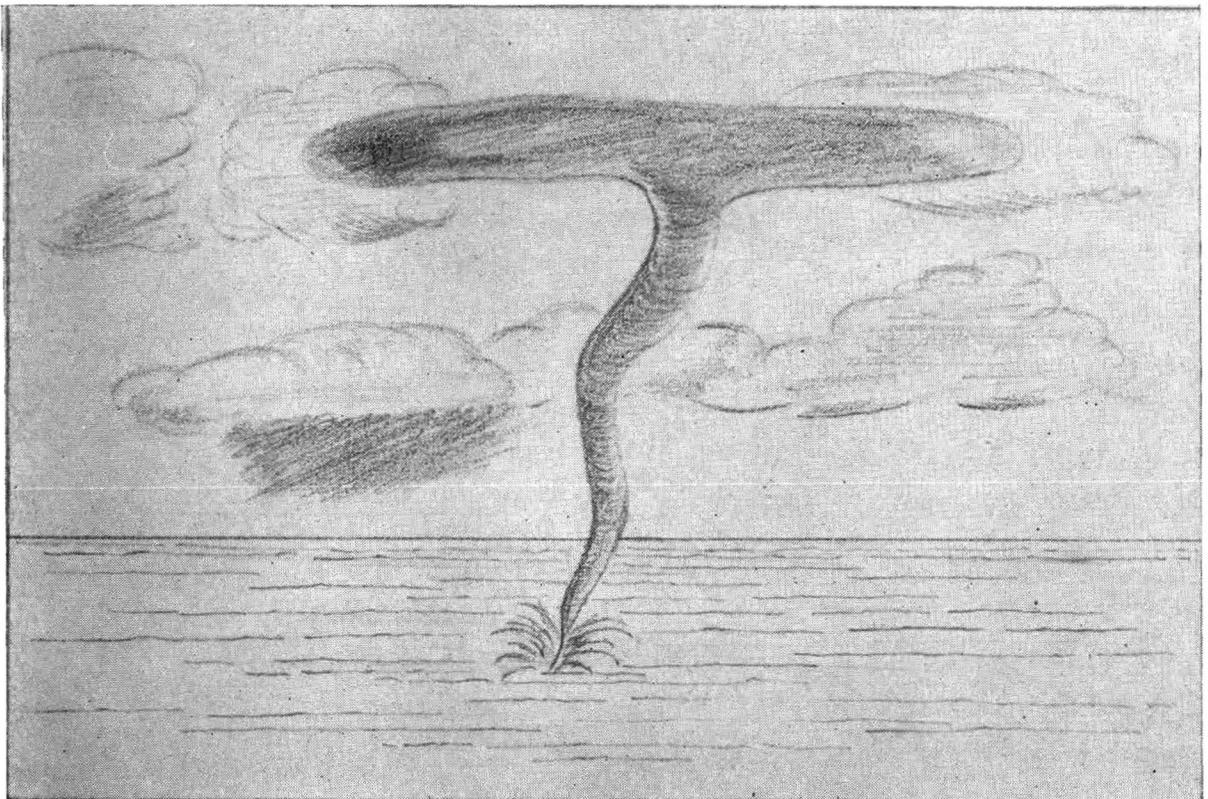
9th September, 1955. From dusk till about 2100 ship's time phosphorescence was observed, apparently bubbling up from beneath the surface to break into brilliant patches having an estimated diameter of some 50 ft. The patches were of an even luminosity though they were speckled with small inanimate objects possessing their own harder and rather more intense light, an effect which was also seen outside the area enclosed by the patches. There was no particular orientation of the patches nor did they occur at any fixed intervals. The phosphorescence was only faintly discernible in the ship's wake. The duration of the patches was 2 to 4 sec. Sea temp. constant at 79.8°F.

Position of ship at 1827: 5° 19' N., 58° 40' E.

*Note.* The observations of S.S. *Leicestershire* and M.V. *Sussex* are of a remarkable type of phosphorescence which rises from below the surface and then spreads out on the sea surface more or less suddenly. There is no doubt about the reality of the phenomenon as we have



Sea fog observed from S.S. *Nuddea* on 7th September, 1955, at  $37^{\circ} 50'S.$ ,  $135^{\circ} 00'E.$   
(see opposite page).



Waterspout observed from S.S. *Planter* on 14th July, 1955, at  $36^{\circ} 48'N.$ ,  $34^{\circ} 42'W.$   
(see opposite page).



Photographs of ice observed by Mr. D. Oates, 2nd Officer, and Mr. R. Munro, Radio Officer, on board S.S. *Warkworth* (Captain N. Thompson), South Shields to Churchill, while passing through heavy pack-ice in the Hudson Strait on 22nd July, 1955. The picture on the right was secured through a pair of bridge binoculars.



Frost smoke, seen from H.M.S. *Osprey*, Portland, looking north-east, on 2nd February, 1956 (see page 163).

had several previous observations of similar character. In some of these observations the rising phosphorescence took the form of a ball, or a succession of these, which on reaching the surface either split into pieces or spread suddenly and evenly out over the surface. We cannot yet give any explanation of the cause of this phenomenon. Samples of the sea water containing such phosphorescence, if obtainable, might give valuable information. A few drops of formaldehyde should be added to the bottle for preserving the sample.

*S.S. Clan Davidson.* Captain T. A. Watkinson. Colombo to Calcutta. Observer, Mr. J. M. Brackenridge, 3rd Officer.

19th September, 1955. From 1630 to 1730 G.M.T. patches of phosphorescence were observed in the water close to the ship, flashing with a milky green light. At first the flashes were very infrequent and appeared to be about 6 in. in diameter and of various shapes: the flashes lasted about  $\frac{1}{4}$  sec. After about 2 to 3 miles the flashes became more frequent, about one every second in various places up to about 250 ft from the ship's side. At the same time larger areas about 6 to 10 ft in diameter were observed to be flashing in a similar manner, although they were of a lesser brilliance than the smaller areas and were more of the nature of a glow. About 20 min. later the large areas had become much less distinct and the small areas more infrequent, until neither could be observed. During the phenomenon the impression was gained that the source of illumination was from 12 to 24 in. below the surface. Air temp.  $79.7^{\circ}\text{F}$ , sea  $80.6^{\circ}$ . Sea slight.

Position of ship:  $5^{\circ} 55' \text{N.}$ ,  $81^{\circ} 00' \text{E.}$

#### South Pacific Ocean

*S.S. Waikawa.* Raratonga to Auckland. Observer, Mr. M. Quinton, 2nd Officer.

25th July, 1955. From 1330 to 1430 G.M.T. the vessel passed close to several very marked patches of phosphorescence, all of about the same size, approximately  $\frac{1}{4}$  mile in diameter. At 1350 the vessel passed through a stationary band, about 500 ft broad and 1 mile in length, lying in a SSE.-NNW. direction. The band was not as bright as the patches, and no patches were in evidence at the time the band was passed through. Air temp.  $58^{\circ}\text{F}$ , sea  $60^{\circ}$ . Wind SE., 2 kt. Sea smooth.

Position of ship:  $33^{\circ} 39' \text{s.}$ ,  $179^{\circ} 46' \text{w.}$

*Note.* This observation was forwarded to us by the Controller, Canadian Meteorological Division.

#### New Zealand waters

*M.V. Norfolk.* Captain W. J. T. Stevens. Balboa to Wellington. Observers, the Master and Mr. M. J. L. Ewens, 3rd Officer.

11th August, 1955, 0800-1100 G.M.T. Very marked phosphorescence, both in the vessel's wake and in the wake of numerous accompanying porpoises, was observed. Large balls or lumps of phosphorescence were frequently visible, many of which were apparently solid and were frequently brought to the surface. They appeared to be in cylindrical form, about 20 in. long and 4 to 6 in. in diameter.

Position of ship at 1100:  $38^{\circ} 50' \text{s.}$ ,  $179^{\circ} 30' \text{w.}$

#### Eastern Pacific Ocean

*S.S. Pacific Northwest.* Captain F. H. Perry. Balboa to Los Angeles. Observer, Mr. W. P. Crane, 4th Officer.

13th September, 1955, 0445 G.M.T. A milky white patch was observed on the water about 200 yd long and 30 yd wide. Closer inspection showed the patch to be composed of a large number of floating bodies, apparently some kind of jelly-fish. Several smaller patches were seen during the next hour, also numbers of individual bodies. Sea temp.  $72^{\circ}\text{F}$ .

Position of ship:  $28^{\circ} 38' \text{N.}$ ,  $116^{\circ} 03' \text{W.}$

## PHOSPHORESCENT WHEEL

### Gulf of Aden

M.V. *British Officer*. Captain A. Henney, O.B.E. Observer, Mr. R. B. Woodcock, Apprentice.

6th September, 1955. At 1710 G.M.T., when the vessel was approximately 50 miles sw. of Aden, a series of alternations between parallel phosphorescent beams and a rotating phosphorescent wheel was observed. Neither the beams nor the spokes of the wheel moved at great speed. The parallel beams were probably 30-40 ft wide; they extended from WSW. to ENE., moving slowly away towards NNW. and passing the ship at intervals of roughly 4 min. When the shafts formed into a wheel, which always appeared on the starboard bow, the whole formation turned anticlockwise. When the wheel was formed its spokes were narrower than the parallel beams, probably 10-15 ft wide. The spokes appeared to rotate from a point on the horizon. The colour of the beams and spokes was definitely white, not blue-green.

At 1735 the whole phenomenon faded away in less than a minute, leaving only phosphorescence in the bow wave and in the small waves breaking in the slight sea. This also faded some 10 min. later, leaving us looking ahead into darkness and wondering if it had really happened.

Ship's course  $264^{\circ}(T)$ , speed 12.4 kt, both unchanged during the observation. Air temp.  $88^{\circ}F$ . Wind w's., force 4.

*Note.* This interesting observation resembles that made by M.V. *British Empress*, published on page 73 of the April 1954 number of this journal, in the alternation between the forms of wheel and bands. A noteworthy difference is that the bands observed by M.V. *British Officer* had a constant direction while those seen by M.V. *British Empress* approached the ship from directions which changed at intervals. We now have a total of three observations of the band-wheel alternation, the earliest being that seen by S.S. *Kurmark* in the Gulf of Oman in 1923, but the details of the appearance differ in each of them, and this emphasises the extraordinary variety which phenomena of phosphorescence exhibit.

## HURRICANE DIANE

### North Atlantic Ocean

S.S. *London Pride*. Captain G. Fox. Aruba to Rotterdam. Observer, Mr. M. P. Fisher, 2nd Officer.

11th August, 1955. The vessel received first warnings of hurricane Diane from U.S.N. Canal Zone. The storm was in the formative stage, with the centre in approximately  $23^{\circ} 00'N.$ ,  $62^{\circ} 00'W.$  Later reports from San Juan and Washington amended the position to  $24.8^{\circ}N.$ ,  $63.5^{\circ}W.$ , moving NW. at 12 kt. Winds of 40-55 kt at the centre and with strong gales extending 200 miles N. and E. and 100 miles SW.

After clearing Mona Island a long low swell was encountered, thought to be the aftermath of hurricane Connie (first report 4th August, 1955). Dense Ci in twisted sheaves and some Cc was observed bearing NE. from the vessel during the latter part of the day. Barometer readings were taken hourly and were found to be about 1.5 mb lower than those taken eight days earlier in the same area. Between 2000 G.M.T. and 0300 (12th) the barometer rose steadily, and presumably the vessel had been in the trough of the storm. Barometer at 1710, 1013.5 mb; 1900, 1011.9 mb; 2000, 1012.6 mb; 2300, 1013.0 mb; 0300 (12th), 1014.4 mb. Air temp. throughout  $84^{\circ}F$ .

At 1710 the storm centre was about 360 miles NE. of the vessel's position, in actual fact directly ahead of the vessel. Avoiding action was taken and at 1800 course was altered to  $090^{\circ}$ . A peculiar sunset was observed that evening: a cloud extending from  $150^{\circ}$  to  $260^{\circ}$  with a uniform base about  $10^{\circ}$  above the horizon slowly formed throughout the afternoon. The sky beneath the cloud was a distinct lemon colour and remained so until after sunset. The sun was a bright red and did

not appear to impart this colour to the cloud or sky, as is usual during sunrise or sunset.

Position of ship at 1800, 11th:  $19^{\circ} 00'N.$ ,  $67^{\circ} 00'W.$

S.S. *Manistee*. Captain F. Barber. Port Antonio to Garston.

First indications that hurricane Diane was developing came at 0000z, 11th August, when the Washington Weather Bureau requested three-hourly reports from ships in an area  $15^{\circ}$ – $25^{\circ}N.$  and  $57^{\circ}$ – $70^{\circ}W.$  The vessel was at that time between Port Antonio, Jamaica, and Calita Point, Cuba. At 1515 ship's time the vessel cleared the Caicos Passage, passing  $13\frac{1}{2}$  miles NW. off Providenciales Island. On clearing the islands a long low NNW. swell developed—this was probably caused by hurricane Connie which had passed a few days earlier. The 2200z 11th August advisory from Miami located the storm  $24.6^{\circ}N.$ ,  $63.1^{\circ}W.$ , moving WNW. at 14 kt, and it was decided to alter course to  $090^{\circ}$  at 0500z 12th August, in order to get to the eastward of the storm. Throughout the evening the swell moved round to ENE., the wind remained light, variable, and the barometer normal. Stellar observation at 0518 (0948z) 12th August fixed the ship in  $23^{\circ} 34'N.$ ,  $69^{\circ} 40'W.$  At 0610/12 course was altered to  $042^{\circ}$  as it was judged that the ship had run far enough east to clear the storm. The 1200z/12 WX from Washington located the storm  $25^{\circ}N.$ ,  $63^{\circ}W.$ , moving NW., 10 kt, and at noon, when in position  $24^{\circ} 35'N.$ ,  $68^{\circ} 22'W.$ , a Mercator course of  $060^{\circ}$  was set for Fastnet. This course should have carried the vessel clear of the forecast track of the storm. At 1930/12 the 0000z/13 WX Washington was received locating the storm  $26^{\circ}N.$ ,  $61.8^{\circ}W.$ , moving NW., 10 kt. At 2030/12 ship's course was altered to  $035^{\circ}$ , this course was maintained until 1200/13 (position  $28^{\circ} 08'N.$ ,  $64^{\circ} 28'W.$ ). At this time Miami advisory located the storm  $27.5^{\circ}N.$ ,  $62^{\circ}W.$ , moving NW. at 9 kt, and course was altered to  $135^{\circ}$ . At 1345/13 with the wind and sea increasing and barometer falling rapidly, course was altered to  $180^{\circ}$  in an attempt to run clear of the storm. The 2200z/13 advisory from Miami showed that the storm had moved W. and not NW. as forecast. The wind speed at this time was estimated between 80 and 90 kt. The ship was gradually worked round on to an E'ly course and at 2000/13 ship's time the storm was in  $27.6^{\circ}N.$ ,  $63.7^{\circ}W.$ , moving WNW. at 9 kt. At 2150/13 altered course to  $045^{\circ}$  and began to run clear of the storm.

*Note.* These observations were forwarded to the Chief of the United States Weather Bureau.

## HURRICANE EDITH

### North Atlantic Ocean

M.V. *Rangitoto*. Captain C. R. Pilcher, O.B.E. Curaçao to London. Observers, the Master and Mr. K. Hyde, 3rd Officer.

25th August, 1955. At 2040 ship's time a message was received from Weather Washington that a small but fully-grown hurricane lay 120 miles due E. of the ship. It had been discovered by a reconnaissance aircraft which estimated highest winds at 70 kt. It was noted that the vessel was in the dangerous semicircle. Maximum speed was maintained so that the vessel could get across the path of the storm ahead of the centre. Wind and sea were both rising rapidly. As the wind veered course was altered to keep the wind and sea two points on the starboard bow. When the barometer ceased to fall speed was reduced to ease the strain on the vessel. From 2100 to 0300 (26th) the barometer fell from 29.86 in. (977.3 mb) to 29.53 in. (966.1 mb) and returned to normal by 1100. Temperature fell from  $81^{\circ}F$  to  $73^{\circ}$  and then rose to  $79^{\circ}$ . Heavy rain and lightning occurred throughout the period. The vessel was clear of the storm by 1200. This storm was later found to be the hurricane Edith.

Position of ship at 2040 S.T., 25th:  $21^{\circ} 36'N.$ ,  $59^{\circ} 04'W.$

*Note.* This observation was forwarded to the Chief of the United States Weather Bureau. The maximum wind recorded in the meteorological logbook was force 9.

## HURRICANE IONE

### North Atlantic Ocean

M.V. *Gloucester*. Captain D. A. G. Dickens, R.N.R. Newport (Mon.) to Philadelphia.

First report of hurricane Ione was received at 0600Z, 15th September, 1955, when ship was about 1,800 miles NE. of approximate centre situated in  $21^{\circ}\text{N.}$ ,  $63^{\circ}\text{W.}$  Previously to this the ship had passed through a depression closely followed by a high (1040 mb) resulting in bad weather, winds of force 7 and 8 being logged on 17 consecutive two-hour periods.

The route of hurricane Ione was plotted daily on synoptic charts from weather analyses transmitted by Washington Radio, the path describing an easy curve towards the American coast of Florida. The curve appeared almost symmetrical apart from a diversion of about 80 miles to WSW.—in position  $25.5^{\circ}\text{N.}$ ,  $70.5^{\circ}\text{W.}$ —on the evening of 16th September.

Reports continued along this line until the morning report on 18th September when Ione showed a marked increase in intensity and an expected path parallel to the coasts of North Carolina, Virginia and Pennsylvania. The evening report confirmed this forecast, giving the position of the eye as 280 miles south of Cape Hatteras. Course as N'E., speed at 12–16 kt and winds of 125 m.p.h. at the centre and 70–80 m.p.h. 100 miles out in the dangerous semicircle. As the hurricane's expected arrival at the Delaware area appeared to coincide with our own, it was decided to alter course to  $180^{\circ}(\text{T})$  and increase to maximum speed. This was done at 0200/19, the relative position of the hurricane at that time being 500 miles to SW.

At this stage the hurricane winds were 125 m.p.h. at the centre, 75 m.p.h. at 75 miles to the westward, 75 m.p.h. at 100 miles to the E., 50 m.p.h. at 275 miles to the N. and E. and 160 m.p.h. to the S. and W. We commenced transmitting weather reports to "Observer, Washington" at three-hour intervals at 0900Z/19. The hurricane was moving in a NNE. direction at about 13 kt. It reached Cape Lookout at 1200Z/19 and was then at its fiercest. The relative position to us was 400 miles WSW. Our weather had, up till then, been moderate, with barometer falling slowly and with S.-SSE. winds, force 2–4.

At noon on 19th September, the reported path of Ione had changed to NNW. with a forward movement of about 14 kt. It was expected to travel inland on the same course. On this information ship altered course to  $259^{\circ}$  and resumed normal speed. However, reports received from the Hurricane Advisory Service later that day indicated a somewhat erratic path and the possibility of Ione heading NE. towards the sea again. A report handed in an hour later confirmed that it had in fact moved NNE. On this the course was altered to  $180^{\circ}$ . Weather at ship was beginning to deteriorate, wind increasing, swell increasing and barometer still falling. Relative position of Ione was about 300 miles due W.

It was obvious from weather reports and from our own synoptic charts that shortly after the centre of the hurricane came over the land there was a marked uncertainty as to the expected probable path. Until then reports had been very accurate with regard to both path and spread of the hurricane. At 1200Z/20 the hurricane was plotted as 160 miles NE. of Cape Hatteras, its relative position to us being 160 miles to the NW. In the vicinity of the eye, winds had increased to force 11 and 12. Weather at ship was worsening at the time. The barometer started to fall rapidly. Shortly before the path of Ione had deviated slightly S. of E. but was now on a steady course of NE. Our course was set for Philadelphia pilot. The weather deteriorated during the next eight hours to such an extent that it was considered possible the hurricane was recurving south-eastward. In consequence ship ran to south-westward. Wind was logged as force 9, increasing to 10. Swell was very high and short, sea very rough, visibility being affected by driving spray. Barometer was 1001.7 mb, wind SW. The hurricane bore N'E., distant 160 miles.

These conditions lasted for about three hours when wind quickly moderated and veered to N. The barometer rose rapidly and ship was able to resume course and full speed.

At 1200z/21 hurricane centre was about 600 miles to ENE. Weather at ship was fine and clear with slight sea, wind N'y, force 3, moderate N'y swell and barometer rising.

Two main points of interest can be derived from the above account:

- (i) The remarkable breaking-up effect on the hurricane caused by its coming into contact with the land in vicinity of Cape Hatteras, and consequent unpredictability of its forward path.
- (ii) The great increase in forward movement once it reached the land.

*Note.* This observation was forwarded to the Chief of the United States Weather Bureau.

## TYPHOON IRIS

### West Pacific Ocean

M.V. *Calchas*. Captain Digby Jones. Kobe to Singapore. Observer, Mr. J. Wishart, 3rd Officer.

21st August, 1955, whilst sailing from Kobe to Singapore via the Baski Channel, weather reports from Tokyo Radio gave warning of a tropical depression off the NE. coast of Luzon, moving NW. towards Luzon Strait and Formosa. At 0800 G.M.T. on 22nd the depression had developed into a typhoon, code name Iris, in a position  $20^{\circ} 00' N.$ ,  $123^{\circ} 00' E.$ , moving towards the Baski Channel. At 0900 in a position due E. of Okinawa the master altered course and steered SSW. to clear the centre of the typhoon. The first sign appeared when the wind backed suddenly from SW. to SE. between 0600 and 1200, when the centre of the typhoon was approximately 500 miles SW. of our position, central pressure 985 mb, apparently moving NW. at 10 kt. At 2200 a pronounced SW'y swell commenced and wind increased to force 5. The storm centre was at this time estimated to be 340 miles WSW. of the vessel, moving NW. 5 kt. The winds at the storm centre had increased from 80 to 100 kt. All the morning of 22nd the cloud, which at first was a fine layer of Cs, increased in depth and extent until at 0130 on 23rd the sky was completely overcast with a low layer of Fb. At 0700 wind reached force 6, with gusts to force 8 and very heavy rain squalls. The storm centre now lay 220 miles W's. of our position. At 1600 wind veered to SW. and decreased, the sky remained overcast. At 0000, 24th, the sea had dropped completely and Iris had weakened.

Position of ship at 0700, 23rd:  $22^{\circ} 30' N.$ ,  $125^{\circ} 50' E.$

*Note.* This observation was forwarded to the Director of the Royal Observatory at Hong Kong whose comment was as follows:

"The first indication that a tropical storm was forming east of the Philippines reached Hong Kong on 20th August, when a message was received by radioteletype from Guam reporting that a vortex (numbered 08043) had been located by a reconnaissance aircraft, and that at 200600z it was centred in position  $11.6^{\circ} N.$ ,  $135.6^{\circ} E.$

"No further reconnaissance was carried out until daylight on 22nd, but positions based on surface reports indicated that this vortex was well to the west of the initial position given in the reconnaissance report.

"Vortex No. 08043 was relocated by aircraft from Guam at daylight on 22nd and at 220000z was classified as a tropical storm in  $18.5^{\circ} N.$ ,  $124.5^{\circ} E.$ , with winds of 45 kt near the centre. Three hours later a second reconnaissance aircraft found 80 kt winds near the centre in position  $19.8^{\circ} N.$ ,  $123.2^{\circ} E.$ , and typhoon Iris came into being.

"The 0600z surface chart at Hong Kong gave little indication of the strength of the wind reported by the reconnaissance aircraft. Basco Island observations indicated wind to be NE. 8 kt within 60 miles of the centre, and the Danish ship *Emile Maersk* reported similar

conditions 30 miles ssw. off this island. The strongest winds reported by ships in the storm field were: *Kyoshin Maru*, ENE. 22 kt, 200 miles NE. of the centre; and *Ruson Maru*, ssw. 22 kt, 25 miles to the SE. Winds at Aparri and Laoag in N. and NE. Luzon remained s'ly, and only the cirrus haze and altostratus cloud cover at Aparri, coupled with a low barometer, gave warning that a typhoon existed 200 miles to the NE.

"On the 1200z surface chart the situation was better defined. Winds at Basco had backed to the west of north and increased to 15 kt, and ships *Dolabella* in position 20°2'N., 121°E., and *Warora* in position 22°3'N., 123°E. reported winds of 310° 14 kt, and 100° 30 kt, respectively.

"On the strength of these reports the storm centre was estimated to be within 60 miles of position 20°7'N., 122°8'E., and it was evident that except in the vicinity of the eye, which appeared to be small, the strongest winds in the field were in the NE. quadrant. The 1800z chart lacked a report from Basco Island, but from two ship reports-re-broadcast from Tokyo it was confirmed that the storm was moving slowly NNW. and probably intensifying.

"Aerial reconnaissance at daylight on 23rd fixed the 230000z position of the centre in 21°4'N., 122°1'E., and surface reports to the NE., W. and SW. of the storm confirmed this. The *Yusen Rico* in 22°6'N., 124°6'E., reported wind sw. 30 kt; *Shokyu Maru* in 21°3'N., 121°2'E., 330°, 33 kt; and *Meiten Maru* in 20°6'N., 120°9'E., 320°, 22 kt.

"At this time the *Calchas*, which had been making regular weather reports, first to Japan and then to Hong Kong, reported wind 140°, 15 kt, from 23°4'N., 127°4'E., and the *Naticina* in 23°8'N., 126°E. gave her wind as 160°, 18 kt.

"It is interesting to note that the *Calchas* first experienced a sw'ly swell at 2200z on 22nd, for it would appear to indicate that as early as 0000z the then tropical storm was sufficiently well developed to generate this swell and that it travelled at a speed of approximately 20 kt to reach the *Calchas* 22 hours later.

"By 0600z Iris was in position 21°8'N., 121°8'E., moving NNW. at 5 kt.

"The *Shokyu Maru* hove-to in 21°2'N., 121°E., was experiencing 55 kt winds from 260°, while *Calchas*, now well within the storm field and transmitting three-hourly observations, reported winds of 26 kt from 150°.

"The 231200z surface chart indicated that Iris was nearing the coast of Formosa in 24°3'N., 121°5'E.

"From Koshun on the southern tip of Formosa came reports of a rising barometer and w'ly winds of 18 kt, while *Shokyu Maru* 50 miles to the S. was experiencing heavy continuous rain and a 32-kt south-wester. *Calchas* was now at her nearest approach to the storm, when the centre bore approximately 285°, distant 210 miles, from her 1200z position, and her weather at this time, force 6 winds from SE'S. with violent rain squalls, was the worst she experienced at any synoptic hour.

"No reports were received in Hong Kong from observing stations in Formosa at 231800z, but from ship reports in the SE. and NE. quadrants of the storm it was evident that the centre was over the island, and winds of 30 to 40 kt were general in the eastern semicircle within 150-200 miles of the centre. 2100z reports from observing stations in Formosa showed that the surface circulation had been very much distorted by the mountainous terrain of this island, but that pressure had fallen appreciably in the N. and W. during the preceding six hours.

"As the centre of Iris moved out over the sea and N. over the Formosa Strait during 24th the surface circulation became more normal but this storm did not reintensify after passing across Formosa, and although winds of up to 30 kt were reported by ships within 100 miles of the centre, island stations off the China coast did not experience any gale force winds at any subsequent synoptic hour, and by 1800z Iris was safely over the Chinese mainland and appeared to be no longer a danger to shipping.

"Typhoon Iris was fairly typical of tropical storms which intensify and reach typhoon strength close to the east of the Philippines, in that the land to the W. distorted the surface circulation, making it difficult to find the position of the centre from surface observations, until the eye moved N. of Luzon.

"Aerial typhoon reconnaissance has done much to reduce the danger of ships encountering an unreported storm in the Far East, but it is the voluntary observers in ships like the *Calchas* making regular weather reports throughout their voyages who provide the best form of insurance against storm damage and disrupted steaming schedules for shipmasters and ship-owners, and who give the forecaster much additional valuable information for providing marine forecasts and storm warnings for ships."

## LIGHTNING

### Central American waters

M.V. *Trevelyan*. Captain H. Gravell. Cairns to San Pedro. Observer, Mr. J. Spall, 2nd Officer.

23rd September, 1955, 2215 G.M.T. During torrential rain there was a discharge of lightning near the foretopmast, with a very loud thunderclap. The topmast was not actually seen to be struck but the truck was split into two halves and the topmast (wood) was split down a distance of 1 ft. There were no signs of burns on either truck or topmast.

Position of ship: at Cristobal.

*Note.* This affords another instance of a ship being struck on the foremast. See the note to the observation of S.S. *Clan Chisholm* on page 18 of the January 1956 number of this journal. We therefore now have a total of 13 observations of ships struck on the foremast as against one struck elsewhere.

### New Zealand waters

M.V. *Norfolk*. Captain W. J. T. Stevens. Balboa to Wellington. Observers, the Master and Mr. M. J. L. Ewens, 3rd Officer.

11th August, 1955, 0800-1100 G.M.T. Widespread towering Cu were observed in an otherwise cloudless sky. These clouds were accompanied by much lightning although at no time was thunder heard, even though the vessel passed under the edge of one of the cloud masses. The colouring of the lightning varied from hard blue-white to a diffuse yellow-white; it was exceptionally vivid and at times almost continuous.

Position of ship at 1100:  $38^{\circ} 50's.$ ,  $179^{\circ} 30'w.$

## ST. ELMO'S FIRE

### Strait of Gibraltar

S.S. *Edenfield*. Captain W. H. Pugsley. Port Said to Fawley. Observer, Mr. J. M. Batterberry, 3rd Officer.

22nd August, 1955, 2000 G.M.T. During a period of vivid lightning with no precipitation St. Elmo's Fire was observed in the form of a bluish-white light mainly steady but with occasional flickering, to a height of 6 in. on top of the forward Canal searchlight davit and mainmast truck. The light varied in intensity and lasted for over an hour. On the Canal searchlight davit stays the light was seen to flow along them, giving a continuous high-pitched hum with a slight crackling noise lasting approximately 20 min.

Position of ship:  $36^{\circ} 31'N.$ ,  $2^{\circ} 39'W.$

## ABNORMAL REFRACTION

### Pacific Ocean

M.V. *Norfolk*. Captain W. J. T. Stevens. Balboa to Wellington. Observers, Mr. J. D. Hellings, Chief Officer, and Mr. B. R. B. Blood, 4th Officer.

4th August, 1955, 0350 G.M.T. The moon was observed to rise greatly enlarged in appearance. The lower limb appeared to be edged with a rim of bright red. The colouring disappeared when the moon reached an altitude of  $4^{\circ}$ - $5^{\circ}$ .

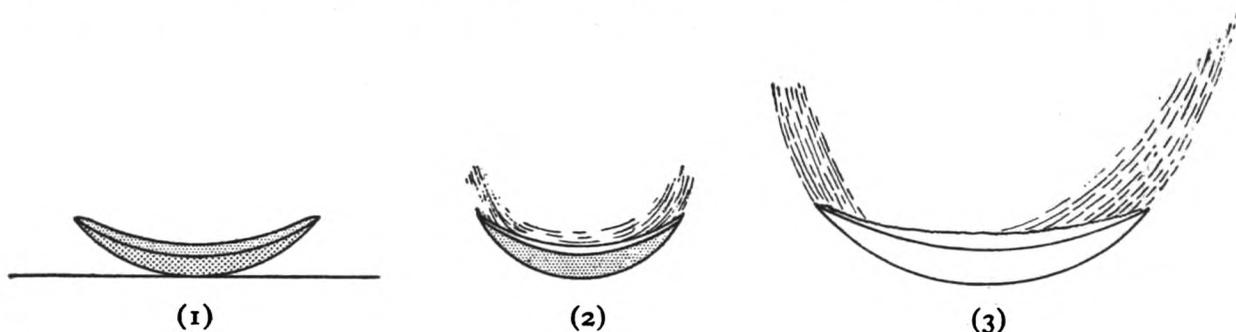
Position of ship:  $21^{\circ} 36's.$ ,  $141^{\circ} 29'w.$

### South China Sea

S.S. *Empire Fowey*. Captain W. T. C. Lethbridge. Singapore to Hong Kong. Observer, Mr. D. E. Black, 3rd Officer.

12th September, 1955, 1940 G.M.T. The crescent moon rose at bearing  $075^{\circ}(T)$

with the centre of the lower limb apparently touching the horizon. The lower part was deep orange and the upper part deep yellow (see sketch 1). When the moon

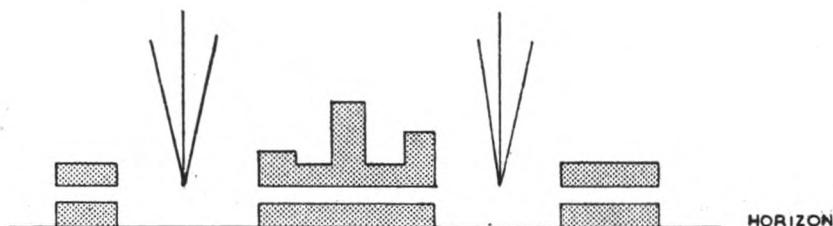


reached an altitude of  $2^{\circ}$ – $3^{\circ}$ , the appearance in a telescope or binoculars was as shown in sketch 2, the lower part being orange and the upper concave rim silvery, with diffused light above. At an altitude of  $8^{\circ}$  the moon, similarly viewed, was of a bright silver colour with a band of greenish-blue above the concave side against which the rugged outline of the moon's surface showed with great clarity (see sketch 3). A faint blue-grey coloration was seen sloping upwards from the cusps of the crescent. The appearance with the unaided eye was different. At altitude  $2^{\circ}$ – $3^{\circ}$  the moon appeared to several observers as a double crescent, the lowest part of the upper silvery one touching the orange-coloured crescent below. At an altitude of  $8^{\circ}$  a similar double crescent was also seen with the unaided eye, the lower being bright silver and the upper very brilliant silver. Visibility excellent.

Position of ship:  $9^{\circ} 26' N.$ ,  $109^{\circ} 39' E.$

### Caribbean Sea

M.V. *Rangitane*. Captain R. G. Rees. Colon to Curaçao. Observers, Mr. J. Peattie, Chief Officer, Mr. J. Metcalf, 3rd Officer, and Mr. G. Clarke, Supernumerary 3rd Officer.



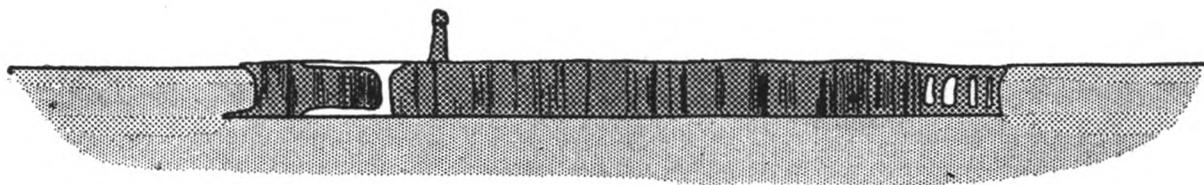
14th September, 1955, 1515 G.M.T. On approaching Cape de la Aguja a ship came into view with elongated superstructure, masts and funnel. It was noted that there was an appreciable gap between the masts and superstructure and the hull itself. A gap between the end of the land and the horizon was also observed. Air temp.  $82.3^{\circ} F$ , wet bulb  $74.2^{\circ}$ , sea  $84^{\circ}$ . Cloud 5/8. Good visibility.

Position of ship:  $11^{\circ} 24' N.$ ,  $74^{\circ} 29' W.$

### South Atlantic Ocean

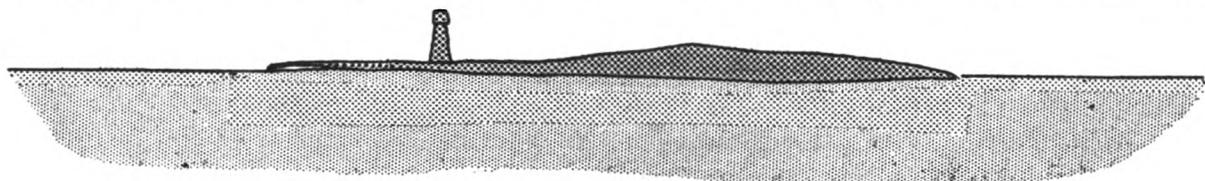
S.S. *Andes*. Captain H. H. Treweeks. Montevideo to Santos. Observers, Mr. L. W. Black, 2nd Officer, and Mr. C. J. Oxborrow, 3rd Officer.

14th July, 1955, 1620 G.M.T. When approaching Lobos Island it was observed to be distorted vertically, giving the appearance of high cliffs. The horizon appeared double, one being level with the top of the island, the other level with the shore of the island; the difference between these two horizons was about 5' of arc. The southern end of the island appeared as a series of pillars caused by a



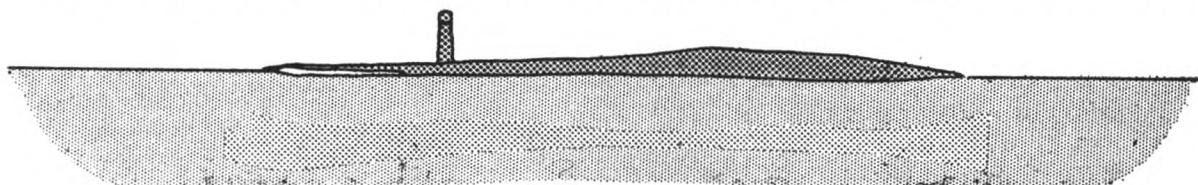
1620: 14 miles

number of rocks lying off the land. The white beach on the northern side of the island was accompanied by an inverted image, joined by a white column which slowly disappeared. The image slowly became less pronounced, and at a distance of



1630: 11 miles

11 miles it appeared as a dark-brown shadow below the island, with a narrow strip of sea visible between. At this time the double horizon disappeared, and when



1635: 9 miles

8 miles from the island no sign of the phenomenon was visible. The lighthouse (height 200 ft) did not at any time appear distorted. Sky cloudless, visibility excellent.

Position of ship: off Lobos Island.

## LUNAR RAINBOW

### New Zealand waters

M.V. *Rangitoto*. Captain C. R. Pilcher, O.B.E. Balboa to Auckland. Observers, Mr. T. Walton, 2nd Officer, and Mr. T. Gibson, 4th Officer.

4th August, 1955, 1715 G.M.T. A lunar rainbow was observed with full spectrum colours, predominantly red, green and yellow. Moon bearing E's. Cloudy with passing showers.

Position of ship:  $38^{\circ} 41'S$ ,  $174^{\circ} 12'W$ .

## SOLAR HALO

### Celebes Sea

M.V. *Levernbank*. Captain R. A. Leach. Makatea to Singapore. Observer, Mr. R. A. Harvey, 3rd Officer.

20th August, 1955, 0245-0330 G.M.T. Two solar halos were observed of radii  $22^{\circ}$  and  $46^{\circ}$ . The altitude of the sun was  $67^{\circ}$ ; the  $22^{\circ}$  halo had a breadth of  $1\frac{1}{2}^{\circ}$  and the  $46^{\circ}$  halo  $2^{\circ}$ . The radii were measured by sextant and the breadths estimated with the sun as a guide. The  $46^{\circ}$  halo was visible over an arc of about  $50^{\circ}$  and had very pure colours of, from the inside, red, yellow, green and violet. The colours were brightest vertically below the sun. The  $22^{\circ}$  halo was visible as a full circle

and had less pure but still distinct colours of red, yellow, green and pale blue. Cloud, 7/8 of Cu, Ac and a thin incomplete layer of Cs.

Position of ship:  $4^{\circ} 24'S.$ ,  $124^{\circ} 23'E.$

*Note.* The  $22^{\circ}$  halo is produced by the refraction of light through faces of ice crystals inclined to one another at an angle of  $60^{\circ}$ . The faces producing the  $46^{\circ}$  halo are inclined at an angle of  $90^{\circ}$ . There is thus a greater dispersion of light in the case of the  $46^{\circ}$  halo, with the result that this halo is wider than the  $22^{\circ}$  halo, and the spectrum colours more separated. It follows that, in general, the colours of the  $46^{\circ}$  halo are purer than those of the  $22^{\circ}$  halo, as noted in the above observation.

## AURORA

### North Atlantic Ocean

S.S. *Cairngowan*. Captain I. G. Foster. Grangemouth to Quebec. Observers, Mr. A. R. Fairley, 2nd Officer, and Mr. A. Stanton, 3rd Officer.

7th August, 1955. A bright display of aurora was observed at 0125 G.M.T. The display took the form of a wide arc about  $10^{\circ}$  in width commencing at about  $10^{\circ}$  above the horizon at a point directly below Arcturus, sweeping across the Great Bear, which was approximately at the vertex of the arc, and falling to a position about  $20^{\circ}$  above the horizon close to Capella. The arc was palish green in colour, the western end formed by vertical rays of yellow and a deeper green. The whole arc pulsed throughout the period of observation, the vertical rays being particularly brilliant at times. The phenomenon was visible until 0600.

Position of ship:  $54^{\circ} 25'N.$ ,  $48^{\circ} 10'W.$

S.S. *Beaverlodge*. Captain L. H. Johnston. Antwerp to Montreal. Observer, Mr. E. Brewer, 4th Officer.

24th September, 1955, 0000 G.M.T. Aurora was observed in the form of an arc from  $295^{\circ}$  to  $050^{\circ}(T)$  with altitude  $13^{\circ}$ . At 0020 the arc faded and only a moon-like glow remained. By 0025 a second arc formed from  $295^{\circ}$  to  $035^{\circ}(T)$  with altitude  $11^{\circ}$ , and by 0035 this arc faded also, leaving a similar glow. At 0040 three arcs formed, the middle being the brightest. The largest arc was from  $280^{\circ}$  to  $050^{\circ}(T)$  with an altitude of  $22^{\circ}$  measured to the underside of the arc, and width  $4^{\circ}$ . The centre arc was from  $300^{\circ}$  to  $030^{\circ}(T)$  and altitude  $10^{\circ}$ , while the smallest arc was from  $320^{\circ}$  to  $010^{\circ}(T)$  and altitude  $6^{\circ}$ . By 0050 the two inner arcs faded, leaving only several bright patches, which, by 0100, faded also and left only a moon-like glow and the largest arc. Shortly afterwards another  $10^{\circ}$  arc formed and quickly faded. From then on only the large arc remained, which gradually broadened and lowered in altitude, until at 0300 the altitude was  $7^{\circ}$ , the width  $8^{\circ}$ , from bearing  $290^{\circ}$  to  $050^{\circ}$ .

Position of ship:  $49^{\circ} 43'N.$ ,  $65^{\circ} 30'W.$

S.S. *Rialto*. Captain H. Greenhill. Hull to Quebec. Observers, Mr. D. J. Pengelly, 3rd Officer, and Mr. D. Smee, 2nd Officer.

29th September, 1955. At 0435 G.M.T. a green and yellow streak of aurora appeared above the horizon at bearing  $240^{\circ}$ ; it rose to an altitude of  $5^{\circ}$ , formed a circle which spun round thrice, and in doing so became deeper and wider while the colour changed through various shades of green. The circle appeared to hover a short time before forming into a long narrow band which quickly crossed over the vessel and disappeared to the east. This was followed by patches of aurora which were similar to Cc clouds, and these in turn were followed by a brilliant arc from which ribbons and draperies hung coloured mauve, blue, green, red and yellowish. This arrangement of aurora forms and arc was repeated six times and the display ended at 0505. A faint glow was seen slightly above the horizon until 0700.

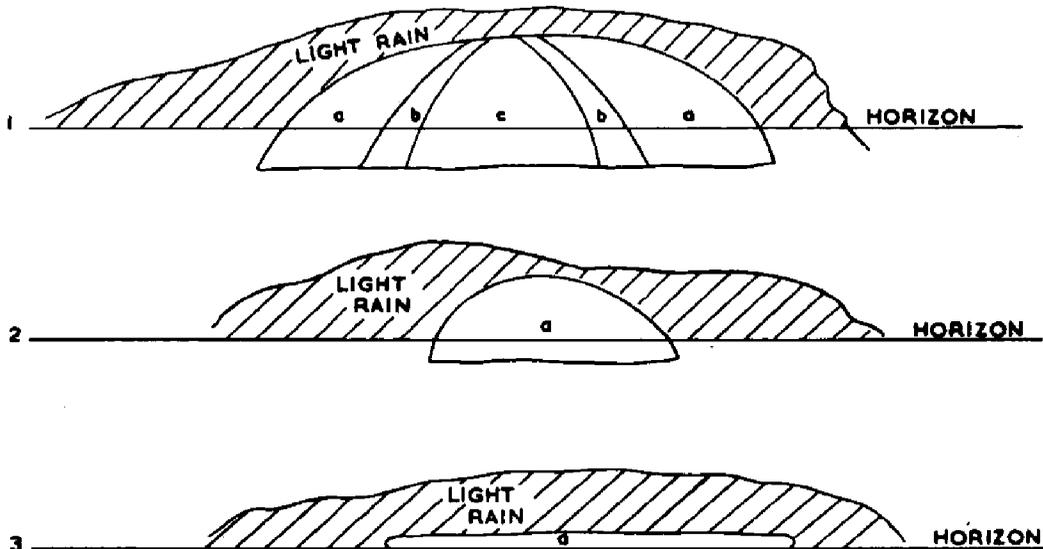
Position of ship:  $55^{\circ} 00'N.$ ,  $45^{\circ} 20'W.$

## UNIDENTIFIED PHENOMENON

### North Atlantic Ocean

S.S. *Thalamus*. Captain R. J. Mayne. Rotterdam to Curaçao. Observers, the Master and Mr. D. M. C. Renton, 3rd Officer.

13th September, 1955. At 1115 G.M.T. a light rain shower passed overhead and travelled in a w'ly direction. When about a mile away, bearing  $280^{\circ}(T)$ , a brilliant coloration was observed on the cloud (sketch 1), approximately 300 yd long. In the sketches the letter *a* denotes a brownish-orange colour, *b* a greenish tinge and *c* turquoise blue. After about 3 min the left-hand side of the ellipse seemed to merge into the other side until only a "hump" of one colour remained (sketch 2).



After a further 2 min the coloration was observed to be flattening and lengthening into a thin band (sketch 3), which completely disappeared after a further 2 min. The phenomenon lasted for 7 min 1120 to 1127.

Position of ship:  $33^{\circ} 20'N$ ,  $32^{\circ} 18'W$ .

*Note.* The observers suggest that this was a rainbow. The sun's altitude at the time of observation was between  $41^{\circ}$  and  $42^{\circ}$  and its azimuth approximately  $117^{\circ}$ . With this altitude the primary rainbow could not have been seen, as its apex would have been on the horizon. The observation does not state the altitude of the apex of the phenomenon, but a secondary rainbow could have been formed with its apex about  $13^{\circ}$  above the horizon, bearing  $297^{\circ}$ . The coloration observed does not correspond to that of a secondary rainbow, which has blue and violet on its upper side and red and orange on its lower side. Furthermore, in normal rainbows the arcs of colour are circular and concentric. No explanation can thus be given of this very interesting phenomenon.

## METEOR

### Bay of Biscay

S.S. *Garvelpark*. Captain A. McF. Allan. Port de Bouc to Le Havre. Observer, Mr. I. M. Ramsay, 2nd Officer.

13th August, 1955. During the period 0030 to 0115 no less than 20 meteors were observed, all but one were visible for periods up to 2 sec, and the majority left no trail. One, however, was seen to the SE. at an altitude about  $40^{\circ}$  at first, and after 5-6 sec was seen to fall into the sea about 4 miles ahead of the ship and caused, what appeared in the moonlight, considerable disturbance when it entered the water. Its trail, which was clearly seen, appeared to be composed of a great number of

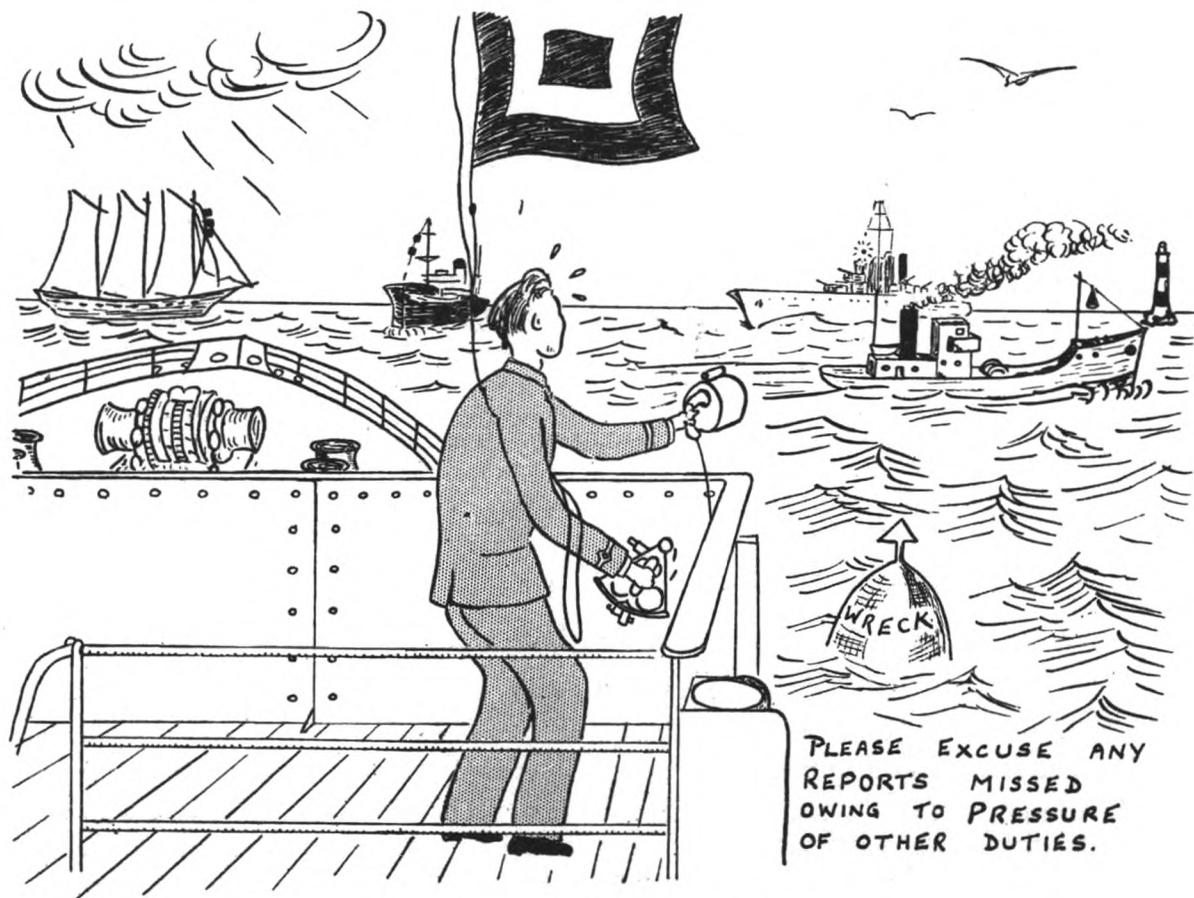
sparks and remained visible for about 3 min after the disappearance of the meteor.

Position of ship:  $42^{\circ} 32' N.$ ,  $4^{\circ} 11' E.$

*Note.* A larger number of meteors than usual is always observed at or around the date of this observation, since the earth's orbit and the orbit of the Perseid meteors intersect at that time, so that many of the meteors enter the earth's atmosphere. The Perseid shower is visible for some time, in favourable conditions of clear sky and absence of moonlight, but usually the meteors attain their greatest frequency on the night of the 12th-13th August. Other meteors may of course be observed on this night, but the probability is that most of the 20 meteors seen were Perseids. The paths of these meteors, if projected backward, intersect at a point in the northern part of the constellation of Perseus, known as the radiant point.

Meteors from different showers have somewhat different appearances. The Perseid meteors, individual members of which like those of all other meteor showers vary very much in brightness, have the special characteristics of rapid flight and a trail, sparkling with points of light, which does not persist at all after the head of the meteor disappears.

Ordinary meteors visible to the unaided eye are extremely small objects, from the size of a grain of dust or salt up to perhaps a third of an inch in diameter, and their brilliancy arises from their sudden disintegration by the friction caused by their great speed through the upper atmosphere. Larger objects occasionally enter the atmosphere which in part survive disintegration owing to their size. These fall to the ground or into the sea and are called meteorites. The above observation of a meteorite coincident in time with the Perseid meteors, but probably unconnected with them, is very interesting as the actual fall to the ground or into the sea is very rarely witnessed.



The April number of *The Marine Observer* contained certain "Reasons in Writing" with which missing observations had been explained. The officer responsible for the above sketch, which came to us in a recent meteorological logbook, has gone one better.

# The International Ice Nomenclature

By E. W. BARLOW, B.SC.  
(Marine Division, Meteorological Office)

Sea-ice is of very varied form and character and passes through a number of stages of formation, maturity and decay. Various distinctions have also to be made, such as that between ice formed at sea and ice found in the sea which is of land (glacier) origin, also between sea-ice freely floating and that attached to the shore (fast-ice). Terms are also needed to denote the extent of ice cover, the size of floes and the extent of ice-fields. Ice terms are therefore numerous. Although the ice terminology contained in Maurstad's Atlas on sea-ice had been recommended for international use by the International Meteorological Organisation as early as 1935, the details of this terminology had in fact received little general recognition. The same term has sometimes been used with different meanings in various countries and the meaning of a term has occasionally changed with lapse of time. As an example of the latter, newly-formed level ice, now known as young ice, was often referred to as bay-ice by early nineteenth-century British writers, while bay-ice now has a different meaning.

The desirability of having a nomenclature, internationally agreed upon for use by all maritime countries, had thus become increasingly apparent and, at a meeting of the Commission for Maritime Meteorology (C.M.M.) of the International Meteorological Organisation at Toronto in 1947, a working group of ice experts was appointed to deal with questions concerning sea-ice, their chief task being the preparation of a simple international ice nomenclature for the use of seamen. Six countries were represented—Argentina, Canada, Denmark, Norway, the United Kingdom and the U.S.A., Dr. H. Thomsen, Denmark, being the chairman. A U.S.S.R. representative was nominated but did not take part in the discussions. After prolonged discussions, mostly by correspondence, and considerable work on the details, a proposal for a nomenclature was ready by November 1951, and this was unanimously adopted by the Commission for Maritime Meteorology of the World Meteorological Organisation at their conference in London in July 1952. At the subsequent meeting of the Executive Committee of the W.M.O. (to which all recommendations of the C.M.M. had to be submitted for approval) it was decided that the nomenclature needed approval on a regional basis before it could be officially adopted for international use. During the consequent discussions, three countries, Finland, Sweden and the U.S.S.R., raised certain objections to some of the terms contained in the new nomenclature. It was accordingly decided to reconstitute the working group, under Dr. Thomsen's chairmanship. Finland, Sweden and the U.S.S.R. were invited to appoint experts to serve on the working group, to which they agreed. The U.S.S.R. then submitted an alternative nomenclature which was somewhat more detailed and differed in other respects from the original C.M.M. proposal, but as a result of further detailed study by the members of the working group and a helpful spirit of compromise on the part of all concerned, an amended nomenclature was eventually agreed upon. In December 1955 the President of the World Meteorological Organisation gave official approval to the new nomenclature for international use.

It must be emphasised that this is to be considered as an abridged nomenclature for the use of seamen and others who only require to differentiate between the main types of ice. The way is thus left open for the subsequent preparation of a fuller nomenclature for the use of scientists, in which further discrimination of ice characteristics could be included. The previous ice nomenclature, as given in Admiralty Pilots, was divided into descriptive ice terms and associated terms, the latter including terms relating to ice navigation and various tools for use in ice, etc. Some of these associated terms were, however, descriptive of forms of ice and these have been incorporated in the international nomenclature. Thus when the Pilots

are revised to contain this nomenclature, the list of associated terms which follows it will be shorter.

The new nomenclature will not be found to differ materially from the previous one. It contains 87 terms, as against 47 comparable ones contained in the Pilots. Much of this increase comes from the subdivision of well-known terms, such as fast-ice, polar ice and slush or sludge. Very many of the terms, and especially the subdivisions of terms, will not usually be required by ships on normal shipping routes, but it must be remembered that the complete nomenclature has also to cater for ships on voyages in sub-polar or polar regions; even for these some of the terms would seldom be required. On the other hand, some of the newly subdivided terms will be very useful for any ship that has to enter, however temporarily, a region of pack-ice; these include the terms specifying the sizes of ice-floes and of ice-fields.

In the new nomenclature the term ice-shelf has been substituted for shelf-ice, which also had the alternative names of barrier ice or ice barrier. Thus the name of the well-known Ross Barrier in the Antarctic is changed to the Ross Ice-shelf. This alteration was necessitated by a change in international land-ice nomenclature since the C.M.M. proposal was originally put forward in 1951.

In preparing the nomenclature there was much discussion about the terms pack-ice and drift-ice. Drift-ice has been used by the British to denote very open pack-ice, where water preponderates over ice. On the other hand the Norwegian equivalent of the term, "drivis", and the German one, "Treibeis", have both been used to refer to pack-ice of any degree of closeness. The term pack-ice has been in general British and American use to denote a collection of ice-floes, but there is liability to confusion here in an international nomenclature, since the Norwegian "pak" and the German "pack" have been used to denote pressure-ice, while the Russian "pak" refers to the heavy ice of the polar cap. It was felt that the term drift-ice would continue to be used by British seamen and it was decided to keep the term pack-ice and to make drift-ice an alternative name for pack-ice of any degree of closeness. The term thus becomes pack-ice/drift-ice, implying that either may be used at will.

The term consolidated pack has been replaced by very close pack-ice/drift-ice. The three alterations given above are the only changes of name that have been made.

Seventeen other terms have also been given alternative names, either on account of long usage or because there is no reason to prefer either of the two. On the other hand a few alternative names which were included in the previous nomenclature, such as landfast-ice for fast-ice, have been deleted.

An important feature of the new nomenclature is the greater precision and clarity of many of the definitions. Furthermore, numerical values have been introduced wherever possible. Thus the four categories of the extent of ice cover are defined in oktas and also in tenths. The sizes of the various categories of ice-floes and ice-fields are also numerically defined.

The new nomenclature will be included in the eighth edition of the *Marine Observer's Handbook*; in the meanwhile an amendment to the seventh edition, now in use, is being prepared. It is understood that the first Admiralty Pilot which will contain the new nomenclature is the eleventh edition of the St. Lawrence Pilot, which is now in course of preparation.



# The Baltic Ice Code

By BERTIL RODHE

(B. Rodhe is First State Meteorologist at the Swedish Meteorological and Hydrological Institute and a Member of the Commission for Maritime Meteorology of the World Meteorological Organisation)

During the past winter, shipping in the North Sea and in the Baltic has again—for the third time since the beginning of the fifties—been badly impeded by severe ice conditions. This time, the ice conditions were worse than they had been since 1947 and 1942. Ice blocked the passages around Denmark. The Sound was the only passage by which the traffic to and from the Baltic could pass, and this could only be done thanks to ice-breaker assistance. Large parts of the Baltic were covered by ice and a number of ships were sealed up in harbours. Moreover, two ships were wrecked because of ice pressure; one of them drifted aground, the other was lost with all hands.

In such winters as this one, the transport channels in the countries around the Baltic are concentrated on a reduced number of harbours which owing to their favourable geographic position may be kept open by means of ice-breakers. Such harbours are Gothenburg in Sweden and Esbjerg in Denmark. This means that for some months Sweden's exports and imports and also those of Finland must to a large extent go through Gothenburg, Trondheim or Narvik, and it is evident that such a temporary reorganisation involves industry and commerce in enormous extra expense. Of course, the Government takes steps to reduce the economic loss as far as possible. It is the task of the Government Ice-breaker Service to maintain shipping to the greatest possible extent. Under ice-breaker command, convoys are organised in ice-covered seas. Moreover, there is the Ice Information Service, the task of which is to publish daily bulletins and broadcast wireless messages about the actual state of ice in the harbours and along the routes.

In all the countries around the Baltic and the North Sea there exist government services of these kinds. In some of them—e.g. in Denmark and Norway—they co-operate in the same office and belong to the Ministry of Shipping. In others—e.g. in Finland, the German Federal Republic, Poland, Sweden and the U.S.S.R.—the ice information service is detached from the shipping service and attached to a state meteorological or hydrological institute. One of the reasons for such an organisation is the need for ice forecasts—and these can hardly be produced without scientific work and a co-operation between hydrographers and meteorologists.

In most of the countries mentioned, the ice information service has been in existence since the latter decades of the nineteenth century. The main task of the service has always been to collect ice observations from pilots, lighthouse-keepers and others, and to publish the ice reports in bulletins. At first, the ice conditions were announced by means of visual signals arranged at exposed points along the coast, but later these signals were replaced by wireless messages. From the very beginning, there was a need for some kind of code in order to shorten the messages as far as possible and so reduce the telegraph charges. There was no international co-operation and each country used its own code. Some countries designated the ice and navigation conditions by means of letters, others used figures. When wireless communication came into general use after the First World War, the need for a commonly accepted code became pressing.

In 1926, hydrographical experts from Estonia, Latvia, Lithuania and Poland met in Riga to discuss common problems connected with the Baltic Sea and the Baltic lakes, rivers and harbours. When the Conference met again later on, other countries, e.g. Denmark, Finland, Germany, Norway, Sweden and the U.S.S.R., joined it.

In due course the BALTIC HYDROLOGICAL CONFERENCE, as it was called, acquired a permanent bureau in Riga and it became the forum where international co-operation in the field of ice information was carried on. The prime movers of the Conference were found in the first three above-mentioned Baltic States, but the

Conference did not survive the Second World War. In 1938 the Conference adopted a wording for the Baltic Code. The wording reads as follows:

*Ice conditions*

- o Clear of ice
- 1 Soupy sludge or young ice
- 2 Fast-ice
- 3 Drift-ice
- 4 Compressed sludge ice or close bands of drift-ice
- 5 Open lane along the coast
- 6 Heavy fast-ice
- 7 Heavy drift-ice
- 8 Pack-ice
- 9 Forcing, screwing of ice

*Navigation conditions*

- o Navigation unimpeded

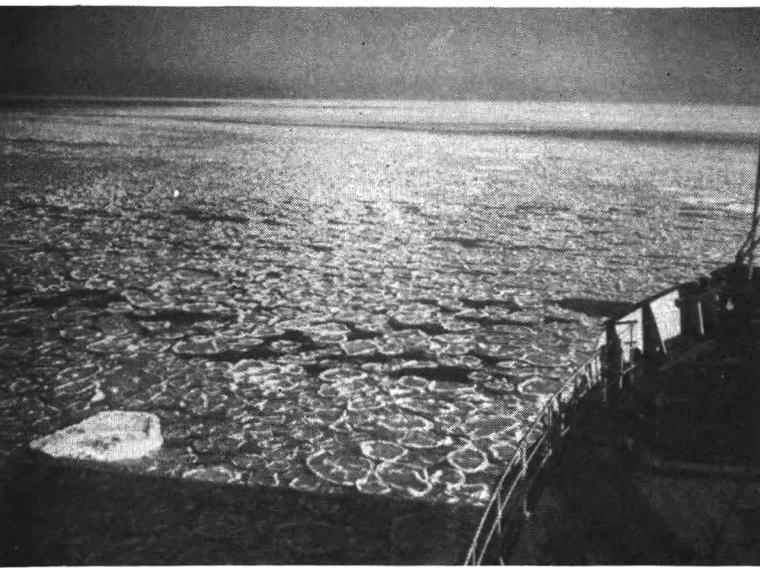
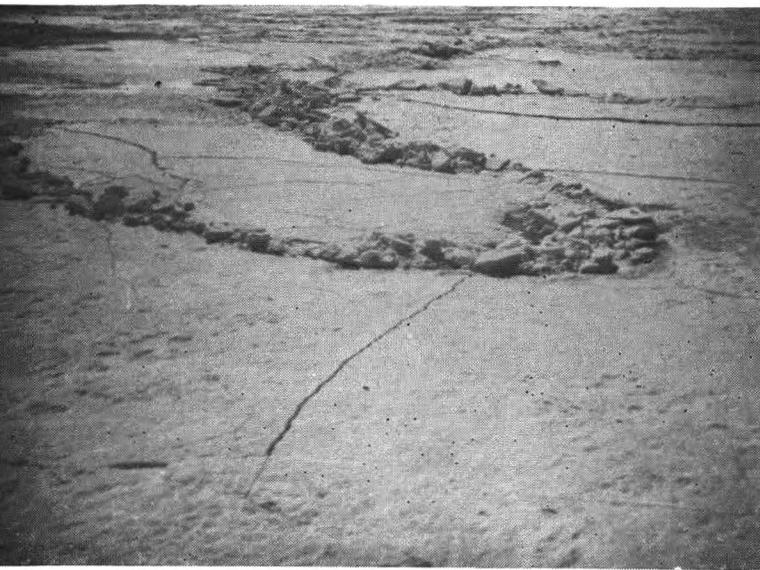
- 1 Navigation unobstructed for steamers, difficult for sailing vessels
- 2 Navigation difficult for weak steamers, closed against sailing vessels
- 3 Navigation possible for strong steamers only
- 4 Navigation possible only for steamers fitted with ice strengthenings
- 5 Shipping maintained by ice-breaker
- 6 Navigation possible through lead in the ice
- 7 Shipping temporarily closed
- 8 Shipping closed
- 9 Possibility of navigation unknown owing to poor visibility

Not only is the Baltic Ice Code used by those who observe and report ice and by the staff of the ice information services, but since the figures conveniently summarise the otherwise lengthy reports, they are also read in the bulletins and radio messages which are addressed to shipowners, industrialists and others interested in winter shipping. Thus, knowledge of the code is widely spread, and at the preparation of the wording the Conference as far as possible considered such code specifications as were already in practice. Therefore the wording of 1938 was not a new one but may rather be looked upon as an official recognition of a code form which had gradually been evolved since ice information started in the nineteenth century.

The reader familiar with meteorological codes should not confuse the Baltic Ice Code with the ice-group  $C_2KD_1re$ , which is utilised in the synoptic code form FM 21A. The group  $C_2K$  resembles the Baltic Ice Code of 1938 and its origin is indeed related to the Baltic Ice Code. Its history is as follows.

In 1935 the INTERNATIONAL METEOROLOGICAL CONFERENCE prepared the International Ice Code for Ice Reports, which contains 90 figures for a very detailed description of polar ice. Today this code is very seldom used. Even when the Conference of Directors in Warsaw recommended this comprehensive code, the need of an additional abbreviated ice code was obvious. The Sub-Commission on Polar Ice was requested to consider the question and attention was focused on the existing Baltic Ice Code. The chairman of the Sub-Commission reported that "the short code used in the Baltic has been found to be very satisfactory. Since a change of this code cannot be recommended and since only one abridged code should be in use, it seems logical to adopt the Baltic Code for general use". Meeting at De Bilt in July of that year (1938) in which the Baltic Hydrological Conference adopted the above-mentioned wording of the Baltic Code, the Commission recommended the proposal of the chairman of the Sub-Commission to the Conference of Directors to the effect that the International Code for Ice Reports should have an additional decade, 90 to 99, entitled "Character of the Ice in abbreviated form of message", the code figures being those of the Baltic Code.

In 1947, when international co-operation in the meteorological field had been re-established after the Second World War, the Conference of Directors of the INTERNATIONAL METEOROLOGICAL ORGANISATION considered another recommendation of the Commission for Maritime Meteorology. The Commission had just met at Toronto and had adopted the resolution "that reporting ships from which ice, other than icebergs, is visible or has been observed at a point within a distance of 30 miles from the ship's position at the synoptic hour, should add to the synoptic weather report the word 'ice' followed by the group  $C_2KD_1re$ ". The code figure  $C_2$  was that adopted in the abridged code of 1938. The code figure K, giving the effect of the ice upon navigation, also derives its origin from the Baltic Code.

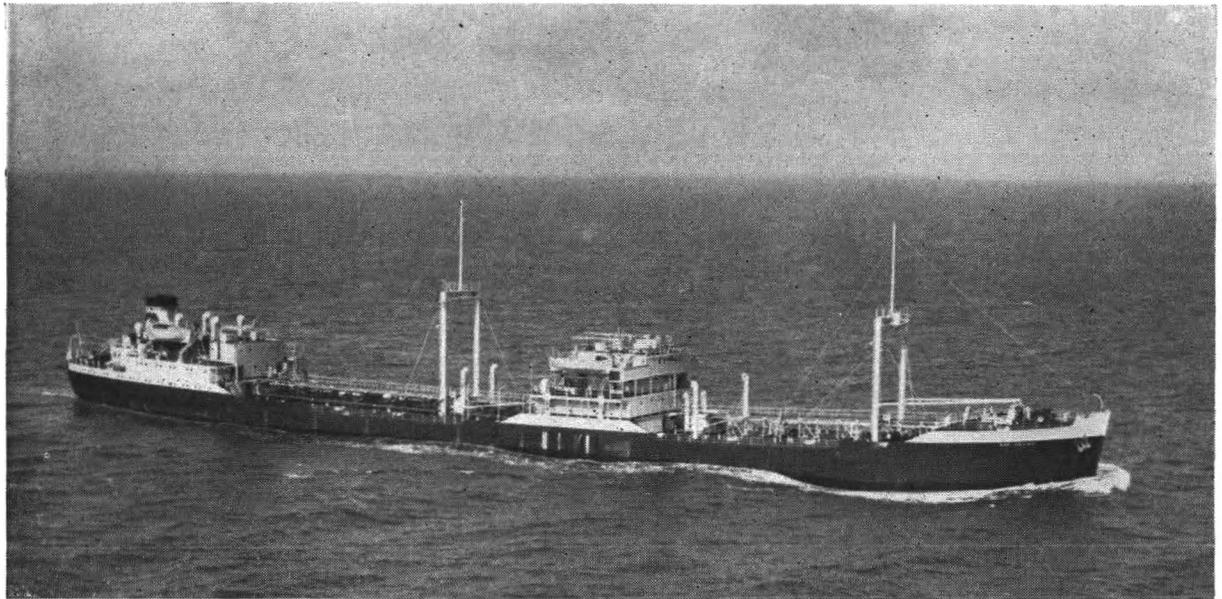


### Ice in the Baltic Sea

*Top.*—Pressure ridge. Rafted new ice.

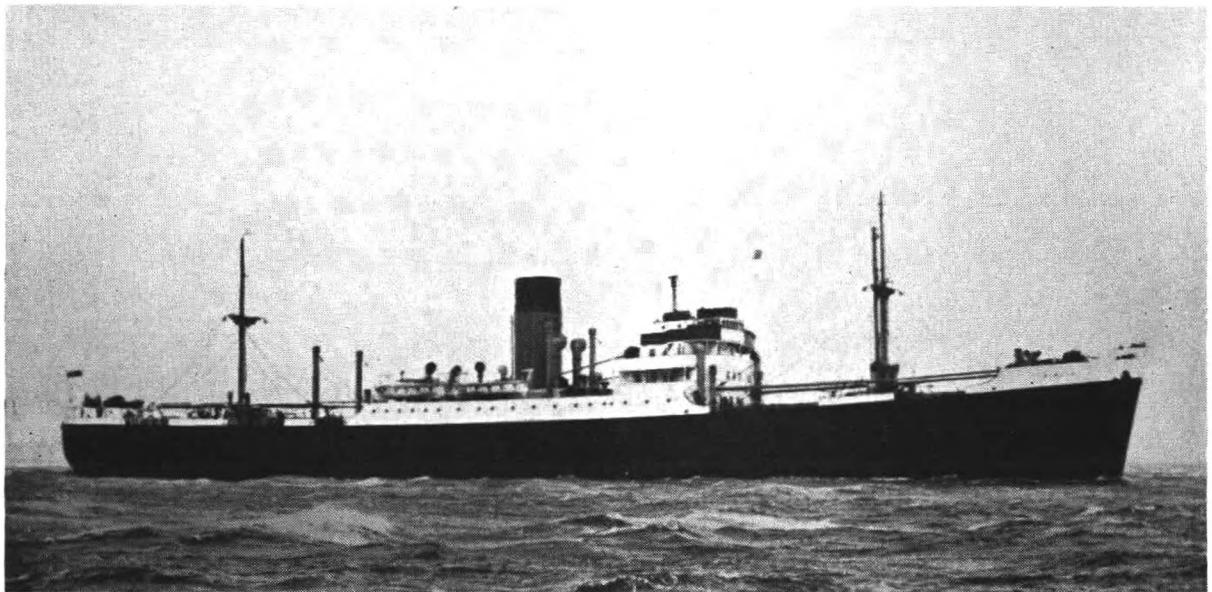
*Middle.*—Pancake ice. A close belt of pancake ice compacted by wind drift.

*Bottom.*—Hummocked ice and fast-ice fringe off the coast. A tug widening the channel in fast-ice.

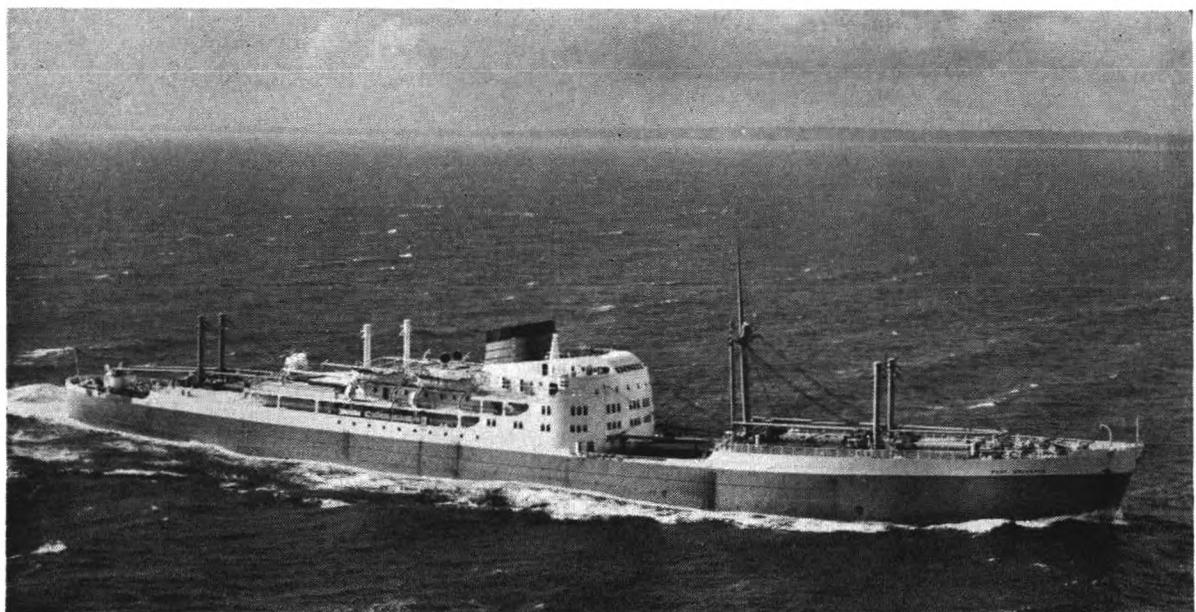


M.V. *San Velino* (Eagle Oil & Shipping Co.) Captain I. G. Goldsworthy

*Skyfotos*



S.S. *Rialto* (Ellerman's Wilson Line) Captain H. Greenhill



M.V. *Port Brisbane* (Port Line) Captain F. W. Bailey, M.B.E.  
The three ships which gained the highest markings for their meteorological logbooks during the year ended March 1956 (see also page 162).

*Skyfotos*

From this it is clear why the meteorological code for ice reports and the Baltic Ice Code of 1938 are so similar. Indeed, they are often not distinguished from each other. There are, however, some differences, which are more marked in the wording than in the real sense of the figures. Realising that differences existed in the ice nomenclatures in use in various countries, the Commission for Maritime Meteorology in 1947 appointed a committee of ice experts to consider the possibility of establishing an international nomenclature. A draft proposal was made in 1951, which was subsequently amended, and the International Ice Nomenclature was officially adopted by the World Meteorological Organisation in December 1955. The preparation of the nomenclature of course concerned those countries which were using the Baltic Ice Code. Meeting at Helsinki in September 1954, representatives of the ice information services of Denmark, Finland, the German Federal Republic, Norway and Sweden found that the code needed revision not only in view of the proposed International Ice Nomenclature but also in order to adapt the specifications of the code to the demands of modern shipping. Information about the navigation conditions for sailing vessels, for example, was no longer needed and it was proposed that it should be replaced by other kinds of information, e.g. on the activity of the ice-breakers. The meeting at Helsinki in September 1954 therefore prepared and recommended a new ice code. In terms of the final International Ice Nomenclature of 1955 the code reads as follows:

*Character of the ice*

- o No ice
- 1 New ice (ice crystals/frazil crystals, slush or sludge, pancake ice or ice-rind)
- 2 Young or rotten fast-ice
- 3 Very open or open pack-ice/drift-ice
- 4 A compressed accumulation of slush or sludge or small pancake ice (a thick layer of ice formed where free drift is obstructed)
- 5 Winter fast-ice
- 6 Close pack-ice/drift-ice
- 7 Very close pack-ice/drift-ice
- 8 Pressure-ice/screw-ice or ice-fields/fields of ice, consisting of heavy floes
- 9 Shore lead
- X No information

*Ice development*

- o No change
- 1 Ice situation getting better
- 2 Ice situation getting worse
- 3 Ice breaking up
- 4 Ice opening or drifting away
- 5 Ice increasing
- 6 Ice freezing together
- 7 Ice drifting in or pressing together
- 8 Warning for pressure ridges
- 9 Warning for hummocking or ice screwing
- X No information

*Effect of the Ice on Navigation*

- o Navigation unobstructed
- 1 Navigation unobstructed for power-driven vessels built of iron or steel, dangerous for wooden vessels without ice sheathing
- 2 Navigation difficult for low-powered vessels without assistance of ice-breaker, dangerous for vessels of weak construction
- 3 Navigation possible only for high-powered vessels of strong construction
- 4 Ice-breaker assistance available in case of need
- 5 Navigation unobstructed in channel in fast-ice previously made by ice-breaker
- 6 Navigation possible only with assistance of ice-breaker
- 7 Ice-breaker can give assistance only to ships strengthened for navigation in ice
- 8 Navigation temporarily closed
- 9 Navigation closed
- X No information

All the countries represented at the meeting in Helsinki at once introduced the new code in their reports. The English name of the code, the Baltic Ice Code, was retained in the hope that it would soon fully replace the old one in the Baltic area. This hope has in fact already been realised. Sending ice reports again after a long period of silence, which lasted since the Second World War, the U.S.S.R. today uses the new code. Poland started the last ice season by applying the code in their reports, and the East German Republic changed over to it on 15th February, 1956. Thus, I am glad to say that a fully reciprocal system of ice information exchange has now been re-established around the Baltic.

# A Comparison between Observations from Ocean Weather Station J and contemporaneous British Selected Ships for the Locality

By R. F. M. HAY, M.A.  
(Marine Division, Meteorological Office)

The purpose here was to find the magnitudes of any small systematic differences which might exist between mean values of pressure, wind speed, air and sea temperature and cloud amount, when derived respectively from ocean weather station observations and from selected ship observations made for the same period from ships close to the station position. Another aim was to find the correlations between corresponding monthly departures of each element using the same two sets of data.

Small systematic differences of this sort might be expected for several reasons. For instance, aboard the British ocean weather ships screen exposures are very similar because the main feature of the hulls and superstructures of these ships closely resemble each other. The two Netherlands vessels, which are responsible for a small proportion of the total observations used, are similar to the British ocean weather ships but somewhat larger. Although these vessels in fact use sling psychrometers, trials in British ocean weather ships have shown that readings of dry and wet-bulb temperatures obtained from screens and hand psychrometers are substantially the same. Hence it can be assumed with some confidence that the temperature observations made at ocean weather stations and discussed here have been obtained from thermometers having substantially similar exposures on both British and Netherlands ocean weather ships. On the other hand, screen exposures vary markedly from one British selected ship to another, partly because their tonnages vary within wide limits, and also because a considerable variety is evident in the design of ship's bridges and superstructures. Aboard the ocean weather ships observations taken by qualified meteorologists, whose sole duty is meteorology, might be expected to be rather more homogeneous than those made by voluntary observers aboard selected ships in addition to their normal duties.

The choice of the period April 1950 to March 1953 for this investigation was dictated firstly because no change was made in the location of the ocean weather stations during that period and secondly because a large number of selected ship observations was available in the same interval for the vicinity of station J. The number of observations available from selected ships in the vicinity of station I was too small to allow of a comparison being made using data from such ships which passed very close to *both* stations I and J respectively. However, for station J, which was at  $52^{\circ} 30' \text{N.}, 20^{\circ} 00' \text{W.}$  through the whole period, nearly 4,000 observations made from selected ships within eight  $2^{\circ}$  "squares", enclosing the station position and bounded by the points  $50^{\circ} \text{N. } 16^{\circ} \text{W.}, 50^{\circ} \text{N. } 24^{\circ} \text{W.}, 54^{\circ} \text{N. } 24^{\circ} \text{W.}$  and  $54^{\circ} \text{N. } 16^{\circ} \text{W.}$ , were available on punched cards. Fig. 1 shows the positions and descriptions of these "squares" in relation to station J. The punched cards for these observations were handled by the Hollerith tabulator in the Marine Division to derive period mean values of pressure, air and sea temperature, and cloud amount for each of these squares. Wind data were treated differently; the Hollerith counter sorter being used to obtain total numbers of observations for each separate wind force, whence mean wind speeds were computed in the usual manner. From the ocean weather ships which occupied station J in the same period nearly 9,000 observations were available. Mean values of all these elements were already available for the individual months of this period in annual Meteorological Summaries for the Ocean Weather Stations I and J published by the Meteorological Office, so that the computation of the corresponding means required for the period (April 1950 to March 1953) was a simple matter.

Since the aim of this work was to determine the magnitude of the differences between the means of certain meteorological elements as determined from large

numbers of observations made (a) at ocean weather stations, and (b) aboard selected ships, when close to the same positions, the next step was to find a set of these differences for each 2° square (P, Q, R, etc., as in Fig. 1), expressed in each case as the difference between a mean value for each 2° square (found from the available selected ships' observations) and the corresponding mean value of the element derived from ocean weather ship observations when at station J. Table 1 gives these differences, together with the actual mean values of each element for the whole period April 1950 to March 1953 at the ocean weather station. The series of differences given in Table 1 refers to the overall three-year period; the number of observations was too small to allow of a reliable series of differences being similarly computed on a monthly basis.

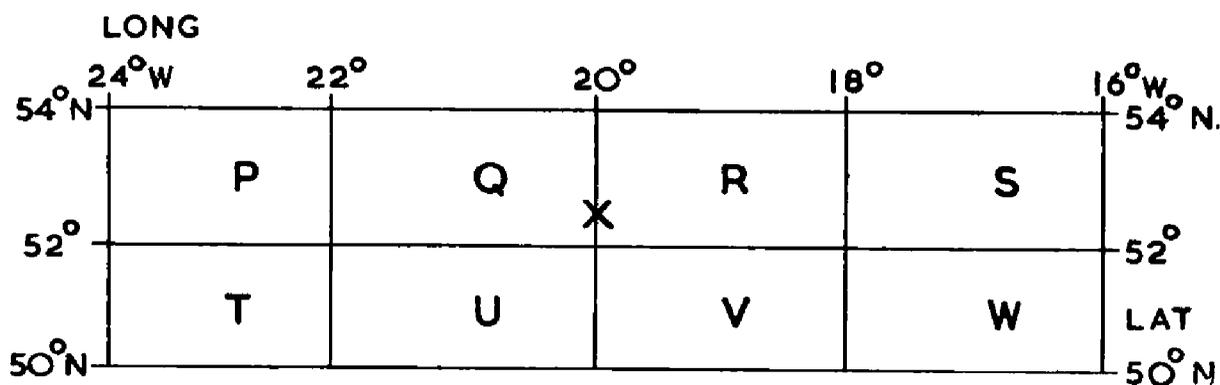


Fig. 1. Areas for which mean values were obtained for selected ship data, April 1950 to March 1953. (Station J shown by X at 52° 30'N., 20° 00'W.)

In the form in which the data are presented in Table 1 they cannot be used directly to determine the magnitude of the difference between the values of a particular meteorological element when derived (a) from selected ship observations, and (b) from ocean weather ship observations, since the former relate to eight different areas and the latter to an isolated position. Hence a simple procedure was followed to make the data for the eight 2° squares yield the same mean value (for each respective meteorological element) as would have been yielded by the ships' observations, supposing that *all* these ships had been passing through the position of ocean weather station J when they made their observations. Such mean values can be conveniently referred to as "interpolated selected ship means".

Two methods by which these interpolated selected ship means can be readily found are by direct interpolation and by drawing the field distribution of isopleths for each element, using the data in Table 1. As a check both methods have been used. Referring to Fig. 1, graphical interpolation was first used to derive the differences for each element (selected ship minus ocean weather station) at the respective intersections of latitudes 51°N. and 53°N. with longitude 20°W., using the differences for the individual 2° squares given in Table 1. (Latitude 51° passes through the mid-points of squares T, U, V and W and latitude 53° through the mid-points of squares P, Q, R and S.) A further interpolation readily gave the required differences (interpolated selected ship mean minus ocean weather ship mean for each element) for the actual ocean weather station position 52° 30'N., 20° 00'W. These results were checked by drawing small charts (not reproduced) showing the distribution of isopleths of differences for each element over the squares P, Q, R, S, T, U, V and W, using the data in Table 1.

The differences between interpolated selected ships' means and ocean weather ships' means obtained in this way are given in Table 2. In the same table are also shown the differences "interpolated selected ship means minus ocean weather stations means" when the former are computed by interpolation but giving double weight to the four squares Q, R, U, V which were nearer the position of station J. Almost identical differences are obtained in both ways.

**Table 1. Differences between Mean Values obtained from British Selected Ship Data and from Ocean Weather Ship Data at Station J for the period April 1950 to March 1953**

	Selected Ship minus Ocean Weather Station		Mean value at Ocean Weather Station		Selected Ship minus Ocean Weather Station		Mean value at Ocean Weather Station				
Pressure (mb)	P	-1.86 (356)	Q	-1.00 (341)	R	-0.17 (326)	S	+0.11 (234)	1012.00		
	T	+1.59 (623)	U	+1.96 (626)	V	+1.27 (679)	W	+1.07 (766)			
Wind (kt)		+0.6 (361)		+0.1 (344)		+0.3 (329)		+0.1 (234)			
		+0.6 (636)		-0.1 (633)		+0.5 (693)		+0.5 (775)	18.0		
Air Temperature (°F)		-0.91 (358)		-0.29 (340)		+0.01 (325)		+0.90 (232)			
		+1.62 (615)		+1.77 (615)		+1.73 (669)		+1.93 (751)	51.84		
Sea Temperature (°F)		-0.99 (272)		-0.46 (261)		+0.11 (257)		+0.61 (181)			
		+1.57 (452)		+1.76 (457)		+1.70 (517)		+1.82 (544)			53.62
Cloud Amount (oktas)		+0.15 (360)		+0.14 (340)		+0.10 (326)		+0.09 (233)			
		+0.16 (632)		+0.13 (629)		+0.10 (686)		+0.01 (767)			6.15

Letters P, Q, R, etc., refer to the areas shown in Fig. 1. To save space they have been shown against the figures for pressure only. The corresponding letters apply to the figures given for each of the other elements.

Figures in brackets underneath each difference denote numbers of observations available.

**Table 2. Difference between Interpolated Selected Ship means and Ocean Weather Ship means at Station J for the period April 1950 to March 1953**

	Interpolated Selected Ship minus Ocean Weather Ship (Equal weight to squares P Q R S T U V W)		Interpolated Selected Ship minus Ocean Weather Ship (Double weight to squares Q R U V)		Number of Observations	
Pressure	..	..	..	..	Selected Ships	Ocean Weather Ships
Wind	..	..	..	..	3,956	8,671
Air Temperatures	..	..	..	..	4,005	8,674
Sea Temperatures	..	..	..	..	3,905	8,674
Cloud Amount (oktas)	..	..	..	..	2,941	4,329
					3,973	8,683

Differences between the means given by numerous readings of pressure, wind, air and sea temperature and cloud amount, as measured by selected ships and by ocean weather ships respectively, are thus seen to be very small. At first sight it can be argued that such good agreement may be fortuitous. Measurements from charts of isopleths referred to above showed that gradients of the elements near station J during this period had these magnitudes.

Pressure	..	..	..	1.5 mb/60 nautical miles
Air temperature	..	..	..	1.3°F/60 nautical miles
Sea temperature	..	..	..	1.2°F/60 nautical miles

The distributions of mean cloud amounts and mean wind speeds respectively were almost uniform over the small area considered.

These figures indicate the maximum errors that could have been introduced into the results by ships' position errors of 60 nautical miles along the directions of these gradients. (The azimuths of the directions of increasing gradient were 150°, 160° and 150° for pressure, air and sea temperature respectively.)

**Table 3. Number of Observations for each 1° Square expressed as a Percentage of the Grand Total of Observations made by Ocean Weather Ships on Station J during the period April 1950 to March 1953**

	24°w.		20°w.		16°w.			
55°N.	—	—	0.0(1)	0.0(1)	0.0(1)	0.0(1)	0.2	—
	—	—	0.0(1)	0.1	0.3	0.9	1.3	—
	—	0.0(1)	0.3	56.6	X35.5	2.1	0.9	0.0(1)
	—	0.0(1)	0.3	0.5	0.4	0.1	0.0(1)	—
50°N.	—	—	0.0(1)	0.2	0.1	—	—	—
								50°N.

A dash is used to denote that no observations were made by an ocean weather ship within that square. The figures in brackets are included to show the actual number of observations made in a square when the percentage was <0.05. The total number of observations available on punched cards was 8,821. Station J is shown by the X at 52° 30'N., 20° 00'W.

To test whether such errors could have resulted from this cause the total number of ocean weather ship observations available at station J during the period were sorted into the 1° squares within which the ship was located at the time, by means of the Hollerith counter sorter. The results are shown in Table 3.\* It can be seen that 92% of the observations were made in the Marsden sub-squares which are bounded by the parallels of 52°N. and 53°N. and 19°W. and 21°W., that is, they exactly surround the ocean weather station position. The "centre of gravity" of the observations in Table 3 can be shown to be within two nautical miles of the position of station J at 52½°N., 20°W. and the same table shows that 95.4% of the observations are contained between the parallels of 52°N. and 53°N. and 16°W. and 24°W. Assuming a normal distribution for these observations with latitude, the standard deviation of the latitude of these observations is close to 0.25° latitude and the probable error is about 0.17° latitude. Using the values of the horizontal gradients of pressure, air and sea temperature given above, this implies that the probable errors in the pressure, air and sea temperature differences due to the ocean weather ships' observations being made with the ships at short distances away from

\* The number of observations in Table 3 slightly exceeds the totals given in Table 2. The latter were derived from data used in compiling annual ocean weather station meteorological summaries for station J, where eight observations a day were used for all elements except sea temperature for which four daily observations were used. Before these summaries were prepared a small number of Netherlands observations had been eliminated, because they would have duplicated British observations made at times when a British ship relieved a Netherlands ship on station J and vice versa.

the position  $52\frac{1}{2}^{\circ}\text{N.}$ ,  $20^{\circ}\text{W.}$  were about  $0.3\text{ mb}$ ,  $0.2^{\circ}\text{F}$  and  $0.2^{\circ}\text{F}$  respectively. Hence the values of the differences given in Table 2 can be accepted as:

Pressure	..	..	..	$0.0 \pm 0.3\text{ mb}$
Air temperature	..	..	..	$+0.4 \pm 0.2^{\circ}\text{F}$
Sea temperature	..	..	..	$+0.3 \pm 0.2^{\circ}\text{F}$
Wind	..	..	..	$+0.3\text{ kt}$
Cloud amount	..	..	..	$+0.1\text{ oktas}$

Errors in the determination of the ships' positions have not yet been taken into account. A statistical study<sup>1</sup> of comparisons between astronomical and electronic fixes (Consol and Loran) at station J (1952) showed a mean discrepancy of about 4 miles by Loran and 11 miles by Consol. Reports from their masters show that the degree of accuracy of navigation to be expected from a weather ship "on station" (irrespective of whether astronomical observations are available or not) varies between 3 and 10 miles. On this account the probable errors given above are slightly underestimated; however, since these position differences have an approximately random distribution around the true station position, the effect of this on the mean differences "selected ship minus ocean weather ships" should be inappreciable.

It is worth looking for an explanation of the fact that air temperature readings made aboard selected ships give readings on the average nearly  $\frac{1}{2}^{\circ}\text{F}$  higher than aboard ocean weather ships. One important reason may well be that a small proportion of the selected ship observations used here *were not made with a screen hung to windward*. However there are some other factors which may be partly responsible for this result. Nearly all the observations aboard ocean weather ships "on station" are made with the ship hove-to or steaming at 1 to 2 knots, whereas aboard a selected ship when the observations are made the engines are usually developing their full power. Aboard a selected ship there is thus nearly always a larger surplus of engine heat than aboard an ocean weather ship, which is available to raise the temperature of the hull and hence of the air passing over the ship. Contamination of air passing through the screen due to previous mixing with air drawn out through ventilators from the engine room, or holds, is also a likely source of error on occasions and one which would be more serious in a selected ship than in an ocean weather ship. These facts, together with the larger generating and auxiliary plant with which a selected ship is equipped, may partly account for air temperature readings being up to  $\frac{1}{2}^{\circ}\text{F}$  higher aboard selected ships than aboard ocean weather ships.

In the case of sea temperature readings the sign of the error depends on such factors as where the bucket was stowed before being used, where the bucket and sample of sea-surface water were placed after being hauled inboard and how long an interval then elapsed before the temperature was read. The size of the sample caught has some effect also. Since the magnitudes of the errors produced by all these factors are not accurately known, the main reason for sea temperature readings measured aboard selected ships being slightly higher than those measured aboard ocean weather ships cannot be given with certainty at present.

The ocean weather ship observations of wind were corrected to a standard height of 33 ft above sea level, the height correction amounting to approximately  $0.06\text{ kt}$  per 1 ft change in height<sup>2</sup> above sea level.

Sufficient data were available to obtain correlation coefficients between anomalies of ocean weather ship monthly means and interpolated selected ship monthly means (expressed as departures from the monthly mean values available for the five years<sup>3</sup> 1948-52). Before these correlation coefficients were computed certain months were excluded because they did not contain sufficient selected ships' observations (in one or more of the squares P, Q, R and S) from which to form reliable interpolated selected ship monthly means, as described earlier. The values of the correlation coefficients ( $r$ ) obtained are shown in Table 4:

Table 4

Element	No. of pairs of monthly means used	Values of $r$
Air temperature .. ..	21	.86
Sea temperature .. ..	17	.96
Pressure .. ..	21	.96
Wind .. ..	21	.70
Cloud .. ..	21	.56

The values of  $r$  for air and sea temperature, pressure and wind are significant at the 0.001 significance level<sup>4</sup>, while the value for cloud is significant at the 0.01 level. These values afford additional evidence of the very close numerical correspondence between means, obtained respectively, from samples of observations taken in the same locality and period aboard ocean weather ships and selected ships.

## REFERENCES

- <sup>1</sup> FRANKCOM, C. E. N. *J. Inst. Nav.*, London, 5, 1952, p. 355.  
<sup>2</sup> CARRUTHERS, N. *Quart. J. R. Met. Soc.*, London, 69, 1943, p. 289.  
<sup>3</sup> HAY, R. F. M. *Five year means of meteorological observations made at ocean weather stations I and J 1948-1952*. Meteorological Office, London, M.R.P.923, 1955.  
<sup>4</sup> BROOKS, C. E. P., and CARRUTHERS, N. *Handbook of Statistical Methods in Meteorology*, 1953, p. 221.

## RECORDING THE WORLD'S WEATHER

(The following is reprinted from an article which appeared in *The Times* on 9th March, 1956, and is reproduced here by permission of the Editor)

**Antarctic Expedition Ships recruited as part of the Observing Fleet**

Recent expeditions to Antarctica, though they represent no more than preliminary moves in establishing scientific bases for the International Geophysical Year, have been of exceptional benefit to all who are concerned with marine meteorology. Both the *Theron* and the *Tottan*, before setting out on the long voyage south, were recruited by the Marine Division of the Meteorological Office into the Voluntary Observing Fleet and their officers into the Corps of Voluntary Marine Observers. That is to say, the ships were supplied by the Meteorological Office with instruments and equipment and their officers undertook to transmit observations four times a day to the nearest station of the World Meteorological Organisation.

For a year before these more spectacular expeditions, eight British whaling ships had been recruited for making voluntary observations in the Antarctic as part of a special W.M.O. programme. Radio weather messages from all or any of these ships moving towards the Antarctic, even when decoded, would have little immediate interest for those citizens of England who sit at home at ease. But they are of great significance to the meteorologist.

**“Synopticians”**

Nothing emphasises more clearly how world-wide are the problems of the meteorologist, and the modern tendency is to study the weather map of the whole hemisphere. Indeed, it may eventually be desirable for research purposes to study such maps of the whole world in order to get the correct perspective. (The modern tendency is leading some meteorologists to describe themselves as “synopticians”.)

The vast share of this work that is comprised within marine meteorology depends on observations from merchant ships wherever their voyages may take them. Of the world total of 2,600 observing ships, about 500 are British selected ships (equipped with instruments by the Meteorological Office) which transmit their observations four times daily by radio in the International Meteorological Code to specified meteorological services in whatever ocean the vessel is situated. Another 60 British supplementary ships (supplied with fewer instruments) send abbreviated code reports four times daily on the same world-wide basis. About 100 British coasting vessels make observations of sea temperature once daily and send them by

radio telephone to the Meteorological Office at Dunstable; 13 lightvessels observe wind, waves, visibility and air and sea temperatures twice daily and transmit to Dunstable; 17 trawlers fishing in far northern waters make non-instrumental observations which they transmit as convenient to British, Norwegian or Icelandic radio stations.

### 143 Reports Daily

An average of 143 reports daily were sent last year to Dunstable from voluntary observing ships in the eastern North Atlantic and United Kingdom coastal waters; 94 were from British selected ships and 16 from foreign selected ships in the North Atlantic, 11 from British coasting vessels and 22 from British lightvessels. Radio weather messages were supplied last year by 70 British selected ships on the Far East route, 65 on the North Atlantic route, 58 on the Australasian route via Suez or the Cape, 47 on the Australasian route via Panama, 33 on the Atlantic coast of South America, and, among others, nine ships on trooping service, 13 near the Falkland Islands and in the Antarctic, and 104 on world-wide tramping.

The British contribution to the W.M.O. is thus substantial. It is essentially a voluntary contribution depending on the goodwill of masters and officers of merchant ships. The Marine Division of the Meteorological Office, through its Port Meteorological Officers in Great Britain, made 3,844 visits to ships last year to help in the smooth running and maintenance of the service. The division awards prizes for the best kept logbooks, recording the meteorological observations, which are sent to the division at Harrow for climatological analysis. One of the prizes is usually an atlas, which is said to be among the most coveted books at sea "in order to settle arguments".

In addition to their radio weather messages, many of the logbooks contain detailed reports of unusual phenomena encountered at sea. Today many of these records are fortified with photographs and, sometimes, exceptionally good drawings. Waterspouts, for example, were photographed last year with great success over the Strait of Hormuz by the Chief Officer of the *British Consul*, and in West African waters the Third Officer of the *Clan Maclean* added to the meteorological logbook a sketch of three stages of a waterspout. A double solar halo over the Caribbean Sea, drawn by the Third Officer of the *Tamaroa*, was described by the Marine Division as an exceptionally interesting observation. Sea smoke (also known as frost smoke) was photographed over the China Sea by the observer of the *Dilwara*, and various sketches of abnormal refraction came from ships in the English Channel, in Antarctic waters, the Tasman Sea and the South Atlantic.

A turtle in the North Atlantic over 1,000 miles from the nearest breeding ground, large shoals of fish in Atlantic equatorial and West African waters, discoloured water in the Malta Channel, the South Atlantic, the south Indian Ocean and the Gulf of Panama, phosphorescence in the North Atlantic, the Gulf of Aden and the Arabian Sea, a double moon over the Indian Ocean, lunar corona over the Gulf of Oman and south Indian Ocean, abnormal rainbows, green flash in the east Pacific, red flash at sunset in West Indian waters and red flash at moonrise in the Indian Ocean, meteors in the South Pacific and the Indian Ocean, and a ship struck by lightning in the western Mediterranean—all have recently helped to fill the column provided in the observer's logbook for remarks.

### Wider Purposes

The main purpose of the logbook, however, is to record the weather messages sent by the selected ships. The information thus collected serves much wider purposes than day-to-day forecasts. Last year, for example, the British Petroleum Oil Company were supplied with wave data and advised on the possibility of day-to-day forecasting of waves for underwater oil drilling in the Persian Gulf. Information was also provided for several investigations into shipping casualties.

Enquiries were answered about weather conditions over the North Sea for bird

migration at night, about weather in the north-east Pacific for surveys by the Fisheries Research Board of Canada, about sea temperatures off the coast of Cornwall for a "clean beaches" scheme, and about the weather many years ago in the Bay of Bengal in connection with a study of tropical storms by the observatory authorities at Poona. A private enquiry was made as to "the likely date one would be able to land a flying boat in the Cap Rink area off the Greenland coast", and another about "wind and sea conditions likely to be encountered in May 1955 on voyage from Southampton to the West Indies, via Vigo Bay".

Weather forecasters have frequently said that they cannot have too many ship reports, and the meteorologist is as acutely conscious as ever of the debt his science owes to those who go down to the sea in ships.

### VOYAGES TO CHURCHILL

The S.S. *Essex Trader*, Captain R. E. Bennett, principal observing officer, Mr. A. Findlay, Second Officer, made two voyages to Churchill in the 1955 season. The following interesting report on the navigation and the ice conditions experienced has been forwarded to us by the master.

"The *Essex Trader* sailed from Hull on her first voyage to Churchill on 24th July, and encountered strong headwinds and rough seas from Cape Wrath to a position 75 miles south of Cape Farewell. After passing Cape Farewell the weather moderated but visibility deteriorated, and the vessel proceeded under conditions of poor visibility with intermittent fog patches across Davis Strait and into Hudson Strait.

"The first icebergs were seen about 120 miles ESE. of Resolution Island, which was passed on the morning of 4th August, and numerous bergs and growlers were seen close to our track as far as Wales Island. Only one small patch of scattered pack-ice was seen and this was easily avoided. It was found that icebergs could be picked up on radar at distances of from 4 to 15 miles (according to size and shape) while field-ice, in smooth water, gave a reasonably good echo at distances of 1 to 3 miles.

"From Wales Island to Churchill navigation was unimpeded and no ice was sighted. The responder beacon on Cape Moses Oates was not working. Vessel arrived at Churchill on 8th August, loaded and sailed on 10th for London.

"On sailing from Churchill no ice was sighted until vessel was in the vicinity of Wales Island, but from that position to a position 90 miles ESE. of Resolution Island numerous bergs and growlers were sighted. Resolution Island was passed on 14th August, no pack-ice was encountered on our passage from Churchill.

"Vessel arrived at London on 25th August, discharged and sailed for Churchill on 1st September. From Land's End to the entrance to Hudson Strait strong headwinds with rough seas were experienced. The first icebergs were seen when vessel was 135 miles ESE. of Resolution Island, which was passed on 13th September. Numerous bergs and growlers were seen on both sides of the track as far as Cape Prince of Wales; from that position to Churchill no ice was seen. Good D/F bearings were obtained from the responder beacon on Cape Moses Oates.

"Arriving at Churchill on 17th September, vessel loaded and sailed for London on 19th. Scattered bergs and growlers were encountered from a position 25 miles N. of Cape Prince of Wales to 130 miles ESE. of Resolution Island. No pack-ice was seen during our second voyage to Churchill.

"With regard to navigation, in my opinion it would be of great assistance if radar reflectors were established on the west end of Charles Island, and on suitable sites on Coates and Mansell Islands.

"As usual excellent co-operation was given by all officials, etc., at Churchill, and all were most helpful.

"On arrival at Churchill the ice/radar report was handed to ice observation officer for forwarding. Below is a list of berg positions sighted during our second voyage.

"*Radar.* Decca 159B, 3 cms, 7kW., width of antenna 4 ft, height above sea in light condition 70 ft, loaded 52 ft.

"*Ice.* The description of ice covers height above sea level, large bergs approximately over 100 ft, medium over 30 and under 100 ft, small over 15 and under 30 ft, bergy bit over 6 and under 15 ft, growlers over 2 and up to 6 ft."

#### Icebergs sighted during second voyage to Churchill

LATITUDE ° N.	LONGITUDE ° W.	SIZE	DESCRIPTION	DISTANCE SEEN BY RADAR miles
60 29	61 21	Large	Square shape	14
60 37	61 22	Large	Oblong shape	12
60 26	61 45	Medium	Hummock shape	6
60 30	61 46	Small	Peak shape	5
60 50	62 58	—	—	11
61 07	64 30	—	—	8
61 14	64 30	—	—	14
61 03	64 44	Small	Flat topped	4
60 58	64 50	Small	Flat topped with slight curve	3
61 04	65 15	Large	Square shape	13
61 12	65 46	Medium	Peak shape	7
61 05	66 07	Small	Round top	4
61 14	66 09	Medium	Triangular shape	8
61 07	66 18	Large	Sugar loaf	15
61 10	66 23	Large	Oblong shape	14
61 05	66 23	Large	Slanting sides roof top	9
61 18	66 32	Large	Triangular shape	10
61 24	67 04	Medium	Round top	6
61 27	67 22	Growler	Flat top	4
61 28	67 24	Bergy bit	Irregular	3
61 29	67 37	Bergy bit	Irregular	3
61 28	67 48	Medium	Square top	7
61 27	68 44	Large	Flat top	11
61 38	68 43	Growler	Jagged top	3
61 46	70 26	—	—	10
62 19	71 34	Large	Oblong shape	13
61 25	68 59	Growler	Peak shape	3
61 20	68 52	Small	Flat top	6
61 14	68 18	—	—	5
61 07	67 05	—	—	8
61 04	66 30	—	—	12
61 06	66 15	Small	Round top	4
60 52	65 42	Three bergy bits	Irregular	4
60 49	65 20	Medium	Triangular	7
60 46	64 53	Medium	Hummock	8
60 42	63 24	Small	Peak shape	5
60 42	63 12	Large	Oblong shape	12
60 50	63 06	Medium	Round top	7
60 30	62 30	Large	Sugar loaf	14
60 29	62 05	Bergy bit	Irregular	3
60 28	62 05	Growler	Irregular	2
60 35	61 35	Large	Triangular	10
60 15	61 10	—	—	13
60 10	61 16	—	—	8

#### EXCELLENT AWARDS, 1955-56

Ever since the inception of *The Marine Observer* in 1924, the July number has contained the names of the captains, principal observing officers and, since the war, the radio officers who, by the standard of the meteorological logbooks which they have sent here during the year ending the previous 31st March, have earned the Excellent Award. This year's list appears on page 132 of this number and once again we have very great pleasure in congratulating those who are named thereon.

The assessment of the meteorological logbooks and the placing of them in an order of merit is a task not lightly undertaken. It is always done by a seaman who has constantly in mind the varying opportunities of precise and continuous observations in differing types of ship and different trades. He realises, for instance, that observing in a small two-mate ship in the North Sea calls for more effort than observing in a four-mate passenger liner on a fine weather run. He marks the books accordingly.

In the year ended 31st March, 1956, the highest marks were gained by the following 10 ships:

1. M.V. *San Velino* (Eagle Oil & Shipping Co.), Captain I. G. Goldsworthy.
2. S.S. *Rialto* (Ellerman's Wilson Line), Captain H. Greenhill.  
M.V. *Port Brisbane* (Port Line, Ltd.), Captain F. W. Bailey, M.B.E.
3. S.S. *Newfoundland* (Johnston Warren Line), Captain C. H. Kenyon.  
S.S. *Devon* (Federal Line), Captain J. M. James.  
S.S. *Mandasor* (T. & J. Brocklebank), Captain G. A. Jackson.  
M.V. *Port Lincoln* (Port Line, Ltd.), Captain J. L. Porter.  
M.V. *Sussex* (Federal Line), Captain E. H. Hopkins.  
M.V. *Inishowen Head* (Messrs. G. Heyn & Son), Captain H. N. Clarke.  
M.V. *Marna* (Chr. Salvesen & Co.), Captain L. B. Anderson.

Photographs of the first three of these ships appear opposite page 153, and we congratulate the S.S. *Rialto* on having her photograph thus published for the second consecutive year.

From the list on page 132, it will be seen that 50 shipping companies are represented this year, and whilst it may be remarked that certain companies have many more awards than others, that is merely because their observing fleets are larger. Proportionately to the number of their observing ships, the number of Excellent Awards going to the larger companies is rather less than that going to the smaller companies.

The number of meteorological logbooks received here during the year was 1,320. Of these 338 or 25.6% were assessed Excellent. The previous year's percentage of books marked Excellent was 23.3 whilst in the year ended 31st March, 1954, the figure was 17.3%. This annual increase in the number of ships gaining the Excellent assessment is the source of no small pleasure to us. The number of Awards which may be given in a year is, however, fixed at 100, and the increase in excellent assessments will inevitably bring its disappointments to a number of officers who see in their own books worthy subjects for an Excellent Award. We can sympathise with these officers, for in our own years at sea we suffered many such disappointments, but there will be some who, in turning to page 132 and reading therein of their success after many setbacks, will be able to give a glance astern and encourage those who follow after.

L. B. P.

## Letters to the Editor

### WEATHER REPORTS AT SEA

SIR,—In regard to your letter, I am very pleased to know that the observations sent in by the officers of my ship have been good and satisfactory. I have tried to impress on them how very important it is to send in accurate weather reports, only then can we expect to receive an accurate weather report from your Office.

I wish to thank you for reliable weather reports I have received for the last 10 years crossing the Atlantic. They have been a great help to me. It is with regret that I must now pass the M.V. *Sacramento* on to a younger master, as I am retiring at the end of the voyage after being 51 years at sea.

I trust and hope the *Sacramento* officers will continue to send reliable observations. With many thanks and good wishes.

Capt. J. E. ROBINSON, M.B.E.

M.V. *Sacramento*.

### FROST SMOKE

SIR,—You may be interested in the enclosed photograph (see opposite page 137) of what must be a rare occurrence in waters round the British Isles, of Arctic sea

smoke appearing east of Portland. It was taken on the morning of 2nd February, 1956, looking NE. from H.M.S. *Osprey*. The air temperature over the land was 22°F and the sea temperature from monthly sea isotherms was about 47°F. The sea smoke lasted about three hours. The wind direction was NE., force 3-4.

How often, I wonder, does this phenomenon occur in the English Channel?

Inst. Cdr. A. COXON

H.M.S. *Osprey*.

*Note.* Although Arctic sea smoke, or frost smoke as it is often called, is quite common in some temperate latitudes in winter-time, its occurrence over the coastal waters of the British Isles is rather rare. The writer has recently<sup>1</sup> made a detailed discussion of the physical factors relating to the formation of Arctic sea smoke, in an article which dealt with an occasion when the phenomenon was observed from an ocean weather ship. An essential condition for its production was shown to be the existence of an air temperature considerably below the sea-surface temperature; and, in a written comment upon these results, Jacobs<sup>2</sup> mentioned a minimum figure of about 16°F (air cooler than the sea) for the formation of Arctic sea smoke in the Gulf of St. Lawrence.

The formation of frost smoke being limited to occasions when air temperatures fall well below corresponding sea-surface temperatures, it is not surprising that most of the cases when its appearance has been reported relate to localities in the polar regions, or in middle latitudes in winter. However, it can also occur in certain localities (and special circumstances) when relatively cold air from a winter continental area (or plateau) moves quickly out over warm water. In such cases the formation of frost smoke will usually be found to occur only with strong winds which are needed to maintain the supply of cold air, and will be limited to an area quite close inshore, since further to seaward the air will be rapidly warmed through contact with the sea surface.

These considerations serve to explain occurrences of frost smoke at Hong Kong, and along the Mediterranean coasts of Spain and Greece in winter, which have been reported to the Marine Division from time to time. The writer is not aware of a previous report of frost smoke from the English Channel, though such cases seem likely to occur from time to time. Their rarity is clearly because it is unusual for air temperatures to fall 16°F or more below the sea temperature on the British coasts. Westward moving outbreaks of continental air when they cross the Low Countries coastline in winter commonly have temperatures as cold or even colder than the prescribed 16°F below the sea temperature, but as a rule they are considerably warmed up by the time they reach the east coasts of England, as the reader can readily prove for himself by reference to numerous corresponding synoptic situations of past winters.

As readers of this note are probably aware, the airstream from between east and north-east which flowed over the British Isles on 1st and 2nd February, 1956, was exceptionally cold, and representative temperatures in this airstream before it left the Continent were around 5°F. The short passage across the southern North Sea sufficed only to raise the temperature of the air to around 20°F, and in fact London recorded its lowest day maximum air temperature on 1st February since 1895. It is fairly safe to assert that frost smoke must have occurred at many other points in the English Channel on 2nd February of this year, and that it has similarly occurred (although no reports came to hand) during other outbreaks of exceptionally cold air from the Continent such as those in the February of 1895 and 1929. Besides being very cold the outbreak of continental air must be rather sudden. Frost smoke has not been observed in the English Channel during spells of cold weather associated with strong northerly pressure gradients, or with prolonged spells of cold weather when an anticyclone lies directly over the British Isles in winter. The reasons are probably because in the first case the temperature of a direct outbreak of Arctic air is rarely much more than 10-12°F colder than the sea by the time it

reaches north Scotland, and in both cases the air is neither as much as 16°F colder than the sea, nor is the layer of cold air at the surface deep enough to allow of frost smoke being formed, by the time this air moves southwards across the warmer waters of the English Channel.

The writer has also discussed the formation of Arctic sea smoke with H. H. Lamb, who states he witnessed the phenomenon on several occasions on the Shannon Estuary during the winters of 1939-40 and 1940-41. Mr. Lamb suggests the phenomenon may be more common on estuaries than on open coastlines and that, since it occurs with offshore winds, it is likely to be more common in such partially enclosed waters as the Shannon and Severn Estuaries, the Firth of Clyde and Southampton Water, than over the estuaries of east Britain; though it is possible that frost smoke occurs there also from time to time.

R. F. M. H.

<sup>1</sup> HAY, R. F. M. "Frost smoke and unusually low air temperature at ocean weather station India." *The Marine Observer*, 23, p. 218 (1953).

<sup>2</sup> JACOBS, L. Correspondence on frost smoke. *The Marine Observer*, 24, p. 113 (1954).

## Book Review

*Admiralty Manual of Navigation*, Vol. III, 1954. 9½ in. × 6 in. pp. x + 437.  
*Illus.* Her Majesty's Stationery Office, 1955. 20s.

Primarily written for officers of the Royal Navy qualifying in navigation and direction, it deals, as stated in the preface, with advanced subjects and mathematical proofs not included in Vols. I and II. As a textbook for the Ministry of Transport examinations for masters and mates, particularly the examination for extra-master for which much of the syllabus is covered, it can be thoroughly recommended.

There are many notable changes in this revised manual. Chapter VII, "The Production of Admiralty Charts", has been re-written and new methods and processes explained.

Chapter X, "The Astronomical Position Line", has been divided into two sections. Section I gives a description of the Marcq St. Hilaire method using the cosine haversine formula to obtain the intercept, and the Weirs azimuth diagram and the familiar A.B.C. tables given in Norie's tables to obtain the azimuth. Also in this section is a description of the longitude method using the half-log-haversine formula. Section 2 contains a selection of direct tabular and mixed methods suitable for marine navigation, including the popular cosine-haversine method and the speedy (H.D.486) tables of computed altitude and azimuth now widely used.

The position line quickly obtained from an ex-meridian observation or by an observation of the Pole Star is explained in Chapter XII.

Chapter XIV has been re-written to cover the theoretical aspects of modern aids to navigation.

The magnetic compass and ships' magnetism with the various methods of correction is a subject that has been well covered in Chapters XXI to XXVI.

Modern method and practice in hydrographic surveying is fully explained in Chapter XXVII.

Of special interest to the meteorological observer at sea is Chapter XV, which explains refraction, dip and mirage, and Chapter XXVIII, which describes in detail the theory of the formation and behaviour of waves so that a fair estimate can be made of the type of sea which may develop in particular conditions.

From the explanation of sea and waves naturally follows a chapter on the subject of ship handling and navigation in heavy weather; the sound principles dealt with

are of interest to all seamen. The only point open to question is the assertion that steaming to the cable to ease the strain is a dangerous practice. It is sometimes necessary in restricted anchorages when circumstances make it impractical to weigh anchor and proceed into open water to ride out a gale, and it has on such occasions sometimes been the means of saving the ship from dragging.

This well illustrated and useful book of reference at the reasonable price of £1 should find a place on every navigator's bookshelf.

A. D. W.

## Personalities

RETIREMENT.—On 16th January, 1956, CAPTAIN J. E. ROBINSON, M.B.E., Commodore of Ellerman's Wilson Line, Ltd., retired from the sea after 51 years' service.

John Edward Robinson was educated at the Hull Trinity House School and went to sea in December 1904 with Messrs. Watts, Watts & Company. His first voyage was made to Japan in 1904 during the Russo-Japanese War and he returned to England in May 1908. At the age of 19½ he was Second Mate of the S.S. *Tottenham*, and remained with Watts, Watts until February 1911. He joined Ellerman's Wilson Line, then known as the Wilson Line, as a junior officer in July 1911, and served as Third, Second and Chief Officer, being promoted to Master in May 1937. In 1945 he was appointed to the new M.V. *Sacramento* when she left the builders' yard and served in her until his retirement. Captain Robinson was elected an honorary member of the Chamber of Commerce in Sacramento, California, who presented him with a large enamelled medallion and placed a plaque aboard the ship to commemorate her association with the city.

Captain Robinson sailed unharmed throughout the First World War and was commanding the *City of Ripon* when she was torpedoed on her voyage from Africa to Port of Spain on 11th November, 1942, in the Second World War. The following year he was awarded the M.B.E. He is a Steward of Hull Trinity House and a Member of the Honourable Company of Master Mariners. His son, Captain J. E. V. Robinson, is also in command of a selected ship, the M.V. *British Marquis*.

Captain J. E. Robinson's association with the Meteorological Office goes back to 1937 when he was in command of the S.S. *Cato*. In all he had sent us 27 meteorological logbooks, 14 of which have been classed Excellent.

We wish him good health and happiness in his retirement.

L. B. P.

RETIREMENT.—In June 1956 COMMANDER M. CRESWELL, R.N.R., the Port Meteorological Officer at Liverpool, retired after nearly 32 years' service. During these years he must have met a large number of officers. Records in the Marine Division show that during recent years he visited about 1,000 ships annually in the course of his duties. Going to sea in 1907 he served his apprenticeship with the Port Line of Glasgow (owners Messrs. Crawford & Rowat), serving first in the full-rigged ship *Port Crawford* and subsequently in the four-masted barque *Port Caledonia*. Obtaining his Master's Certificate in 1914 he then joined the Canadian Pacific Line as 3rd Officer of the *Mount Royal*.

During the 1914-18 War he served as an R.N.R. Lieutenant, firstly as a navigating officer in a cruiser squadron and latterly in command of patrol and escort vessels, and as group officer of minesweeping trawlers, during which he took part in the Gallipoli campaign.

After demobilisation in 1919 he passed for extra master, square-rigged, and rejoined the Canadian Pacific, serving in the "Empress" ships as 1st Officer until his resignation in October 1924, on taking up an appointment in the Meteorological Office.

After a course of meteorological training in London he took up his appointment at Liverpool as Port Meteorological Officer on 1st January, 1925.

Commander Cresswell was mobilised in 1939 and appointed to D.E.M.S. As it was considered essential, however, to keep in touch with the voluntary observing fleet and that their instruments be maintained and inspected, and the interest of the ships' officers in meteorological work sustained, he remained at Liverpool in the employment of the Meteorological Office and worked in liaison with the Naval Control Authorities throughout the war. It was largely due to this policy that British voluntary observing ships were able to resume their normal weather activities almost immediately hostilities ceased.

Commander Cresswell is a Liveryman and member of the Court of the Honourable Company of Master Mariners, also a Freeman of the City of London. He has been a member of the Technical Committee for five years and Honorary Secretary of the North-Western Area for eight years. In 1935 he served as President of the Liverpool R.N.R. Officers' Club and for 21 years was Honorary Secretary.

Despite his retirement he is not severing his contact with the Meteorological Office, because in August 1956 he will be taking up the post of Merchant Navy Agent in the Humber area in succession to Captain R. E. Dunn, who will then be retiring from that agency.

A. D. W.

## Notices to Marine Observers

### Postal Arrangements

The quarterly numbers of *The Marine Observer* are published on the last Wednesdays of December, March, June and September.

*The Marine Observer* is addressed to the Captain, S.S./M.V. . . . . ., c/o the owners, and captains are requested to make their own arrangements for forwarding.

Shipowners, Marine Superintendents and all concerned in the despatch of mails to ships are asked to kindly facilitate the despatch and delivery of mail received at their offices from the Meteorological Office and "Air Publications and Forms Stores" to their ships abroad. Addressed to the captains of ships, this contains information required for the conduct of meteorological work at sea, and is most effective if received by the captains at the earliest possible date.

### Changes in forecast areas in North Sea and Iceland areas and in times and frequencies for B.B.C. Bulletins for Shipping.

On 1st November, 1955, two new areas were added to those contained in the North Atlantic Weather Bulletin broadcast to shipping by the G.P.O. from Portishead Radio. They cover the vicinity east and north of the Icelandic coast up to 100 miles from the coast and are as follows:

- (a) DENMARK STRAIT extending from 65°N., 35°W. to 68°N., 19°W.
- (b) NORTH ICELAND extending from 68°N., 19°W. to 64°N., 10°W.

Forecasts for these two areas give surface wind force and direction, with the addition of air temperature when this is expected to be below freezing. This information is broadcast for the benefit of British trawlers operating in this area. The loss of two British trawlers in January 1955, north of Iceland, due to their capsizing because of heavy accumulation of ice on their superstructures, emphasises the value of this information.

From 22nd April, 1956, certain areas included in radio weather bulletins for coastal shipping issued by the G.P.O. and B.B.C. have been amended as follows:

- (a) The area formerly called Iceland is now called SOUTH-EAST ICELAND. Thus with the addition of the two new areas Denmark Strait and North Iceland in the Atlantic bulletin, all the coastal waters around Iceland are now covered.

- (b) Two new areas have been added in the North Sea:
- (i) The area to the eastward of Fair Isle between 59°N. and 61°N. is to be named VIKING.
  - (ii) The eastern half of the area Dogger is to be renamed FISHER.
- (c) The area Heligoland is replaced by a new area named GERMAN BIGHT. There are a few minor consequent changes in the limits of some existing North Sea areas.

For definite limits of all these areas see the chart contained in Admiralty Notice to Mariners in the *Radio Times* and in a recent amendment to the *Marine Observer's Guide*, which has been issued to all British voluntary observing ships.

Also, with effect from 22nd April, 1956, the radio weather bulletins broadcast for shipping by the B.B.C. are included in the Light Programme on 1500 metres instead of on the Home Service.\* The times of these new bulletins are as follows:

Monday to Saturday	0645 to 0650 G.M.T. 1340 to 1345 clock time 1758 to 1800 clock time 2400 to 0005 clock time
Sunday	0645 to 0650 clock time 12 o'clock to 1205 clock time 1928 to 1930 clock time 2400 to 0005 clock time

The five-minute shipping bulletins consist of:

- (a) a statement of gale warnings in force; a general synopsis;
- (b) forecast for the next 24 hours for each coastal sea area, giving wind direction and Beaufort force, weather and visibility;
- (c) a selection of *actual* reports from certain coastal stations containing wind direction and Beaufort force, present weather, visibility, barometric pressure and tendency.

The two-minute bulletins consist of the forecast for coastal sea areas only.

Twenty-four-hour forecasts for the East Anglian herring fishing fleet are added to all shipping forecasts issued by the B.B.C. during the fishing season (about two months from the beginning of October). The area involved is entitled SMITH'S KNOLL.

Twenty-four-hour forecasts are also issued for Scottish fisheries in the area MINCH during the 1340 and 2400 hour broadcasts from Monday to Friday inclusive.

Gale warnings issued by the B.B.C. will be broadcast as near to the hour as possible.

The contents of the bulletins issued by G.P.O. coast stations remain unaltered, except for the changes in names of areas. w/T transmissions will include South-East Iceland and Viking from Wick, and German Bight from Cullercoats. R/T transmissions will include South-East Iceland and Viking from Wick, Fisher from Cullercoats and German Bight from Humber.

\* We have been advised by the B.B.C. that for technical and administrative reasons it is not practicable to issue these bulletins for shipping on 247 metres as well as 1,500 metres.

### Changes in Nautical Staff

Lieut.-Commander E. R. Pullan, R.D., R.N.R., who has been assistant to Commander Creswell at Liverpool, has been appointed to the post of Port Meteorological Officer at Southampton in succession to Captain J. R. Radley, who has been promoted to Port Meteorological Officer, Liverpool, on the retirement of Commander Creswell (see page 166). Addresses and telephone numbers remain unchanged.

# Fleet Lists

## GREAT BRITAIN

The following is a list of British ships voluntarily co-operating with the Marine Division of the Meteorological Office. The names of the Captains, Observing Officers and Senior Radio Officers are given as ascertained from the last written returns received. The date of receipt of the last return received is given in the third column.

All returns received from observing ships will be acknowledged, direct to the ship, by the Marine Superintendent.

The Port Meteorological Officers and Merchant Navy Agents at the ports will make personal calls on the Captains and Observing Officers as opportunity offers, or on notification from the ship at any time when their services are desired.

Excellent awards are made at the end of each financial year. The names of the Captains, Principal Observing Officers and Senior Radio Officers gaining these awards are published in a special list in *The Marine Observer*.

It is requested that prior notification of changes of service, probable periods of lay-up, transfer of Captain, or other circumstances which may prevent the continuance of voluntary meteorological service at sea, may be made to the appropriate Port Meteorological Officer or Merchant Navy Agent.

Captains are requested to point out any errors or omissions which may occur in the list.

### Selected Ships

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Acara</i> ..	GJSW	19.3.56	G. D. Simpson, O.B.E.	P. J. Burden, J. Ball, G. H. Ryan	J. Stuart	Elder Dempster Lines, Ltd.
<i>Adelaide Star</i> ..	GKPB	1.3.56	C. Roberts, C.B.E.	R. R. Glenn, T. Harris, A. Francombe	C. Williams	Blue Star Line, Ltd.
<i>Aden</i> ..	GKMN	10.12.55	W. J. Banks	P. B. Jackson, A. K. Ewing	D. Harris	P. & O. Steam Navigation Co.
<i>Afghanistan</i> ..	GNYB	1.12.55	F. W. Bowley, F.R.A.S.	J. Cummins, D. M. Foster, A. K. Grey	P. J. Shanahan	F. C. Strick & Co., Ltd.
<i>Ayana</i> ..	GKVV	30.9.55	F. W. Mould	H. A. McGill, T. Hastings, I. Westergaard	L. Kidd	Trinder Anderson & Co.
<i>Ayax</i> ..	GJXM	13.2.56	G. Carney	D. H. Thomas, D. Astell, J. M. Smith	C. C. Branthwaite	A. Holt & Co.
<i>Albiston</i> ..	MABT	21.2.56	R. Mace	E. C. Cross, P. E. Thompson, J. Brown	W. Hammond	F. C. Strick & Co., Ltd.
<i>Alcantara</i> ..	GLQR	26.10.55	W. H. Grimshaw	P. F. Jowers, T. Farquharson, J. A. Lewin		Royal Mail Lines, Ltd.
<i>Alsatia</i> ..	MABL	17.12.55	J. Chapman, R.D., Capt. R.N.R. (Retd.)	B. V. Mercer, R. T. Ibbotson, H. Dorner, C. Pennington	J. Mockler	Cunard Steamship Co., Ltd.
<i>Amakura</i> ..	MCPN	23.1.56	A. Jones	D. Andrew, T. Jones, C. Eckersley	J. Banks	Booker Bros. McConnell & Co., Ltd.
<i>Andes</i> ..	GOCV	5.1.56	P. M. Burrell	C. Oxborough, P. Ramage, T. M. Milner	W. Smith	Royal Mail Lines, Ltd.
<i>Anadria</i> ..	GDWM	12.2.56	A. N. Sargent	P. A. A. James, O. Elson, M. Goddard, P. Gadsden		
<i>Apapa</i> ..	MACE	22.11.55	C. H. Sweeney	A. J. Bryant, W. E. Christie	P. Byrne	Cunard Steamship Co., Ltd.
<i>Araba</i> ..	GLKF	24.1.56	W. B. Tanner, R.D., Capt. R.N.R. (Retd.)		G. Gillings	Elder Dempster Lines, Ltd.
<i>Arabistan</i> ..	GCKK	15.12.55	R. B. Arthur, M.B.E.	J. Board, B. Coates, J. Smith	T. Sandham	Cunard Steamship Co., Ltd.
<i>Araby</i> ..	GMZL	8.10.55	W. B. Avison	F. W. Bush, J. H. Hedley, A. S. Bashford	J. A. Byrne	F. C. Strick & Co., Ltd.
<i>Arakaka</i> ..	GDEV	23.12.55	J. A. Carter	C. Colwinston-Thomas, R.N.R., D. Lawson	B. F. Halpin	Royal Mail Lines, Ltd.
<i>Argentina Star</i> ..	GTKF	24.11.55	E. R. Pearce, O.B.E.	R. A. Hammond, C. Nolan, J. L. Anczykowski	J. Fraser	Booker Bros. McConnell & Co., Ltd.
<i>Ariguani</i> ..	GMBL	27.2.56	R. W. Lundy, O.B.E., R.D., Lt.-Cdr. R.N.R. (Retd.)	D. N. Murray, B. G. Knights, J. Rawding	— Cragg	Blue Star Line, Ltd.
<i>Armagh</i> ..	GQGG	28.10.55	M. R. Foster	J. Quinlan, N. Abbot, H. G. Penny	I. Humphreys	Elders & Fyffe, Ltd.
<i>Arundel Castle</i> ..	GCZL	21.1.56	D. D. MacKenzie	J. Cole, T. Cameron, J. Johnston	J. Barkinshaw	Avenue Shipping Co.
				R. Grice, D. France, B. Fry	G. Kilminster	Union Castle Mail S.S. Co., Ltd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Ascania</i>	GKNJ	24.12.55	E. A. Divers, O.B.E., R.D., Capt. R.N.R.	R. Venn, D. Robertson, R. Howard, D. Ridley, D. A. Williams	W. Smith	Cunard Steamship Co., Ltd.
<i>Ashburton</i>	GNJN	25.1.56	I. S. McLean	J. K. Bryon, H. Jones, R. Toye	C. P. North	Trinder Anderson & Co.
<i>Asia</i>	GLJV	17.1.56	W. E. Warwick, R.D., Cdr. R.N.R.	J. R. Clark, W. Seubert, J. Wilson Smith, H. Leslie Smith	J. S. Marshall	Cunard Steamship Co., Ltd.
<i>Assyria</i>	GGKX	7.2.56	J. G. Bradley, R.D., Capt. R.N.R.	H. M. Snow, M. J. Ridge, D. V. Gallagher	B. A. Long	Cunard Steamship Co., Ltd.
<i>Asturias</i>	GLQS	6.3.56	J. Smith, R.D., Capt. R.N.R.	J. Wilson, P. M. Box, R. J. Bland, P. H. Atkinson, B. Awcock	R. Farrel	Royal Mail Lines, Ltd.
<i>Athelfoam</i>	GMFN	3.1.56	C. R. J. Roberts	J. O'Sullivan, A. MacDonald, P. McKinney	P. J. Broudair	Athel Line, Ltd.
<i>Athens</i>	GBLS	5.12.55	L. H. Edmeads	A. Harrison, J. O. Williams, D. Aberdeen, J. W. Licalsi	H. S. Knight	Shaw, Savill & Albion Co. Ltd., Union Castle Mail S.S. Co., Ltd.
<i>Athlone Castle</i>	GYTK	28.1.56	C. C. Page	P. Jackson, G. Stockley, R. Hinkley	J. Summers	Elder Dempster Lines, Ltd.
<i>Aureol</i>	GMGJ	1.2.56	W. Munt	D. Capstick, P. Myers	F. W. J. Broomfield	Blue Star Line, Ltd.
<i>Australia Star</i>	GYCS	24.12.55	J. A. Hoppé	G. C. Williams, J. C. Farmer, E. C. Smith	L. Cooper	Trinder Anderson & Co.
<i>Australind</i>	GJKF	3.9.55	R. Willcocks	H. R. Coates, R. Liley, R. Warwick	W. Edgington	Purvis Shipping Co., Ltd.
<i>Austons</i>	GBSV	30.11.55	J. W. Cromarty	S. O. Nazar, J. H. Lillico	L. R. Bradley	Dene Shipping Co., Ltd.
<i>Avondene</i>	MAWG	28.12.55	F. Moorcraft	J. W. B. Morgan, E. B. Addison	J. T. W. Moody	Walter Runciman & Co., Ltd.
<i>Avonmoor</i>	GFGL	7.11.55	J. A. Barton	D. A. Crawford, R. R. Jordan, R. S. Usher	P. Wiggins	Hector Whaling, Ltd.
<i>Balaena</i>	GLDG	13.5.54	P. Uirik	R. Christoffersen, — Bentzen, A. Anderson	J. Dahl	Royal Mail Lines, Ltd.
<i>Balantia</i>	GBNM	8.3.56	J. L. Perkins	T. D. Lilley, H. Nixon, D. Knights	J. Egerton	H. Hogarth & Sons
<i>Baron Ephinistone</i>	GLCD	29.9.55	T. D. Drysdale	T. B. McLeod, W. Findlay, R. Blackmore, A. Watson, J. Day	J. Marnell	H. Hogarth & Sons
<i>Baron Glenconner</i>	GTQK		T. R. Reid	R. W. Gunn, H. Bayson, T. H. MacDonald	T. R. Collins	H. Hogarth & Sons
<i>Baron Macleay</i>	GKXM	13.12.55	J. Reid	T. H. MacDonald, J. H. Thomas, H. Bryson	J. Lee	H. Hogarth & Sons
<i>Baron Murray</i>	GIFB	21.12.55	J. Pearson	J. W. Budka, J. Minards, M. Crawford	A. P. Oliver	H. Hogarth & Sons
<i>Baron Renfrew</i>	GYDR	23.1.56	W. Warden	G. Downie, D. Harlock, P. Laurie	A. W. Wall	H. Hogarth & Sons
<i>Barrister</i>	MSFR	15.12.55	A. Wolstenholme	M. Watson, J. Bean, L. G. Bennett	R. W. Rayner	T. & J. Harrison, Ltd.
<i>Baskerville</i>	GSDN	13.2.56	G. Blacklock	M. Martin, P. Felts, J. J. Aitkin	G. Stacey	Runciman (London), Ltd.
<i>Basamo</i>	GNXK	24.11.55	C. H. Tutty	C. M. Jordan, C. Main, A. M. Robson	A. Learey	Ellerman's Wilson Line, Ltd.
<i>Beaverburn</i>	MAQB	18.2.56	W. J. P. Roberts	I. M. Smith, J. Brook, G. C. Gamblin	G. Adamson	Canadian Pacific S.S., Ltd.
<i>Beaverford</i>	MQJB	22.4.55	J. Soame	R. J. Baddock, M. Organ, C. R. Worthington, D. Roberts	B. Johnson	Canadian Pacific S.S., Ltd.
<i>Beaverford</i>	GBCP	13.10.55	F. Roberts	J. Brooks, M. Mayes, J. Palmer	J. Appleton	Canadian Pacific S.S., Ltd.
<i>Beaverlake</i>	GBCQ	5.2.54	N. W. Duck, D.S.C., R.D., Capt. R.N.R. (Retd.)	C. Hutchinson, G. Palmer, J. Whaling, M. Scott	A. E. S. Thompson	Canadian Pacific S.S., Ltd.
<i>Beaverlodge</i>	MAGJ	16.2.56	L. H. Johnston, M.B.E.	E. Brewer, B. Snell, J. Hooley	W. Moadley	Canadian Pacific S.S., Ltd.
<i>Bellerophon</i>	GGCM	10.3.56	H. H. Sanderson	M. Nall, R. Webb, R. Dinnie, A. Donnan	A. E. Holman	A. Holt & Co., Ltd.
<i>Bennetis</i>	MAGG	12.1.56	R. Griffiths	G. C. Alston, J. Ritchie, I. R. Ansell	P. Gregory	W. Thomson & Co.
<i>Biscoe</i>	GDCW	24.12.55	S. K. Williams	C. T. Fellowes, M. D. Chester, B. Mullen	D. Wilkes	Hector Whaling, Ltd.
<i>Bransfield</i>	GDRK	4.5.54	M. Paulsen	A. G. Giblin	T. Salvesen	Hector Whaling, Ltd.
<i>Brasil Star</i>	GTLF	19.3.56	G. E. Barnard	R. Middleton, M. J. Thomas, J. R. Massey	A. C. Webb	Blue Star Line, Ltd.
<i>Bravo</i>	GLDZ	20.1.56	J. A. Etches	A. J. Collard, R. Lomas, F. M. Martin, R. Neesham	J. Hudson	Ellerman's Wilson Line, Ltd.



NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Cilicia</i>	GDGL	1.4.55	I. L. Gibson, O.B.E.	D. MacLeod, G. Hendry, N. McFarlane	C. Pennington	Anchor Line, Ltd.
<i>Cingalese Prince</i>	GFRK	25.1.56	R. C. Proctor, O.B.E.	D. Milburn, J. F. Newton, K. E. Maxwell	K. McQuire	Prince Line, Ltd.
<i>City of Barcelona</i>	GTRR	3.9.55	A. N. Fry	J. A. Cuckey, A. C. Mason, C. I. Free	A. D. Adams	Ellerman Lines, Ltd.
<i>City of Birmingham</i>	GZLR	12.3.56	E. M. Robertson	T. M. Dickson, R. Bellhouse, T. Bernard	J. D. Clutton	Ellerman Lines, Ltd.
<i>City of Brisbane</i>	GDLM	9.12.55	E. G. Chapman	F. W. Bland, H. Brown, A. M. Bowman	A. E. Lawrence	Ellerman Lines, Ltd.
<i>City of Bristol</i>	GCPN	6.8.55	W. A. Owen	C. H. Long, R. I. McNab, I. G. Lunley, L. R. Jones	E. Fitzgerald	Ellerman Lines, Ltd.
<i>City of Cape Town</i>	GBBQ	5.5.55	J. Blewett	J. R. Lowe, J. R. Phimm, N. Bradley	F. D. Green	Ellerman Lines, Ltd.
<i>City of Carlisle</i>	GBJK	9.6.55	F. McKay	P. J. Carnie, G. Roose, A. MacMillan	J. O'Donoghue	Ellerman Lines, Ltd.
<i>City of Chester</i>	MAHN	27.2.56	A. L. Beckett	J. S. Nuttall, G. Stewart, J. G. Hill	C. K. Cotching	Ellerman Lines, Ltd.
<i>City of Delhi</i>	GLBW	6.12.55	W. S. Lowe	R. Bailey, W. Fleming	W. Sharp	Ellerman Lines, Ltd.
<i>City of Derby</i>	GFWC	21.12.55	W. McCulloch	M. McDonald, A. Boag, A. Willa	J. Simpson	Ellerman Lines, Ltd.
<i>City of Durham</i>	GBJM	14.11.55	D. Hamilton	P. Lamb, P. E. Pope, J. Robertson	G. W. Hockston	Ellerman Lines, Ltd.
<i>City of Edinburgh</i>	GNGC	6.12.55	W. Nimmo	T. Innes, F. W. More, B. Fletcher	H. Smith	Ellerman Lines, Ltd.
<i>City of Evansville</i>	GNJF	1.11.55	R. V. Bradshaw	R. MacMahon, J. V. Ashby, O. Henderson	B. W. Evans	Ellerman Lines, Ltd.
<i>City of Johannesburg</i>	GBKW	18.11.55	W. J. Merchant	G. P. Rainer, P. Collin, A. J. Lawrie	E. Woodward	Ellerman Lines, Ltd.
<i>City of Kharطوم</i>	GBZC	12.3.56	T. G. Mathias	M. F. Murfin, R. B. Perry, A. Evans	J. F. Doocoy	Ellerman Lines, Ltd.
<i>City of Lichfield</i>	GDXL	3.12.55	G. R. Jackson	A. A. Smith, R. P. M. Cook, J. Grains, M. Wade	A. Hunter	Ellerman Lines, Ltd.
<i>City of Lille</i>	GSLN	12.5.54	H. Mackie	F. W. More, D. Wright, G. H. Watkins	A. T. Murray	Ellerman Lines, Ltd.
<i>City of Liverpool</i>	GZJX	6.3.56	F. M. Wormsley	P. Thronton, — Heywood, A. S. Conyers	— Peat	Ellerman Lines, Ltd.
<i>City of Lyons</i>	GMCN	2.12.55	W. Howel	J. M. Longstaff, J. Kinely, W. M. McGregor	E. D. McMahon	Ellerman Lines, Ltd.
<i>City of Manchester</i>	CXLD	26.1.56	W. A. Hannah	W. McGowan, P. H. Soones, S. G. Hider	A. J. Duggan	Ellerman Lines, Ltd.
<i>City of New York</i>	GLYQ	4.7.55	A. M. Westlake	B. J. Lewis, P. Boyle, P. A. Embley	J. Herron	Hall Line, Ltd.
<i>City of Paris</i>	GFQM	27.2.56	T. H. Speakman	E. George, P. K. Leatham, B. C. Matson	A. Gandon	Ellerman Lines, Ltd.
<i>City of Pretoria</i>	GBLN	6.8.55	A. G. Freeman	A. A. Ramsden, D. A. Broadway, P. R. Williamson	K. G. Arthur	Ellerman & Bucknall S.S. Co., Ltd.
<i>City of Swansea</i>	GBZT	8.9.55	F. J. H. T. Vizer	P. Field, C. Heywood, F. Smith, J. Pether	M. Riley	Ellerman Lines, Ltd.
<i>City of Sydney</i>	GSEM	18.2.55	G. F. Sumpton	J. M. S. Gibson, J. Kendal, R. A. White	T. H. Rowlands	Ellerman Lines, Ltd.
<i>Clan Brodie</i>	GKPD	27.10.55	A. V. Gordon	D. J. Burgoyne, T. Jewel, G. Mitchell	A. Crawford	Cayzer Irvine & Co., Ltd.
<i>Clan Buchanan</i>	GKNM	15.2.55	H. T. Booth	B. Peat, A. Stafford, J. W. Stickler	J. Brown	Cayzer Irvine & Co., Ltd.
<i>Clan Campbell</i>	GDZK	15.11.55	H. C. Simpson, O.B.E.	M. R. Learner, P. Kent, R. A. Birlison, M. Bolton	D. B. Strang	Cayzer Irvine & Co., Ltd.
<i>Clan Chattan</i>	GFBX	2.3.56	J. McCrone	A. Campbell, J. S. A. Rendell, K. Barr, J. Dodds	E. Shillabeer	Cayzer Irvine & Co., Ltd.
<i>Clan Chishalm</i>	GFBY	7.1.55	W. R. Woodruffe	R. Bullmore, G. A. Berry, J. Ibeater	J. W. S. Wilson	Cayzer Irvine & Co., Ltd.
<i>Clan Davidson</i>	MAWU	2.12.55	T. A. Watkinson	J. M. Brackenbridge, W. Cathro, P. Phillips	G. D. Ainslie	Cayzer Irvine & Co., Ltd.
<i>Clan Forbes</i>	GPGB	7.12.55	I. C. Scott	T. H. Graham, R. Snape, C. L. Leaswain, G. A. J. R. Findlay	P. H. Cottrill	Cayzer Irvine & Co., Ltd.
<i>Clan Macaulay</i>	GZCS	7.10.55	F. N. S. Petherbridge	R. Escombe, E. Coate, E. N. Bass, A. F. Flanery	C. Heggerty	Cayzer Irvine & Co., Ltd.
<i>Clan Macdonald</i>	GCPG	29.9.55	A. J. Hogg	M. N. Ure, G. W. E. F. Wilson, G. Brice	R. W. Bathgate	Cayzer Irvine & Co., Ltd.
<i>Clan MacDougall</i>	GFBO	3.2.56	P. MacMillan	T. Hunter, A. Mair, M. Fowkes, A. Plant	C. E. C. Crewer	Cayzer Irvine & Co., Ltd.
<i>Clan MacKinnon</i>	GK LX	15.3.56	W. Graham	P. J. Morrison, O. T. Ross, I. White	G. Norton	Cayzer Irvine & Co., Ltd.
<i>Clan MacLaren</i>	GSSC	10.3.56	A. G. MacPherson	R. J. Scott, T. H. Ward, E. Taylor	R. W. Moore	Cayzer Irvine & Co., Ltd.
<i>Clan Macleay</i>	GSTV	7.2.56	S. S. Davidson	E. W. T. Patterson, C. Stonehouse, A. F. Aspin	F. Fawcett	Cayzer Irvine & Co., Ltd.

<i>Clan MacLean</i>	GSWX	7.3.56	H. Whitehead	E. T. Burke, D. Williams, H. S. Catterall	H. G. P. Macnamara	Cayzer Irvine & Co., Ltd.
<i>Clan Macrae</i>	MAHP	4.1.55	H. Lockyer	B. J. Johnson, S. Shaw, J. L. Daniel	D. W. Powell	Cayzer Irvine & Co., Ltd.
<i>Clan MacTavish</i>	GUBB	10.3.56	E. Gough, O.B.E.	A. M. Ewing, J. Nutt, J. M. Shearer	W. Ellmers	Cayzer Irvine & Co., Ltd.
<i>Clan Robertson</i>	GRQQ	7.11.55	H. J. Anchor, O.B.E., R.D., Capt. R.N.R. (Retd.)	R. M. McCrone, J. A. Stockley, J. L. Harris, J. Patterson	A. Hadden	Cayzer Irvine & Co., Ltd.
<i>Clan Shaw</i>	GBYW	11.8.55	L. C. Higgins, M.B.E.	J. T. Messenger, L. Hamer, J. G. Smith	G. H. Hudd	Cayzer Irvine & Co., Ltd.
<i>Clan Sutherland</i>	GFVZ	3.10.55	F. H. Turton	G. S. Gann, E. C. Harvey, B. Middleton	W. Gay	Cayzer Irvine & Co., Ltd.
<i>Clan Urquhart</i>	GFBK	15.11.55	C. M. Powell, M.B.E.	G. E. Trowdale, T. R. Halliday, K. G. P. Swift, G. C. H. Wearing	R. Morris	Cayzer Irvine & Co., Ltd.
<i>Clydebank</i>	GKLM	14.3.55	F. Hale	W. C. Stoddard, R. Spedding, H. R. Hall	E. B. Maguire	Andrew Weir & Co., Ltd.
<i>Condesa</i>	MAHU	2.11.55	A. McEwan	M. Gilmour, A. Millie, A. Ellis	J. Bishop	Furness-Houlder Argentine Lines, Ltd.
<i>Consuelo</i>	GGCQ	8.11.55	G. Goodman	R. K. Youngman, B. Yale, N. O. Cook	C. Cain	Ellerman's Wilson Line, Ltd.
<i>Corfu</i>	GRNW	7.1.56	G. K. Fox	A. C. MacKinnon, D. Williams, J. A. G. Jones	B. C. McCorry	P. & O. Steam Navigation Co.
<i>Corinaldo</i>	GMKP	8.11.55	J. L. Downie	W. G. Cullen, N. C. Halden, A. Dougal	S. Cox	Donaldson Bros. & Black, Ltd.
<i>Corinthic</i>	GZYL	18.1.56	A. C. Jones	G. Broom, P. Harkness, R. Frisby, Mounsey	Lilles	Shaw, Savill & Albion Co., Ltd.
<i>Corrales</i>	GSJL	14.1.56	W. F. Young	B. Hodges, R.N.R., C. Gilbert, C. Spikins	D. L. Oliver	Elders & Fyffes, Ltd.
<i>Cotopaxi</i>	GQNX	30.11.55	J. D. Richards	D. J. Bishop, E. Gowland, R. D. O'Driscoll	M. M. Garbett	Pacific Steam Navigation Co.
<i>Croftier</i>	MNGX	23.12.55	S. Diamond	J. A. Heald, H. Sutcliffe, R. Maxwell	R. Doyle	T. & J. Harrison, Ltd.
<i>Cumberland</i>	GPPY	20.1.56	A. E. Williams	G. Lowry, J. T. Varney, P. G. Rankin	R. Oliver	Federal Steam Navigation Co., Ltd.
<i>Cuzco</i>	GKPF	2.12.54	F. D. Eckford	K. L. Crowther, C. D. Pattison, A. Jestico	M. R. Dalton	Pacific Steam Navigation Co.
<i>Daleby</i>	MFBV	28.1.56	F. D. Lloyd	K. Barnett, E. H. Williams, D. Rogers	M. R. Carney	Ropner Shipping Co. Ltd.
<i>Dallas City</i>	GCLS	3.3.56	C. E. Exton	J. Davies, A. B. Parkhouse, J. Campbell	D. Aycliffe	Sir William Reardon Smith & Sons, Ltd.
<i>Darro</i>	MAID	1.3.56	W. S. Thomas	R. J. Kistler, T. Crebbin, J. A. Lebrecht, T. R. Johnson	W. Cameron	Royal Mail Lines, Ltd.
<i>Deerpool</i>	GKDY	1.3.56	S. Richards	A. C. Duncan, D. Small, W. Clarke	J. M. Barry	Sir R. Ropner & Co., Ltd.
<i>Delphic</i>	MBLQ	9.3.56	C. L. Cartoll, D.S.C., R.D., Lt.-Cdr. R.N.R. (Retd.)	B. H. Agnew, R. Fulford-Dobson, J. Bakewell	N. Craig	Shaw, Savill & Albion Co., Ltd.
<i>Deseado</i>	MAIH	15.10.55	R. C. S. Woolley, R.D., Cdr. R.N.R. (Retd.)	G. S. Bonner, B. Copland	J. S. MacDonald	Royal Mail Lines, Ltd.
<i>Devon</i>	GDRF	31.12.55	J. E. Bury	M. Carrell, L. Bridges, M. J. D'Oyly	J. Bilton	Federal Steam Navigation Co., Ltd.
<i>Devonshire</i>	GTTV	26.1.56	H. Kerbyson	Ashton, J. W. Mackinlay, G. H. Draysey	A. Jones	Bibby Bros. & Co.
<i>Diluara</i>	GYQV	23.12.55	M. C. Williams	R. J. Eiston, D. H. Carter, I. K. Bowerman, T. W. Barnett	S. Taylor, M.B.E.	British India Steam Nav. Co., Ltd.
<i>Discovery II</i>	GWVM	1.12.55	H. O. L'Estrange, D.S.C., R.D., Cdr. R.N.R.	R. W. Major, R. M. Fredrick, I. R. Norrington	Miller	National Institute of Oceanography
<i>Dominion Monarch</i>	GRGG	19.12.55	B. Forbes Moffat	D. Hammerton, R. L. Reid, P. Griffin	F. V. Harford	Shaw, Savill & Albion Co., Ltd.
<i>Dorset</i>	GZFQ	21.12.55	K. Barnett	W. D. F. Cooper, C. T. M. Bosworth, D. S. Garvie	E. H. Caley	Federal Steam Navigation Co., Ltd.
<i>Drina</i>	MAIL	29.12.55	F. I. Swallow	C. C. Cowley, S. Craigie, T. P. Reeve	W. B. Charlton	Royal Mail Lines, Ltd.
<i>Duke of Athens</i>	GMYS	18.2.56	T. Walton	R. E. Gattiss, J. Love, M. Chorazewski	F. D. Lockwood	Trent Maritime Co., Ltd.
<i>Dunedin Star</i>	GKKT	22.11.54	J. D. W. Davies	C. Holleyoak, J. B. Kirkham, J. Hutton	R. Read	Blue Star Line, Ltd.
<i>Dunera</i>	GBBR	28.12.55	A. A. Kay	D. Matthews, P. Davis, T. M. Hall	T. F. Holden	British India Steam Nav. Co., Ltd.
<i>Durango</i>	MALM	10.11.55	F. A. C. Thacker	J. M. Jones, J. C. Craigie, R. Fairley, G. Rogers	D. Franklin	Royal Mail Lines, Ltd.
<i>Durban Castle</i>	GPGP	3.9.55	J. E. R. Wilford, R.D., Cdr. R.N.R. (Retd.)	W. Kirkbridge, F. J. Pigeon, I. C. A. Drake	J. Drover	Union Castle Mail S.S. Co., Ltd.
<i>Durenda</i>	GFSL	2.1.56	W. J. Machon	H. F. Poulton, D. M. Taylor, R. C. Old, J. Munro	T. Lee	British India Steam Nav. Co., Ltd.
<i>Durham</i>	GWVK	8.2.56	J. D. Bennett	G. Bevis, D. Hannah, C. B. Treleaven, J. Needham, J. Thompson, W. Carver	P. Dickson	Federal Steam Navigation Co., Ltd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Edenfield</i> ..	GFJF	18.1.56	W. H. Pugsley ..	G. H. Vaughan, A. O. P. Johnson, C. P. Douglas ..	P. Driscoll ..	Hunting & Son, Ltd.
<i>Edinburgh Castle</i> ..	GOHN	24.2.56	H. A. Deller ..	I. R. Mason, T. C. M. Ball, E. J. Harding ..	I. Hodgson ..	Union Castle Mail S.S. Co., Ltd.
<i>Egadia</i> ..	GJZD	6.2.56	D. Barclay ..	R. Watt, J. McLary, W. Stockley ..	F. Blyth ..	Anchor Line, Ltd.
<i>Elyssia</i> ..	GJZK	12.3.56	A. J. E. Colquhoun, M.B.E.	W. B. Sawyers, A. T. McKendrick, A. J. Dickie, M. McLaren ..	A. R. Prole ..	Anchor Line, Ltd.
<i>Empire Clyde</i> ..	GDXS	2.3.56	A. C. Johnston ..	T. McCutcheon, K. Muir, R. B. Douglas ..	W. Thompson ..	Anchor Line, Ltd.
<i>Empire Roway</i> ..	GMPW	16.2.56	W. T. C. Lethbridge ..	D. G. Black, P. W. R. Bull, J. R. V. Beatty ..	W. Dawson ..	P. & O. Steam Navigation Co.
<i>Empire Ken</i> ..	GKZJ	6.2.56	H. E. Sang ..	J. B. Palmer, J. Thwaites, B. Challis ..	T. Winslow ..	Royal Mail Lines, Ltd.
<i>Empire Orvell</i> ..	GRCB	17.3.56	J. D. Birch, D.S.C., R.D., Cdr. R.N.R. (Retd.) ..	D. Hughes, B. Clarke, T. McCarthy ..	A. Shippam ..	Orient Steam Navigation Co., Ltd.
<i>Empire Star</i> ..	GCDP	1.3.56	A. Penrice ..	R. Burns, P. Davies, D. McWhan ..	A. Elliott ..	Blue Star Line, Ltd.
<i>Empress of France</i> ..	GNTV	28.1.56	S. W. Keay, O.B.E. ..	I. G. Bell, P. Leslie, P. Stocker ..	W. Murphy ..	Canadian Pacific S.S., Ltd.
<i>Empress of Scotland</i> ..	GMLV	28.1.56	J. P. Dobson, D.S.C., R.D., Capt. R.N.R. ..	G. Coton, R. Elliott, R. Dickinson, N. Walker ..	B. B. Campbell ..	Canadian Pacific S.S., Ltd.
<i>English Star</i> ..	MFSS	20.10.55	L. Vernon, M.B.E. ..	I. V. Anderson, P. B. Musson, E. S. Neave ..	H. B. Smith ..	Blue Star Line, Ltd.
<i>Essequibo</i> ..	GKPK	1.7.55	T. W. F. Bolland ..	A. W. Pickering, E. J. O'Keefe, P. J. Shephard ..	P. Snaith ..	Royal Mail Lines, Ltd.
<i>Essex</i> ..	GMML	8.12.55	L. W. Fulcher ..	P. J. Sedgwick, N. M. Parry, J. Cosker, P. N. Jeanes ..	R. Baker ..	Federal Steam Navigation Co., Ltd.
<i>Essex Trader</i> ..	GCMS	12.10.55	R. E. Bennett ..	A. Dindley, E. Atkinson, Z. Greiber, D. O'Neill ..	F. Wilson ..	Trader Navigation Co., Ltd.
<i>Esso Cambridge</i> ..	GRWJ	2.3.56	R. Drummond ..	J. Cotran, J. M. Phillips, J. Wilson ..	D. Robertson ..	Esso Transportation Co., Ltd.
<i>Esso Canterbury</i> ..	GQZF	20.1.56	J. W. Smith ..	W. D. Walters, K. Fullwood, D. Shermer, G. Arthur ..	P. L. French ..	Esso Transportation Co., Ltd.
<i>Esso Essex</i> ..	GSTS	27.1.56	O. H. Shephard ..	I. Petrie, V. Donovan, G. Thomas ..	W. Blake ..	Esso Transportation Co., Ltd.
<i>Esso Glasgow</i> ..	GTXC	18.1.56	R. O. Webb ..	J. R. Lewis, J. Evans, M. D. Lochrie, J. B. Robinson ..	O. O'Sullivan ..	Esso Transportation Co., Ltd.
<i>Esso Manchester</i> ..	GWCD	27.8.55	R. E. Smith ..	J. R. Petrie, J. M. Phillips, A. Harling ..	T. D. Kenny ..	Esso Transportation Co., Ltd.
<i>Eucadia</i> ..	GJZL	12.1.56	W. MacVicar, M.B.E. ..	J. E. Watson, F. M. Dare, A. Johnston ..	D. Sprout ..	Anchor Line, Ltd.
<i>Eumaeus</i> ..	MRWT	16.1.56	H. C. Large ..	A. L. Lane, B. A. Hood, T. P. Bobbin ..	J. C. Wilson ..	A. Holt & Co.
<i>Explorer</i> ..	GYJX	16.1.56	W. S. Eustace ..	J. W. Embbleton, S. Marlowe, J. A. Billington ..	J. Rea ..	T. & J. Harrison, Ltd.
<i>Factor</i> ..	GPZV	27.8.55	R. Williams ..	R. Bell, R. H. Douglas, I. G. Morris ..	N. Davitt ..	T. & J. Harrison, Ltd.
<i>Fanad Head</i> ..	GNOQ	20.3.56	J. Alexander ..	T. F. Austin, L. B. Fleming, T. G. Morrison, A. W. Burns ..	J. Lyons ..	G. Heyn & Sons, Ltd.
<i>Flamenco</i> ..	GCBV	13.3.56	T. H. McGill ..	H. Butterworth, J. Pepper, C. Pringle ..	J. Sherwood ..	Pacific Steam Navigation Co.
<i>Franconia</i> ..	GBRQ	27.8.55	D. N. Maclean, D.S.C., R.D., Capt. R.N.R. (Retd.) ..	H. L. Ashcroft, J. B. Clemenson, A. Hutcheson, H. Blackmon ..	E. P. Bishop ..	Cunard Steamship Co., Ltd.
<i>Fremantle Star</i> ..	MQFT	16.9.55	C. R. Horton, D.S.C. ..	J. A. F. Jenkins, C. Smeaton, C. T. Whitaker, R. Moreland, G. Marsh ..	M. J. Sheenan ..	Blue Star Line, Ltd.
<i>Fresno City</i> ..	GBYD	3.10.55	D. L. Beynon ..	J. S. Randall, D. Jack, M. Scarffe ..	L. Mills ..	Sir William Reardon Smith & Sons, Ltd.
<i>Garvelpark</i> ..	GKSV	27.2.56	R. P. Forrest ..	R. Conway, A. Blair, A. Mitchell ..	N. Andelston ..	Messrs. J. & J. Denholm, Ltd.
<i>Geelong Star</i> ..	GNWF	26.1.56	J. S. Crowe ..	G. E. Waddall, N. E. Eadie, I. R. Lialdane, R. N. Parker ..	D. Lodge ..	Blue Star Line, Ltd.
<i>Glenartney</i> ..	GBLG	5.12.55	D. Stewart ..	H. C. Moule, M. P. Stone, D. C. Wareing ..	B. I. Chamberlain ..	Glen Line, Ltd.
<i>Glenbank</i> ..	GKLC	25.2.56	H. A. Carver ..	J. Bain, H. J. Pope, J. P. Morgan, J. D. Gardner, J. Pilling, T. D. A. Murphy ..	T. J. Hayes ..	Andrew Weir & Co., Ltd.
<i>Glenorchy</i> ..	GBLL	25.11.55	R. A. Hanney ..		R. Bradshaw ..	Glen Line, Ltd.



NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>John Holt</i>	GNFD	29.2.56	W. R. Atkinson	M. DeLacey, J. G. Jones, N. G. Bentz	W. R. Hughes	Guinea Gulf Line, Ltd.
<i>Jurnalist</i>	MSFQ	18.10.55	R. A. Phillips	J. Baillie, J. O. Dickenson	F. X. Smythe	T. & J. Harrison, Ltd.
<i>Kenitworth Casile</i>	MQLP	14.3.56	J. A. Applin	R. W. Smith, H. Burgess, J. Cutcliffe	D. Gillow	Union Castle Mail S.S. Co., Ltd.
<i>Kenuta</i>	GCBW	1.3.56	T. J. Naylor	A. Menzies, Turner, R. Dewsnap	I. W. Dick	Pacific Steam Navigation Co.
<i>King Robert</i>	MAON	24.6.54	G. Craze	G. Boyle, J. P. Daniel	R. V. Pemberton	King Line, Ltd.
<i>King William</i>	GNVF	3.10.55	J. C. Davies	W. Moss, A. H. Brines, J. T. Langstaff	J. M. Pugh	King Line, Ltd.
<i>Kohistan</i>	GSFZ	14.11.55	A. N. Henderson	J. Beerman, G. Grindrod, P. Walker	S. Gregg	F. C. Strick & Co., Ltd.
<i>Koyan</i>	GKST	15.9.54	W. I. McIntosh	G. H. Robertson, R. S. Brown, —, Campbell	P. H. Reynolds	Henderson & Co.
<i>Lalande</i>	GNFL	18.11.55	A. H. Watson	W. J. Thomas, P. V. Des Landes, O. Conner	A. Peloe	Lampert & Holt Line, Ltd.
<i>Lanarkshire</i>	GCTC	17.1.56	R. B. Lindsley	P. A. Smith, P. Morrison, J. A. Russell	H. H. Mann	Turnbull Martin & Co., Ltd.
<i>Lancashire</i>	GLZC	16.2.56	H. B. Peate, D.S.C., R.D., Capt. R.N.R.	G. W. Walsh, J. Morris, V. G. McColl	G. C. Talbot	Bibby Bros. & Co.
<i>Langton Grange</i>	MAOT	22.12.55	J. R. Faulkner	D. W. Luff, J. Healy, N. Roberts	P. Wall	Houlder Bros. & Co., Ltd.
<i>Lassell</i>	GFND	28.1.56	J. King	J. Sampson, A. Corlett, E. Minshull	J. Brown	Lampert & Holt Line, Ltd.
<i>Laurentia</i>	GNDY	19.3.56	T. S. Graham	T. Scott, N. Larsen, W. Joyce	D. Murray	Donaldson Bros. & Black, Ltd.
<i>Levernbank</i>	GLPZ	25.2.56	R. A. Leach	J. Rigby, T. E. Alexander, P. J. Elder	G. J. Kelly	Andrew Weir & Co., Ltd.
<i>Limerick</i>	GNLF	21.12.55	R. F. Hellings	H. G. Chaffer, P. Johnson, W. D. Garvey	R. Bromham	Birt, Potter and Hughes
<i>Linguist</i>	GQBC	15.12.55	W. Weatherall	T. A. Butler, C. S. Boam, J. A. Ashcroft, D. A. Chadwick	M. C. O'Callaghan	T. & J. Harrison, Ltd.
<i>Lismoria</i>	GNKJ		J. L. McQueen	W. McKean, R. Allen, A. Johnson, J. Henrickson	I. Limpitlaw	Donaldson Line, Ltd.
<i>Livorno</i>	GPWF	4.7.53	A. Hinchliffe	R. A. Jones, D. J. Rouse	M. MacMahon	Ellerman's Wilson Line, Ltd.
<i>Lloydrest</i>	MAOY	22.8.53	L. Barwell	A. Burrell, J. Beckensale, G. Bridges	J. Rowe	Crest Shipping Co., Ltd.
<i>Lock Avon</i>	GMZT	29.12.55	G. M. Fletcher	J. Connell, C. Bush, D. Dunbar	N. Webber	Royal Mail Lines, Ltd.
<i>Lock Garth</i>	GMZY	17.11.55	G. S. Grant, R.D., Cdr.	J. Evans, H. Thornbury, A. Hawkins	F. Page	Royal Mail Lines, Ltd.
<i>Loch Ryan</i>	MAOZ	12.2.56	T. Stevens	M. Keen, M. Jones, R. Holford, J. Barton	L. C. Francis	Royal Mail Lines, Ltd.
<i>London Pride</i>	GKTJ	2.3.56	W. Bingham	D. P. Prince, A. Murgatroyd, J. Corcoran	P. B. Killien	London Overseas Freighters, Ltd.
<i>Lotorium</i>	GRLP	13.1.56	N. Clarke	A. Rossouw, B. Lloyd, D. H. White	B. I. D. Mellors	Anglo-Saxon Petroleum Co., Ltd.
<i>Macharda</i>	GKKF	21.9.55	T. C. Eddy	J. J. Redden, W. Lloyd Williams, R. C. Main	G. Stone	T. & J. Brocklebank, Ltd.
<i>Magdatur</i>	GBJX	16.11.55	H. G. Allan, M.B.E.	P. Slade, J. C. Long, G. R. Riley, A. M. Warren	D. C. Brown	T. & J. Brocklebank, Ltd.
<i>Mahanada</i>	GOFM	16.2.56	J. R. Newman	A. J. Bass, P. F. Blackburn, W. H. M. Coles	T. Williams	T. & J. Brocklebank, Ltd.
<i>Mahout</i>	GDZN	12.3.56	T. C. Eddy	J. H. Moore, J. Pattison, J. E. Millichap, W. R. France	J. Guthrie	T. & J. Brocklebank, Ltd.
<i>Mahseer</i>	GZSV	28.2.56	A. Hill, O.B.E.	D. G. Wild, S. E. Turner, P. Briscoe, J. Poole	A. E. Rea	T. & J. Brocklebank, Ltd.
<i>Maiter</i>	GSCL	3.3.56	J. Clarke	W. H. Clifford Hicks, D. Moore, J. Hanbridge	J. Davis	T. & J. Brocklebank, Ltd.
<i>Makalla</i>	GOFN	20.2.56	H. Simpson	D. M. G. Murphy, E. Watkins, H. Evans	W. Curry	T. & J. Brocklebank, Ltd.
<i>Malancha</i>	GZRD	13.12.56	J. G. Nuttall	E. T. M. Chambers, J. Saxty, C. O. Marsden	H. K. Wrigley	T. & J. Brocklebank, Ltd.
<i>Malayan Prince</i>	GNSQ	12.3.56	E. G. Jones	M. A. Greig, R. C. Redman, D. C. Burgess	M. D. Johnston	Prince Line, Ltd.
<i>Manchester City</i>	GBBP	10.11.55	W. Hine, R.D., Lt.-Cdr. R.N.R. (Retd.)	T. Lyvan, P. Saunders, J. Baker, D. R. Nutton	J. Baker	Manchester Liners, Ltd.

<i>Manchester Explorer</i>	GNBK	19.3.55	W. E. G. Oliver	J. Baker, G. Garner, L. Fletcher	T. G. Jones	Manchester Liners, Ltd.
<i>Manchester Mariner</i>	GSPD	7.10.53	E. W. Raper	K. Lehepuu, G. R. Thompson, K. W. Rourke	P. B. McNab	Manchester Liners, Ltd.
<i>Manchester Merchant</i>	MGZQ	16.12.55	W. H. Downing	D. W. Whitworth, A. Cookson, A. Sutherland, D. P. Humphrey	A. J. S. Broadbent	Manchester Liners, Ltd.
<i>Manchester Pioneer</i>	GNVG	24.11.55	A. Starmer	G. B. Hannaford, P. Cullen, C. J. Harfoot, W. Boyle	J. Buchanan	Manchester Liners, Ltd.
<i>Manchester Port</i>	GYNF	10.1.55	J. L. McLaren	L. Taylor, L. Fletcher, G. A. Cowell	M. Doran	Manchester Liners, Ltd.
<i>Manchester Progress</i>	GPGD	21.1.55	M. Bewley	J. C. Elliot, E. Askew, T. Hancock	I. Sterry	Manchester Liners, Ltd.
<i>Manchester Prospector</i>	GQKV	13.2.56	F. Lewis	W. Boyle, T. M. Varley, D. C. Woodall	W. B. MacPherson	Manchester Liners, Ltd.
<i>Manchester Regiment</i>	GBRD	19.3.56	W. H. Downing	G. R. Thompson, G. Andrews, J. T. Bird	J. Reid	Manchester Liners, Ltd.
<i>Manchester Shipper</i>	MAPC	5.5.55	H. Hancock	A. W. Barber, P. N. Fielding, N. T. Storr, J. Williamson	W. Critchley	Manchester Liners, Ltd.
<i>Manchester Spinner</i>	GNVB	9.12.55	F. L. Osborne	P. Cresswell, M. J. Butler, D. Millard	J. Reid	Manchester Liners, Ltd.
<i>Manchester Trader</i>	GMWG	4.8.55	E. W. Espley	J. E. Croft, D. G. Thomas, G. R. Clayton	F. I. Fitzgerald	Manchester Liners, Ltd.
<i>Mandator</i>	GBNY	17.11.55	E. L. Jones	D. F. Barratt, G. A. Jenkins, P. Gunson	B. Beecham	T. & J. Brocklebank, Ltd.
<i>Manitoe</i>	GRXC	13.10.55	F. J. Barber	K. Leslie, J. Beatson, D. J. Ely, G. Edmonds	L. Varmen	Elders & Fyffes, Ltd.
<i>Mablecove</i>	GNLX	25.4.55	W. R. Thorburn	P. Leslie, N. Saddington, D. A. Jones	T. Herriots	Canadian Pacific S.S., Ltd.
<i>Mapledell</i>	GBBS	24.11.55	E. F. Aikman	C. D. Ward, P. C. Lovell-Smith	V. Cummung	Canadian Pacific S.S., Ltd.
<i>Marabank</i>	GCCP	4.1.56	T. S. Robertson	R. F. Hamilton, D. C. Quinlan, E. H. Travers	J. D. Grennan	Andrew Weir & Co., Ltd.
<i>Marengo</i>	GLFW	24.11.55	S. Bennett	C. Tutty, E. Barker, —, Parker	L. H. James	Ellerman's Wilson Line, Ltd.
<i>Margay</i>	GFYQ	22.10.55	G. W. Stammers	J. Morris, H. J. Jones, A. Scott	B. R. Banks	Kaye, Son & Co., Ltd.
<i>Markhor</i>	GTFZ	23.7.55	H. F. Scotins	J. S. Munro, D. D. Barlow	A. Halstead	T. & J. Brocklebank, Ltd.
<i>Mariland</i>	GTTG	1.9.55	H. Fosbrooke	B. P. Ross, J. McK. Coles, R. Roberts	T. Herlihy	Kaye Son & Co., Ltd.
<i>Maritta</i>	GNQT	28.2.56	W. G. C. Alexander	J. R. Crane, W. S. Dockeray, D. Clifford	E. Boyce	Shaw, Savill & Albion Co., Ltd.
<i>Mataroa</i>	GCSV	12.1.56	R. G. James, R.D., Capt. R.N.R.	C. Beck, P. Bird, D. Andrews, J. D. Haberfeld	L. Dixon	T. & J. Brocklebank, Ltd.
<i>Matheran</i>	GOFQ	6.1.56	H. E. MacGregor	A. C. Stallard, P. Austin, O. Pritchard, D. W. G. Groves	A. C. Knight	Elders & Fyffes, Ltd.
<i>Matina</i>	GSZX	5.12.55	W. G. Lock	A. Booth, G. C. Wallis, H. E. Beyer, C. Bell	A. Connock	Cunard Steamship Co., Ltd.
<i>Mauretania</i>	GTTM	2.8.52	W. M. Stewart, O.B.E.	N. M. Johnson, D. J. McManus, R. J. Ogilvy, G. W. Wotton	A. F. Crosby	Cunard Steamship Co., Ltd.
<i>Media</i>	GSWR	18.1.56	J. D. Armstrong, D.S.C., R.D., Lt.-Cdr. R.N.R. (Retd.)	P. Kind, J. P. Martin, R. Hardman	D. Fisher	Blue Star Line, Ltd.
<i>Melbourne Star</i>	GDFZ	29.11.55	G. Aldridge	W. Bayley, J. Parker, J. Rogers	E. Barley	Federal Steam Navigation Co., Ltd.
<i>Middlesex</i>	MPBK	3.11.55	T. J. Alderman	C. P. Jones, I. Slater, R. E. Donald	T. Lilly	H.M. Postmaster General
<i>Monarch</i>	GBDF	26.8.54	J. P. F. Betson	W. Richardson, I. J. L. Lang, P. V. Flynn	H. MacKay	F. C. Strick & Co., Ltd.
<i>Muristan</i>	MABB	12.1.56	T. Dunn	M. S. Fleming, I. Ockleford, D. Smyth	J. G. Anderson	Andrew Weir & Co., Ltd.
<i>Mytilenak</i>	GLQB	1.9.55	L. W. Thorne	D. Campbell, G. D. Scott, A. Patterson	E. Hughes	Blue Star Line, Ltd.
<i>Napier Star</i>	MAPN	15.2.56	J. B. Kennedy	P. J. Tindale, D. L. Burt, G. C. Jones, —, Veretker, —, Newman, —, Gault	—, Starr	Anglo-Saxon Petroleum Co., Ltd.
<i>Naticina</i>	GIGH	15.2.56	H. R. Hughes	D. Grantham, R. Shaw, M. J. Laws	H. Roberts	A. Holt & Co.
<i>Nestor</i>	GNZG	23.1.56	J. M. Anderson	M. J. Steele, P. K. MacDonald, S. E. Minshall	W. Miller	Shaw, Savill & Albion Co., Ltd.
<i>New Australia</i>	GZKD	6.1.56	J. W. Hart	D. Collmar, B. Tomalin, K. M. Wallace, W. Denly	T. Morrison	Blue Star Line, Ltd.
<i>New Zealand Star</i>	GYCR	28.11.55	E. N. Rhodes	R. Parker, P. Hunt, I. Thompson	T. Cahill	Furness Withy & Co., Ltd.
<i>Newfoundland</i>	GNMC	18.10.55	I. K. Kew	K. L. Row, R. T. Heys, K. Swinburne	A. Harris	Federal Steam Navigation Co., Ltd.
<i>Norfolk</i>	MMBD	1.2.56	W. J. T. Stevens	M. J. Evans, J. D. Hallings, C. M. McCathie, R. J. Bayliss	R. Drake	Prince Line, Ltd.
<i>Nordic</i>	GDJC	28.11.55	F. S. Thornton, O.B.E.	E. Humphries, P. Tebbutt, J. Buddles	J. Soper	Cable & Wireless, Ltd.
<i>Norseman</i>	GBVS	29.10.55	R. E. Small	P. A. J. Edwards, W. R. Henderson, P. A. Shaw		

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Nottingham</i>	GCNC	25.6.55	E. Allen	E. Cooper, D. Burdett, P. Egan, G. Treleven	L. Sutton	Federal Steam Navigation Co., Ltd.
<i>Nova Scotia</i>	GNK	2.12.55	J. E. Wilson, O.B.E.	E. W. Foxworthy, A. C. Wales, A. R. Smith	W. C. Brock	Furness Withy & Co., Ltd.
<i>Novelist</i>	GMLG	22.11.55	R. H. Longster	J. T. C. Gibson, H. P. Roberts, C. Carew	J. F. France	F. & J. Harrison, Ltd.
<i>Oakland Star</i>	GFKT	26.3.56	J. F. Byrne, O.B.E.	I. T. Lowe, D. N. Murray, R. J. Webb	L. Hodge	Lampport & Holt Line, Ltd.
<i>Obuasi</i>	GMLQ	13.4.55	R. W. Phillip	D. A. Norris, R. Myers, D. Corner, D. Howe	S. W. Barlow	Elder Dempster Lines, Ltd.
<i>Oilfield</i>	GNMN	27.1.56	M. Manthorpe	F. N. Cummings, J. Haddow, A. McConn	P. Shine	Hunting & Son, Ltd.
<i>Oluf Sven</i>	OYHC		J. C. Ryge	P. D. Moller, G. Simonsen		Hunting Aerosurveys, Ltd.
<i>Orari</i>	GJKX	6.3.56	J. R. M. Ramsey	R. Michael, E. L. Hubbard, C. J. Highfield	D. E. A. Watts	New Zealand Shipping Co., Ltd.
<i>Orcades</i>	MABA	17.3.56	A. C. G. Hawker, C.B.E.	E. H. T. Pickles, G. McGuffie, N. I. Collett		
<i>Orion</i>	GYKL	28.2.56	A. C. G. Hawker, C.B.E.	J. W. Spiers, D. B. Gaffney, D. Campbell	F. Millar	Orient Steam Navigation Co., Ltd.
<i>Oronsay</i>	GCNB	16.2.56	S. Burnmand	G. Munson, G. Woods, E. Robinson	F. Harrop	Orient Steam Navigation Co., Ltd.
<i>Oronites</i>	GEXM	22.12.55	C. W. C. Pinckney, O.B.E.	D. Ward, R. G. Charlton, B. O'Sullivan	R. Oakley	Orient Steam Navigation Co., Ltd.
<i>Orstova</i>	GNDL	22.11.55	R.D., Cdr. R.N.R. (Retd.)	E. Levine, T. R. Williams	A. Quintin	Orient Steam Navigation Co., Ltd.
<i>Otaka</i>	GPBV	19.1.56	N. A. Whinnfield	R. Ellingham, R. Mattingley, B. Pickering	P. Parish	Orient Steam Navigation Co., Ltd.
<i>Otranto</i>	GFKV	9.1.56	J. D. Bennett	D. G. Thomas, J. Glover, J. Weston, E. Norman	R. Heath	New Zealand Shipping Co., Ltd.
<i>Pacific Fortune</i>	GBFM	21.12.55	R. W. Roberts, O.B.E., D.S.C.	D. B. Williams, K. E. Howard	— Clarke	Orient Steam Navigation Co., Ltd.
<i>Pacific Northwest</i>	GQCP	23.12.55	H. A. Shaw	A. Adams, J. Jones, G. D. Kaye	I. R. M. Thomas	Furness Withy & Co., Ltd.
<i>Pacific Reliance</i>	GMJK	18.2.56	F. H. Perry	D. M. Lloyd, A. Seabrock, P. Crone	M. Harris	Furness Withy & Co., Ltd.
<i>Pacific Unity</i>	GUAN	9.11.55	A. H. Cooke	J. Lee, D. J. Bail, D. G. Fuller	W. J. Jennings	Furness Withy & Co., Ltd.
<i>Pacaree</i>	GCNX	7.2.56	A. Thompson	D. Garside, N. Zavos, E. Woods	F. O'Shea	Furness Withy & Co., Ltd.
<i>Pampas</i>	GCDL	1.3.56	L. T. Peterson	R. J. Williams, D. J. Morris, H. G. Cresswell	J. Parker	Elders & Fyffes, Ltd.
<i>Papamui</i>	GDJW	18.1.56	H. A. Owen	G. S. Vale, J. L. Fraun, J. A. G. Arnott, W. M. Wheatley	A. Duggan	Royal Mail Lines, Ltd.
<i>Paparoa</i>	GBCZ	14.9.55	J. D. Guylor	J. S. Thorpe, J. R. Gair, D. Hyde	P. C. Callender	New Zealand Shipping Co., Ltd.
<i>Paraguay</i>	MAQS	16.12.55	W. J. Phillips	R. P. B. Hanson, A. A. Faulkner, B. D. Allan, D. Phillips	I. Barber	New Zealand Shipping Co., Ltd.
<i>Paraguay Star</i>	GTNC	28.2.56	D. R. MacFarlane, D.S.O., O.B.E.	B. N. Rowley, T. Parks, R. F. Daglitesh	B. M. Rowley	Royal Mail Lines, Ltd.
<i>Pardo</i>	GMNZ	3.8.55	W. Williams	E. Whitley, D. Wilkinson, P. A. Stephens, B. Gibb	J. Martin	Blue Star Line, Ltd.
<i>Parima</i>	GCLQ	18.10.55	T. Fraser, D.S.C., R.D., Cdr. R.N.R. (Retd.), A.I.N.A.	R. E. Farley, F. W. Chapman, C. B. Lampert	M. B. Wood	Royal Mail Lines, Ltd.
<i>Parthia</i>	GSWQ	6.1.56	S. A. Jones, R.D., Cdr. R.N.R. (Retd.)	R. Sly, J. Cox, N. Jestic	A. Mercert	Royal Mail Lines, Ltd.
<i>Patagonia Star</i>	GQGT	1.10.55	E. Jermyn	R. J. Ogilvy, N. M. Douglass, B. J. Pennington	A. O'Sullivan	Cunard Steamship Co., Ltd.
<i>Perim</i>	GCCB	14.10.55	L. Porter	J. Law, G. Kellock, D. MacKillop	J. Stewart	Lampport & Holt Line, Ltd.
<i>Perthshire</i>	GYWK	17.12.55	T. N. Soane	P. Beeley, W. A. Read, E. M. Hobbs, D. C. Barnett	R. Cahill	P. & O. Steam Navigation Co.
<i>Philomel</i>	GYPV	12.1.56	H. Selmer	F. J. Cameron, W. G. Parry, D. B. Jones	J. Pattie	Turnbull Martin & Co., Ltd.
<i>Pilcomayo</i>	GBZX	29.10.55	G. Medlycott	S. May, J. Cannock, A. Howard-Tripp, H. Selmer	A. Laurie	General Steam Navigation Co., Ltd.
<i>Pipiribi</i>	GDRQ	10.11.55	S. R. Harding	J. Rutter, J. Sutton, J. Diaper	R. G. Richmond	Royal Mail Lines, Ltd.
				B. Foister, H. Mayhew, B. Leek	A. McInnis	New Zealand Shipping Co., Ltd.



NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Rialto</i>	GBLV	20.6.55	H. Greenhill	D. Smee, D. J. Pengelly, S. Smith, J. Bradley	D. Mackenzie	Ellerman's Wilson Line, Ltd.
<i>Richmond Castle</i>	GCSP	29.12.55	W. C. J. Swift	O'Connor, Hooper, Logan	R. A. Rees	Union Castle Mail S.S. Co., Ltd.
<i>Ripplingham Grange</i>	GIGP	8.3.56	R. Owen	Hector, M. H. L. Jenkins, E. Evans	V. Ash	Houlder Bros. & Co., Ltd.
<i>Rochester Castle</i>	GZQF	17.2.56	A. C. M. Black, O.B.E.	M. Llewellyn, C. Rae, S. Kitching	H. McColl	Union Castle Mail S.S. Co., Ltd.
<i>Rough Head</i>	GNTN	11.5.55	E. W. Black, O.B.E.	N. Walsh, A. F. James, J. McD. Knox	M. Maw	G. Heyn & Sons, Ltd.
<i>Roslin Castle</i>	GYJZ	16.8.55	C. E. Lorains	P. Truman, E. A. C. Paul, N. E. Upham	M. Duff	Union Castle Mail S.S. Co., Ltd.
<i>Roxwallan Castle</i>	GDFI	21.9.55	A. G. Bidwell	K. J. Barry, J. Taylor, R. G. Goddard, C. A. McKeown	J. A. R. Walker	Union Castle Mail S.S. Co., Ltd.
<i>Roxburgh Castle</i>	GBGS	2.1.56	A. T. Underdown	P. Sheridan, J. Pascoe, J. Spencer, E. Lawrence	J. Walker	Union Castle Mail S.S. Co., Ltd.
<i>Ruahine</i>	GKSY	28.11.55	F. Loughheed	R. Shannon, R. Blood, P. Holloway, O. Springett	J. Heath	New Zealand Shipping Co., Ltd.
<i>Runic</i>	GGCS	10.3.56	C. W. Sendall	R. Hind, T. Hicks, J. K. Wyles	A. McMurray	Shaw, Savill & Albion Co., Ltd.
<i>Sacramento</i>	GKCN	16.1.56	H. Grunnill	Pettinger, Morrill, P. J. S. Bishop	C. V. Child	Ellerman's Wilson Line, Ltd.
<i>Saint John</i>	GRBT	12.3.56	I. Ellis	Whitfield, H. Bulmer, J. Copp, J. Wright	J. E. Conway	South American Saint Line, Ltd.
<i>Salacia</i>	GZRN	5.10.55	J. L. Downie	D. G. Hall, I. MacFarlane, H. D. McDiarmid	W. MacKay	Donaldson Bros. & Black, Ltd.
<i>Salamanca</i>	GLSG	22.12.53	P. L. Hockey	E. J. Pepper, G. R. Dewsnap, R. S. Bryant	B. E. Bewley	Pacific Steam Navigation Co.
<i>Salaverry</i>	GBLQ	24.9.55	E. C. Hicks, R.D., Cdr. R.N.R. (Retd.)	B. I. Coppack, T. Wilcockson, G. B. Swan	W. Read	Pacific Steam Navigation Co.
<i>Salinas</i>	GLJK	1.11.55	A. G. Litherland	J. Spencer, R. K. Thomas, P. L. Whittaker	J. Jenkins	Pacific Steam Navigation Co.
<i>Salween</i>	GFFN	26.1.56	W. D. E. Campbell	A. H. S. Gray, G. Armstrong, J. McKenzie, J. Cowrie	S. Law	P. Henderson & Co.
<i>Samanco</i>	MARQ	29.10.55	T. H. G. McGill	D. J. Bishop, P. Guerrier, R. Pass	M. D. Pilgrim	Pacific Steam Navigation Co.
<i>San Adolfo</i>	GYKK	19.2.56	A. Walker	F. D. Smith, P. Flanders, E. J. Cousins	C. Maguire	Eagle Oil & Shipping Co., Ltd.
<i>San Felix</i>	GFJZ	20.3.56	J. S. Munday	M. T. Lewis, C. A. Grunson, H. F. Mitchell	R. Jones	Eagle Oil & Shipping Co., Ltd.
<i>San Vaino</i>	GCNY	7.3.56	I. J. Goldsworthy	G. J. Hughes, W. Richardson, G. Scarf	T. Murray	Eagle Oil & Shipping Co., Ltd.
<i>San Veronica</i>	MASQ	4.1.56	G. Harris	M. D. Allen, R. Davis, G. C. Turnbull	J. Hogan	Eagle Oil & Shipping Co., Ltd.
<i>San Vulfrano</i>	MASR	22.3.56	T. B. Wright	W. A. Poston, D. W. Bates, B. J. Hamilton, J. Evans	H. Conner	Eagle Oil & Shipping Co., Ltd.
<i>Sansu</i>	GQQN	27.9.55	L. B. Silvester	D. G. Brown, W. M. Crossman, D. Howison	J. Clarke	Elder Dempster Lines, Ltd.
<i>Santander</i>	GBNR	27.3.56	E. J. Leicester	J. T. Bruce, P. Staples, A. G. Corbet	J. Whitfield	Pacific Steam Navigation Co.
<i>Sarmiento</i>	MARW	18.3.54	A. G. Litherland	J. Eardley, F. Nuttall, W. Jenkins	K. Lancaster	Pacific Steam Navigation Co.
<i>Saxton Star</i>	MARX	23.1.56	R. J. C. McDonald	L. Franklyn, F. Cree, K. L. Morris	P. Ashford	Blue Star Line, Ltd.
<i>Saxonia</i>	GSJS	5.10.55	J. D. Armstrong	P. Walton, G. Buckley, Q. K. Paul, I. A. Watt, I. K. Bryce, D.S.C., R.D., R.N.R.	A. Goodwin	Cunard Steamship Co., Ltd.
<i>Scottish Eagle</i>	MMVX	15.2.56	R. R. Baxter	M. W. Scott, J. J. Grigor, J. Lyon	H. Arnold	Scottish Tankers, Ltd.
<i>Scythia</i>	GDPY	23.12.55	F. G. Watts, R.D., Lt.-Cdr. R.N.R. (Retd.)	D. Atkinson, P. Miller, J. S. Nicholson	S. W. Brown, M.B.E.	Cunard Steamship Co., Ltd.
<i>Seattle Star</i>	MMNW	29.11.55	J. McInnes	E. Blake, J. O. Rymes, D. E. Sayle	H. Williams	Blue Star Line, Ltd.
<i>Selector</i>	MARZ	15.2.55	R. L. Williams	F. Doran, E. D. Ashdown, J. Keating	C. O'Callaghan	T. & J. Harrison, Ltd.
<i>Settler</i>	GTTX	24.5.54	R. F. Phillips	R. J. Turnbull, R. B. Wilson, I. Mitchell	J. E. Blake	Falkland Islands Dependency Survey
<i>Shackleton</i>	GVDG		W. Johnston	T. Woodfield, T. Flack, A. Kerr	R. F. Abdey	Andrew Weir & Co., Ltd.
<i>Shielbank</i>	GDPZ	28.12.55	R. J. Owen	J. F. Carr, E. J. Baines, R. D. Parry	S. Ribee	Torry Research Station
<i>Sir William Hardy</i>	GSZY		J. Munro	S. Ribee, M. Slater	I. Fahy	Headlam & Son
<i>Sneaton</i>	GDBS	14.3.56	W. Armstrong	E. Wilson, G. Wilson, W. R. Atkinson		

<i>Socotra</i>	MASC	17.3.56	L. H. Howard, R.D., Lt.-Cdr. R.N.R. (Retd.)	D. Dornom, H. O. Cribb, H. Hossell	H. Williams	P. & O. Steam Navigation Co. Ropner Shipping Co., Ltd.
<i>Somersby</i>	GRLK	27.1.56	J. Kenny	K. B. Dines, H. W. Finn, P. Palereman	G. Greenfield	Blue Star Line, Ltd.
<i>South Africa Star</i>	GUAU	12.10.55	R. N. T. Jones	R. J. Webb, F. R. McGuckin, E. J. T. Boorne, J. F. Harris	W. G. Houghton	Chr. Salvesen & Co.
<i>Southern Collins</i>	MASE	19.5.55	J. W. Ross	G. A. Waterson, A. Smith, C. Geach, W. Dunnet	N. W. Wilding	Shaw, Savill & Albion Co., Ltd. Chr. Salvesen & Co.
<i>Southern Cross</i>	GSWW	8.3.56	Sir D. Aitchison, K.C.V.O.	R. L. Reid, T. C. Halle, W. W. Newport, I. P. N. Cameron, C. C. Paterson, M. Butcher	H. Mathews	Chr. Salvesen & Co.
<i>Southern Garden</i>	MASF	19.5.55	W. J. Swanson	J. B. Kerr, W. Christoffersen	A. R. Turnbull	Chr. Salvesen & Co.
<i>Southern Harvester</i>	CFZJ	17.5.55	L. Bartho	J. Thomson, A. Wiseman, R. D. McGlaston	T. Johnson	Chr. Salvesen & Co.
<i>Southern Opal</i>	MASG	12.5.55	A. F. Baikie	A. Brown, W. Simpson, P. Whitecross	E. C. Taylor	Chr. Salvesen & Co.
<i>Southern Satellite</i>	GTNR	9.3.56	W. Swanson	K. Sneekestad, R. O. Frizendore, O. Vikkländer	J. Marr	Chr. Salvesen & Co.
<i>Southern Venturer</i>	GNNM	12.5.55	H. Myhre			
<i>Specialist</i>	GCFY	30.11.55	L. J. Sharman, R.D., Cdr. R.N.R.	T. F. Maddox, J. B. Mitchell, A. A. Dunn	J. Nisbet	T. & J. Harrison, Ltd. Union Castle Mail S.S. Co., Ltd.
<i>Stirling Castle</i>	GYPX	17.11.55	I. F. Oakley	W. R. Warner, C. Ennis, A. D. Foulkes	W. A. Brown	Turnbull Martin & Co., Ltd.
<i>Stirlingshire</i>	GCQD	8.3.56	E. W. Jenkin	A. G. Cruickshank, D. M. Geddes, R. G. Turner	W. Holmes	P. & O. Steam Navigation Co.
<i>Strathaird</i>	GRSX	2.2.56	R. J. F. Paice	K. W. Farr, T. A. M. Lincoln, F. Gorton, M. J. Borland	H. A. M. Jardine	P. & O. Steam Navigation Co.
<i>Stratheden</i>	GDGT	12.10.55	K. A. H. Cummins	Guy, P. J. Black, S. W. Townsend	B. M. Evans	P. & O. Steam Navigation Co.
<i>Strathmore</i>	GYMS	12.12.55	A. G. Jenkins	P. L. N. Padfield, J. Houghton, P. Ewell	J. P. Carey	P. & O. Steam Navigation Co.
<i>Strathnaver</i>	GRPZ	6.8.55	J. M. Peter	D. C. Guthrie, L. H. Kellet, A. Foster, J. Woolten	W. Freman	P. & O. Steam Navigation Co.
<i>Struan</i>	MASJ	9.1.56	M. Polson	L. Lawrence, J. Maclean, W. Mason	P. Curson	Chr. Salvesen & Co.
<i>Suffolk</i>	GQOS	20.3.56	H. C. R. Dell	P. Plaistowe, R. B. Hood, P. Field	P. E. Robertson	Federal Steam Navigation Co., Ltd.
<i>Sussex</i>	MAEF	12.10.55	E. H. Hopkins	J. Newsham, D. Turner, W. Sewell	D. James	Federal Steam Navigation Co., Ltd.
<i>Sydney Star</i>	MKSM	6.7.55	G. L. Evans	R. Crookall, L. Graham, J. Reeve, B. R. Cook	W. A. Wade	Blue Star Line, Ltd.
<i>Tabaristan</i>	GZDR	6.3.56	W. J. Ellis	Jobling, —, Deering, R. J. Kane	P. Pike	F. C. Strick & Co., Ltd.
<i>Tagelus</i>	GBMG	16.11.55	J. Brittain	B. Atkinson, J. Todd, D. Curphey	R. D. East	Anglo-Saxon Petroleum Co., Ltd.
<i>Tamaroa</i>	GFWX	16.12.55	T. H. Davies	J. Richmond, W. J. Lyman, B. Roberts, D. Williams	D. MacRae	Shaw, Savill & Albion Co., Ltd.
<i>Tamele</i>	GCBF	9.9.55	C. H. Sweeney	R. S. Elliott, C. E. Thompson, D. J. Burgess	A. Allen	Elder Dempster Lines, Ltd.
<i>Tantallon Castle</i>	MQWN	3.3.56	N. M. Lloyd, R.D., Cdr. R.N.R.	N. M. Lloyd, G. Francis, J. L. White	V. A. Bennett	Union Castle Mail S.S. Co., Ltd.
<i>Tarkoa</i>	MASU	26.5.55	R. A. Roberts	G. J. Forster, T. P. Dodkins, C. Armitage	A. G. Hindle	Elder Dempster Lines, Ltd.
<i>Tasmania Star</i>	GKPC	4.1.56	R. White, D.S.C.	P. E. Leatham, I. B. Owen, A. Pickford	C. W. James	Blue Star Line, Ltd.
<i>Tectus</i>	GBMJ	17.11.55	D. Curtis-Lewis	R. E. Jacklin, G. S. Smith, G. A. Ramsden	W. Henny	Anglo-Saxon Petroleum Co., Ltd.
<i>Tekoa</i>	GJFQ	23.11.55	F. Williamson	J. Baxter, J. Reid, D. Standing	J. Gibson	New Zealand Shipping Co., Ltd.
<i>Telemachus</i>	GBLB	18.1.56	A. Lane	W. B. Bannerman, R. G. Southern, A. G. Cole	F. M. Shannon	A. Holt & Co.
<i>Tenagodus</i>	GDLZ	25.1.56	C. A. Milligan	J. Sydenham, D. C. Hamlyn, J. R. Pearson	C. Bourne	Anglo-Saxon Petroleum Co., Ltd.
<i>Tetela</i>	GMPN	28.10.55	G. M. Roberts, M.B.E.	A. Blackburn, N. W. Thomas, D. Hamilton	M. Riley	Elders & Fyffes, Ltd.
<i>Teviot</i>	MASX	28.6.55	W. A. Kennedy	D. J. Walker, A. N. Brook, G. B. Chamberlain	R. W. Morden	Royal Mail Lines, Ltd.
<i>Thaumastus</i>	GDTS	19.3.56	G. A. C. Nelson	W. T. Copeland, P. S. L. Nobes, R. Hayward-Willis	R. W. Fowlie	Anglo-Saxon Petroleum Co., Ltd.
<i>Theliconus</i>	GBMT	22.3.56	J. M. Hogg	P. Shawyer, B. R. Whittle	W. S. Stobo	Anglo-Saxon Petroleum Co., Ltd.
<i>Theron</i>	VGWW		H. L. Maro	K. Egset, J. Ohlsen	H. Nolvik	Christensen Canadian Enterprises
<i>Thule</i>	GCBL	12.5.55	F. Holst	R. E. Devik, G. Abrahamsen, R. Pettersen	E. Bergan	Hector Whaling, Ltd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Timaru Star</i>	GKKM	24.2.55	H. W. McNeil	J. G. King, H. Sproul-Cran, D. McKerrow, J. Calabrese	W. Jones	Blue Star Line, Ltd.
<i>Tinto</i>	GBYT	2.3.56	S. H. Bennett, M.B.E.	J. A. Green, P. Ramsay	G. G. Dunn	Ellerman's Wilson Line, Ltd.
<i>Tongariro</i>	GLFZ	8.12.54	I. C. Davison	P. Cresswell, A. Mason, J. Baxter, J. Hale	P. D. Dickson	New Zealand Shipping Co., Ltd.
<i>Torr Head</i>	GZPW	19.3.56	S. J. Stark	R. J. Quail, T. McI. Hamill, R. S. M. Heddles	J. McKinnon	G. Heyn & Sons, Ltd.
<i>Tottan</i>	LMMG	5.3.56	L. Jacobsen	D. W. S. Limbert, A. Berg, T. Baardsen	O. M. Rasmussen	Royal Society
<i>Tregenna</i>	GBPM	12.7.54	W. F. Denyer	B. C. Smith, J. M. Downard, F. M. Marchant	P. Gostick	Hain S.S. Co., Ltd.
<i>Trelecan</i>	GBPQ	22.8.55	I. Cornish	D. K. Ball, S. H. Ray, G. C. Lee	H. Whittaker	Hain S.S. Co., Ltd.
<i>Trellyon</i>	GBPP	25.1.56	W. T. Evans	T. Youdan, E. D. Stewart, H. Winter	K. Beelby	Hain S.S. Co., Ltd.
<i>Tribesman</i>	GBNZ	31.12.55	W. P. Baker	C. D. Wilde, W. C. Johnston, W. Thompson	H. W. Ashcroft	T. & J. Harrison, Ltd.
<i>Tribulus</i>	GFIS	15.12.55	J. M. Davidson	R. K. Kerley, J. D. T. Price, G. Newton	P. A. Marriott	Anglo-Saxon Petroleum Co., Ltd.
<i>Trochiscus</i>	GFKB	28.11.55	C. M. C. K. Young, M.B.E.	J. W. Curry, J. Forsyth, J. M. Conely	G. Andrews	Shell Tanker, Ltd.
<i>Tweed</i>	GBRP	27.8.55	R. D. Jones	P. J. Foster, D. Stratton, A. R. Hamily	P. Stephenson	Royal Mail Lines, Ltd.
<i>Twickham</i>	GNDC	16.2.56	S. E. Hooper	D. Dickson, D. N. Allan, J. F. Coyne	J. Rayner	Watts, Watts & Co., Ltd.
<i>Tyrone</i>	GZPZ	13.2.56	N. Fraser	J. G. C. Campbell, B. P. Trefer, P. J. MacPherson	L. A. E. Lavel	Trinder, Anderson & Co.
<i>Umtali</i>	GYWB	27.1.56	F. E. J. O'Hea	C. M. Cozens, D. L'Estrange, V. J. Shanahan	S. Hewitt	Bullard King & Co., Ltd.
<i>Umtata</i>	GDOF	9.3.56	D. L. Weston	G. S. Wood, R. Harris, D. Coombs	J. Molloy	Bullard King & Co., Ltd.
<i>Umsinto</i>	GIFO	14.1.56	R. Harber	J. R. Aldous, P. Austin, J. Rose	G. Marchant	Bullard King & Co., Ltd.
<i>Velletia</i>	MGGD	11.12.54	J. Nettleship	G. M. Greison, T. G. Wormald, J. B. Morris, W. G. McNaughton	W. J. Beattie	Anglo-Saxon Petroleum Co., Ltd.
<i>Vestra</i>	MNNB	18.12.53	D. S. Archibald	K. B. Sinder, D. C. White	D. C. White	J. T. Salvesen & Co.
<i>Velo</i>	GPCI	15.2.56	J. Maynard	G. Paton, R. Massam, W. Walker	G. Williams	Ellerman's Wilson Line, Ltd.
<i>Waipawa</i>	GWXQ	12.1.56	A. S. D. Masters	A. S. G. L'Estrange, D. R. Pochin, D. James	H. L. Haas	Shaw, Savill & Albion Co., Ltd.
<i>Wairangi</i>	MATX	10.12.55	J. L. Stobbs, R.D., Lt.-Cdr. R.N.R.	J. Cousins, R. J. McVittie, T. Wilson	J. Taylor	Shaw, Savill & Albion Co., Ltd.
<i>Waiwera</i>	GBJB	11.1.56	R. A. Barns	R. A. Barns, K. D. Billingham, G. G. Hendry	J. Downie	Shaw, Savill & Albion Co., Ltd.
<i>Waits Bay</i>	GKBZ	6.1.56	A. Donald, O.B.E.	W. E. Campbell, J. Clements, M. R. Fikins	J. R. Martin	Sir R. Ropner & Co., Ltd.
<i>Wanstead</i>	GFLS	10.3.56	I. W. Jackson	N. Atkinson, R. H. Hall-Soloman, D. C. Hall	W. H. Carmichael	Watts, Watts & Co., Ltd.
<i>Washington Star</i>	GRPR	31.5.55	C. E. Legg	W. L. Murphy, P. E. Brecknell, I. W. Walker	I. James	Lampport & Holt Line, Ltd.
<i>Wendover</i>	GFML	18.10.55	J. A. Tully	M. King, A. Dougiass, A. Pharony	H. Whitticase	Watts, Watts & Co., Ltd.
<i>Westmeath</i>	GQGI	5.3.56	T. G. Wilson	Munden, K. R. Curming, R. Pope	D. McSweeney	New Zealand Shipping Co., Ltd.
<i>Winchester Castle</i>	GTPZ	15.11.55	G. W. B. Lloyd	J. G. Kemp-Luck, A. J. Chalmers, J. W. Hall	E. H. Pitt	Union Castle Mail S.S. Co., Ltd.
<i>Windsor</i>	GPOG	10.1.55	A. Cox	I. Lang, N. Gray, J. R. Kirby	W. Pyburn	Watts, Watts & Co., Ltd.
<i>Woodford</i>	GFMM	24.9.55	J. Cormack	I. Branch, J. Lewis, D. W. Griffin, D. W. J. Bewick	A. Carr	Watts, Watts & Co., Ltd.
<i>Woolwich</i>	GRWC	7.3.56	D. Cameron	A. Sugden, J. Lewis, D. Griffin	J. McKenzie	Watts, Watts & Co., Ltd.
<i>Worcestershire</i>	GFZM	23.11.55	F. C. Brooks	R. W. Barton, R.N.R., R. M. Bessant, D. Downard	W. G. Fletcher	Bibby Bros. & Co.
<i>Yoma</i>	GLPN		K. Marsh	T. Conway, W. Fitzgerald, T. A. Hood	J. Brown	P. Henderson & Co.

## Supplementary Ships

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Alert</i> .. .. .	GCBM	12.9.52	R. H. J. Wallis	R. M. Turnbull, G. A. Alfred, D. M. Curror, B. MacLagan	A. Prest	H.M. Postmaster General Bristol Steam Navigation Co., Ltd.
<i>Apollo</i> .. .. .	MSFM	24.10.55	G. V. Barnes	P. J. Wright, H. G. Mowatt	R. Cunningham	H.M. Postmaster General
<i>Ariel</i> .. .. .	GMDY	29.4.54	C. M. G. Evans, M.B.E.	E. J. Evans, D. C. Chisholm, A. C. H. Childs	J. E. S. Sarns	Joseph Robinson & Sons
<i>Begonia</i> .. .. .	GBRM	8.11.55	R. Reekie	J. B. Barker, L. Hopper, M. Johnson	W. E. N. Gordon	Ropner Shipping Co., Ltd.
<i>Bellerby</i> .. .. .	MQJF	18.2.56	F. Tate, O.B.E.	W. E. N. Gordon, S. H. Nicholson, R. U. Pope	E. Yard	Geo. Nisbet & Co.
<i>Blairclava</i> .. .. .	GLLG	24.11.55	J. Macvean	J. E. Halliday, M. Gilmour, A. McAdam	— Humble	Cape of Good Hope Motorship Co., Ltd.
<i>Cape Breton</i> .. .. .	GLXG	2.2.53	J. Smith	Miller, W. R. Pilling, A. D. Chappell	I. Hart	W. H. Stott & Co., Ltd.
<i>Cape Howe</i> .. .. .	GCYP	18.1.56	A. M. Fraser	A. C. Hunter, T. Welsh, A. McPhail	J. MacDonald	Anchor Line, Ltd.
<i>Cara</i> .. .. .	GSZI		A. Mackay	I. Skinner, A. Livingstone, G. Cowan	C. J. Ritchie	Cayzer Irvine & Co., Ltd.
<i>Carlo</i> .. .. .	GQKL	5.3.56	R. Massam	A. K. Blake, P. Willingham, J. J. Bell	D. Munroe	Cayzer Irvine & Co., Ltd.
<i>Circassia</i> .. .. .	GZMD	9.2.56	J. McG. Brown	J. Ballantyne, R. M. Sinclair	W. R. Dowinton	Walter Runciman & Co., Ltd.
<i>Clan Alpine</i> .. .. .	GIFP		T. O. Marr	A. C. Myhill, M. P. R. Turner, R. R. Cawdrey	F. H. Wright	Sir William Reardon Smith & Sons, Ltd.
<i>Clan Lamont</i> .. .. .	GTTD	2.7.55	J. E. Townrow	J. MacNiven, D. M. Geddes, D. Grant	A. Hughes	Sir William Reardon Smith & Sons, Ltd.
<i>Dartmoor</i> .. .. .	CFQT	24.2.56	L. G. Welch	G. C. Laing, A. Coaster, T. Summers	G. O'Brien	Cable & Wireless, Ltd.
<i>Devon City</i> .. .. .	MBKL	29.10.55	J. Sloan	P. A. H. Beckett, G. A. Thompson, B. G. Sharp	D. T. Greaves	Counties Ship Management Co., Ltd.
<i>Eastern City</i> .. .. .	GBRB	3.1.56	H. W. Marshall	D. V. Jones, C. Davidson, T. H. White	R. Miller	Newbiggin S.S. Co., Ltd.
<i>Edward Welshaw</i> .. .. .	MBMP	26.3.56	R. W. Porter-Reynolds	A. Miller, T. Archer, G. Goodale, P. Clough	J. Hill	J. & C. Harrison & Co., Ltd.
<i>Fry Hill</i> .. .. .	MAKS	3.1.56	C. Dalziel	J. Naisbit, B. Wary, M. Nichols, D. Greaves	N. Burnitt	Houston Line (London), Ltd.
<i>Greenbait</i> .. .. .	MSGG	2.12.54	R. Cook	I. D. S. Ogilby	J. A. McKernan	Hudson S.S. Co., Ltd.
<i>Harpaiston</i> .. .. .	GFEX	15.12.54	H. R. C. Small	A. H. Webber, J. Baras, P. Brake	J. E. Unsworth	Hudson S.S. Co., Ltd.
<i>Hestone</i> .. .. .	GUGJ	8.3.56	E. D. Bonney, M.B.E.	B. Middleton, J. Denver, G. Rowland	P. Hemery	Royal Mail Lines, Ltd.
<i>Hudson Deep</i> .. .. .	MPCR	16.8.55	J. Gibbons, D.S.C.	M. J. Rice, K. R. Mackenzie, R. Moloney	E. Mathias	Commercial Cable Co.
<i>Hudson Fifth</i> .. .. .	GDMK	10.3.56	A. Crosby	M. R. Umurski, W. Wilson	D. A. Styles	Phocean Ship Agency, Ltd.
<i>Leicestershire</i> .. .. .	GDBL	14.1.56	E. D. Brand	R. Humphreys, J. W. Walldie, J. Routledge	R. Goodman	T. & J. Brocklebank, Ltd.
<i>Loch Gosoon</i> .. .. .	MMJT	10.2.56	E. N. Giller, M.B.E.	R. Sutton, L. Fenner, J. Marks	J. Devitt	Messrs. Stone & Rolfe, Ltd.
<i>Marie Louise Mackay</i> .. .. .	GDNP	1.11.55	C. F. Hunter	L. P. Denny, H. Goodbody, W. Nimmo, L. Cook, S. Bailey	D. MacFarlane	Glen & Co., Ltd.
<i>Markab</i> .. .. .	GCVT	21.7.55	C. Christensen	M. Rosic, J. Toet, J. Phillis, C. Christensen	J. Poulter	Cable & Wireless, Ltd.
<i>Marina</i> .. .. .	MLPK	17.3.56	L. B. Anderson	J. Carme, W. G. Morrison	M. Roberts	Counties Ship Management Co., Ltd.
<i>Mathura</i> .. .. .	GXCX		J. P. Jackson	J. Dunn, T. J. Hamilton, S. Baxter	G. Banner	Glen & Co., Ltd.
<i>Menastone</i> .. .. .	GUFA	30.11.55	S. Sheasby	A. Todd, W. Thomas, J. C. Elliott		
<i>Meia</i> .. .. .	MPWB	19.12.55	A. D. McNab	R. G. Laursen, M. McColl, J. Chisholm		
<i>Milo</i> .. .. .	GQDP		H. G. Mowat	P. Wright, W. Kays		
<i>Mirror</i> .. .. .	GDFL	8.11.55	T. A. Vickers, Capt. R.N.Z.N.R. (Retd.)	E. J. Reilly, G. Lightfoot, J. Hawkins		
<i>Mulberry Hill</i> .. .. .	MAKQ	3.12.55	S. N. Mallett	H. A. Kerwick, R. B. Tarbuck, M. Keating		
<i>Narva</i> .. .. .	GQFP		R. J. McNinch	J. G. Paul, A. Wood, B. Beavers		

## Supplementary Ships—Contd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Nicania</i>	GIGJ	6.1.56	J. Carr	L. F. Money, B. R. Alderton, B. S. Holroyd	C. R. McAnerny	Anglo-Saxon Petroleum Co., Ltd. Anglo-Saxon Petroleum Co., Ltd.
<i>Northia</i>	GDQK	11.1.56	A. Mackay	M. A. Cooper, I. C. G. Wildish	..	Port Line, Ltd.
<i>Port Fairy</i>	GSTP	16.2.56	W. M. Clough	D. A. Church, R. C. W. Marr, W. R. C. Pether	..	Bolton Steam Shipping Co., Ltd. Bolton Steam Shipping Co., Ltd.
<i>Ramsay</i>	GPSW	7.2.56	J. J. Grugan	G. C. Murray, G. W. Brown, D. Fullwood	E. Loft	Wm. France, Fenwick & Co., Ltd.
<i>Rembrandt</i>	GPFD	27.2.56	M. V. Siddle	C. H. Phillips, J. Parsloe, R. Grubb	J. Broomhall	Hall Bros.
<i>Rockwood</i>	GPSN	2.1.56	A. Dover	J. R. Walker, T. Waugh, F. Turnbull	J. Moss	Currie Line, Ltd.
<i>Royal Emblem</i>	GDSC	10.5.55	H. Morgan	K. B. Jewell, M. Martin	F. Petch	Ellerman's Wilson Line, Ltd.
<i>Runa</i>	GFSW	15.10.55	T. Henry, O.B.E.	W. Taylor, T. Henry, A. McIntyre	A. Corless	Glen & Co., Ltd.
<i>Rutland</i>	GTCP	..	W. Allan	N. Hebden, N. Cook, J. Pickering	H. Moore	Ellerman's Wilson Line, Ltd.
<i>Silvito</i>	GSVG	2.7.54	S. F. Williams	K. Wilson, —, Ballantyne	—, Quin	Glen & Co., Ltd.
<i>Shuna</i>	MMGC	28.12.55	J. Loose	J. Kelly, T. J. Buchanan	M. J. Maundrell	Lyle Shipping Co., Ltd.
<i>Table Bay</i>	MFIV	23.11.55	G. E. Miles	H. M. Keeman, T. L. Langlands, D. MacCullum	..	Anchor Line, Ltd.
<i>Taranita</i>	GIGS	..	R. S. Paton	J. D. McIntosh, J. A. G. McColl, D. MacDonald	A. MacPherson	Glen & Co., Ltd.
<i>Thelma</i>	MBKK	23.9.54	T. A. W. Fairweather	W. H. Dodson, G. Gillon, D. K. Paterson	K. Hicks	Hain S.S. Co., Ltd.
<i>Trelisick</i>	GBPR	29.10.55	D. T. Spencer	J. Spall, D. L. Lacey, M. Cayzer	C. A. Gaffney	Hain S.S. Co., Ltd.
<i>Trevelyan</i>	MATE	2.1.56	H. Gravell	J. P. C. Forster, E. F. Boyd, N. Carrivick	T. Berry	Hain S.S. Co., Ltd.
<i>Trevice</i>	MATH	22.3.56	B. George	A. V. Rowles, A. O. Jones, D. P. Mitchell	W. Blacklaws	Hain S.S. Co., Ltd.
<i>Trevorlas</i>	MATL	10.3.56	W. H. Whitaker	R. Angus, K. Chow	C. B. Holyoaks	Hain S.S. Co., Ltd.
<i>Tronda</i>	MMLX	15.10.51	R. J. Sinclair	A. Burrell, J. A. Squire	..	Chr. Salvesen & Co.
<i>Truro</i>	GJTO	17.6.55	H. Whitfield	S. A. Turk, C. K. Taylor, J. Dodsworth, —, Dando	V. Smith	Ellerman's Wilson Line, Ltd.
<i>Unganda</i>	GFRQ	25.2.56	D. W. Spiers, G.M., R.D., Cdr. R.N.R.	D. P. Daley, R. Diggle, P. Pollard	..	British India Steam Nav. Co., Ltd.
<i>Warwick Castle</i>	GRRJ	18.2.56	J. D. B. Fisher	D. E. Kerrigan, G. G. Callender	H. Smith	Union Castle Mail S.S. Co., Ltd.
<i>Yarmouth Trader</i>	GUAP	2.9.55	R. A. Goodings	J. Liston, A. Rae	P. Thomas	Great Yarmouth Shipping Co., Ltd.
<i>Zealand</i>	MSNN	..	D. Sinclair	..	W. Jones	Currie Line, Ltd.

## Marid Ships

The following is a list of ships voluntarily observing and reporting sea temperatures from coastal waters of Great Britain. Captains are requested to point out any errors or omissions in the list.

NAME OF VESSEL	CALL SIGN	CAPTAIN	OWNERS/MANAGERS
<i>Actuality</i> .. .. .	GPPF	D. O'Leary .. .. .	F. T. Everard & Sons, Ltd.
<i>Amsterdam</i> .. .. .	MFBP	C. R. Baxter, D.S.C. .. .. .	British Transport Commission
* <i>Angelo</i> .. .. .	GQFY	S. N. Stokes .. .. .	Ellerman's Wilson Line, Ltd.
* <i>Apollo</i> .. .. .	MSFM	C. V. Barnes .. .. .	Bristol Steam Navigation Co., Ltd.
<i>Ariosto</i> .. .. .	GKPW	W. C. Gill .. .. .	Ellerman's Wilson Line, Ltd.
* <i>Atlantic Coast</i> .. .. .	GWSY	J. O. Rowland, M.B.E. .. .. .	Coast Lines, Ltd.
<i>Barra Head</i> .. .. .	MPOZ	W. Flett .. .. .	A. F. Henry & MacGregor, Ltd.
<i>Belrayock</i> .. .. .	MKGV	— Irvine .. .. .	London & Edinburgh Shipping Co., Ltd.
* <i>Belvina</i> .. .. .	MLZF	W. Fisher .. .. .	London & Edinburgh Shipping Co., Ltd.
<i>British Coast</i> .. .. .	GWQX	R. E. Holt .. .. .	Coast Lines, Ltd.
* <i>British Scout</i> .. .. .	GJKD	T. S. Rawlinson .. .. .	British Tanker Co., Ltd.
<i>Brora</i> .. .. .	MLVY	M. MacIver .. .. .	William Sloan & Co.
<i>Caledonian Coast</i> .. .. .	GKXF	J. Webber, M.B.E. .. .. .	Coast Lines, Ltd.
<i>Cambria</i> .. .. .	GBKT	N. Lloyd-Williams .. .. .	British Transport Commission
<i>Cato</i> .. .. .	GUAK	L. Jenkins .. .. .	Bristol Steam Navigation Co., Ltd.
<i>Cicero</i> .. .. .	GRTD	A. T. Jardine .. .. .	Ellerman's Wilson Line, Ltd.
<i>Clupea</i> .. .. .	GOAJ	J. Jappy .. .. .	Fishery Board for Scotland
<i>Corfen</i> .. .. .	GDJX	E. S. Granger .. .. .	Wm. Cory & Son, Ltd.
<i>Corfleet</i> .. .. .	GWTD	A. G. Waller .. .. .	Wm. Cory & Son, Ltd.
<i>Cormain</i> .. .. .	MAHT	J. T. Collin .. .. .	Wm. Cory & Son, Ltd.
<i>Cormead</i> .. .. .	GDBX	T. Slack .. .. .	Wm. Cory & Son, Ltd.
<i>Cormist</i> .. .. .	GDVT	R. J. Garrow .. .. .	Wm. Cory & Son, Ltd.
<i>Cormoat</i> .. .. .	GLKV	R. B. Armstrong .. .. .	Wm. Cory & Son, Ltd.
<i>Cormull</i> .. .. .	MAHS	E. R. W. Allen .. .. .	Wm. Cory & Son, Ltd.
<i>Corncrake</i> .. .. .	MJKL	W. S. Dunlop .. .. .	Moss Hutchison Line, Ltd.
<i>Crane</i> .. .. .	MMCS	B. Cooney .. .. .	Moss Hutchison Line, Ltd.
<i>Drake</i> .. .. .	MMYC	J. Main .. .. .	General Steam Navigation Co., Ltd.
* <i>Dryburg</i> .. .. .	GNYD	G. Simpson .. .. .	George Gibson & Co., Ltd.
<i>Duke of Argyll</i> .. .. .	GNVX	W. N. Greenwood .. .. .	British Transport Commission
<i>Duke of Lancaster</i> .. .. .	GCPQ	J. I. Irwin, R.D., Cdr. .. .. .	British Transport Commission
<i>Duke of Rothesay</i> .. .. .	GNVL	H. Thompson .. .. .	British Transport Commission
<i>Empire Cedric</i> .. .. .	GRSC	W. H. Laws, R.D., Lt.-Cdr. R.N.R. (Retd.) .. .. .	Atlantic Steam Navigation Co., Ltd.
<i>Empire Cymric</i> .. .. .		W. P. Page .. .. .	Ministry of Transport
<i>Empire Doric</i> .. .. .	MAVQ	W. Close .. .. .	Atlantic Steam Navigation Co., Ltd.
<i>Empire Gaelic</i> .. .. .	MAVR	H. T. Green .. .. .	Atlantic Steam Navigation Co., Ltd.
<i>Explorer</i> .. .. .	MRCZ	G. B. McLaren .. .. .	Scottish Home Department
<i>Falcon</i> .. .. .	MNXL	S. W. Develin .. .. .	General Steam Navigation Co., Ltd.
<i>Fountains Abbey</i> .. .. .	MSGT	F. W. Wooler .. .. .	Associated Humber Lines
<i>Fulham X</i> .. .. .	MADV	D. Battle .. .. .	Central Electricity Authority
<i>Golden Dawn</i> .. .. .	MIZV	A. Adamson, M.B.E., R.D., Sk. Lt. R.N.R. (Retd.) .. .. .	A. Adamson, M.B.E.
* <i>Gothland</i> .. .. .	MJMS	H. Anderson .. .. .	Currie Line, Ltd.
<i>Great Western</i> .. .. .	GWRD	D. O. Griffiths .. .. .	British Transport Commission
<i>Grebe</i> .. .. .	MAEY	J. S. Lickis .. .. .	General Steam Navigation Co., Ltd.
<i>Greyfriars</i> .. .. .	MLQN	D. Hunt .. .. .	E. R. Newbigin, Ltd.
<i>Guernsey Coast</i> .. .. .		F. C. Lucas .. .. .	Coast Lines, Ltd.
<i>Harrogate</i> .. .. .	MNDB	J. M. Walters .. .. .	Wilson's & N.E. Railway Shipping Co., Ltd.
<i>Hibernia</i> .. .. .	MBMT	W. E. Meade .. .. .	British Transport Commission
<i>Hibernian Coast</i> .. .. .	GKXC	G. Mearns .. .. .	Coast Lines, Ltd.
<i>Isle of Guernsey</i> .. .. .	GQYJ	F. Breuilly .. .. .	British Transport Commission
<i>Isle of Jersey</i> .. .. .	GRBQ	C. E. Abbey .. .. .	British Transport Commission
<i>Isle of Sark</i> .. .. .	GTSR	G. Pierce .. .. .	British Transport Commission
<i>Jersey Coast</i> .. .. .	MKDL	J. Richardson .. .. .	Coast Lines, Ltd.
<i>Jura</i> .. .. .	MARU	L. J. Blanche .. .. .	Admiral Shipping Co., Ltd.
<i>Loch Seaforth</i> .. .. .		J. Smith .. .. .	David MacBrayne, Ltd.
<i>London Merchant</i> .. .. .	MBRZ	C. A. Piper .. .. .	London Scottish Lines, Ltd.
<i>Maidstone</i> .. .. .	MNQV	E. H. Ashton .. .. .	British Transport Commission
<i>Malmo</i> .. .. .	GQCN	A. D. Seath .. .. .	Ellerman's Wilson Line, Ltd.
<i>Marine Craft Unit (R.A.F.) No. 1102</i> .. .. .		Flt.-Lt. D. A. Koster .. .. .	Royal Air Force
* <i>Melrose</i> .. .. .	MCFD	J. Murray .. .. .	Geo. Gibson & Co., Ltd.
<i>Melrose Abbey</i> .. .. .	GSYW	J. Blackburn .. .. .	Hull & Netherlands S.S. Co., Ltd.
† <i>Meta</i> .. .. .	MPWB	A. D. McNab .. .. .	Clydesdale Shipowners Co., Ltd.
* <i>Milo</i> .. .. .	GQDP	H. E. Lawson .. .. .	Bristol Steam Navigation Co., Ltd.
<i>Minna</i> .. .. .	GKPS	T. Mather .. .. .	Fishery Board for Scotland
† <i>Narva</i> .. .. .	GQFP	R. J. McNinch .. .. .	Glen & Co. (Scottish Navigation Co., Ltd.)
<i>Ocean Coast</i> .. .. .	GYMP	G. H. Clarke .. .. .	Coast Lines, Ltd.
* <i>Pluto</i> .. .. .	GUAB	G. V. Barnes .. .. .	Bristol Steam Navigation Co., Ltd.
<i>Peregrine</i> .. .. .	GIGM	W. Lockhart .. .. .	General Steam Navigation Co., Ltd.
<i>Princess Maud</i> .. .. .	GWRT	R. A. H. Lord, D.S.C., R.D., Lt.-Cdr. R.N.R. (Retd.) .. .. .	British Transport Commission
* <i>Rattray Head</i> .. .. .	GCBR	J. Graham .. .. .	A. F. Henry & MacGregor, Ltd.
<i>Ringdove</i> .. .. .	GRKK	E. C. Painter, D.S.C. .. .. .	General Steam Navigation Co., Ltd.
* <i>Rollo</i> .. .. .	GSFG	S. Stokes .. .. .	Ellerman's Wilson Line Ltd.
<i>Rora Head</i> .. .. .	MKVB	G. Harvey .. .. .	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>Runa</i> .. .. .	GFSW	T. Henry, O.B.E. .. .. .	Clydesdale Shipowners Co., Ltd.
<i>St. Clement</i> .. .. .	GRGM	W. J. Ramsay .. .. .	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>St. Helier</i> .. .. .	GLBT	W. Baker .. .. .	British Transport Commission

## Marid Ships—contd.

NAME OF VESSEL	CALL SIGN	CAPTAIN	OWNERS/MANAGERS
<i>St. Julien</i> .. ..	GLBV	L. J. Richardson ..	British Transport Commission
<i>St. Magnus</i> .. ..	GFYK	W. McKay .. ..	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>St. Ninian</i> .. ..	GJBB	A. M. Dundas .. ..	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>Selby</i> .. ..	MLFT	A. C. Allen .. ..	Wilson's & N.E. Railway Shipping Co., Ltd.
<i>Slieve Bawn</i> .. ..	MQCC	E. A. Bradshaw ..	British Transport Commission
<i>Slieve Bearnagh</i> ..	MLNL	C. R. Gill .. ..	British Transport Commission
<i>Slieve Bloom</i> .. ..	MQDD	R. J. Thomas .. ..	British Transport Commission
<i>Slieve League</i> .. ..	MQCM	J. Abram .. ..	British Transport Commission
<i>Slieve More</i> .. ..	MQBM	R. Roberts .. ..	British Railways (L.M. Region)
<i>Southern Coast</i> .. ..	MASD	G. Goldman .. ..	Coast Lines, Ltd.
<i>Stock Force</i> .. ..	MGYD	G. Roberts .. ..	W. S. Kennaugh & Co., Ltd.
<i>Suffolk Coast</i> .. ..	MMVC	T. Taylor .. ..	Tyne Tees Shipping Co., Ltd.
<i>Teal</i> .. ..	GBXC	C. C. Reynolds ..	General Steam Navigation Co., Ltd.
<i>Teano</i> .. ..	GSTY	A. T. Jardine .. ..	Ellerman, Wilson Line
† <i>Thelma</i> .. ..	MBKX	F. Fairweather ..	Glen & Co., Ltd.
<i>Vienna</i> .. ..	GTBR	A. Pearson Button ..	British Railways (Eastern Region)
* <i>Whitby Abbey</i> .. ..	MSGV		Associated Humber Lines
† <i>Yarmouth Trader</i> ..	GUAP	R. A. Goodines ..	Great Yarmouth Shipping Co., Ltd.

\*These ships also send in non-instrumental weather messages when in the North Sea.  
 †Ships also on supplementary list.

## Trawlers and North Sea Traders

The following is a list of trawlers and North Sea traders voluntarily observing and reporting those elements of the weather which do not entail the use of any meteorological instruments.

NAME OF SHIP	CALL SIGN	SKIPPER	OWNERS/MANAGERS
<b>Trawlers:</b>			
<i>Afridi</i> .. ..	GFWX		Derwent Trawlers, Ltd.
<i>Athenian</i> .. ..	GFWD		Onward Steam Fishing Co., Ltd.
<i>Alamein</i> .. ..	GKCD		Hull Merchants Amalgamated Trawlers, Ltd.
<i>Banquo</i> .. ..	MSWY		Hellyer Bros., Ltd.
<i>Benvolio</i> .. ..	MDPD		Northern Fishing Co.
<i>Bradman</i> .. ..	GMCC		Bunch Steam Fishing Co., Ltd.
<i>Ernest Holt</i> .. ..	GFXD	H. J. Aldiss, R.D., Lt.- Cdr. R.N.R. (Retd.) ..	Ministry of Agriculture and Fisheries Onward Steam Fishing Co., Ltd.
<i>Fezenta</i> .. ..	GLGB		Consolidated Fisheries, Ltd.
<i>Grimsby Town</i> .. ..	GQNL		Derwent Trawlers, Ltd.
<i>Hargood</i> .. ..	MGKK		Northern Fishing Co.
<i>Imperialist</i> .. ..	GRGJ		Newington Steam Trawling Co., Ltd.
<i>James Barrie</i> .. ..	GBJF		Kingston Steam Trawling Co., Ltd.
<i>Kingston Emerald</i> ..	NBSH		Loyal Steam Fishing Co., Ltd.
<i>Lancer</i> .. ..	GCPC		Loch Fishing Co. of Hull, Ltd.
<i>Loch Levan</i> .. ..	G CXM	W. Parkinson .. ..	Loch Fishing Co. of Hull, Ltd.
<i>Loch Oskraig</i> .. ..	GZQX	E. Moore .. ..	Lord Line, Ltd.
<i>Lord Cunningham</i> ..	GBKD		Dominion Steam Fishing Co., Ltd.
<i>Macedonian</i> .. ..	MGFC		Northern Trawlers, Ltd.
<i>Northern Jewel</i> .. ..	GRNN		Northern Trawlers, Ltd.
<i>Northern Wave</i> .. ..	GYZC		St. Christopher Steam Fishing Co., Ltd.
<i>Prince Philip</i> .. ..	MBLD		Sir Thomas Robinson & Son (Grimsby), Ltd.
<i>Sardinian</i> .. ..	MEZW		Lionel C. Tomlinson
<i>Sabina</i> .. ..	GZNJ	J. W. Tomlinson .. ..	Thomas Hamling & Co., Ltd.
<i>St. Alcuin</i> .. ..	MGCW	G. Argument .. ..	Thomas Hamling & Co., Ltd.
<i>St. Amant</i> .. ..	GFUD	J. Meyers .. ..	Thomas Hamling & Co., Ltd.
<i>St. Apollo</i> .. ..	GBBZ	A. E. Fisher .. ..	Thomas Hamling & Co., Ltd.
<i>St. Britwin</i> .. ..	MFXJ	J. Dobson .. ..	Thomas Hamling & Co., Ltd.
<i>St. Elston</i> .. ..	GDDL	W. Parkinson .. ..	Thomas Hamling & Co., Ltd.
<i>St. Keverne</i> .. ..	GMDR		Thomas Hamling & Co., Ltd.
<i>St. Nectan</i> .. ..	GZJY		Thomas Hamling & Co., Ltd.
<i>St. Wiston</i> .. ..	GDDK		Thomas Hamling & Co., Ltd.
<i>Serron</i> .. ..	GQRX		Standard Steam Fishing Co., Ltd.
<i>Stella Canopus</i> .. ..	GKQR	J. Kersey .. ..	Charleson-Smith Trawlers, Ltd.
<i>Stella Polaris</i> .. ..	NAWW	G. Weir .. ..	Charleson-Smith Trawlers, Ltd.
<i>Thracian</i> .. ..	MQKL		Sir Thomas Robinson & Son (Grimsby), Ltd.
<i>Vanessa</i> .. ..	GPMN		Atlas Steam Fishing Co., Ltd.
<i>Yardley</i> .. ..	GJYT		Crampin Steam Fishing Co., Ltd.
<b>North Sea traders:</b>			
<i>Carlo</i> .. ..	GQKL		Ellerman's Wilson Line, Ltd.
<i>Folda</i> .. ..	MLFR	A. Goodland .. ..	The South Georgia Co., Ltd.
<i>Iberian Coast</i> .. ..	GFDP	D. Collins .. ..	Tyne-Tees Shipping Co., Ltd.
<i>Olivian Coast</i> .. ..	MDRQ	E. Wilson .. ..	Tyne-Tees Shipping Co., Ltd.
<i>Netherlands Coast</i> ..	NQLK		Tyne-Tees Shipping Co., Ltd.
<i>Scotia</i> .. ..	GPYM	A. M. Finlayson ..	Scottish Home Office

## Lightvessels

The following lightvessels voluntarily observe, record and/or report from coastal waters of Great Britain

NAME OF VESSEL	MASTERS
<i>Bar</i> .. .. .	E. E. Abbott
<i>Dowsing</i> .. .. .	J. R. Audley, S. R. Smith, D. A. Bacon
<i>East Goodwin</i> .. .. .	W. A. Price, L. W. Ling, L. N. Hawkes
<i>Galloper</i> .. .. .	E. G. Mullitt
<i>Humber</i> .. .. .	S. A. Balle, W. S. Parish
<i>Newarp</i> .. .. .	B. Hadden
<i>Royal Sovereign</i> .. .. .	L. P. Dawson, S. G. Sharnan
<i>St. Gowan</i> .. .. .	H. G. T. Morgan, V. J. Lake
<i>Seven Stones</i> .. .. .	D. Appleby, J. H. Cooper
<i>Shambles</i> .. .. .	C. N. Duff
<i>Shipwash</i> .. .. .	J. L. Goldsmith
<i>Skulmartin</i> .. .. .	D. Hawkins
<i>Smith's Knoll</i> .. .. .	W. J. Hall, J. O'Neill

## Training Establishments

The following is a list of Training Establishments which submit logbooks, kept by the cadets under training, to the Marine Division.

ESTABLISHMENT	CAPTAIN/SUPERINTENDENT	LAST RETURN RECEIVED
<i>Conway, H.M.S.</i> .. .. .	E. Hewitt, R.D., Capt. R.N.R. .. .. .	6.1.56
<i>Pangbourne Nautical College</i> .. .. .	H. C. Skinner, O.B.E., Cdr. R.N. .. .. .	27.7.55
<i>Warsash, School of Navigation</i> .. .. .	G. W. Wakeford, Capt. .. .. .	21.12.55
<i>Worcester, H.M.S.</i> .. .. .	G. C. Steele, V.C., Capt. R.N.R. .. .. .	3.4.56

## AUSTRALIA

### Voluntary Observing Ships

The following is a list of observing ships voluntarily co-operating with the Australian Meteorological Branch.

NAME OF VESSEL	CALL SIGN	OWNERS
<b>Selected Ships:</b>		
<i>Asphalion</i> .. .. .	GZPZ	Alfred Holt & Co.
<i>Bulolo</i> .. .. .	VJPD	Burns Philp & Co.
<i>Canara</i> .. .. .	MAGZ	British India Steam Navigation Co.
<i>Charon</i> .. .. .	GZJQ	Alfred Holt & Co.
<i>Chupra</i> .. .. .	GDZV	British India Steam Navigation Co.
<i>Duntroon</i> .. .. .	VIFB	Melbourne Steamship Co., Ltd.
<i>Gorgon</i> .. .. .	MBKC	Alfred Holt & Co.
<i>Idomeneus</i> .. .. .	GKYZ	Alfred Holt & Co.
<i>Koolinda</i> .. .. .	VJFC	Western Australian State Steamships
<i>Koomilya</i> .. .. .	VJNF	McIlwraith McEacheron, Ltd.
<i>Koorawatha</i> .. .. .	VLCW	McIlwraith McEacheron, Ltd.
<i>Kooringa</i> .. .. .	VLKR	McIlwraith McEacheron, Ltd.
<i>Malaita</i> .. .. .	VJYY	Burns Philp & Co.
<i>Malekuta</i> .. .. .	VLWB	Burns Philp & Co.
<i>Nellore</i> .. .. .	GBLZ	Eastern & Australian Steamship Co., Ltd.
<i>Orestes</i> .. .. .	GFPQ	Alfred Holt & Co.
<i>Romanic</i> .. .. .	GSLs	Shaw, Savill & Co.
<i>Triadic</i> .. .. .	GDNM	British Phosphate Commission
<i>Trienza</i> .. .. .	GJJZ	British Phosphate Commission
<i>Triona</i> .. .. .	GDFT	British Phosphate Commission
<i>Wangenella</i> .. .. .	VJPQ	Huddart Parker & Co., Ltd.
<i>Westralia</i> .. .. .	VJNJ	Huddart Parker & Co., Ltd.
<b>Supplementary Ships:</b>		
<i>Brazilian Prince</i> .. .. .		Shaw, Savill & Co.
<i>Dorrigo</i> .. .. .		Western Australian State Steamships
<i>Dulverton</i> .. .. .	VJVJ	Western Australian State Steamships
<i>English Prince</i> .. .. .		Shaw, Savill & Co.
<i>Kabbarli</i> .. .. .		Western Australian State Steamships
<i>Kybra</i> .. .. .	VJFN	Western Australian State Steamships

## BERMUDA

### Voluntary Observing Ships

The following is a list of observing ships voluntarily co-operating with the Meteorological Station, Bermuda.

NAME OF VESSEL	CALL SIGN	OWNERS
<i>Queen of Bermuda</i> .. ..	GZKF	Furness, Withy & Co., Ltd.
<i>Ocean Monarch</i> .. ..	GJXD	Furness, Withy & Co., Ltd.

## CANADA

### Voluntary Observing Ships

The following is a list of observing ships voluntarily co-operating with the Canadian Meteorological Division.

NAME OF VESSEL	CALL SIGN	OWNERS
<b>Atlantic List</b>		
<b>Selected Ships:</b>		
<i>Canadian Challenger</i> .. ..	VCSK	Canadian Pacific Steamships, Ltd.
<i>Canadian Constructor</i> .. ..	VGBY	Canadian National S.S. Co., Ltd.
<i>Canadian Cruiser</i> .. ..	VGPZ	Canadian National S.S. Co., Ltd.
<i>Cyrus Field</i> .. ..	GKQC	Western Union Cable Depot
<i>d'Iberville</i> .. ..	CGSM	Minister of Transport
<i>Esso Knoxville</i> .. ..	HPTK	Imperial Oil Shipping Co.
<i>Esso San Juan</i> .. ..	HOJV	Imperial Oil Shipping Co.
<i>Fort Avalon</i> .. ..	MBMC	Furness Withy & Co.
<i>Fort Hamilton</i> .. ..	GCSS	Furness Withy & Co.
<i>Fort Hearne</i> .. ..	VCGX	Hudson's Bay Co.
<i>Imperial Edmonton</i> .. ..	VGSJ	Imperial Oil Shipping Co.
<i>Imperial Toronto</i> .. ..	VGSJ	Imperial Oil Shipping Co.
<i>Irvingbrook</i> .. ..	HPBM	Western Trading Corporation
<i>Lakonia</i> .. ..	GCDB	Balfour Guthrie, Ltd.
<i>Lord Kelvin</i> .. ..	GDMN	Western Union Cable Depot
<i>Pinnacles</i> .. ..	VGGZ	Shell Canadian Tankers, Ltd.
<i>Rupert Island</i> .. ..	VDXX	Hudson's Bay Co.
<i>Sunbeam</i> .. ..	LJSQ	
<i>Sunjarv</i> .. ..	VGVQ	Saquenay Terminals, Ltd.
<b>Supplementary Ships:</b>		
<i>Canadian Conqueror</i> .. ..	VCPV	Canadian National S.S. Co., Ltd.
<i>Canadian Highlander</i> .. ..	VCPV	Canadian National S.S. Co., Ltd.
<i>Canadian Leader</i> .. ..	VCQC	Canadian National S.S. Co., Ltd.
<i>Canadian Observer</i> .. ..	VCNW	Canadian National S.S. Co., Ltd.
<i>Canadian Victor</i> .. ..	VCNX	Canadian National S.S. Co., Ltd.
<i>Paloma Hills</i> .. ..	VGGX	Shell Canadian Tankers, Ltd.
<i>Rincon Hills</i> .. ..	VGGY	Shell Canadian Tankers, Ltd.
<b>Pacific List</b>		
<b>Selected Ships:</b>		
<i>Waihemo</i> .. ..	ZMJO	Canadian Australasian Line
<i>Waihawa</i> .. ..	ZMJI	Canadian Australasian Line
<i>Wairuna</i> .. ..	ZMJT	Canadian Australasian Line
<i>Waitomo</i> .. ..	ZMKO	Canadian Australasian Line
<b>Supplementary Ships:</b>		
<i>Anna Bakke</i> .. ..	LANK	Knut Knutsen
<i>Antrim</i> .. ..	GRJL	Avenue Shipping Co.
<i>Borgainville</i> .. ..	LMSQ	A. F. Klaveness & Co.
<i>Castleville</i> .. ..	LMAI	A. F. Klaveness & Co.
<i>City of Brooklyn</i> .. ..	GZKT	Ellerman Lines, Ltd.
<i>Elizabeth Bakke</i> .. ..	LJIX	Knut Knutsen
<i>Gjertrud Bakke</i> .. ..	LJZK	Knut Knutsen
<i>Mattawunga</i> .. ..	SJRT	Transatlantic Shipping Co.
<i>Ogeka Bakke</i> .. ..	LLGU	Knut Knutsen
<i>Sunnyville</i> .. ..	LNQZ	A. F. Klaveness & Co.
<i>Ventura</i> .. ..	LAFS	Ventura Steamship Corporation
<i>Vigan</i> .. ..	LAGQ	Kirköy Shipping Co., Ltd.

# INDIA

## Voluntary Observing Ships

The following is a list of observing ships voluntarily co-operating with the India Meteorological Department.

NAME OF VESSEL	CALL SIGN	OWNERS
<b>Selected Ships:</b>		
<i>Alavi</i> .. .. .	VWBL	The Mogul Line, Ltd.
<i>Bahadur</i> .. .. .	MAVH	Asiatic Steam Navigation Co., Ltd.
<i>Bharatjal</i> .. .. .	VWXC	Bharat Line, Ltd.
<i>Dara</i> .. .. .	GDPT	British India Steam Navigation Co., Ltd.
<i>Darssa</i> .. .. .	GFSM	British India Steam Navigation Co., Ltd.
<i>Dumra</i> .. .. .	GMLA	British India Steam Navigation Co., Ltd.
<i>Dwarka</i> .. .. .	GCKS	British India Steam Navigation Co., Ltd.
<i>Havildar</i> .. .. .	GLVK	Asiatic Steam Navigation Co., Ltd.
<i>Indian Exporter</i> .. .. .	VWVW	India Steamship Co., Ltd.
<i>Indian Merchant</i> .. .. .	VWVR	India Steamship Co., Ltd.
<i>Indian Pioneer</i> .. .. .	VWVS	India Steamship Co., Ltd.
<i>Indian Trader</i> .. .. .	VWYT	India Steamship Co., Ltd.
<i>Islami</i> .. .. .	VWJC	The Mogul Line, Ltd.
<i>Jaladuta</i> .. .. .	VWDJ	Scindia Steam Navigation Co., Ltd.
<i>Jalaganga</i> .. .. .	VWJG	Scindia Steam Navigation Co., Ltd.
<i>Jalaketu</i> .. .. .	VWWC	Scindia Steam Navigation Co., Ltd.
<i>Jalakirti</i> .. .. .	VWWD	Scindia Steam Navigation Co., Ltd.
<i>Jalakrishna</i> .. .. .	VWJM	Scindia Steam Navigation Co., Ltd.
<i>Jalamanjari</i> .. .. .	VWWY	Scindia Steam Navigation Co., Ltd.
<i>Jalaprakash</i> .. .. .	VWYD	Scindia Steam Navigation Co., Ltd.
<i>Jalayamuna</i> .. .. .	VWJJ	Scindia Steam Navigation Co., Ltd.
<i>Jehangir</i> .. .. .	VWBJ	The Mogul Line, Ltd.
<i>Kampala</i> .. .. .	GCKX	British India Steam Navigation Co., Ltd.
<i>Kavanya</i> .. .. .	MACS	British India Steam Navigation Co., Ltd.
<i>Mahadevi</i> .. .. .	GCRN	Asiatic Steam Navigation Co., Ltd.
<i>Maharaja</i> .. .. .	GNBY	Asiatic Steam Navigation Co., Ltd.
<i>Mohammedi</i> .. .. .	GCBS	The Mogul Line, Ltd.
<i>Mozaffari</i> .. .. .	MACV	The Mogul Line, Ltd.
<i>Nadir</i> .. .. .	GCDV	Asiatic Steam Navigation Co., Ltd.
<i>Nurani</i> .. .. .	MAPS	Asiatic Steam Navigation Co., Ltd.
<i>Rajula</i> .. .. .	GMSN	British India Steam Navigation Co., Ltd.
<i>Santhia</i> .. .. .	GFSN	British India Steam Navigation Co., Ltd.
<i>Shahjehan</i> .. .. .	GPIX	Asiatic Steam Navigation Co., Ltd.
<i>State of Bombay</i> .. .. .	VWWP	Scindia Steam Navigation Co., Ltd.
<i>State of Madras</i> .. .. .	VWWN	Scindia Steam Navigation Co., Ltd.
<i>State of Saurashtra</i> .. .. .	VWXY	Scindia Steam Navigation Co., Ltd.
<i>Subadar</i> .. .. .	MADK	Asiatic Steam Navigation Co., Ltd.
<i>Umaria</i> .. .. .	GMNS	British India Steam Navigation Co., Ltd.
<b>Supplementary Ships:</b>		
<i>Amra</i> .. .. .	GNNX	British India Steam Navigation Co., Ltd.
<i>Bharatmitra</i> .. .. .	VWYX	Bharat Line, Ltd.
<i>Bharatraja</i> .. .. .	VWXL	Bharat Line, Ltd.
<i>Bharatram</i> .. .. .	VWXM	Bharat Line, Ltd.
<i>Bharatratna</i> .. .. .	VWZX	Bharat Line, Ltd.
<i>Bharatveer</i> .. .. .	VWZY	Bharat Line, Ltd.
<i>Bharatvijaya</i> .. .. .	VWZK	Bharat Line, Ltd.
<i>Indian Commerce</i> .. .. .	VWZW	India Steamship Co., Ltd.
<i>Indian Importer</i> .. .. .	VWYT	India Steamship Co., Ltd.
<i>Indian Reliance</i> .. .. .	VWCJ	India Steamship Co., Ltd.
<i>Indian Renown</i> .. .. .	VWCF	India Steamship Co., Ltd.
<i>Itaura</i> .. .. .	GMWW	British India Steam Navigation Co., Ltd.
<i>Jagran</i> .. .. .	VWZF	Great Eastern Shipping Co., Ltd.
<i>Jalazad</i> .. .. .	VWDF	Scindia Steam Navigation Co., Ltd.
<i>Jalajawahar</i> .. .. .	VWDD	Scindia Steam Navigation Co., Ltd.
<i>Jalakendra</i> .. .. .	VWWB	Scindia Steam Navigation Co., Ltd.
<i>Jalamayur</i> .. .. .	VWWX	Scindia Steam Navigation Co., Ltd.
<i>Jalamohan</i> .. .. .	VWCX	Scindia Steam Navigation Co., Ltd.
<i>Jalapadma</i> .. .. .	VWYN	Scindia Steam Navigation Co., Ltd.
<i>Jalaprabha</i> .. .. .	VWXS	Scindia Steam Navigation Co., Ltd.
<i>Jalaputra</i> .. .. .	VWBN	Scindia Steam Navigation Co., Ltd.
<i>Jalarajendra</i> .. .. .	VWYP	Scindia Steam Navigation Co., Ltd.
<i>Jalaratna</i> .. .. .	VWDS	Scindia Steam Navigation Co., Ltd.
<i>Jalausha</i> .. .. .	VWWV	Scindia Steam Navigation Co., Ltd.
<i>Jalavallabh</i> .. .. .	VWYM	Scindia Steam Navigation Co., Ltd.
<i>Jalavihar</i> .. .. .	VWBQ	Scindia Steam Navigation Co., Ltd.
<i>Malika</i> .. .. .	GCSK	Asiatic Steam Navigation Co., Ltd.
<i>Risaldar</i> .. .. .	GLVL	Asiatic Steam Navigation Co., Ltd.
<i>Rizwani</i> .. .. .	VWBF	The Mogul Line, Ltd.
<i>State of Andhra</i> .. .. .	VWBD	Scindia Steam Navigation Co., Ltd.
<i>State of Travancore-Cochin</i> .. .. .	VWBX	Scindia Steam Navigation Co., Ltd.

## NEW ZEALAND

### Voluntary Observing Ships

The following is a list of observing ships voluntarily co-operating with the Meteorological Service of New Zealand.

NAME OF VESSEL	CALL SIGN	OWNERS
<b>Selected Ships:</b>		
<i>Kaimanawa</i> .. .. .	ZMGZ	Union Steam Ship Company of New Zealand, Ltd.
<i>Kaitoke</i> .. .. .	ZMTZ	Union Steam Ship Company of New Zealand, Ltd.
<i>Kaponga</i> .. .. .	ZMVE	Union Steam Ship Company of New Zealand, Ltd.
<i>Karitane</i> .. .. .	ZMJX	Union Steam Ship Company of New Zealand, Ltd.
<i>Kauri</i> .. .. .	ZMCV	Union Steam Ship Company of New Zealand, Ltd.
<i>Kawaroa</i> .. .. .	ZMBX	Union Steam Ship Company of New Zealand, Ltd.
<i>Kawatiri</i> .. .. .	ZMKX	Union Steam Ship Company of New Zealand, Ltd.
<i>Kawera</i> .. .. .	ZMFY	Union Steam Ship Company of New Zealand, Ltd.
<i>Komata</i> .. .. .	ZMCX	Union Steam Ship Company of New Zealand, Ltd.
<i>Kopua</i> .. .. .	ZMLZ	Union Steam Ship Company of New Zealand, Ltd.
<i>Koromiko</i> .. .. .	ZMRT	Union Steam Ship Company of New Zealand, Ltd.
<i>Kotohai</i> .. .. .	ZMQU	Union Steam Ship Company of New Zealand, Ltd.
<i>Kurou</i> .. .. .	ZMFJ	Union Steam Ship Company of New Zealand, Ltd.
<i>Kurutai</i> .. .. .	ZMQH	Union Steam Ship Company of New Zealand, Ltd.
<i>Matua</i> .. .. .	ZMBN	Union Steam Ship Company of New Zealand, Ltd.
<i>Monowai</i> .. .. .	ZMCD	Union Steam Ship Company of New Zealand, Ltd.
<i>Navua</i> .. .. .		Union Steam Ship Company of New Zealand, Ltd.
<i>Port Montreal</i> .. .. .	GRKJ	Port Line, Ltd.
<i>Port Quebec</i> .. .. .	GWGQ	Port Line, Ltd.
<i>Port Saint John</i> .. .. .	GBCZ	Port Line, Ltd.
<i>Tofua</i> .. .. .	ZLMI	Union Steam Ship Company of New Zealand, Ltd.
<i>Waimate</i> .. .. .	ZMDV	Union Steam Ship Company of New Zealand, Ltd.
<i>Waimea</i> .. .. .	ZMRU	Union Steam Ship Company of New Zealand, Ltd.
<i>Waipori</i> .. .. .	ZMFL	Union Steam Ship Company of New Zealand, Ltd.
<i>Wairata</i> .. .. .	ZMBZ	Union Steam Ship Company of New Zealand, Ltd.
<i>Wairimu</i> .. .. .	ZMVR	Union Steam Ship Company of New Zealand, Ltd.
<i>Waitemata</i> .. .. .	ZMQW	Union Steam Ship Company of New Zealand, Ltd.
<b>Supplementary Ships:</b>		
<i>Katapoi</i> .. .. .	ZMVD	Union Steam Ship Company of New Zealand, Ltd.
<i>Kairanga</i> .. .. .	ZMCY	Union Steam Ship Company of New Zealand, Ltd.
<i>Kaitangata</i> .. .. .	ZMTJ	Union Steam Ship Company of New Zealand, Ltd.
<i>Kaitawa</i> .. .. .	ZMVC	Union Steam Ship Company of New Zealand, Ltd.
<i>Korui</i> .. .. .	ZMVB	Union Steam Ship Company of New Zealand, Ltd.
<i>Korowai</i> .. .. .	ZMKD	Union Steam Ship Company of New Zealand, Ltd.
<i>Piri</i> .. .. .	ZMGM	Imperial Chemical Industries, Ltd.
<i>Port Waikato</i> .. .. .	ZMJN	Holm & Company, Ltd.
<i>Viti</i> .. .. .	VQWS	Tasman Steam Ship Company of New Zealand, Ltd.
<i>Waiana</i> .. .. .	ZMDQ	Union Steam Ship Company of New Zealand, Ltd.
<i>Waitaki</i> .. .. .	ZMLR	Union Steam Ship Company of New Zealand, Ltd.

## SOUTH AFRICA

The following is a list of observing ships voluntarily co-operating with the South African Weather Bureau.

NAME OF VESSEL	CALL SIGN	OWNERS
<i>Abraham Larsen</i> .. .. .	GKZB	Union Whaling Co., Durban
<i>Africana II</i> .. .. .	ZSVK	Division of Fisheries, Cape Town
<i>Barrier</i> .. .. .	ZTCB	African Coasters, Ltd.
<i>F. T. Bates</i> .. .. .	ZSWW	South African Railways and Harbours
<i>Constantia</i> .. .. .	ZSRF	South African Marine Corporation, Cape Town
<i>Dalia</i> .. .. .	ZSDV	South African Railways Ships, Johannesburg
<i>Frances Repetto</i> .. .. .	ZSNB	
<i>George Irvin</i> .. .. .	ZSGF	Friarage Steam Fishing Co., Ltd.
<i>Hereto Coast</i> .. .. .	MQZK	
<i>Matabele Coast</i> .. .. .	CKGD	Thesen's Steamship Co., Cape Town
<i>Morgenster</i> .. .. .	ZSSJ	South African Marine Corporation, Cape Town
<i>Tristania</i> .. .. .	ZSCW	Tristan Development Co., Cape Town
<i>Vergelegen</i> .. .. .	ZSSN	South African Marine Corporation, Cape Town

## WEST INDIES

The following observing ships voluntarily co-operate with the British Caribbean Meteorological Service.

NAME OF VESSEL	CALL SIGN	OWNERS
<i>Electra</i> .. .. .	MRYX	Cable & Wireless, Ltd.
<i>West Indian</i> .. .. .	WRBR	Indo-China Steam Navigation Co., Ltd.

# HONG KONG

## Voluntary Observing Ships

The following is a list of observing ships voluntarily co-operating with the Royal Observatory, Hong Kong.

NAME OF SHIP	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	SHIPPING COMPANY OR OPERATOR
Anking	J. McKinlay	J. Hunter, T. A. C. Taylor, G. W. Bryant	R. A. Wilson	China Navigation Co., Ltd.
Anshan	A. Naismith	J. F. O'Connor, J. W. G. Wilby, K. D. Johnson	Li San Kau	China Navigation Co., Ltd.
Belinda	C. L. V. Dury	C. Fryet, C. O. Wong, S. Luk	K. Keong	Shun Cheong Steam Navigation Co., Ltd.
Changsha	D. C. Sim	A. Harper, P. J. McPherson, A. H. McAuley, M. D. O'Keefe	Li Chiu Tsai	China Navigation Co., Ltd.
Chengtu	R. E. Selwyn Jones	W. J. Coburn, P. G. Marking, R. E. Brooks	Leung Shu Fun	China Navigation Co., Ltd.
Choy Sang	J. H. Thomas	C. M. Gibbs, W. M. Pearson, J. Chisholm	D. B. Cummung	Indo-China Steam Navigation Co., Ltd.
Chung King	W. E. Hargrave	D. W. R. Gash, P. Y. Lam, B. Ginsholm	U. In San	China Navigation Co., Ltd.
Eastern Glory	L. C. Cox	S. R. Bridgeford, I. D. Patterson, J. McArdle	D. J. O'Moore	Indo-China Steam Navigation Co., Ltd.
Eastern Muse	G. W. F. Edwards	G. Kinley, R. Easley, M. Client	J. C. Middleton	Indo-China Steam Navigation Co., Ltd.
Eastern Queen	S. Schofield	M. J. Pope, J. R. Simpson, R. Beedie	R. O. Smith	Indo-China Steam Navigation Co., Ltd.
Eastern Saga	W. E. Reeve	C. Preston, J. B. Bowman, R. C. Hoggard, R. E. Strange	W. C. Walker	Indo-China Steam Navigation Co., Ltd.
Eastern Star	W. T. Rochester	R. K. Learoyd, R. King, A. B. Weller, J. W. Kempster	A. C. Martin	Indo-China Steam Navigation Co., Ltd.
Eastern Trader	Tai Ai Chun	Chen How Chao, Huang Chi Hsin	Lee King Yue	Indo-China Steam Navigation Co., Ltd.
El Brenon	A. Pinto Marques	J. M. Doyle, Raynaldo Fung	Chan Yu Tang	Great Southern Steamship Co., Ltd.
Elisbeth	W. Borrows	O. T. Ugliand, O. Y. Wellington	C. M. Tsang	Shun Cheong Steam Navigation Co., Ltd.
Fengting	J. Story	J. R. Brett, F. Cunningham, I. R. Neil	D. Fong Yan	China Navigation Co., Ltd.
Fengtien	G. P. Cope	G. Gilroy, W. M. Coates, C. T. Lu	Yu Pak Pui	China Navigation Co., Ltd.
Foochow	L. King	A. Atkin, J. M. K. Kelly, C. H. Shih	Chin Fook On	China Navigation Co., Ltd.
Fukien	R. C. W. Gorman	J. M. Parker, H. M. J. Bent, W. S. Huang	Ho Shu Wai	China Navigation Co., Ltd.
Funing	H. Pilling	I. F. Robertson, P. W. Campbell, M. W. Lewis	Choi Pong Cheung	China Navigation Co., Ltd.
Hai Hing	Johan L. A. Nilsen	Clas Asserson, Ove Saltvold, Knut Amundsen	Ip Yuen Hoi	China Siam Line
Hai Lee	Johannes Hansen	A. Skjorvestad, O. Andreassen, J. Evensen	Wute Ju Chan	China Siam Line
Hai Meng	J. Eide	H. Kysrvaag, A. Overland, F. Pettersen	Chan Kam Tsun	China Siam Line
Hang Sang	J. M. Marshall	J. E. William, G. C. Taylor, P. Ferrar	R. Prosser	Indo-China Steam Navigation Co., Ltd.
Hanyang	C. A. N. Baker	A. Bartley, J. Kiely, W. Lee	Lam Bun	China Navigation Co., Ltd.
Heinrich Jessen	I. P. Johannsen	H. Fallesen, W. Kronenbitter, E. G. Kragelund	Liao Pok Ying	Jebsen & Co.
Hélios	Nils Soelberg	O. Holm Andersen, A. Gronvik, O. Eldrup	Ip Yuk Fai	China Siam Line
Hermelin	Tanstad Sorensen	M. Sandvik, P. Petersen, P. I. Boe	Lai Kwong Yin	China Siam Line
Hermod	O. Apold	Kristoffersen, A. Sjøberg, Herman Wold	P. Poon	China Siam Line
Hervar	Halvor Andersen	John Mikkelisen, Robert Stephan, P. Halten	Fung Wing Kee	China Siam Line
Hew Sang	N. H. King	L. I. Ovsiannikoff, W. F. Povey, Yeung Koh Ching	Wong Ka Tong	Indo-China Steam Navigation Co., Ltd.
Hin Sang	J. F. G. Fotheringham	E. M. Norman, R. N. Maund, J. F. Edmunds	Kwong Shek Hee	Indo-China Steam Navigation Co., Ltd.
Hoi How	A. Fieldheim	A. Vespestad, L. E. Drange, H. Pedersen	H. H. Fastingsen	Karsten Larssen & Co. (Hong Kong), Ltd.
Hoi Wong	O. Offedal	R. Økland, O. Espeseth, K. Hemnes	E. Moller	Karsten Larssen & Co. (Hong Kong), Ltd.
Hoi Ying	Kr. Munkejord	B. Macland, J. Ekrene	L. Ydstebø	Great Southern Steamship Co., Ltd.
Hong Kong Trader	J. R. G. Findlay	Ko Keng Teng, Zee Chia Gee, Sih Hsiung	Wen Wing Hoo	Indo-China Steam Navigation Co., Ltd.
Hop Sang	T. C. W. Marr	J. G. Perrin, K. Sinclair, B. G. Box	D. Taylor	Indo-China Steam Navigation Co., Ltd.
Ho Sang	G. P. Parish	W. G. White, H. G. Smith, T. Y. Yuen	H. R. Bullers	Indo-China Steam Navigation Co., Ltd.
Hunan	J. F. Follett	G. Baxter, J. Keates, C. Tee	Lo Kim Chek	Indo-China Steam Navigation Co., Ltd.
Hupoh	F. Kelly	C. E. Lingard, D. Green, P. Bulatoff	Tsang Kau	China Navigation Co., Ltd.
Jacob Jebsen	R. A. D. Nielsen	J. Holst, G. Andersen, C. Fung	L. Yung	China Navigation Co., Ltd.

Lao ..	A. E. Andersson	G. H. Drake, E. A. Lindholm, T. V. Hedenklint	P. E. G. Wengelin	Everett Steamship Corporation
Lok Sang	R. G. G. Stanton	W. E. McIackland, A. C. Bromfield, L. J. Kirk	J. A. Carolan	Indo-China Steam Navigation Co., Ltd.
Musi Hack	H. Benneche	O. A. Antonsen, K. Kieboe	Chan Sui Yeung	Chin Seng Hong Shipping Co., Ltd.
Ocean Trader	J. L. Haines	J. Hardisty, Tzou Lai Chung, Chen Shyue Yeng	Hung San	Great Southern Steamship Co., Ltd.
Pakhoi	J. W. E. Warrior	W. Davidson, J. M. Innes, R. A. Burton	Cheung Shau Wai	China Navigation Co., Ltd.
Poyang	G. T. M. Ramsay	J. R. Suffren, G. S. R. Ormond, A. P. Sokoloff	Lo Wan Kai	China Navigation Co., Ltd.
Produce	J. Aksnes	L. Fagerland, A. N. Nilsen, A. Sondervik	Lok Kow Wei	Karsten Larssen & Co. (Hong Kong), Ltd.
Sangola	W. E. Davies	D. M. Gill, H. L. Thein, A. K. Bondrey	D. Dowie	Mackinnon, Mackenzie & Co. (Hong Kong), Ltd.
Shanxi	W. J. Bunney	D. S. Southey, S. H. Damp, G. E. Bennet		China Navigation Co., Ltd.
Soochow	A. Watson	A. W. K. Prosser, L. P. James, J. R. Kidd, F. M. Lawrie	Yeung Wai Ki	China Navigation Co., Ltd.
Star Alcyone	W. S. T. Rasmussen	R. G. Grasman, J. N. Jacobsen, A. Kindberg	B. A. I. Olssen	Everett Steamship Corporation
Star Betelgeuse	P. H. Zetterquist	O. C. G. Warfvinge, S. H. Soderlind, O. T. I. Louhimo		Everett Steamship Corporation
Szechuen	B. McLennan	W. Pollock, F. J. Troup, L. J. Wang	K. I. Danborn	China Navigation Co., Ltd.
Tai Chung Shan	D. O. Conway	P. W. Graham, M. T. Chan, C. L. Ho	Leung Tjeuk Shin	China Navigation Co., Ltd.
Tai Ping	J. L. Hall	J. A. Doyle, T. I. Robertson, T. Harorth	K. Y. Pun	Shun Cheong Steam Navigation Co., Ltd.
Tai Poo An	E. C. Thomson	J. E. Lyon, C. K. Woo, K. S. Ho	— McGregor	Australia Oriental Line
Tai Poo Sek	G. E. Mackay	R. W. E. Little, F. K. Lim, Y. Leung	K. Lam	Shun Cheong Steam Navigation Co., Ltd.
Tai Yuan	Y. N. Campbell	R. N. Frappell, J. B. Aldiss, M. R. M. Seale, M. D. Burbidge	C. C. Tsui	Shun Cheong Steam Navigation Co., Ltd.
Tak Sang	M. I. Groundwater	J. Parish, A. W. Lloyd-Taylor, M. H. Major	Leung Kan	China Navigation Co., Ltd.
Thai	A. G. A. Heinze	P. A. Perswald, B. H. Johansson, W. Schoenmakers	W. J. Briggs	Indo-China Steam Navigation Co., Ltd.
Wo Sang	D. G. R. Kinnear	P. J. Sullivan, C. J. Farren, D. Wilson	U. K. W. Mauritzson	Everett Steamship Corporation
Yachow	V. R. Woolfe	J. A. McDonald, J. C. Mark, C. J. Wong	P. M. Matley	Indo-China Steam Navigation Co., Ltd.
Yunnan	A. J. Keddie	S. H. Liu, G. Cornforth, C. F. Chan	W. H. Collom	China Navigation Co., Ltd.
			Wai Pun Un	China Navigation Co., Ltd.

## MALAYA Voluntary Observing Ships

The following is a list of observing ships voluntarily co-operating with the Malayan Meteorological Service.

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS
Islander	VSPS	F. C. Gray	J. E. Hall	K. A. Taylor	Houstead Co, Ltd
Kah Poh	ZBBJ	J. S. Robertson	J. S. Robertson		Straits Shipping Co., Ltd.
Katong	ZBNR	N. R. Murray	A. M. Harton	K. A. Menon	Straits Steamship Co., Ltd.
Kimans	VSND	P. B. Bruce	P. N. Hicks, B. F. Rehse	K. M. Pillar	Straits Steamship Co., Ltd.
Larut	VPKO	R. C. Barker	G. Coupar	P. A. Anderas	Straits Steamship Co., Ltd.
Manihine	ZTIA	D. R. Davies	D. R. Davies		Fishery Research Station
Matang	VSPB	C. L. Brown	I. W. Cook, G. Hunter	R. M. Fernandez	Straits Steamship Co., Ltd.
Perlis	VSPJ	I. Berry	H. R. Watson	K. C. Jones	Straits Steamship Co., Ltd.
Salang	VSYZ	D. Lloyd-Jones	J. Hogg	N. Tham	Straits Steamship Co., Ltd.
Stanley Angwin	GNXG	R. G. Ogden	B. G. Ogden	D. Mahony	Cable & Wireless, Ltd.
		A. R. Moss	B. H. Wise, J. S. Barker, D. Silwood		



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**Marine Observer's Handbook.** (M.O. 522, 7th edition, 1950, reprinted 1952.)  
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**Meteorological Handbook for Pilots and Navigators.** (M.O. 448, 2nd edition,  
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