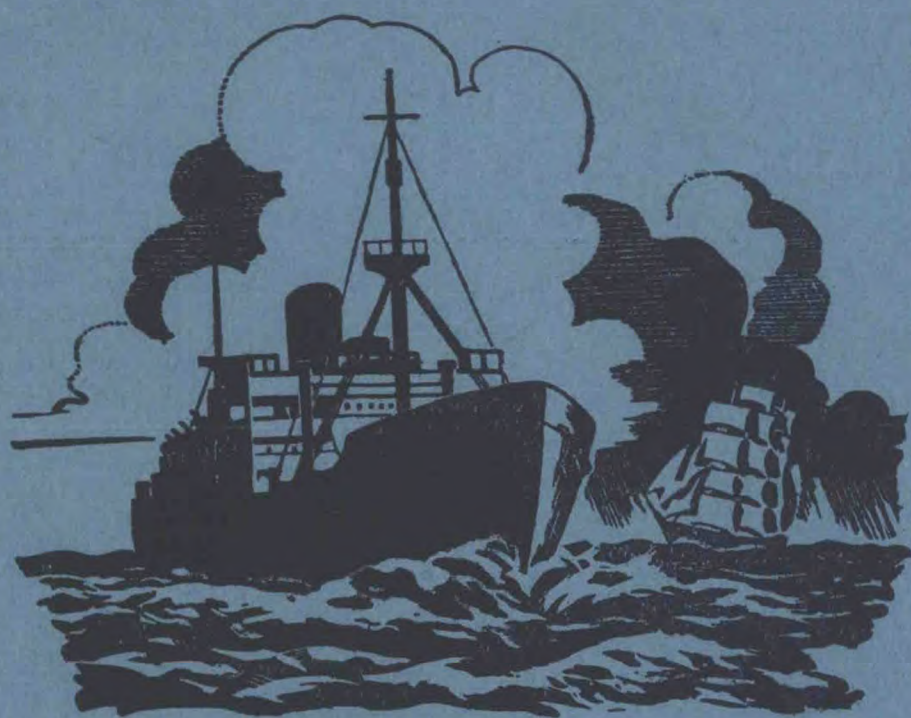


M.O. 528

# The Marine Observer



Volume XX    No. 149

JULY, 1950

FIVE SHILLINGS NET





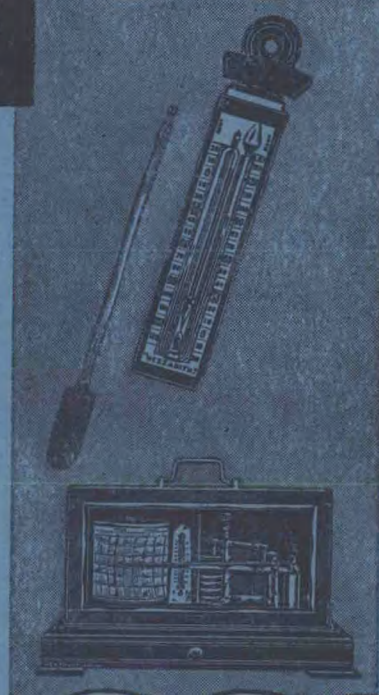
### METEOROLOGICAL INSTRUMENTS

Patentees and Specialists in the  
manufacture of Navigational  
instruments for over 100 years.  
The "Hezzanith" range of products  
includes—

SEXTANTS, COMPASSES, BINNACLES,  
BINOCULARS, TELESCOPES, SOUNDING  
MACHINES, CHART INSTRUMENTS,  
CLOCKS, ANEROIDS, RULES, ETC.

TEMPERATURE INDICATING AND  
RECORDING INSTRUMENTS.

Catalogues (M048) will be gladly sent  
upon request.



**HEATH & COMPANY**  
**NEW ELTHAM** **LONDON, S.E.9**

Phone : ELTHAM 3836

Grams : "Polaris, Phone," London

## METEOROLOGICAL MAGAZINE

The Magazine contains authoritative articles on a wide variety of topics, including the first accounts of much recent research of great importance, international collaboration in meteorology and aviation, reports of scientific meetings, notices and reviews of new books, descriptions of new instruments, notes on interesting weather and optical phenomena in this country and abroad, letters from correspondents. Figures are also given every month, summarising the weather experienced at many places in the British Commonwealth.

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE  
*and obtainable from the following Sales Offices*

York House, Kingsway, London, W.C.2; 429 Oxford Street, London, W.1  
(Post Orders: P.O. Box 569, London, S.E.1); 13a Castle Street,  
Edinburgh, 2; 39 King Street, Manchester, 2; 2 Edmund Street,  
Birmingham, 3; 1 St. Andrew's Crescent, Cardiff; Tower Lane, Bristol, 1;  
80 Chichester Street, Belfast; or through any bookseller.

*Price 1s. By post 1s. 1d. Annual Subscription 13s. including postage*

# THE MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology

prepared by the

Marine Branch of the Meteorological Office

VOL. XX

No. 149

JULY 1950

## TABLE OF PRINCIPAL CONTENTS

	<i>Page</i>
Editorial .. .. .	122
Annual Report of Work .. .. .	125
The Marine Observers' Log—July, August and September .. .. .	136
Some Observations in the Surface Layers of Antarctic Waters. By Dr. F. Loewe, Ph.D. .. .. .	152
Air Currents revealed by Soaring Gulls. By F. Graham Millar .. .. .	154
Marine Navigation. By Lt.-Cdr. P. G. Satow, D.S.C., R.N. .. .. .	158
The Royal Research Ships <i>Discovery II</i> and <i>William Scoresby</i> .. .. .	168
Centenary of the Royal Meteorological Society .. .. .	170
A Meeting of the Royal Society .. .. .	175
Ocean Weather Station "Jig"; a Joint Anglo-Netherlands Venture .. .. .	176
Southern Ice Reports—July, August and September, 1948 and 1949 .. .. .	180
Letter to the Editor .. .. .	181
Books Received .. .. .	181
Personnel .. .. .	184

Published for the Meteorological Office by  
HIS MAJESTY'S STATIONERY OFFICE

*Crown Copyright Reserved*

To be purchased from  
York House, Kingsway, LONDON, W.C.2      429 Oxford Street, LONDON, W.1  
P.O. BOX 569, LONDON, S.E.1  
13a Castle Street, EDINBURGH, 2      1 St. Andrew's Crescent, CARDIFF  
39 King Street, MANCHESTER, 2      1 Tower Lane, BRISTOL, 1  
2 Edmund Street, BIRMINGHAM, 3      80 Chichester Street, BELFAST  
or from any Bookseller

Printed in Great Britain under the authority of His Majesty's Stationery Office by  
The Campfield Press, St. Albans, Herts  
S.O. Code No. 40-38-7-50

PRICE 5s. NET or £1 1s. 0d. per annum (post free)



## EDITORIAL

In this edition appears an account of the centenary celebrations of the Royal Meteorological Society. One may ask what connection this has with maritime meteorology. The answer is that the Fellows of the Society, be they professional or amateur meteorologists, have by their enthusiasm so encouraged meteorological research and observation, as well as its practical application, that they have contributed very materially toward the eminence of British meteorology as we find it today. And the seaman, like the airman and the farmer, being particularly affected by meteorological conditions, tends to benefit therefrom. It is appropriate to mention in passing that the Royal Meteorological Society has numbered quite a few famous seamen in its Fellowship, and of these one might mention Admiral Fitzroy, the first Director of the Meteorological Office, Sir Ernest Shackleton, of Antarctic fame, and Sir David Wilson-Barker, for many years in command of H.M.S. *Worcester*. The strength of the Royal Meteorological Society, like other Societies of its type, perhaps lies in the fact that it is an independent scientific body whose members can quite freely express their views at its meetings and can do much to influence meteorological opinion and policy in this democratic country of ours.

Another occurrence of considerable importance, both to seamen and to meteorologists, and in fact to the whole world, which took place during April, 1950, was the fiftieth anniversary of the Marconi Company.

It was in May, 1897, that the first radio messages were exchanged over the water, between Lavernock Point and Flat Holm in the Bristol Channel; this was carried out by the G.P.O. in collaboration with a young Italian, Guglielmo Marconi. He had been experimenting in Italy on his wireless telegraphy invention as early as 1895, and although others had elaborated the theory and carried out experiments on similar lines at about this time, he was indeed, in a practical sense, "the father of radio". Marconi came to England in 1896 and quickly enlisted the interest of the G.P.O. in his invention. Various other preliminary experiments led up to the establishment of the first regular radio stations—for communication between Rathlin Island and Ballycastle (Co. Antrim), a distance of seven miles—for the prime purpose of reporting to Lloyds the passage of ships past this island. Lloyds' underwriters, as well as the G.P.O., were quick to appreciate the practical value of radio and they gave considerable encouragement to Marconi.

In 1898 a radio set was installed in the East Goodwin Lightvessel, for communication with the South Foreland; and in 1899 the first radio message was sent across the Channel. The year 1899 also saw the introduction of radio apparatus into the Royal Navy, and the first exchange of messages between a merchant ship and the shore, when the steamer *St. Paul*, with Marconi aboard, communicated with the Needles at a distance of about sixty miles.

The Marconi Marine Company was officially formed in 1900, although a British Marconi Company had been in existence under another name since 1897.

The first merchant ship to be fitted commercially with radio was the Norddeutscher-Lloyd steamer *Kaiser Wilhelm der Grosse*, in 1900, and a year later the *Lake Champlain*, of the Beaver Line, had the distinction of being the first British ship to be so fitted. The first transatlantic signal was also



transmitted in 1901 : by the end of this year about forty ships were fitted with radio telegraphy. A great advance became possible with the British invention, by J. A. Fleming, of the thermionic valve in 1904.

Two spectacular incidents stand out in the early history of radio at sea : the messages from the master of the C.P.R. liner *Montrose*, which led to the arrest of Dr. Crippen at Father Point (River St. Lawrence) in July, 1910 ; and the *Titanic* disaster in April, 1912, whereby 1,500 lives were lost, 700 being saved by the *Carpathia*, summoned to the rescue by radio. The *Titanic* disaster was, incidentally, the direct cause of the first Safety of Life at Sea Conference, and did much to bring about the compulsory equipment of radio in ships, improvements in lifeboat facilities aboard ships and the inauguration of the International Ice Patrol.

In appreciation of the benefits which he brought to mankind by his inventive genius, Marconi received many honours during his busy life ; his yacht *Electra*, which was fitted with elaborate experimental radio apparatus, became as world famous as her owner. When, as the Marchese Marconi, G.C.V.O., LL.D., D.Sc., he died in 1937, radio had become a part of our daily lives.



*By permission of Marconi Marine Communication Co. Ltd.*

Marconi, London, 1896, showing original apparatus brought by him from Italy.  
(For details see note at bottom of page 157.)

It is, perhaps, from the safety of life at sea viewpoint, that radio is so invaluable to all those who go down to the sea in ships, and this has been emphasised in a spectacular way during each of the world wars. The commercial and entertainment value of radio at sea is also extremely important, and modern advances in radio technique enable practically all ships to be constantly in communication with the shore. The advantages of electronic aids to navigation such as the direction finder, Loran, Consol and radar, all

of which are derived from or related to radio, are fairly obvious. There is no doubt whatever that the shipping industry owes a great debt to the radio technician.

Safety of life and property at sea are inextricably bound up with weather conditions, and there is little doubt that if it were not for radio, synoptic meteorology and forecasting as we know it today would be impossible, as would the transmission of weather bulletins and gale warnings to shipping. The synoptic meteorologist depends almost entirely upon radio for the collection of weather messages from the oceans, from aircraft and from distant stations ashore or in other countries, in order to build up his chart. For his upper-air observations, which are as necessary for the modern technique of forecasting as they are for the meteorological safety of aircraft, he needs to use the radio-sonde and radar; for thunderstorm detection he depends upon radio reception of atmospherics. World meteorology would certainly be in a very difficult position if, by some means or other, all radio communication were suddenly to cease.

At the same time we should bear in mind the enormous value of radio and radar from the meteorological research viewpoint. Most of our information about conditions in the upper atmosphere is obtained by means of radio of one type or another, and radar is providing a new method of investigating the structure of fronts, hurricanes and similar weather phenomena.

On another page of this number will be found "Work of the Year", which includes a brief account of the admirable work done by voluntary meteorological observers in merchant ships. Prior to the introduction of wireless telegraphy—and this voluntary work has gone on since about 1850—such observations could only be recorded in logbooks for climatological work, but now they are coded and transmitted by radio for the immediate use of the meteorologist of any country in the world who requires them. Merchant ships of all nations play their part in this voluntary scheme, and this is, perhaps, one of the finest examples of voluntary international co-operation in the world, and it is certainly very world-wide in its character. As "Work of the Year" shows, the observations sent in by merchant ships, as well as those provided by the newly-established Ocean Weather Stations, are not only essential for synoptic meteorology (forecasting) but serve many other purposes. The quality of the observations generally is at a high level and it seems that voluntary observers take a keen interest in the work; there is ample evidence of this in the pages of the "Marine Observer's Log".

A list of those British merchant ships whose officers are considered to have contributed the best series of observations during the year, and have therefore been selected for the presentation of "Excellent Awards", appears on page 134. The Director of the Meteorological Office wishes us to convey his congratulations to the recipients, as well as his thanks for the efficient work they have done. It is not possible for all voluntary observers to earn "Excellent Awards"; if so, there would perhaps be little value in the award—but to those who have received no award this year the Director sends his warm thanks for their good work and their continued loyal co-operation with this Department, for the furtherance of our knowledge about the weather over the oceans.

*Note.* The Editor is indebted to the author of *Wireless at Sea* for the historical information about radio in this editorial.



WORK OF THE YEAR (ENDING 31st MARCH, 1950) OF THE MARINE  
BRANCH OF THE BRITISH METEOROLOGICAL OFFICE AND THE  
VOLUNTARY OBSERVING FLEET

1. Voluntary Observing Ships

(a) GENERAL

The Voluntary Observing Fleet is comprised as follows.

(i) *Selected Ships*

These ships are loaned tested meteorological instruments and given instructions and logbooks for taking meteorological observations at standard synoptic hours. The observations are transmitted by radio in the International Code to meteorological centres throughout the world for synoptic purposes and the completed logbooks returned for climatological use.

(ii) *Supplementary Ships*

Supplementary ships make and transmit observations in an abbreviated form at the main synoptic hours. Where the ship's own meteorological equipment is considered adequate no instruments are loaned. In other cases thermometers or a barometer may be issued to the ship. These ships have been asked to make radio weather messages in areas where shipping is relatively sparse.

(iii) *Marid Ships*

These vessels are equipped with sea thermometer and canvas buckets. They make and transmit observations of sea temperature in home waters for forecasting purposes.

(iv) *Lightvessels*

Eight lightvessels provide observations of wind, visibility, air and sea temperature twice daily at 0600 G.M.T. and 1500 G.M.T. for forecasting purposes. These observations are passed by R/T through the nearest coastguard station and thence by telegram to Weather Wire London. Four of the vessels make observations of waves also.

(b) NUMBER OF OBSERVING SHIPS

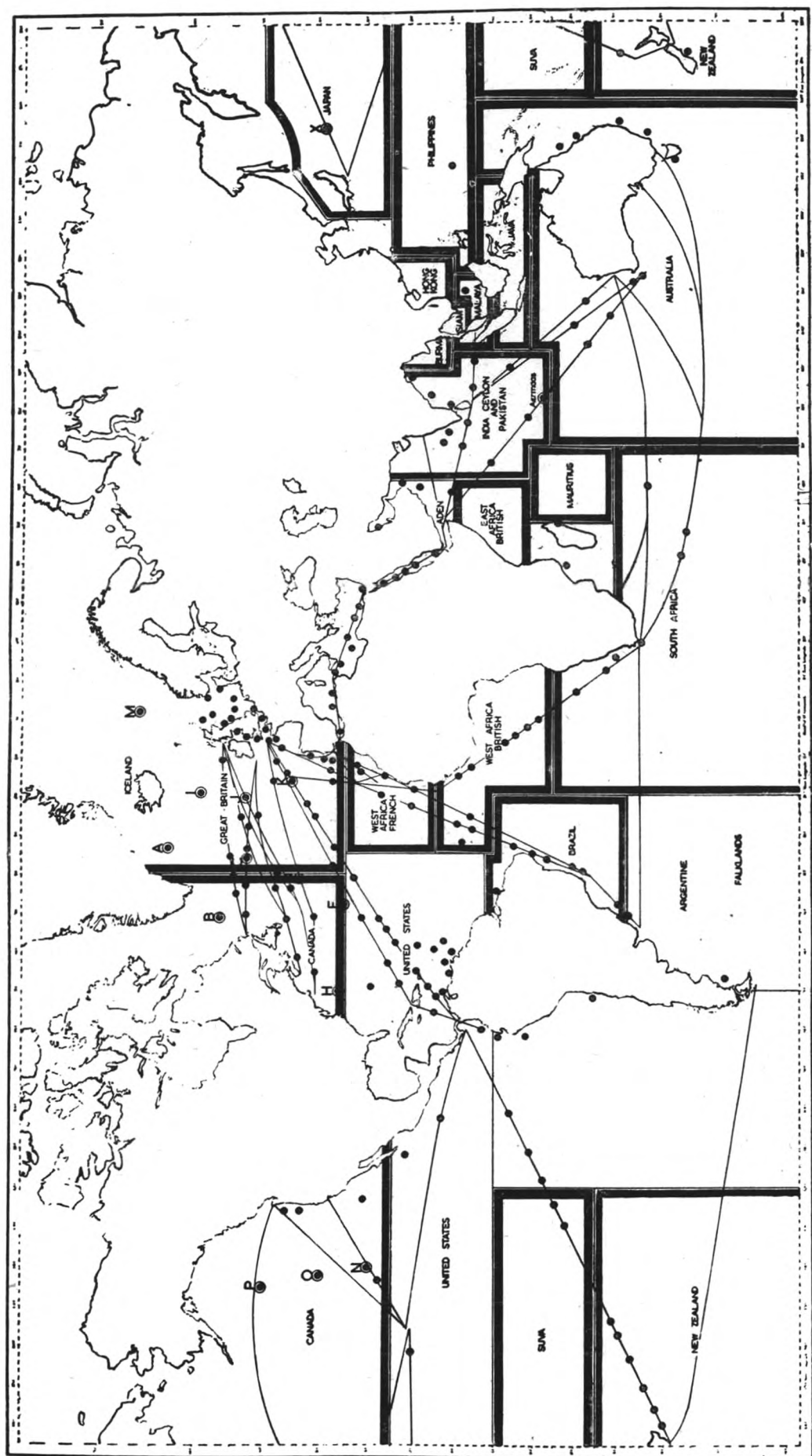
Table I shows the number of vessels of each class monthly throughout the year.

TABLE I

	1949									1950		
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
*No. of Selected Ships on Fleet List	505	509	511	507	511	510	511	509	509	507	505	499
†Number of Supplementary Ships on Fleet List	22	26	27	32	33	32	34	35	33	31	29	25
No. of "Marid" Ships on Fleet List	77	77	77	77	78	76	77	77	77	71	67	65
No. of Lightvessels on Fleet List	5	5	5	5	5	5	5	5	5	8	8	8

\*Including a monthly average of ten trawlers.

†Including a monthly average of four trawlers.



## WORLD CHART

showing :— (a) The positions of British ships which made voluntary Meteorological observations on 3rd January 1950 (a day picked at random)

(b) Ocean Weather Ship positions marked with a circle

(c) The areas in which ships send radio weather messages at specified hours to various Meteorological Authorities.



Foreign Ships

Radio weather messages from Ocean Weather Ships operated by other nations in the North Atlantic and from Foreign Selected Merchant Ships have also been received regularly throughout the year.

General

Arrangements were made for selected British whaling vessels to co-operate with the Anglo-Scandinavian Expedition during their season in the Antarctic.

(c) RADIO REPORTS

Table II shows the numbers of British Selected Ships, Marid Ships, Foreign Ships and Lightvessels reporting to Dunstable, and the number of messages received at the Central Forecasting Office, excluding reports received from Ocean Weather Ships.

TABLE II

	1949									1950		
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1. <i>British Selected Ships</i>												
No. reporting to Dunstable	252	251	265	249	258	239	261	269	271	229	214	240
No. of messages received	2,412	2,378	2,538	2,418	2,468	2,394	2,449	2,690	2,584	2,187	2,071	2,345
No. of groups (excluding address and ship's name)	19,771	20,136	21,493	20,529	21,210	20,404	20,617	22,703	21,754	18,346	17,769	20,160
Daily average	80.4	76.7	84.6	77.9	79.5	79.8	79.0	89.7	83.4	70.6	74.0	75.6
2. " <i>Marid</i> " Ships												
No. reporting to Dunstable	35	34	36	32	33	38	40	42	33	34	31	42
No. of messages received	201	231	269	273	251	275	241	226	213	188	182	274
Daily average	6.7	7.5	9.0	8.8	8.1	9.2	7.8	7.5	6.9	6.1	6.5	8.8
3. <i>Foreign Ships</i>												
No. reporting to Dunstable	115	116	200	181	174	159	158	165	155	170	177	209
No. of messages received	624	765	912	848	849	865	727	761	626	686	655	837
No. of groups (excluding address and ship's name)	4,593	5,684	6,910	6,332	6,100	6,286	5,338	5,610	4,647	5,093	4,847	6,243
Daily average	20.8	24.7	30.4	27.4	27.4	28.8	23.4	25.4	20.2	22.1	23.4	27.0
4. <i>Lightvessels</i>												
No. reporting to Dunstable	5	5	5	5	5	5	5	5	5	8	8	8
No. of messages received	244	260	223	251	306	296	300	300	308	323	437	487
Daily average	8.1	8.4	7.4	8.1	9.9	9.9	9.7	10.0	9.9	10.4	15.6	15.7

(d) EQUIPMENT

Table III shows the distribution of instrumental equipment on loan to voluntary observing ships.

2. Ocean Weather Ships

THE BRITISH OCEAN WEATHER SHIP SERVICE

During the year each of the four British Ocean Weather Ships has completed two years' service as a weather ship (eighteen voyages). Stations "Item", 60° 00'N., 20° 00'W., and "Jig", 53° 50'N., 18° 40'W., were constantly manned by these ships throughout the year, except as follows:

- “ Item ” 13th to 16th April, station vacated to land a sick man at Londonderry. 24th May to 9th June, station temporarily shifted to 61°N., 13°W., for co-operation with a flight of jet aircraft, and vacated from 25th to 26th May in answer to an S O S from the Danish ship *Erik Boye*.
- “ Jig ” 10th to 15th July, station vacated for an air/sea rescue search for a missing R.A.F. aircraft, and 26th to 29th October to land a sick man.

Throughout the year the ships have carried out a full programme of meteorological work, transmitting all results to Dunstable by radio.

Air/sea rescue exercises have been carried out at frequent intervals by aircraft of Nos. 18 and 19 Groups, R.A.F.

Whenever necessary the ships have obtained medical advice, by radio through C.F.O. Dunstable, from the Luton and Dunstable Hospital.

Data for International Aerological Days in 1949-50 have been prepared in the ships on station during the appropriate periods.

Radio contact has been made frequently with Ocean Weather Ships of other nations.

The weather ships' navigational aids are regularly used by both civil and R.A.F. aircraft flying over the North Atlantic Ocean: 4,172 aircraft have made use of the facilities provided by the ships during the year.

The true-wind resolver installed in the ships, after frequent adjustment has been found to be insufficiently robust for its purpose.

Oceanographers from Cambridge University carried out highly successful seismic experiments aboard *Weather Explorer* with depth charges to determine the thickness of the bottom sediment.

Newspaper correspondents and a navigation school instructor did a voyage as passengers in a weather ship.

TABLE III

	1949										1950		
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	
1.(a) Full set of M.O. instruments	386	395	404	404	410	415	420	424	427	433	433	432	
(b) Full set of M.O. instruments (except barograph)	9	9	8	7	8	8	8	7	7	9	8	9	
(c) Full set of M.O. instruments (except barometer)	77	73	68	70	69	64	64	60	59	56	55	51	
(d) Full set of M.O. instruments (except barometer and barograph)	15	16	15	14	13	12	11	11	10	7	7	6	
2.(a) M.O. barometer and barograph only	0	0	0	0	0	0	0	0	0	0	0	0	
(b) M.O. barometer only	3	1	1	1	1	1	1	1	1	0	0	0	
3. Ship's own barometer only	8	8	8	7	7	7	6	5	4	2	2	1	
4. Various instruments from various sources	1	1	1	1	0	0	0	1	1	0	0	0	
5. Full " trawler " sets	6	6	6	3	3	3	1	0	0	0	0	0	
6. Full " lightvessel " sets	5	5	5	5	5	5	5	5	5	8	8	8	
7. " Marid " sets	77	77	77	77	78	76	77	77	77	71	67	65	
8.(a) Supplementary Ships. Full set except barograph	—	2	2	3	3	3	3	3	1	1	0	0	
(b) Supplementary Ships. Full " trawler " set	—	—	—	3	3	3	5	6	6	6	6	5	
(c) Supplementary Ships. Miscellaneous instruments	—	—	—	—	—	—	—	1	1	1	0	0	



### Search and rescue

*Weather Explorer* proceeded to the assistance of the S/T. *Mayflower*, ashore on Sandra Island. The ship refloated undamaged. *Weather Observer* proceeded to the assistance of the Danish S.S. *Erik Boye*, in distress 70 miles from Myggenaes. She located the distressed vessel, but as two other trawlers were then standing by she returned to station. *Weather Observer* carried out a search lasting six days, under the control of R.A.F., Aldergrove, for traces of a R.A.F. meteorological flight aircraft. *Weather Watcher* proceeded to the assistance of S/T. *Red Crusader*, ashore east of Islay, but the crew were rescued by a lifeboat.

Much credit is again due to all hands aboard the weather ships for maintaining the observational and communications routine in conditions which often involve discomfort and hardship and require considerable ingenuity.

Minor changes have been made in the radio frequencies, etc., used by British Ocean Weather Ships, and the following radio facilities are now in operation :

#### (a) Normal or non-emergency state

H/F point-to-point with Dunstable on 4225, 8705, 11525, 13365 kc/s  
W/T air guard (continuous) on 2912, 6543, 8485, 11306 kc/s  
V.H/F emergency and distress on 118.1 mc/s (continuous)  
on 116.1, 121.5 mc/s (as requested)  
V.H/F D/F (on request) as specified by Area Control  
M/F Beacon at H+05, H+20, { on 406 kc/s at Station "I"  
H+35, H+50 for 5 minutes { on 410 kc/s at Station "J"  
Eureka Beacon (on request) { receive on 213 mc/s  
transmit on 223 mc/s  
Surface search 10 cm. radar (as required)  
Maritime distress channel (continuous) on 500 kc/s  
M/F D/F (as required)  
Loran, associated with Consol, for fixing ship's position (as required).

#### (b) Distress alert state

As above, except that :

V.H/F D/F is operated continuously

M/F Beacon is operated as required

Eureka Beacon is operated continuously

M/F D/F is operated continuously

and the following is introduced :

R.A.F. air/sea rescue guard (continuous) on 3805, 6500 kc/s.

### 3. Marine Climatology

#### (a) COLLECTION OF OBSERVATIONS

The numbers of logbooks (Washington Code, 1947) received each month in the Marine Branch from Selected and Supplementary Ships were as follows :

1949									1950		
Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
36	32	52	40	43	45	35	71	48	59	41	61

These smaller numbers compared with last year's figures are due to the fact that for economy reasons ships' masters have been urged not to send in their logbooks until they are full. Logbooks and upper-air data have been regularly received from Ocean Weather Ships at Stations "I" and "J". Micro-film copies of observations made at all other North Atlantic Ocean Weather Stations and, by courtesy of the U.S.A.A.F., data from Japanese Ocean Weather Ships in the Western Pacific, have also been regularly received.

(b) ANALYSIS OF OBSERVATIONS

Routine work during the year has included :

- (i) Observations from logbooks received from British Selected Ships and weather ships and from Naval logbooks have been punched on to Hollerith cards.



*Crown copyright reserved*

Observations from ships' log books being punched on to Hollerith cards in the Marine Branch, Meteorological Office.

- (ii) Extraction of meteorological data by decades, from German Hollerith cards, for the North Atlantic. About 200,300 cards have so far been handled.
- (iii) On behalf of the Indian Government, the British Tabulating Co. (Hollerith) were allowed to duplicate some 792,000 cards of data for the Indian Ocean.
- (iv) Duplication of data in the North Atlantic by the Netherlands Meteorological Service is continuing. Three batches of cards have already been shipped to Holland comprising 1,654,000 cards.
- (v) The tabulation of data in the Southern Hemisphere (sent monthly to the U.S.A.) has so far comprised 28,062 observations.
- (vi) The tabulation of Indian Ocean Southern Hemisphere data monthly sent to Indonesia for the period January to July, 1949, comprised 4,852 observations.
- (vii) A summary of weather at Ocean Weather Ship Station "Item" during 1948.
- (viii) Charts of monthly mean sea temperature for the North Atlantic were completed.



#### 4. Currents and Ice

The preparation of current charts of the north-eastern part of the Pacific Ocean, eastward of long.  $160^{\circ}\text{W.}$ , was begun.

Current charts for the South-West Pacific Current Atlas are being drawn.

The sections relating to currents and ice have been entirely rewritten for new editions of eight Admiralty Pilots and generalised current charts have been prepared for these. Co-operation with the Climatological Branch has been effected in rewriting the text of the meteorological sections of seven of these pilots, and meteorological charts have been prepared for them, as required, in the Marine Branch.



*Crown copyright reserved.*

Hollerith sorting machines in the Marine Branch. The cards are being placed in the machine on the right. The machine then automatically sorts the cards out into 12 pockets, the particular pocket depending on the position of the hole punched in the card.

#### 5. Special work and investigations

Work on the harmonic analysis of monthly mean sea temperatures on the North Atlantic was completed, and the results will be published as a Geophysical Memoir.

Papers were prepared on :

“ The Relation between the Surface and Gradient Wind Velocity over the North Atlantic and the deviation between the Mean Vector Wind and the Mean Isobars in the Tropics.”

“ The Formation, Characteristics and Occurrence of Waterspouts over the Oceans.”

“ The Diurnal Variation of Sea and Air Temperatures, Wind Velocity and Cloud Amounts over the Ocean.”

“ Temperature and Humidity Lapse Rates near the Surface of the Ocean ” and “ Variation of Wind with Height in the Lower Levels over the Ocean ”.

Work is continuing on the following :

“ Diurnal Variation of Pressure in the Mediterranean.”

“ Comparison of Bucket and Intake Methods for Measuring Sea Temperatures, from Ocean Weather Ship Data.”

Special weather maps were constructed for the Ministry of Transport examination for masters and mates.

## 6. Enquiries

Much information, including statistical tables and charts of marine data, were prepared for other branches, as well as for other Government Departments, the Naval Meteorological Service and various shipping companies. Much of the above was concerned with investigation into shipping casualties.

## 7. Lectures

Commander Hennessy, on behalf of the Marine Superintendent, gave a lecture to navigation school instructors attending a “summer course” at Cranfield Aerological College on 21st April, 1949. The substance of this talk was printed in the January and April, 1950, *Marine Observers* under the title “Weather Wise”.

On 7th March, 1950, talks on “Aspects of Marine Meteorology” were given by members of the staff to instructors of various navigation schools.

An exhibition and film show was staged on board H.Q.S. *Wellington* (the headquarters ship of the Honourable Company of Master Mariners), when a talk on Ocean Weather Ships was given by the Marine Superintendent on 9th March, 1950.

## 8. Publications

*The Marine Observer's Handbook* (7th Edition) is in the press.

The manuscript of the textbook, *Meteorology for Mariners*, has been completed.

A new atlas was published, *Monthly Sea-Surface Temperatures of the North Atlantic* (M.O. 527).

A revised version of *Quarterly Surface Current Charts of the Western North Pacific*, incorporating monthly chartlets of the China Seas, was published.

## 9. International Co-operation

### (a) INTERNATIONAL CIVIL AVIATION ORGANISATION

The second I.C.A.O. conference on North Atlantic Ocean Stations was held in London between 20th April and 12th May, 1949, to consider the revision and renewal of the agreement signed in London on 25th September, 1946.

The Governments of Belgium, Canada, Denmark, France, Ireland, Netherlands, Norway, Portugal, Sweden, the United Kingdom and United States of America were represented.

A new agreement was concluded to secure the continued provision, financing, maintenance and operation of ocean weather stations in the North Atlantic and thereby contribute to the safety, regularity, efficiency and economy of air navigation. This agreement was signed on the 12th May, 1949, subject to governmental ratification, and will terminate on 30th June, 1953, when a third conference will be convened. The new agreement provides for ten ocean weather stations, as follows :

Station	Operated by
" A " at 62° 00'N., 33° 00'W.	Netherlands and U.S.A.
" B " at 56° 30'N., 51° 00'W.	Canada and U.S.A.
" C " at 52° 45'N., 35° 30'W.	U.S.A.
" D " at 44° 00'N., 41° 00'W.	U.S.A.
" E " at 35° 00'N., 48° 00'W.	U.S.A.
" H " at 36° 00'N., 70° 00'W.	U.S.A.
" I " at 59° 00'N., 19° 00'W.	United Kingdom
" J " at 52° 30'N., 20° 00'W.	United Kingdom } Assisted by the
" K " at 45° 00'N., 16° 00'W.	France } Netherlands*
" M " at 66° 00'N., 02° 00'E.	Norway, assisted financially by Belgium, Denmark and Sweden.

*France at Station " K "	15 patrols annually
Netherlands at Stations " J " and " K "	7 patrols annually
United Kingdom at Stations " I " and " J "	30 patrols annually

A relief vessel to assist Norway on Station " M " will be provided, if necessary, by France, Netherlands or the United Kingdom, for which relief Norway will pay a sum of £7,500 for each patrol of twenty-one days on station.

For the Anglo-Netherlands operation of Station " J ", the Netherlands took over duty on 15th April, 1950, and will relieve the British Ocean Weather Ships for five voyages during the year and in subsequent years. The result will be that each British ship will have a period in harbour during the summer for overhaul. " I " and " J " were moved to the new positions on 25th March, 1950.

#### (b) INTERNATIONAL METEOROLOGICAL ORGANISATION : MARITIME COMMISSION

Considerable progress has been made in international discussions concerning :

- (a) An international marine Hollerith card.
- (b) An international nomenclature for sea ice.

The Marine Superintendent, as President of the Maritime Commission of the International Meteorological Organisation, has had much international consultation by correspondence.

#### 10. Excellent Awards

As a token of appreciation, the Director of the Meteorological Office is arranging to present a book, suitably inscribed, to the captains, principal observing officers and senior radio officers of British Selected Ships whose work has been considered of outstanding quality throughout the past year. The book selected for the purpose this year is *The University Atlas*, by George Phillip & Son, Ltd.



**EXCELLENT AWARDS**  
**Year ending 31st March, 1950**

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER
<i>Andes</i> .. ..	D. A. Casey, O.B.E., D.S.O., D.S.C. ..	W. B. Avison ..	W. Smith
<i>Argyll</i> .. ..	J. Dodds .. ..	T. R. Rowe ..	J. Downey
<i>Asia</i> .. ..	B. Harrison .. ..	D. S. Lomax ..	W. J. Rainey
<i>Athelregent</i> ..	W. A. Meneight ..	W. H. Buckle ..	A. Williams
<i>Athenic</i> .. ..	D. Aitchison .. ..	J. W. Webster ..	D. Hoggart
<i>Atlantis</i> .. ..	A. R. Osburn .. ..	R. Phillips ..	H. Matthews
<i>Baron Maclay</i> ..	A. Campbell .. ..	J. Baxter .. ..	J. Freel
<i>Bassano</i> .. ..	D. B. Ramsbottom, D.S.C.	J. B. Harbord ..	G. Shilson
<i>Beaconsfield</i> ..	J. W. Gardiner .. ..	A. Ferguson ..	A. D. Garden
<i>Beaverburn</i> ..	J. B. Smith, O.B.E. ..	S. Fieldhouse ..	T. Ainsworth
<i>Beaverglen</i> ..	J. Soame .. ..	L. Kinnis .. ..	R. Burch
<i>Benarty</i> .. ..	D. S. Sinclair .. ..	M. J. Peyton-Bruhl	R. Dixon
<i>British Energy</i> ..	R. Smyth .. ..	S. E. Banyard ..	J. Cochran
<i>British Escort</i> ..	H. H. Burke .. ..	S. G. Sanderson ..	A. Murray
<i>Cairnavon</i> .. ..	J. Scott .. ..	G. J. D. Sutherland	W. P. Greaves
<i>Cairnesk</i> .. ..	I. G. Foster .. ..	W. Errington ..	E. Johnston
<i>Carlton</i> .. ..	K. Wardale .. ..	W. A. Morris ..	J. Park
<i>Chitral</i> .. ..	D. Hockley .. ..	J. A. P. Crichton ..	A. P. Porter
<i>City of Bristol</i> ..	E. Garner .. ..	W. A. James ..	K. P. Grocock
<i>City of Hereford</i> ..	G. A. Ring .. ..	J. F. Mason ..	S. C. Ambler
<i>City of Lille</i> ..	W. A. Owen .. ..	H. M. Steele ..	A. Julius
<i>Clan Brodie</i> .. ..	B. Vernon-Brown ..	E. J. E. Owen ..	W. Morrison
<i>Clan Chattan</i> ..	H. C. Simpson, O.B.E. ..	J. W. Ward ..	E. Shillabeer
<i>Clan Chisholm</i> ..	J. McCrone .. ..	W. Pennell .. ..	J. A. Gray
<i>Clan Davidson</i> ..	H. J. Anchor, O.B.E., R.D., R.N.R. .. ..	A. M. Kennedy ..	C. A. Devine
<i>Clearpool</i> .. ..	J. Whamond .. ..	A. Pringle .. ..	R. R. Bromham
<i>Condesa</i> .. ..	H. Heal .. ..	S. J. Edgington ..	J. Bishop
<i>Corinthic</i> .. ..	G. M. Robertson ..	G. W. Woodbridge ..	B. O. Baxter
<i>Dallas City</i> .. ..	D. W. Butcher .. ..	P. H. Banks ..	C. Lowe
<i>Darro</i> .. ..	W. H. Grimshaw, O.B.E.	J. S. Kent .. ..	J. B. Smith
<i>Deebank</i> .. ..	B. Rivett .. ..	A. H. Pickles ..	A. McPherson
<i>Delilian</i> .. ..	R. McNie .. ..	J. S. Rodgers ..	A. Read
<i>Denbighshire</i> ..	D. Hey .. ..	L. Henshall ..	G. Heapy
<i>Derryclare</i> .. ..	G. Smith .. ..	E. T. Paddon ..	G. Williams
<i>Deseado</i> .. ..	S. J. G. Hill .. ..	P. C. T. Davies ..	N. Roberts
<i>Dominion Monarch</i>	Sir Henry Gordon, K.B., D.S.C. .. ..	S. H. Wilde ..	M. C. Murray
<i>Dromore</i> .. ..	C. Fryer .. ..	R. E. G. Simmons ..	W. W. Docherty
<i>Dunkery Beacon</i> ..	A. C. E. Green .. ..	A. J. Hawkes ..	A. B. Ewart
<i>Durango</i> .. ..	P. M. Burrell .. ..	M. W. Weekes ..	N. Brewer
<i>Empire Star</i> .. ..	G. Barnard .. ..	D. Brewster ..	J. Murphy
<i>Empress of Canada</i>	E. A. Shergold .. ..	B. Snell .. ..	J. Butterworth
<i>Eros</i> .. ..	R. C. Vigurs .. ..	V. Irvine .. ..	H. Lammas
<i>Esperance Bay</i> ..	T. V. Roberts .. ..	K. Murray-Browne	M. J. Sheehan
<i>Essex Trader</i> ..	C. Arundell .. ..	F. Stamps .. ..	A. B. Pilkington
<i>Fanad Head</i> .. ..	W. A. Haddock ..	R. Caffrey .. ..	A. I. Thompson
<i>Fordsdale</i> .. ..	T. T. Oliver .. ..	P. H. Garden ..	H. Knight
<i>Georgic</i> .. ..	R. Sell, R.D., R.N.R. ..	A. R. M. Graham ..	A. G. Hill
<i>Glenorchy</i> .. ..	C. Houghton .. ..	P. Menmuir ..	E. H. Power
<i>Hororata</i> .. ..	A. E. Taylor, R.D. R.N.R.	P. Jeanes .. ..	D. E. Hodding
<i>Hubert</i> .. ..	J. Whayman D.S.C. R.D. R.N.R. ..	P. J. Whalberg ..	N. Baskerville
<i>Inverbank</i> .. ..	A. M. Williamson ..	A. Findlay .. ..	S. Dewsnap
<i>John Biscoe</i> .. ..	Cdr. Kirkwood .. ..	Lt. C. Minchin ..	P. O'Conner
<i>John Holt</i> .. ..	A. Kennedy .. ..	W. L. Harrison ..	P. A. Senior
<i>Kent</i> .. ..	N. A. Thomas .. ..	A. Stalker .. ..	C. Jones
<i>King William</i> ..	A. B. Drever .. ..	R. B. Campbell ..	T. Wilson
<i>Lord O'Neill</i> .. ..	R. A. Ferguson .. ..	C. R. Wilson ..	C. A. Murphy

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER
<i>Machaon</i> ..	H. S. Wood ..	C. J. Sawle ..	N. S. Ogilvie
<i>Macharda</i> ..	R. A. Penston ..	J. Kirkham ..	J. Caddy
<i>Maloja</i> ..	E. J. Parry ..	J. C. Jenkins ..	A. Macbeth
<i>Manchester City</i> ..	F. L. Osborne ..	J. A. McCarven ..	A. S. J. Broadbent
<i>Matina</i> ..	H. Roberts ..	H. G. Cresswell ..	A. C. Knight
<i>Nestor</i> ..	E. N. Powell M.B.E. ..	I. S. Todd ..	L. Booth
<i>Norfolk</i> ..	A. I. Robertson R.D. R.N.R. ..	A. B. Moss ..	J. Heath
<i>Nova Scotia</i> ..	J. E. Wilson O.B.E. ..	J. Williamson ..	W. C. Brock
<i>Novelist</i> ..	T. E. Steele ..	G. B. Roberts ..	D. Granger
<i>Orduna</i> ..	J. Whitehouse ..	W. Singleton ..	J. Clarke
<i>Orion</i> ..	Sir A. J. Baxter K.B.E. D.S.C. R.D. R.N.R.	M. R. Wilmshurst ..	T. H. Shannon
<i>Pacific Exporter</i> ..	F. W. Swann ..	R. G. G. Bonney ..	A. F. Covy
<i>Pacific Fortune</i> ..	E. O. Evans ..	W. Sturt ..	—, Thomas
<i>Pacific Nomad</i> ..	E. A. Kemp ..	L. M. Morgan ..	B. Coghlan
<i>Palana</i> ..	F. P. Spurr ..	J. A. Lefevre ..	H. Olding
<i>Paparoa</i> ..	E. H. Hopkins ..	J. Hedley ..	W. Sykes
<i>Paringa</i> ..	E. F. Fernaby ..	A. H. W. Dallas ..	B. S. Magennis
<i>Perthshire</i> ..	A. J. Hogg ..	M. P. Turner ..	F. Rayner
<i>Philomel</i> ..	H. M. Selmer ..	P. J. Slater ..	A. Laurie
<i>Port Chalmers</i> ..	H. W. Hazlewood ..	I. H. Stewart ..	E. G. Gunner
<i>Port Lincoln</i> ..	L. Copeland ..	G. H. Manley ..	P. J. McKeon
<i>Port Pirie</i> ..	H. Steele ..	H. J. Holdrup ..	W. Miles
<i>Port Wyndham</i> ..	E. E. Roswell ..	C. Watkins ..	J. N. Coutts
<i>Regent Hawk</i> ..	J. Ward ..	T. Farrar ..	R. W. Jones
<i>Rimutaka</i> ..	T. L. Maltby ..	J. M. Healey ..	C. L. Lambe
<i>Roslin Castle</i> ..	H. L. Holland ..	G. E. Smith ..	H. E. Robinson
<i>Rowcallan Castle</i> ..	R. A. D. Cambridge ..	M. T. Williams ..	M. Knowles
<i>Royal Star</i> ..	G. Aldridge ..	B. Edgington ..	M. Cahill
<i>St. Apollo</i> ..	J. H. Ellis, D.S.C. ..	L. A. Abbey ..	E. E. White
<i>San Veronica</i> ..	C. Allison O.B.E. ..	D. Kennedy ..	W. Coghill
<i>Settler</i> ..	R. F. Phillips ..	W. Aitkin ..	A. Brett
<i>Silverbriar</i> ..	T. S. Morgan ..	H. Tomlinson ..	T. Coughlan
<i>Southern Garden</i> ..	W. J. Swanson ..	W. E. G. Sutton ..	W. J. Tulloch
<i>Stanthorpe</i> ..	R. G. Roberts ..	R. S. Drew ..	F. R. Pope
<i>Tamaroa</i> ..	W. Thompson ..	A. H. Baber ..	D. MacRae
<i>Tongariro</i> ..	D. H. Chadwick ..	R. D. Parkin ..	J. A. Hasson
<i>Trevaylor</i> ..	A. G. Williams O.B.E. ..	D. R. Jenkins ..	D. W. Cross
<i>Tweed</i> ..	K. Drake ..	D. S. Guinness ..	A. Copeland
<i>Twickenham</i> ..	J. A. Tully ..	J. Porteous ..	D. Barker
<i>Vasconia</i> ..	G. S. Evans ..	M. V. Meardon ..	R. Burns
<i>Wairangi</i> ..	W. G. West ..	P. M. Mortimer ..	H. Jardine
<i>Warwick Castle</i> ..	J. Trayner ..	J. Scott ..	E. A. Shaw
<i>Yoma</i> ..	M. M. Rowlands ..	D. Wilson ..	W. Allen
<i>Zealandic</i> ..	P. F. Owens ..	J. Saunders ..	A. McLennan

# The Marine Observers' Log



JULY, AUGUST AND SEPTEMBER

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

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

Responsibility for each observation rests with the contributor.

## CURRENTS

### Off Banc d'Arguin, West Africa

*M.V. Roslin Castle.* Captain H. L. Holland. Cape Town to Hull. Observer, Mr. G. E. Smith, 3rd Officer.

14th September, 1949, 2300 G.M.T., to 15th September, 2118 G.M.T. Almadi Point Lighthouse (lat.  $14^{\circ} 45' \text{N.}$ , long.  $17^{\circ} 33' \text{W.}$ ) was passed at a distance of 5 miles and the course was then set  $000^{\circ} (\text{T})$  to pass  $33' \text{W.}$  of Cape Blanco. At noon on the 15th the vessel was  $3' \text{E.}$  of the course line and was adjusted to  $359^{\circ}$  to pass through a position  $33' \text{W.}$  of Cape Blanco. At 1600 the vessel was  $4' \text{E.}$  of the course line and altered to  $358^{\circ}$  to allow for this easterly set. At 2025 the loom of Cape Blanco light was observed, and on comparing soundings by echo with bearings of the loom it was apparent that the vessel had set well inside the course steered. At 2118 Cape Blanco light was sighted abeam on the extreme range of 21.1 miles (height of eye 41 ft.), the soundings by echo were 38 fathoms and the vessel was again inside the course steered. From these observations it was estimated that in the 9.3 hours from noon to 2118 the vessel had set in towards the coast  $093^{\circ} (\text{T})$ , 14.6 miles, rate 1.57 knots.

*Note.* Observations of 134 currents with mid-positions lying within the region of  $20^{\circ}$ – $22^{\circ} \text{N.}$ , long.  $16^{\circ}$ – $18^{\circ} \text{W.}$ , for the months of August to October were received during the period 1910–39. Of these, 10 per cent had an easterly component, but the strongest of these thirteen currents was at the rate of 20 miles per day. The observation recorded above is therefore of interest on account of the exceptional strength of the current.

Further south, between lats.  $14^{\circ} \text{N.}$  and  $18^{\circ} \text{N.}$ , which includes the region of Cape Verde, the proportion of onshore sets is greater. For each of the months from June to October inclusive, from 24 per cent to 28 per cent of all currents observed set in directions between  $30^{\circ}$  and  $150^{\circ}$ .



## New Zealand Waters

S.S. *John A. Brown*. Observer, Mr. J. P. Wilson, 2nd Officer.

20th November, 1949, 0115 G.M.T. A few miles off Three Kings Islands, steering  $114^{\circ}$  (T), a stream of current was observed extending as far as the horizon on either side of the vessel, flowing from SW to NE at a rate of 1 to 2 knots. It was found that this stream of water was approximately 4 miles broad and was  $5^{\circ}$  cooler than the surrounding water, the temperature of the former being  $64^{\circ}\text{F.}$  and the latter  $69^{\circ}$ . • Eddies, swirls and broken water marked the edge of this veritable "river" of cooler water. It may be of interest to note that several large whales were seen disporting themselves in this stream.

Position of Ship : Latitude  $33^{\circ} 29'S.$ , Longitude  $170^{\circ} 58'E.$

*Note.* This is a region of strong current and tidal streams. The following remarks occur in the New Zealand Pilot : "The tidal streams between these islands (Three Kings) attain rates of from 3 to 5 knots, and the races frequently give an appearance of shoal depths. The tidal streams, strong currents and races between these islands and the mainland must be guarded against".

## TIDE RIPS

### Atlantic Equatorial Waters

S.S. *Sovac*. Captain H. Anthony. Curaçao to Takoradi. Observer, Captain H. Anthony.

13th September, 1949. Numerous pronounced heavy tide rips were observed running in a criss-cross direction, between 1200 and 1500 G.M.T. and again between 1800 and 1900. The sea on either side of this area was comparatively smooth with a long swell, whereas inside was choppy and confused. Weather conditions : wind E, 2, barometer 1013.5 mb., temperature, air  $83^{\circ}\text{F.}$ , sea  $83^{\circ}$  and remaining constant throughout. Sky  $3/8$  covered with Cu.

Position of Ship : Latitude  $9^{\circ} 45'N.$ , Longitude  $43^{\circ} 45'W.$

## RISE IN SEA TEMPERATURE

### Off Cape Blanco

M.V. *Rhodesia Star*. Captain C. H. Watson. Tenerife to Cape Town. Observer, Mr. R. E. Escrett, 4th Officer.

14th August, 1949, 2330 G.M.T. While passing from the cold water south of the Canaries current, mainly heavy dew and a rapid rise in sea temperature were experienced. At 2315 G.M.T. the sea temperature was steady at  $73^{\circ}\text{F.}$ , but 15 minutes later it rose to  $84^{\circ}$ . Weather conditions : corrected barometer 1012.6 mb.; temperature : dry bulb  $74^{\circ}$ , wet bulb  $73^{\circ}$ ; wind variable, 2; overcast sky. At midnight the sea temperature was steady at  $82^{\circ}$ . Course  $190^{\circ}$ . Speed 16.5 knots.

Position of Ship : Latitude  $20^{\circ} 34'N.$ , Longitude  $17^{\circ} 48'W.$

*Note.* The upwelling of cooler sub-surface water which takes place along the west coast of Africa in the region of the Canary Current is often pronounced in the neighbourhood of Cape Blanco. Rapid changes of sea temperature may thus sometimes be observed there.

## DISCOLOURED WATER

### Mouth of Rio Magdalena

M.V. *Wairangi*. Captain W. G. West. Curaçao to London. Observer, Mr. J. L. Harrison, 3rd Officer.

20th July, 1949, 1345 G.M.T. Vessel passed into area of silt-discoloured water, sea temperature 82°F., S.G. 1024. Least distance of silt from river mouth 10 miles, greatest distance 22 miles. The colour was not so deep as has been seen on previous occasions, suggesting that there had been little recent heavy rains in the Cartagena area, and it extended more easterly from the mouth of the river, probably due to the current experienced, setting 072°, 0.9 knots.

Position of Ship : Latitude 11° 15' N., Longitude 75° 01' W.

### South China Sea

S.S. *Jersey City*. Captain I. Williams. Cochin to Vancouver. Observer, Mr. D. Baker, 2nd Officer.

20th July, 1949, 0630 G.M.T. A line of discoloured water was observed running 080° to 260°. It was approximately 2 cables in width and of a light brown colour. The sea was smooth with temperature 85°F. The air temperature was 83°F and the wind variable, force 1.

Position of Ship : Latitude 11° 34' N., Longitude 112° 37' E.

### Off Point de Galle, Ceylon

M.V. *Waiwera*. Captain B. Forbes-Moffatt. Colombo to Fremantle. Observers, Captain B. Forbes-Moffatt and Mr. A. C. H. Childs, 3rd Officer.

29th September, 1949, 0630 G.M.T. Vivid coloration of water was passed through. A streak of brown, red and yellow water approximately 50 ft. wide was observed to stretch from horizon to horizon along a bearing of about 100° and 280° (T) from position of ship. There was no apparent tide or current. Sea temperature was 81.5°F.

Position of Ship : Latitude 5° 57' N., Longitude 80° 09' E.

## PHOSPHORESCENCE

### Arabian Sea

S.S. *Matheran*. Captain A. B. Bannatyne, O.B.E. Aden to Colombo. Observer, Mr. R. M. Lucas, 3rd Officer.

16th August, 1949, 1650 G.M.T. The vessel crossed a definite dividing line and entered an area of phosphorescence. The affected sector was from horizon to horizon in a N-S direction, and gave the sea a "milky" appearance to such an extent that the ship's wash was hardly discernible from the bridge. A similar line of demarcation was observed on the east side of the area, which was crossed at 1736 in lat. 12° 29' N., long. 57° 39' E. The sky was cloudless, corrected barometer 1006.4 mb., wind SSW, 6. Temperatures : air 77°F., wet bulb 74°, sea 76°.

Position of Ship : Latitude 12° 33' N., Longitude 57° 27' E.

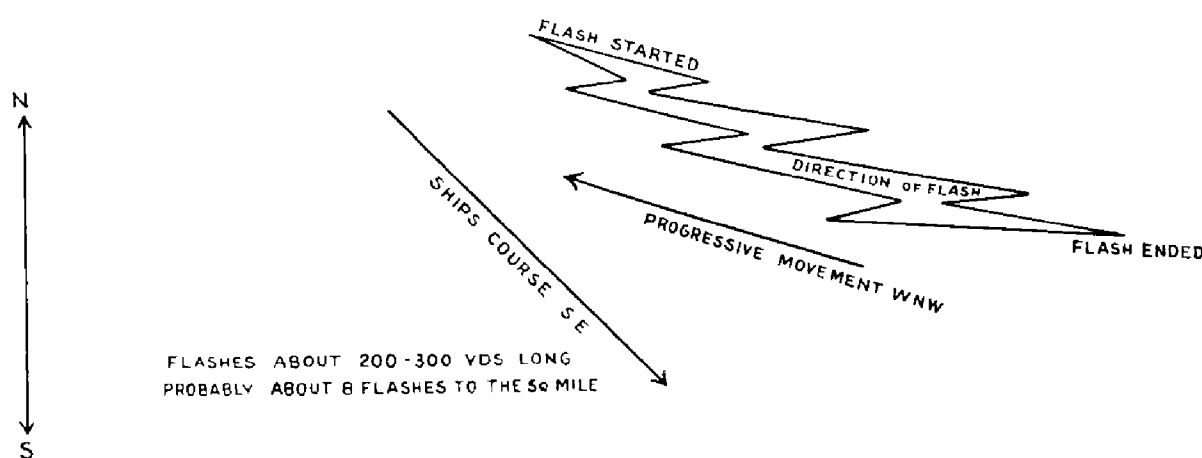
S.S. *Atlantis*. Captain A. R. Osburn. Southampton to Wellington, N.Z. Observer, Mr. R. Phillips, Senior 3rd Officer.

16th August, 1949, 1615 G.M.T. Vessel passed through an area of uniform luminosity approximately 1 mile wide.

Position of Ship : Latitude  $12^{\circ} 20' \text{N.}$ , Longitude  $57^{\circ} 30' \text{E.}$

S.S. *Dara*. Captain T. A. Spencely. Bombay to Karachi. Observer, Mr. G. R. McLutosh, 3rd Officer.

30th August, 1949, 2000–2200 G.M.T. In vicinity  $22^{\circ} 30' \text{N.}$ ,  $68^{\circ} 10' \text{E.}$ , at mouth of Gulf of Cutch, brilliant phosphorescence in lightning-like zig-zag form was observed in patches of about a square mile each. These



patches seemed to have a slight directional movement WNW, but the zig-zag phosphorescence flashed from left to right in a WNW–ESE direction.

M.V. *Georgic*. Captain R. Sell, R.D., R.N.R. Hong Kong to Liverpool. Observer, Mr. A. R. M. Graham, Senior 3rd Officer.

1st September, 1949, 2330 G.M.T. Diffused phosphorescence or “milky sea” was observed in a patch of varying luminosity. It first became apparent about 2330, and grew gradually brighter until the vessel entered the brightest part, which was clearly seen before it was reached. At no time was it bright enough to illuminate an object. The waves appeared to break less frequently in the brightest part.

Position of Ship : Latitude  $12^{\circ} 55' \text{N.}$ , Longitude  $54^{\circ} 27' \text{E.}$

## PHOSPHORESCENT WHEEL

### Malacca Strait

S.S. *City of Sydney*. Captain J. B. Maclaren. Penang to Colombo. Observer, Mr. J. B. Walker, Chief Officer.

23rd July, 1949, 0400 A.T.S. Approximately 8 miles SSE of Pulau Perak Island (lat.  $5^{\circ} 42' \text{N.}$ , long.  $98^{\circ} 56' \text{E.}$ ) the sky was overcast with continuous moderate to heavy rain, wind force 3 to 4, sea moderate and visibility good. Phosphorescent phenomenon suddenly commenced consisting of revolving waves of light somewhat reminiscent of a revolving searchlight or spray light. A few minutes after, the display developed into a definite rotating “cartwheel”, the “spokes” were plainly visible but the “hub” was not

observable. The display ended about 0420 as suddenly as it began. The rays of light were seen best from a height of eye of 30 ft., on descending to a lower level they appeared to fade considerably.

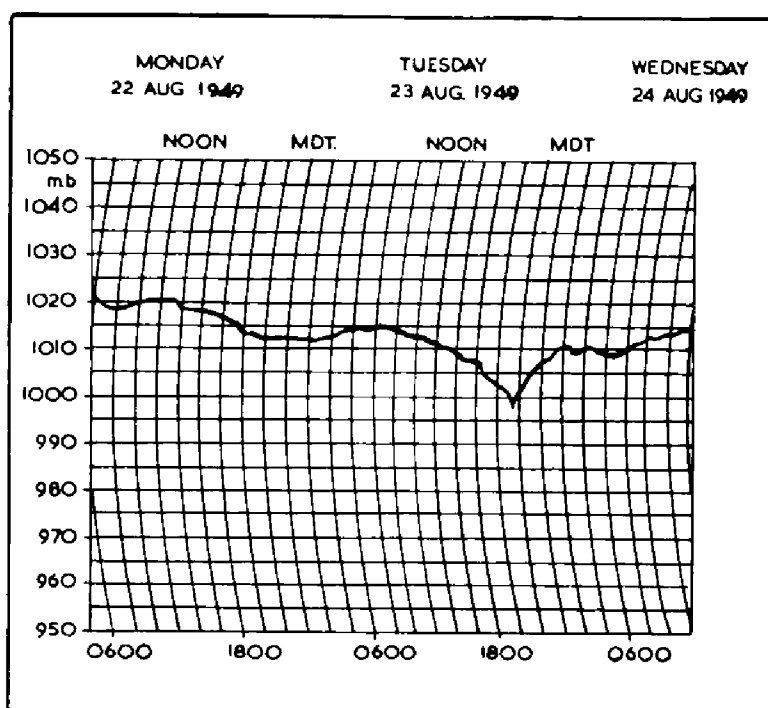
*Note.* A phosphorescent wheel was observed by S.S. *Laomedon* in the same vicinity on 25th February, 1949 (see *Marine Observer*, Vol. XX, page 6).

## HURRICANE

### Approaching Caribbean Sea

S.S. *Mataroa*. Captain R. G. James, R.D.S., R.N.R. Southampton to Curaçao. Observer, Mr. J. Beck, 4th Officer.

23rd August, 1949. Just before noon A.T.S. on 19th August, a very distinct solar halo was observed through a thin nebulous veil of Cs. and again on the 21st at about the same time. Although well within trade-wind limits the clouds were mainly Cs. and Cc. with Cb. and Sc.; but continually in a state of flux. Frequent heavy prolonged rain squalls were experienced. At 0700 G.M.T. on 22nd August a hurricane was reported in lat.  $25^{\circ}\text{N}$ ., long.  $70.5^{\circ}\text{W}$ ., some 700 miles west of the ship, to which was attributed the previous unusual conditions. The barometer showed a tendency to fall, although preserving its diurnal range. The hurricane was moving WNW at



15 knots, yet conditions at ship did not settle. During the afternoon on the 23rd the wind backed, becoming ESE at 1600 G.M.T. and increased from force 6 to 8 at 1800, during which time the barometer fell 6 mb. Reports from other ships in the immediate vicinity indicated only light to moderate winds, so course was maintained. At 1900 blinding torrential rain commenced, the barometer was still falling and the sea becoming steeper. At 2030 the wind was full hurricane force of 11 to 12 and the barometer 998 mb., a drop of 11 mb. in 3 hours. The ship then hove-to and sent wireless warnings of developing tropical disturbance. By 2100 the sea was mountainous and the crests were whipped off by the wind. This flying spray plus the rain reduced visibility to practically nil; all that could be seen of the sea was an agitated



mass of foam. After heaving-to the barometer steadied almost immediately and began to rise steeply, the wind moderated and visibility improved, so course 224° was resumed at 0300 on the 24th. At 0600 the ship again hove-to as barometer had become unsteady and conditions had worsened. By 0800 the sea had subsided considerably and course was resumed, the sky became lighter but did not clear for over 8 hours. The ship sustained no damage, the only marks were where the wind had stripped paint off the hull and cleaned the radar reflector down to bare metal. When the wind was strongest, with fierce gusts, the mercury barometer pumped wildly, the aneroid jerked backwards and forwards 0.2 in. and the barograph trace became very thick and blurred.

Position of Ship at 1200 G.M.T. :

August	Latitude	Longitude
19th	36° 44' N.	42° 40' W.
20th	32° 57' N.	47° 55' W.
21st	28° 44' N.	52° 54' W.
22nd	24° 57' N.	57° 11' W.
23rd	21° 25' N.	61° 21' W.
24th	18° 35' N.	63° 30' W.

**RAPID BAROMETRIC AND WIND DIRECTION CHANGES**

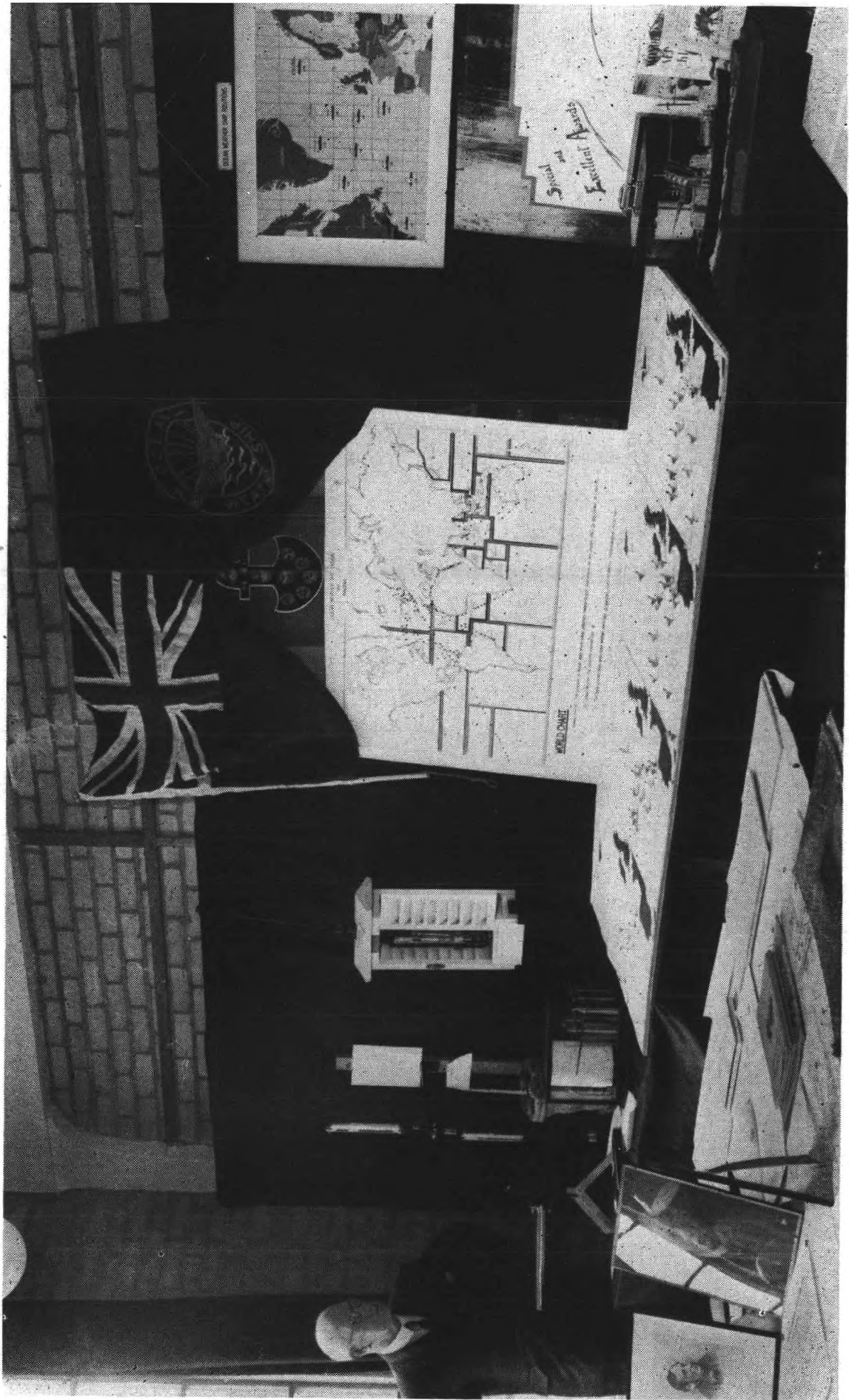
**North Atlantic Ocean**

S.S. *John Holt*. Captain J. Shaw. Dakar to Liverpool. Observer, Mr. W. L. Harrison, 2nd Officer.

23rd September, 1949. At 0010 G.M.T. the barometer rose suddenly from 1013.1 to 1017.1 mb., the sky became completely overcast with very low St., approximate height between 200 ft. and 500 ft., and the wind veered from 025° to 075°, force 4. Air and sea temperatures remained at 69°F. and 68°F. respectively throughout. Between 0010 and 0120 the barometer was rising and falling rapidly, taking about 14 to 15 minutes for each rise and fall, whilst alternately the wind back to N, force 4, on the low readings (the sky clearing to scattered Sc. 1/8, height 3,000 ft.) and veering to 075° to 070°, force 4, on the high readings (the sky becoming completely overcast again). Each time the sky was in the process of becoming overcast, the cloud seemed to come from 070° in a broad band and appeared to fan out rapidly. These variations persisted until 0118, when the broad band of St. disappeared over the northern horizon, leaving behind Sc. 3/8, approximate height 1,000 ft. to 2,000 ft.

Approx. times of change G.M.T.	Barometer mb.	Wind °	Force	Cloud type	Amount in eighths	Height of cloud Ft.
0010	1017.1	075	4	St.	8	200-500
0025	1014.3	035	4	Sc.	1	3,000
0038	1017.4	078	4	St.	8	500
0052	1015.0	040	3	Sc.	1	3,000
0057	1017.0	070	4	St.	8	500
0104	1016.0	070	3	Sc.	3	3,000
0111	1013.8	070	3	St.	8	500-1,000
0120	1016.5	035	4	Sc.	3	1,000-2,000

Position of Ship : Latitude 23° 04' N., Longitude 16° 43' W.



Crown copyright reserved.

A view of part of the Marine Branch exhibition for the centenary of the Royal Meteorological Society (see page 174). Standing on the left is Mr. E. W. Barlow, B.Sc., well known to readers of *The Marine Observer*. The "sword" apparently piercing Mr. Barlow is actually a hand-aspirated psychrometer, an instrument which may be issued to ships at some future date.

## VARIATIONS OF AIR TEMPERATURE

### Off the Coast of Portugal

M.V. *Kenilworth Castle*. Captain L. H. Farrow. Gibraltar to Sunderland.  
Observer, Mr. J. W. Bigham, 4th Officer.

5th July, 1949. The vessel passed through an area where unusual variations of air temperature accompanied by changes of wind were experienced. The following observations were taken :

G.M.T.	Air Temp. °F.	Wet Bulb °F.	Wind	Bar. in.	Sea Temp. °F.
0300	70		Var. 1/2	29.95	69
0500	74		E'ly, 1/2	Unsteady	Not observed
0600	85	70	E × N, 2	Unsteady	Not observed
0645	93		Backing	Unsteady	Not observed
0700	80		N × W, 4	29.90	69
0710	76		N × W, 4	Not observed	Not observed
0718	81		N × W, 4	Not observed	Not observed
0730	74		N × W, 4	Not observed	Not observed

Between 0300 and 0500 frequent lightning with occasional thunder was observed over the land in the direction of Lisbon, but only infrequent light rain was experienced on board, although the sky was mainly overcast. The state of the sky during the period 0500–0700 was 6/8 clouded, 5/8 Cu., 1/8 Cc., while visibility was only moderate due to a hazy horizon. At 0730 the vessel appeared to have passed out of the area. The noon (1100 G.M.T.) observations were : wind N'ly, 4, barometer 30.04 in., air temperature 75°, sea temperature 70°, cloud 2/8 Ci., although the wind gradually increased to N, 6, at 1900, at which time other observations were : barometer 30.04 in., air temperature 67°, sea temperature 65°, cloud 1/8 Cu.

Position of ship : Latitude 39° 24' N., Longitude 9° 36' W., Course 360°. Speed 14.3 knots.

*Note.* At the time these marked variations were being reported a pressure gradient giving E'ly winds covered the northern half of the Iberian Peninsula. The ship was just entering the region of this wind, and it is probable that occasional gusts of very warm dry air coming from the land surface of the interior of the peninsula were reaching her. The extreme heat at this early hour may have been partly caused by the heating of the land on the previous day. It may also have been in part due to the warming of dry air as this descended to sea level from the relatively high altitudes of the plateau.

## THUNDERSTORM AND WATERSPOUT

### At Galveston

S.S. *Stanthorpe*. Captain R. G. Roberts. Observer, Mr. I. Macquarrie, 2nd Officer.

1st July, 1949, 2100 to 2300 G.M.T. At 2100 the sky to NE was black and wind NW, 2. When leaving Galveston at 2210 a local thunderstorm was observed approaching rapidly along the coast from NE. Barometer fell steadily from 1018 mb. at 1800 to 1013 mb. at 2215 when the storm struck the ship. When the storm was about  $\frac{1}{2}$  mile NE of the north jetty the formation of a waterspout was seen, about 200 ft. in diameter and revolving anticlockwise in about 6 seconds. When this crossed the break-water there were seven other patches of whirling spray. The clouds were about 300 ft. high and wisps of these could be seen whirling around, but at no time was a complete column to the clouds seen to form. At about 2218

a whirling patch passed over the ship with wind between force 11 and 12 from 020°, which slowly died down at 2245. Immediately after the first gust of wind torrential rain fell with vivid lightning and crashing thunder ; visibility was reduced to 50 yards. The barometer rose to 1016 mb. during the first gust of wind and the barograph made a vertical recording, but dropped to 1015 mb. when rain had passed over and wind died down at 2300. The weather-side awnings were blown to shreds.

### CLOUD PHOTOGRAPHS

South Australia

S.S. *Karetu*. Captain T. S. MacNicol.





24th August, 1949, 0600 G.M.T. (approximately). These photographs were taken by Mr. F. C. Ridig, Chief Officer, at Coff's Harbour, South Australia, using a yellow filter with Selo H.P. 3 film. Weather conditions wind S×E (approximately 170°), 5 knots, barometer 1021.3 mb., air temperature 65°F. Meteorological situation: an anticyclone, with highest pressure 1033 mb., was centred in the South Australian Bight and extended on to South Australia. Moderate gradient winds from SSW to SSE covered the South Australian and Victorian coasts with scattered to broken Cu. and a few isolated showers. In the upper air, however, a depression was centred over New South Wales and a well-marked trough of low pressure extended westward to Adelaide. The Cc. and Ac. clouds photographed at Coff's Harbour were doubtless associated with this trough.

## EXCEPTIONAL VISIBILITY

### Leaving Straits of Gibraltar

S.S. *Kohistan*. Captain A. N. Henderson. Port Said to Manchester. Observer, Mr. J. E. B. Belt, 2nd Officer.

10th August, 1949. After passing Gibraltar the strong breeze which existed in the Straits died away, visibility improved and the sea became glassy. Visibility was first noticed to be exceptional when Vila Riddle 18-mile light in lat. 37° 11' N., long. 7° 24½' W., became visible bearing 014° (T) at a distance of 44½ miles. Later, at 0230 G.M.T., St. Vincent, a 22-mile light, came into view bearing 301° (T), distance 55 miles. Both lights, together with other coastal lights between them, were seen quite plainly without optical aid.

### Bay of Bengal

S.S. *Shahjehan*. Captain J. Thompson. Madras to Calcutta. Observer, Mr. J. Stevenson, 3rd Officer.

29th August, 1949, 0430 G.M.T. Exceptional visibility was experienced throughout the passage, and at 0430 G.M.T. the 5,000 ft. range of Baruva



was clearly visible, as shown in the sketch, the highest peak, 5,010 ft., bearing 313° (T), distance 70 miles. It was interesting to note that the lower cloud base was patently below the horizon level. Weather conditions: barometer 29.80 in., wind NE, 1-2, air temperature 84°F., sea smooth, swell low from SSE, wisps of fine Ci. and horizon cloud of Cu. and Sc.

## ABNORMAL REFRACTION

### Off Coast of Spain

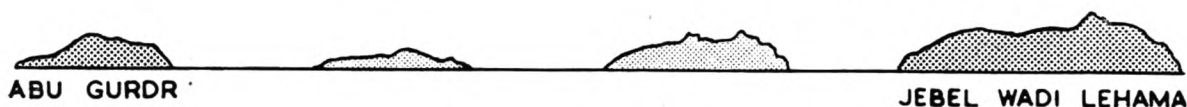
S.S. *Stanthorpe*. Captain R. G. Roberts. Galveston to Gibraltar. Observer, Mr. B. D. Murray, 3rd Officer.

19th July, 1949, 2230 G.M.T. The loom of Cabo de Santa Maria light was seen at a distance of 30 miles ; the light also could be seen flashing until 2320, when the loom appeared again, height of eye 30 ft. From the top bridge, height of eye 40 ft., Vila Real de San Antonio light was seen flashing twice and the loom several times. Cabo Santa Maria light came into view again with loom only. At 2345 the flash was again visible bearing  $009^{\circ}$  (T), and loom of Vila Real de San Antonio bearing  $030^{\circ}$  (T), distance 51 miles. Corrected barometer 1018.6 mb., air temperature  $68^{\circ}\text{F.}$ , wet bulb  $65^{\circ}$ , sky cloudless, very damp with heavy dew.

Position of Ship : Latitude  $36^{\circ} 30' \text{N.}$ , Longitude  $8^{\circ} 03' \text{W.}$

### Red Sea

S.S. *Stanthorpe*. Captain R. G. Roberts. Port Said to Aden. Observer, Mr. B. D. Murray, 3rd Officer.



30th July, 1949, 1630 G.M.T. About 18 minutes after sunset the western horizon was aglow, and in this land was seen appearing as four islands (see sketch). The highest peak on the northern one bore  $271^{\circ}$  and that on the southern one  $216\frac{1}{2}^{\circ}$  (T), and were the summits of Jebel Wadi Lehama (6,490 ft.), distance 87 miles, and Abu Gurdr (5,125 ft.), distance 83 miles.

Position of Ship : Latitude  $24^{\circ} 13' \text{N.}$ , Longitude  $36^{\circ} 35' \text{E.}$

## MIRAGE

### Mediterranean Sea

M.V. *Georgic*. Captain R. Sell, R.D., R.N.R. Hong Kong to Liverpool. Observer, Mr. A. R. M. Graham, Senior 3rd Officer.

11th September, 1949, afternoon. While steaming from Cani Rocks to Cape Serrat a mirage of Fratelli Rock was seen at an altitude of  $0^{\circ} 15'$ , 25 miles distant. The atmosphere between the horizon and this altitude appeared opaque and in places like a continuous coastline ; ships were inverted. The opaque layer thinned out to the west of Ras Enghela, and the horizon appeared as a faint line projected about  $0^{\circ} 10'$  above the true horizon with a layer of haze between. The altitude decreased in proportion to the distance away, so that the coastline abeam appeared normal but gradually slanted up above the true horizon, reaching its greatest altitude right ahead. At close distances the gap between the horizon and image was filled with what appeared to be a long thin streamer of inverted cloud.

## LUNAR RAINBOWS

### North Atlantic Ocean

S.S. *Magdapur*. Captain H. E. MacGregor. Port Said to Boston. Observer, Mr. D. A. M. O'Byrne.

7th July, 1949, 0100 G.M.T. A very clear moonbow was observed bearing  $026^{\circ}$  (T); spectrum colours faintly discernible at lower ends but rest of bow appeared white. It was visible for about 20 minutes. Moon bearing  $206^{\circ}$  (T), altitude  $20^{\circ}$ ; visibility excellent. No cloud to the south of ship but Cu. and Cb. developing from NW, very fine drizzle.

Position of Ship : Latitude  $40^{\circ} 05' \text{N.}$ , Longitude  $33^{\circ} 20' \text{W.}$

### South Atlantic Ocean

S.S. *City of Paris*. Captain H. Percival, O.B.E. London to Cape Town. Observer, Mr. I. S. McGregor, 2nd Officer.

7th August, 1949, 1900 G.M.T. A lunar rainbow was observed following a brief squall. It seemed to enter the water midway between the ship and the horizon on the starboard side and the other end of the bow was right astern. Green and yellow were the colours discernible and the general effect by moonlight was most striking. Full moon was on the 8th. The rainbow was of short duration and faded in about 30 seconds. The sky was  $\frac{6}{8}$  clouded with Sc. and Ac.; height of low cloud 4,000 ft.

Position of Ship : Latitude  $17^{\circ} 10' \text{S.}$ , Longitude  $3^{\circ} 53' \text{E.}$

## SOLAR HALO

### North Atlantic Ocean

S.S. *Pakeha*. Captain H. C. Smith. Durban to London. Observer, Mr. A. R. Stephenson, 3rd Officer.

19th July, 1949, 1130 G.M.T. A complete solar halo, radius  $22^{\circ}$  approximately, and an arc of a second, radius  $46^{\circ}$  approximately, was observed. The sky was completely covered with Cs. In the halo and the arc the colours red, orange, yellow and blue were clearly visible. The arc had disappeared by 1200 and the halo by 1215.

Position of Ship : Latitude  $17^{\circ} 49' \text{N.}$ , Longitude  $17^{\circ} 36' \text{W.}$

## LUNAR CORONAE

### North Atlantic Ocean

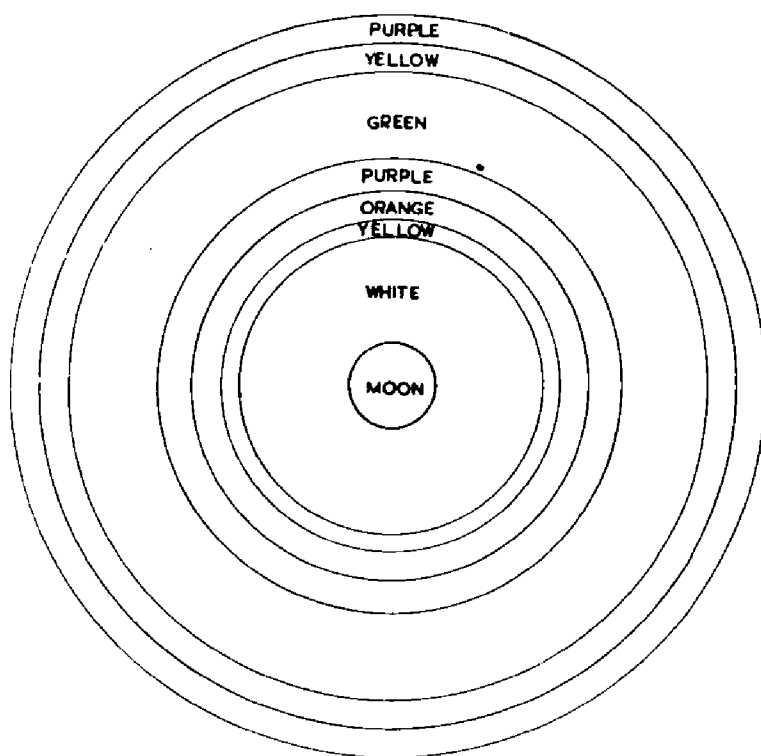
S.S. *El Gallo*. Captain P. Pederson. Liverpool to Peru via Panama. Observer, Mr. J. Channing-Pearce, 3rd Officer.

6th September, 1949, 0001 G.M.T. A vividly coloured corona around the moon was observed. It had a diameter of approximately  $6^{\circ} 25'$ , and four distinct colours could be seen. The outer rim was narrow and red, and dissolved into a narrow band of yellow, which in turn changed to a broad band of green ending in a faint narrow band of blue.

Position of Ship : Latitude  $47^{\circ} 24' \text{N.}$ , Longitude  $16^{\circ} 12' \text{W.}$

S.S. *Argyll*. Captain J. Dodds. Tyne to Port Sulphur. Observer, Mr. T. Rowe, 2nd Officer.

9th September, 1949, 0445 G.M.T. A very fine lunar corona was observed. The sky was  $\frac{4}{8}$  covered with Cs., but this cloud broke up rapidly giving way to Cc. The following sketch indicates the impression received of colours. The phenomena lasted only 4 or 5 minutes, but a rough sketch was made while it was still visible.



Position of Ship : Latitude  $39^{\circ} 56' \text{N.}$ , Longitude  $29^{\circ} 09' \text{W.}$

## AURORAE

### North Atlantic Ocean

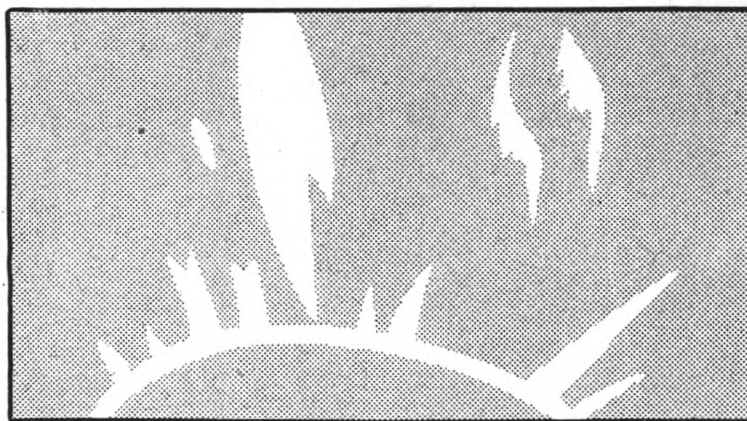
S.S. *Delilian*. Captain R. McNie. Avonmouth to Port Alfred. Observer, Mr. J. Wainwright, 3rd Officer.

19th August, 1949, 0045 G.M.T. Aurora observed in the form of an arc from the horizon at  $280^{\circ}$  to  $045^{\circ}$ . The maximum altitude of the upper edge was  $23^{\circ}$  and of the lower  $10^{\circ}$ . By 0100 rays appeared from  $290^{\circ}$  and gradually spread over the whole segment of the arc. At 0120 maximum luminosity was attained, with rays reaching almost to the observer's zenith and changing rapidly in intensity and magnitude. The rays were predominantly pale yellow and green, and at 0130 began to fade, leaving a lightness in the northern sky which entirely disappeared by 0144.

Position of Ship : Latitude  $53^{\circ} 40' \text{N.}$ , Longitude  $40^{\circ} 10' \text{W.}$



O.W.S. *Weather Watcher*. Captain F. A. Elston. At Station "Item". Observers, Mr. J. Alexander, 2nd Officer, and Mr. J. Findlater, Assistant Meteorological Officer.



4th August, 1949, 0045 G.M.T. Aurora observed from NE to SW with streaks from NE to SW passing overhead. The display was very bright at 0100, and began to take on curtain formation until at 0108 maximum intensity was reached. The colour was then greenish-white and the formation an arc from NE to SW with curtains and streamers above it extending through the zenith to the E as shown in sketch. There was much radio interference at time of aurora.

Position of Ship : Latitude  $60^{\circ} 03' \text{N.}$ , Longitude  $20^{\circ} 08' \text{W.}$

#### **St. Lawrence River and Gulf**

M.V. *Port Pirie*. Captain F. W. Bailey, M.B.E. Montreal to Curaçao. Observers, Mr. W. Wakefield, 4th Officer, and Mr. J. T. Martyn, 3rd Officer.

2nd September, 1949. Various and numerous forms of aurora were observed. They were mainly green-white and appeared to pulse and flicker. 7/8 of the sky was covered with displays from 0300 to 0700 G.M.T. The period of lesser displays was much greater. Bands of colour curved from the ENE horizon through observer's zenith to western horizon in regular parallels.

3rd September, 1949, 0230 G.M.T. A 30-minute display of aurora was observed showing all colours of the spectrum. It was most spectacular and mainly "cloud" structure.

### **METEORS**

#### **North Atlantic Ocean**

M.V. *Sutherland*. Captain R. Thwaites. Port Arthur to Emden. Observer, Mr. G. C. Lewis, 3rd Officer.

27th August, 1949, 0138 G.M.T. Observed an intensely bright green meteor bearing  $080^{\circ}$  at an altitude of  $50^{\circ}$ . It fell almost vertically to the horizon, passing through constellation Pegasus and brilliantly illuminated the whole of the NE quadrant for about 3 or 4 seconds. It had a trail of misty green light about  $5^{\circ}$  long, which disappeared abruptly about 3 seconds after the body itself. The sky was fine and very clear, and there was no moon.

Position of Ship : Latitude  $37^{\circ} 08' \text{N.}$ , Longitude  $65^{\circ} 14' \text{W.}$

S.S. *San Felix*. Captain C. Summers. United Kingdom to Punta Cardon, Venezuela. Observer, Mr. R. Wilkinson, 2nd Officer.

20th September, 1949, 0545 G.M.T. A very brilliant blue flash, such as is associated with electric welding, lit up the sky, making it possible to see the horizon quite clearly all round. About one second afterwards, but definitely not at the time of the flash, a large-sized ball of similar hue as the flash, materialised or burst in a position roughly  $5^{\circ}$  below the star Schedar. Its movement appeared to be simultaneous with its appearance, slow at first but gaining speed afterwards, and the course of the flight eclipsed Polaris to  $15^{\circ}$  below Capella and to  $30^{\circ}$  below Castor and Pollux. This path will be seen to be slightly curved. Prior to disintegrating and disappearing completely, about 10 small pieces detached themselves from the meteor; these quickly turned a whitish-red colour and were not visible after the main body had disappeared. The small pieces were of a size usually associated with an ordinary small-sized meteor. During flight the colour, size and shape of the body was approximately the same. A trail of vapour was clearly visible, and after the meteor had disappeared was traced back to its point of origin. Approximately 4 minutes afterwards there was a deep boom, like the firing of a gun in the distance.

Position of Ship : Latitude  $36^{\circ} 38' \text{N.}$ , Longitude  $38^{\circ} 56' \text{W.}$

#### Atlantic Equatorial Waters

S.S. *Machaon*. Captain H. S. Woods. Liverpool to Durban. Observer, Mr. C. J. Sawle, 3rd Officer.

28th July, 1949, 2242 G.M.T. An explosive flash was observed bearing  $155^{\circ}$  (approximately), altitude  $10^{\circ}$ , of the same diameter as the sun as seen through a smoked glass. The centre was dark green and went through various changes to its outer edges, which were orange. It did not move and lasted for 2 seconds. The sky was cloudless.

Position of Ship : Latitude  $1^{\circ} 38' \text{S.}$ , Longitude  $8^{\circ} 14' \text{W.}$

*Note.* This appears to have been a large meteor, the path of which in the upper air was directly towards the observer.

#### Off Mexican Coast

M.V. *Pacific Exporter*. Captain W. F. Swann. Manchester to Vancouver. Observer, Mr. R. Simmons, 1st Officer.

12th July, 1949, 1115 G.M.T. Observed a meteor very low on the horizon. It came into view from behind the horizon bearing  $300^{\circ}$ , travelled on a curve rising to an altitude of  $1^{\circ}$  and disappeared behind the horizon bearing  $310^{\circ}$ . It was brilliant green and of the magnitude of Vega, 0.1. No trail was observed nor were stars seen as the sighting was so low. A thin veil of Ci. covered  $6/8$  of the sky.

Position of Ship : Latitude  $20^{\circ} 36' \text{N.}$ , Longitude  $106^{\circ} 57' \text{W.}$

*Note.* It is rare to see a meteor rising from below the horizon. Meteors may be at different heights in the upper atmosphere when they become luminous and therefore visible. If we consider a meteor becoming visible at one particular height, its nearness to the observer will depend on the altitude at which it is observed. It will be nearest if seen in the region of the zenith and farthest if seen near the horizon.

### Red Sea

S.S. *Bennevis*. Captain T. M. Blaikie. Suez to Aden. Observer, Mr. D. S. McPherson, 2nd Officer

3rd August, 1949, 2138 G.M.T. A meteor was observed at an altitude of  $25^{\circ}$ , bearing  $130^{\circ}$ . It disappeared at an altitude of  $20^{\circ}$ , bearing  $115^{\circ}$ , duration of flight about 2 seconds. It had a very bright white glow at the head of its body and left a long brilliant green-blue trail which ended in reddish sparks.

Position of Ship : Latitude  $15^{\circ} 50' \text{N.}$ , Longitude  $41^{\circ} 32' \text{E.}$

### Gulf of St. Lawrence

S.S. *Manchester Progress*. Captain W. H. Downing. Manchester to Montreal. Observer, Mr. T. H. Lynn, 2nd Officer.

30th September, 1949, 0500 G.M.T. There was a tremendous flash and the whole sky was lit up by a dull red cloud for about 2 seconds. After this a thin red straight line of light about 80' long was observed bearing  $280^{\circ}$  (T), altitude  $60^{\circ}$  approximately. After about 5 minutes this line bent into the form of a half circle, the open parts of which faced the wind, W'ly, force 3.



Shortly afterwards it began to fade gradually and finally disappeared at 0515.

Position of Ship : Latitude  $50^{\circ} 42' \text{N.}$ , Longitude  $58^{\circ} 14' \text{W.}$

## SOME OBSERVATIONS IN THE SURFACE LAYERS OF ANTARCTIC WATERS

DR. F. LOEWE, PH.D.

Senior Lecturer in charge, Department of Meteorology, University of Melbourne.

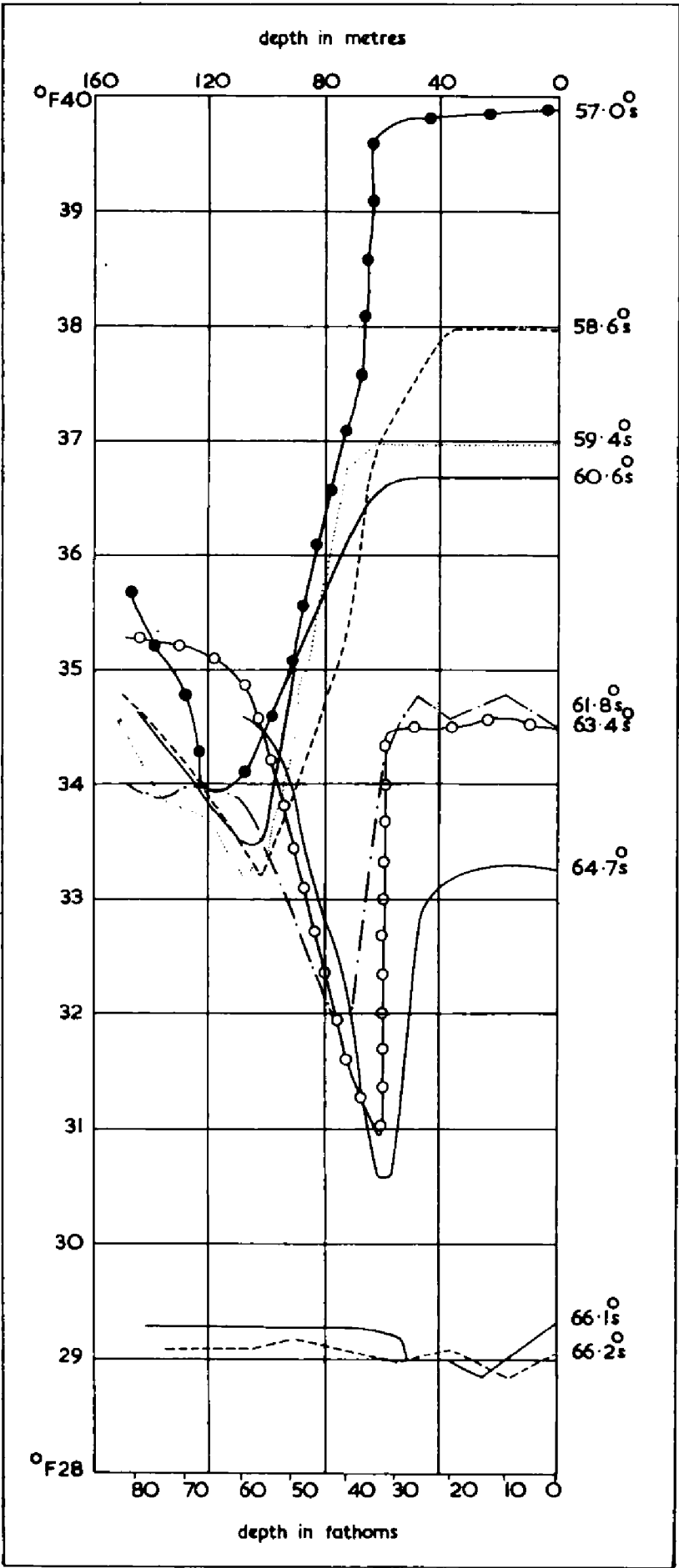
During the sojourn in Antarctic waters in February-March, 1948, of the research ship *Wyatt Earp* of the Royal Australian Navy, some oceanographical observations were made, but the programme of the ship did not include extensive oceanographical work. A sea-water temperature recorder did not work quite reliably; unfortunately this was not immediately discovered, and water temperatures measured with the aid of a bucket are only available for the later stages of the voyage. As the difference between air and water temperatures was generally small, the cloudiness high and evaporation negligible, the bucket temperatures can be regarded as reliable. The average sea-surface temperature in the middle of February and March in lat.  $65^{\circ}$ – $66^{\circ}$ S. and long.  $150^{\circ}$ E. was just above freezing point\*; in lat.  $66^{\circ}$ – $66.8^{\circ}$ S. and long.  $145^{\circ}$ – $163^{\circ}$ E. in the first half of March the average temperature was  $-1.25^{\circ}$ C. ( $29.35^{\circ}$ F.). The sharp fall of temperature with increasing latitude is also found in charts of the average monthly temperature (N. A. Mackintosh, *Discovery Reports*, Vol. 23, 1947).

Some observations with a bathythermograph to a maximum depth of 150 m. (82.02 fathoms) were made, in particular a section between  $66.3^{\circ}$ S.,  $147^{\circ}$ E. and  $57.0^{\circ}$ S.,  $157^{\circ}$ E. The data appear reliable. They show clearly distinguishable water masses (see fig. opposite). The southernmost stations give uniformly low temperatures, which south of  $65^{\circ}$ S., between 50 m. and 140 m. in depth (27.34 and 76.55 fathoms), are near  $-1.6^{\circ}$ C. ( $29.12^{\circ}$ F.). The surface layers have, according to the amount of ice and melt water, either the same or slightly higher temperatures which, however, rarely reach freezing point.

Northward the surface temperatures increase continuously, and below about 120 m. (66 fathoms) a warmer water body appears. The sharp delineation of the cold layer and its small thickness of only 40 m. to 50 m. (21.87 to 27.33 fathoms) is quite striking (see fig. opposite).

This narrowness is more pronounced than in the discontinuous records of soundings with reversing thermometers (Howard and Sverdrup, *Br. Austr. N. Zeal. Ant. Res. Exp. Rep.*, Ser. A, Vol. 3, part 2, sect. 1). The minimum temperature increases, from  $64\frac{1}{2}^{\circ}$ S. to  $57^{\circ}$ S., from  $-0.8^{\circ}$ C. ( $30.56^{\circ}$ F.) to  $+1.0^{\circ}$ C. ( $33.80^{\circ}$ F.). At the same time the core of the cold-water layer seems definitely to descend northward. At  $64\frac{1}{2}^{\circ}$ S. it is found at a depth of only 50 m. (27.33 fathoms) and sinks rather regularly to 120 m. (65.61 fathoms) in  $57^{\circ}$ S. These data correspond reasonably well with previous ones in the same region (see Howard and Sverdrup above, and the simultaneous observations on a Japanese whaling factory summarised in "Report on Sea and Water Observations on Antarctic Whaling Ground", *Oceanographical Magazine*, Vol. 1, No. 1, Tokio, 1949). Salinity observations at three stations in  $66^{\circ}$ S. give the following values: 30 m. (16.41 fathoms),  $33.4\text{‰}$ ; 50 m. (27.33 fathoms),  $34.1\text{‰}$ ; 100 m. (54.69 fathoms),  $34.25\text{‰}$ ; 150 m. (82.02 fathoms),  $34.34\text{‰}$ ; 200 m. (109.35 fathoms),  $34.40\text{‰}$ ; 300 m. (164.04 fathoms),  $34.52\text{‰}$ .

\*  $0^{\circ}$ C ( $32^{\circ}$ F), not the freezing point of salt water which is about  $-1.89^{\circ}$ C ( $28.6^{\circ}$ F).



Results of bathythermograph observations, temperatures being plotted against depths.



## AIR CURRENTS REVEALED BY SOARING GULLS

BY F. GRAHAM MILLAR

Meteorological Division, Department of Transport, Canada.

The cloud picture by O. M. Ashford in *The Marine Observer* for July, 1949, page 175, contains a flock of soaring gulls. This picture reminded the author of a study of gull soaring published some years ago by A. H. Woodcock, of the Woods Hole Oceanographic Institution (U.S.A.). He found that gulls are able to soar over the open sea, away from a ship, only when the sea is warmer than the air.

Examination of the record of the O.W.S. *Weather Recorder* for the time the picture was taken shows that the sea was colder than the air by 8°F. Thus "free" soaring (away from a ship) would be impossible. A second examination of the photograph confirms that the gulls were grouped near the ship. We must conclude that they were able to soar by frequently entering the air currents deflected upwards by the ship.

As one might expect, the behaviour of gulls in free soaring depends on the wind force. With Beaufort forces up to 4, the soaring is purely circular and takes place only if the sea is more than 3°F. warmer than the air. With Beaufort 5 there is mixed linear and circular soaring, provided the sea is at least 9°F. warmer than the air. In linear soaring, the bird flies straight into the wind. As the wind rises into the lower range of Beaufort 6, circular soaring ceases but linear soaring persists; all soaring ceases for still higher winds.

When soaring is impossible, gulls will remain at rest upon the water, or follow a ship by making wing-flapping flights interspersed with periods of rest. Of course, whenever possible they will soar upon the updraft over a ship, but this is not free soaring. When weak convection is present they will repeatedly test the updrafts, as if to determine the possibility of soaring. The frigate bird, which is very efficient in soaring flight, is apparently able to soar continuously with a less favourable air-sea temperature difference than a gull requires.

Circle soaring is prolonged soaring in which the birds circle about in a chimney-like updraft, being carried down-wind at the same time if there is a wind. Some birds circle clockwise while others circle counter-clockwise in the same updraft. During the rare occasions when many birds enter an updraft consecutively, a sufficient portion of its extent is demarked to show that the air column has continuity and is not just a rising bubble of warm air. In light winds the columns approach the vertical, but as the wind increases they become tilted, as the tops are displaced down-wind more than the bottoms. For example, with a wind of force 4 an angle of 30° from the vertical has been observed.

It is clear that these rising currents are composed of relatively warm air from near the warm sea. Sail-plane pilots use warm updrafts to maintain soaring flights exactly as the gulls do, and refer to the updrafts as "thermals". Some thermals make their presence obvious through being capped by cumulus clouds. When cumulus clouds are forming, it has been noted that gulls will soar between altitudes of 150 ft. and 2,000 ft. or more. The tops of the rising columns appear to be at cloud level, for occasionally birds have been seen to pass through or behind wisps of cloud.

The linear updrafts are of an entirely different character from thermals, although the sea must be much warmer than the air if they are to exist. Birds soaring linearly in the same updraft are distributed in a vertical sheet, parallel to the wind, with a transverse thickness not much greater than a few times the wingspread of gulls. Soaring in these sheets takes place up to altitudes of many hundred feet.

The linear up-currents either disappear or become useless to the gulls for wind forces above Beaufort force 6. Probably the up-currents actually disappear, since the sea-air temperature difference must be greater with forces 5 or 6 than with force 4 if soaring is to be possible.

The type of soaring is a direct reflection of the pattern of turbulence in the air. It seems to be significant that linear soaring begins when "white caps" become very frequent. In theory, the wind speed at which "white caps" begin is the speed at which pressure of the wind on the wave-face begins to mount rapidly. A new and vigorous small-scale turbulence in the air must set in, originating in the buffeting of the waves by the wind. In relation to increasing winds, chimney-like thermals are able to persist at first, but are accompanied by linear updrafts. Only the latter exist in slightly greater wind, but these too are apparently suppressed by strong turbulence with still higher winds.

Logically, downdrafts and updrafts must exist simultaneously, the one type feeding the other. When the up-currents are linear in form the pattern may be pictured as a series of cylindrical vortices lying side by side and rotating in opposite directions. Fig. 1a illustrates the supposed cross-section, and shows how the vortices are equivalent to downdrafts distributed between updrafts.

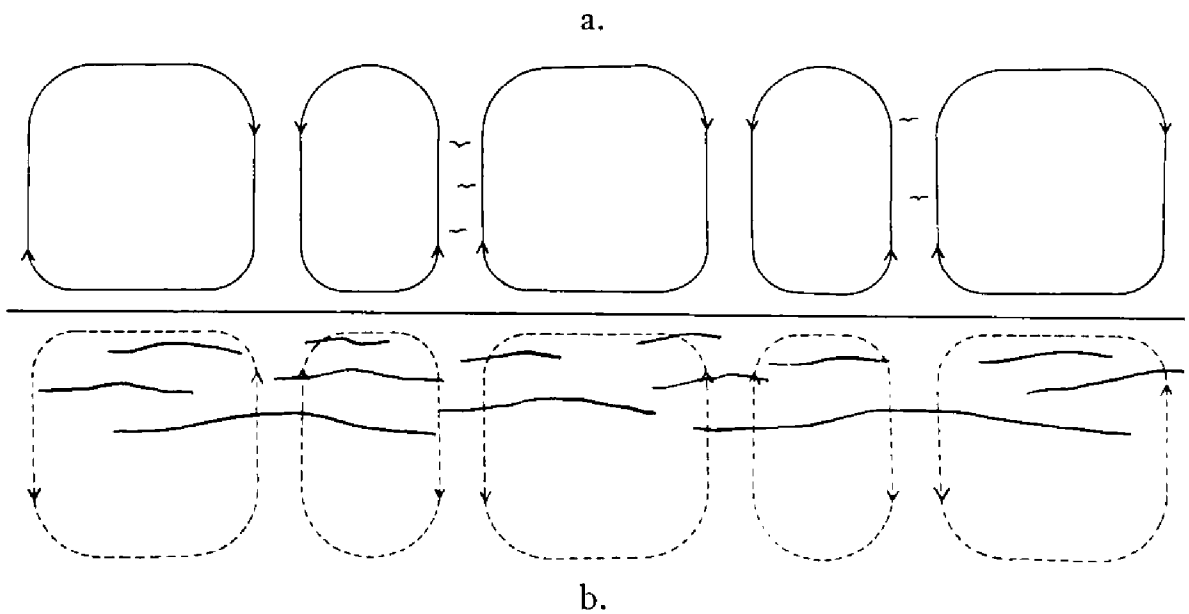


FIG. 1

Dr. Irving Langmuir, of the General Electric Company, has investigated wind lanes on the surface of water, the glassy streaks that extend on the surface parallel to the wind. By studying the motion of dead leaves, and artificial floats and markers, Langmuir discovered that there is a slow surface drift towards the wind lanes (see Fig. 2). Within the lanes the drift to leeward is more rapid than elsewhere, and there is a slow *downward* motion

in the water below the surface. Between the lanes there is a slow *upward* motion beneath the surface. Thus the circulation may be pictured in cross-section as consisting of cylindrical vortices rotating in opposite senses.

Woodcock has done experiments similar to those of Langmuir, but by numbering the floats he kept track of them individually. He dropped the floats at uniform intervals at rightangles to the wind, and found that they quickly aligned themselves into lanes parallel with the wind. However, 60 per cent of the floats on the average originated to the left of the lanes in which they were found. (The "left" refers to the left hand of an observer with his back to the wind.) The plan of the currents upon the face of the water, between the wind lanes, is schematically illustrated in Fig. 2. The cross-section of the currents, mentioned in this and the previous paragraph, may be seen in Fig. 1b. To account for more floats being drawn from the left side of the lanes, it is necessary to suppose that the vortices to the left of each wind lane, rotating clockwise, are of a larger diameter than those to the right of the wind lane, rotating counter-clockwise. This effect is theoretically attributable to the rotation of the earth. The experiments were done in the Northern Hemisphere, and the asymmetry would be in the opposite sense in the Southern Hemisphere.

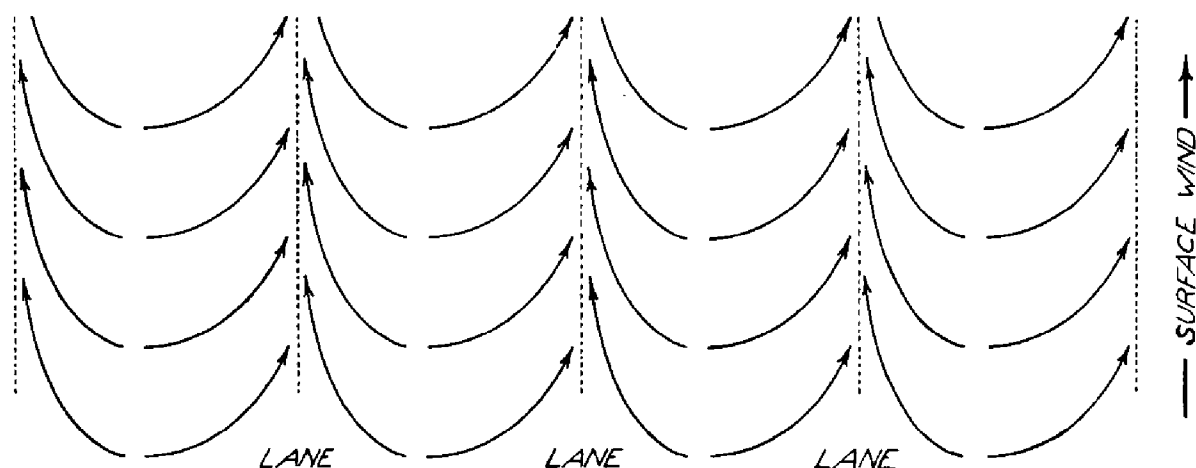


FIG. 2

Theory shows, and it is regularly verified, that air moving over the rotating earth is deflected to the left in the lowest layers by surface friction in the Northern Hemisphere. By analogy with the details of the motion in surface water, it seems pretty clear that the vortices in the linear updrafts must be alternately different in diameter, as illustrated in Fig. 1a.

At a favourable wind speed, the effect of friction between the air and the water is to set up similar linear vortices in both these fluids. But, to draw an inference from the soaring of gulls, it is only when the air is quite unstable thermally, thus favouring vertical motion, that the vortices exist in the air to any great extent.

The two types of updraft contributing to circular and linear soaring may also be observed on occasion by the formations of fog or low-level cloud. "Steam fog" is one name applied to condensed vapour rising from a body

of water when the water is very much warmer than the air. It is a frequent phenomenon on the Great Lakes of North America in the late autumn and early winter. On different occasions this fog varies from thin patches and traces to a dense blanket up to 50 ft. in thickness. Provided the wind is at least force 3, isolated pillars will rise from moderate or dense steam fog, reaching up several hundred feet or even up to the clouds. Obviously this air movement is identical to that in which circle soaring is possible.

Steam fog can and does exist with quite strong winds, but there has been no description of changes in its structure in strong winds. On occasion scud (fractocumulus) has been observed extending low over the sea in long streaks. It would be of interest to note whether the cloud belts are usually parallel to the wind ; if so, the scud could be considered a manifestation of cylindrical vortices like those revealed by the linear soaring of gulls. Does such scud exist only with Beaufort forces 5 and low 6, when the sea is at least 9° warmer than the air ? Since wind lanes on the water seem to be analogous to linear updrafts in the air, observations on their behaviour would contribute to our understanding of this type of air current. It is not known what is the upper limit of wind force under which wind lanes occur, or whether the limit is affected by the difference in temperature between the wet-bulb thermometer and the sea surface. Perhaps some readers of *The Marine Observer* may be able to make observations bearing on these questions.

At any rate it may give the observer some pleasure to interpret the soaring behaviour of birds in terms of the detailed structure of the air currents, and to link the type of soaring with the concurrent wind and temperature conditions. It is in the regions of the warm oceanic currents that soaring conditions are most favourable, and these are, in fact, the habitat of species of sea birds that specialise in soaring.

#### REFERENCES

- A. H. WOODCOCK, " Convection and Soaring over the Open Sea ", *J. of Marine Res.*, v. 3, pp. 248-253 (1940).  
A. H. WOODCOCK, " A Theory of Surface Water Motion Deduced from the Wind-Induced Motion of the Physalia ", *J. of Marine Res.*, v. 5, pp. 196-205 (1944).  
PHIL. E. CHURCH, " Steam Fog over Lake Michigan in Winter ", *Trans. Amer. Geophys. U.*, v. 26, pp. 353-357 (1945).

#### Note. PHOTOGRAPH OF MARCONI (page 123)

On the left is the Righi oscillator, transmitting 1 or 1.5 metres (now known as the Hertz dipole aerial), the earliest short-wave transmitter. The black box contains the coherer with tapper and relay, connected between the two horizontal copper strips which acted as the receiving aerial. On the top of the box is an ordinary morse sounder, which could be replaced by a bell or tape recorder as required.

## MARINE NAVIGATION

### Radar, Meteorology and Charts

BY LT.-CDR. P. G. SATOW, D.S.C., R.N.

(Lt.-Cdr. Satow is engaged upon meteorological and radar research as a serving Naval officer)

The significance of post-war radar as an aid to marine navigation is well known, and few mariners who have had the experience of using radar at sea in their own ships will now be prepared to dispense with their ship-borne equipment. Furthermore, anyone who had experience of war-time sets, designed in great haste to meet the most pressing needs of war—attack and defence—will appreciate the design and engineering genius which has gone into the production of modern commercial sets, which are one and all a tremendous credit to the radio industry of the United Kingdom.

But let us for a moment consider the lot of the user. His equipment can be seen by anyone interested in the trend of modern development and engineering skill at the periodical exhibitions at Radiolympia, or by arranging to visit a production centre where the finished article is being assembled and tested. Now turn to the ship herself, and you find the radar aerials sited in a place of honour, high in the superstructure, where it will provide the maximum coverage and warning of collision to the user.

Let us consider carefully the problems confronting the user and some of the steps which may have to be taken to ensure that the maximum safety factor accrues from the application of radar to marine navigation.

The equipment is probably designed to operate on a wavelength of approximately 3 cm. (a frequency of 10,000 mc/s). The aerial will be capable of continuous rotation and the transmitted beam will be narrow and sharply defined in horizontal width, but will have broader extent in the vertical to combat rolling. (In some sets designed for special requirements, stabilising equipment may be fitted to the aerial array so that the aerial sweeps the horizon irrespective of the ship's motion ; but this is not normally necessary for navigational radars.)

Information received from the returned echoes is passed down from the aerial to the plan position indicator, which presents to the observer, in effect, an aerial view of all that surrounds the vessel out to a selected range (or to a given radius) from her position. The P.P.I. may show a picture which is north-stabilised and consequently bears direct comparison with the chart, or without stabilisation from the gyro compass it will be relative to the ship's heading at any given moment. The essential difference between these two systems of using the displayed information is that in the first instance the echoes will remain in their true positions (on their true compass bearings from the ship's light-spot on the face of the P.P.I.) ; whereas in the second instance they will appear to rotate around the display in step with every change of heading or ship's course. In heavy weather, with a ship yawing from side to side of her course, or when in heavily frequented or restricted waters, when alterations of course may be frequent, this latter state of affairs is likely to be a considerable embarrassment. The relative display does, however, have the advantage that the picture bears direct interpretation with visual data obtained on the bridge of the ship, and many users prefer the relative display for this reason.



Two subsidiary subjects now find their place in the application of displayed radar information to the practice of marine navigation. As the first of these subjects has a measure of influence on the second, it will be considered firstly in this review.

### **Meteorology**

Variations in the apparent performance of marine radar when applied to the detection of shipping and land targets, have led to a study of propagation conditions in various parts of the world. The subject as a whole is not one solely of post-war interest, for nearly ten years ago newly-established coastal radars began to accumulate records of changing performance of their sets which could not be accounted for by any variations in power output or receiver sensitivity. Cases had also been reported of shipping targets being sighted in good visibility at ranges considerably *less* than those at which they should have been detected by radar.

Assuming constant power output and receiver sensitivity of the set, to which end "performance monitoring" is finding increasing favour, any further changes in apparent performance can be reduced to a study of non-standard propagation in the lowest layers of the atmosphere. Radar transmissions, and of course the returning echo, can be bent from their theoretical path in a "standard atmosphere" as a result of varying degrees of refraction in the lowest layers—on the marine side this will involve the air immediately above the sea.

The principal elements involved are temperature and humidity. Extremes of heat, cold and damp are not of primary concern, but it is found that sudden changes in these elements in the vertical plane have a far-reaching effect on the density and therefore on the refractive index and bending powers of the air stream. To the meteorologist this may be recognised as another feature of air-mass analysis, which in fact it is. During their transfer from one geographical region to another, air streams are modified in various ways by the surfaces over which they move.

Without imposing the technical problems of radio-meteorology on the reader, it should be sufficient to point out that they are extremely complex, and any quantitative examination of the real values of the various elements in any given air mass over a selected transmission path, presents practical obstacles which are in keeping with the difficulties of the present-day forecaster and, indeed, of all those who make meteorology a study.

The ordinary user of marine radar should not be expected to acquire sufficient knowledge of the subject, nor to have sufficient quantitative data at his disposal to enable him to embark on a programme of forecasting radio-meteorological conditions. But it is of paramount importance to the safety of life and property at sea that he should be capable of understanding the atmospheric changes which are affecting the performance of a primary navigational aid, in exactly the same way as he would understand the influence of mirage conditions on the taking and acceptance of astronomical sights.

The introduction of three terms will simplify the overall study of radio-meteorology in its application to marine navigation. These terms, together with an outline of the processes which accompany them, are given below.

### **Sub-refraction: loss of surface cover**

This condition is brought about by an upward bending of the coverage pattern of the radar set near the horizontal. It leaves gaps in coverage near the radio horizon with sets operating on centimetric waves, when theoretical data shows that the target and range are suitable for radar detection.

The trend of the two basic elements which produce sub-refraction may be summarised as (i) a rapid fall in temperature with height, (ii) a rise in humidity with height. The first of these may be classed as the governing factor.

The effect of sub-refraction on the detection of land is likely to be a considerable reduction in warning of its presence whilst approaching the land, and similarly the detection of shipping targets and navigational sea-marks may be cut down to ranges which are only some two-thirds of those to be expected in standard conditions. A further danger exists in regions of drifting ice where, at the best, only a small proportion of the ice mass shows above the water and is therefore available for reflection of radar transmissions.

The presence of this condition may well be noticed first by a loss of performance against shipping targets. There were cases during the recent war when, in good visibility, targets were sighted by lookout men before detection by radar, even with the radar aerials sighted higher than the observer's eye. It must be admitted that, especially in the early days, there were undoubtedly occasions when this state of affairs could be attributed to inefficient set operation ; but at that time neither was performance monitoring available nor did the personnel understand the effects of non-standard propagation.

It should be noted that, under these atmospheric conditions, no increase in transmitter power (should it be available) will serve to overcome the upward-bending refractive process which is taking place when vertical temperature and humidity gradients are favourable to sub-refraction.

### **Standard propagation**

Broadly speaking, standard propagation may be expected when neither sub-refraction nor super-refraction are present. It is the condition resulting from "standard" temperature and humidity lapse-rates in the immediate surface layers, and it will be appreciated that, in some parts of the world, this condition may not exist for whole seasons at a time.

Propagation conditions are dependent upon the origin and recent trajectory of the air stream at any given time, together with the relative value of the adjacent sea-surface temperature. In the Mediterranean, for instance, almost completely surrounded by land, conditions over the sea may well be non-standard for about 90 per cent of the year, and it is for this reason that the term "standard" is used when and where applicable in place of the term "normal", which might wrongly infer an *average* condition.

### **Super-refraction: extended surface coverage**

Super-refraction is caused by stratification of the surface air stream, and is generally associated with well-defined inversions of temperature near the surface. Radar transmissions tend to follow the curvature of the earth's surface, and as a result reach targets far beyond the theoretical standard radio horizon. This trapping effect produces increased field strength at long

ranges, and provided the targets are of suitable character and cross-section and present a suitable aspect, reflection of the transmissions will return detectable echoes to the ship.

The direct effect of this condition is an apparent increase in the performance of the ship-borne radar. It is surprising how many users are quite ignorant of the phenomenon and its often spectacular effects, but the explanation is comparatively simple and the associated meteorological conditions are normally simple to recognise.

Super-refraction is generally associated with a sea-surface temperature at least 5°F. below the air temperature near the surface, although it is recognised that the temperature of the air *precisely at sea level* must be equal to that of the sea. Anticyclonic conditions are frequently favourable to the development of radio ducts, which cause this trapping of the radio energy emitted by the radar aerials, and sufficient excess of air temperature over that of the sea will frequently be caused by radiation weather over the land, accentuating the contrast in coastal waters.

Over the open sea the contrasts between air and sea-surface temperatures are usually much smaller, and radio-meteorological conditions may be expected to be much more uniform over wide areas. Changes in propagation conditions in oceanic areas may generally be expected near frontal discontinuities when the basic character of the air stream is changed; also when the air mass passes over sharp contrasts in sea temperature, such as that between the Labrador current and the Gulf Stream.

Apart from the extended coverage on shipping targets, super-refraction has an interesting effect in the realm of practical navigation. Instead of radar detection of land occurring at ranges which increase in proportion to the elevation of the land, the detection range is often quite unpredictable and small low-lying targets may be picked up at tremendous ranges. As an example, the writer has seen strong and steady echoes on his radar display coming from the Houtman Islands off the west coast of Australia at ranges up to 75 miles; but these islands are only 16 ft. high and detection would not be expected under standard propagation conditions at more than about eight nautical miles from the ship.

Another feature of super-refraction is that the land is usually detected low down near sea-level, due to the trapping effect on the transmissions, and cases have been observed where great lengths of a coastline were showing on the P.P.I. display without echoes being obtained from the topographical features inland, which by virtue of their height would show up at the longer ranges under standard atmospheric conditions.

### Charts

British post-war radar has now completed several millions of ship-radar miles on the high seas, and interest is now turning to the general application of this valuable aid to marine navigation. It has been found from practical experience that quite a number of prominent radar targets are not shown on the marine charts in general use, whilst conversely there are some charted features which cannot be identified on the radar display.

Considerable research has been taking place over the last three years, sponsored by the Hydrographer of the Navy, and encouraged within the Merchant Navy by the Operational Research Group of the Marine Safety Division at the Ministry of Transport, to determine the extent to which marine

navigation is being materially affected by these differences. Suggestions have been made from time to time that special radar charts should be prepared and issued to supplement those already in use. Trials have already shown that such a scheme is quite unnecessary and is also impracticable. Apart from the financial aspect of such an undertaking, and the expert staff required by its implementation, the duplication of correction work would make it unacceptable to the marine organisations concerned.

During recent years several differing types of chart have been published for marine use, notably the folios of overprinted lattice charts constructed for use with radio aids, such as Loran and Consol. It may be thought that these are being overlooked in this present review. There is, however, an important difference between those charts and the ones normally employed in visual navigation, in that they are not maintained corrected to date by Notices to Mariners. When using "radio-aids lattice charts", it is necessary to transfer the ship's position to a fully-corrected chart before the position can be accepted navigationally by the commanding officer.

In the latter part of 1946 the writer was engaged in an interesting series of sea trials, mostly in the English Channel, to secure positive data on the structure of the radar picture from various points offshore, and photographs of P.P.I. displays were obtained from a number of specially selected geographical positions to give as great a variety as possible of range and aspect. These sea trials revealed a number of interesting points, which are summarised below :

- (i) A distinction must be drawn between pilotage and off-shore navigation. Although there is no sudden change-over, the former involves position-fixing off largely pinpoint targets, whilst the latter generally necessitates some form of compromise between displayed echoes and available charted data.
- (ii) Features which may have been charted for the original purpose of visual navigation may not be those best suited to radar methods of fixing the ship.
- (iii) Identification of targets in congested waters presents considerable difficulties without the use of additional aids. These may take the form of buoy patterns, radar beacons or optical radar/chart "matching devices".
- (iv) The employment of optical "matching techniques" between the P.P.I. and the chart shows considerable promise if (a) the optics of the "matching units" can be perfected, (b) the working lighting of the chart surface is sufficient for the fine detail to be easily distinguished, and (c) if the whole undertaking can be made into a commercial proposition and at reasonably low cost to the user.

Largely in connection with these problems, further experimental work was carried out by the Hydrographer of the Navy on improving the contrast between land and sea areas, greater emphasis being made to the coastline and the tinting of shoal water. A number of new buoy symbols were tried out in an endeavour to give navigational buoys greater emphasis amongst the labyrinth of soundings.

More recently, however—on 20th May, 1949, to be precise—the Hydrographic Department published a new chart covering the western half of the English Channel and including the area out to 40 miles to the west and south of the Scilly Islands, where so many ships make their landfalls from the Atlantic and Bay of Biscay. Unlike the outfits of latticed charts to which reference has already been made, this new British Admiralty Chart, No. 2649, has been incorporated in a working folio (England, south coast), and duly receives its fair share of navigational corrections.

This facilitates the work of fixing and maintaining the ship's positions and track all on the one chart, which in itself has a number of interesting new features.

- (i) Blue overprint in shoal areas, the limit on Chart 2649 being at the 10-fathom line.
- (ii) Improved indication of tidal stream reference points by the addition of a purple diamond overprint at the charted position.
- (iii) Improved clarity of the coastline.
- (iv) Replacement of "hachuring", etc., by positive contouring (where available) and additional spot-heights.
- (v) Emphasis has been made to those portions of the contouring which it is thought are likely to give more prominent radar echoes and to show distinctively to ships well off-shore.
- (vi) Block-shading has been used for built-up areas with omission of minor terrestrial detail unlikely to be of any assistance in fixing the ship's position.

The first two of these have already appeared on a number of recently published new editions; the remaining features are under trial.

Since receiving his own ship's copy of Chart 2649 in June, 1949, the writer has been fortunate in steaming several thousand miles throughout the waters of the English Channel, and it has been possible to examine fully the items of special interest in this experimental chart.

At a considerable number of selected points off the English and French coasts, out of range of the coastline, under standard propagation conditions, the radar echoes were recorded and plotted on the chart. For trials purposes visual information was incorporated in the initial determination of the ship's position to ensure that no false evaluation of the radar display could lead to wrong conclusions in the final criticism of the chart and its features. In practice, of course, the visual information is frequently not available when the mariner falls back on ship-borne radar for the determination of his position.

To illustrate the method by which the radar observations are co-ordinated with charted data, and to show the contrast between standard radar propagation conditions and the influence of intense super-refraction, two examples are being given here.

On page 164 is shown a portion of the new experimental Admiralty Chart, No. 2649, showing the south-western extremity of England (Cornwall), together with an area of the western approaches to the English Channel, in which many landfalls from the Atlantic and Bay of Biscay are made.



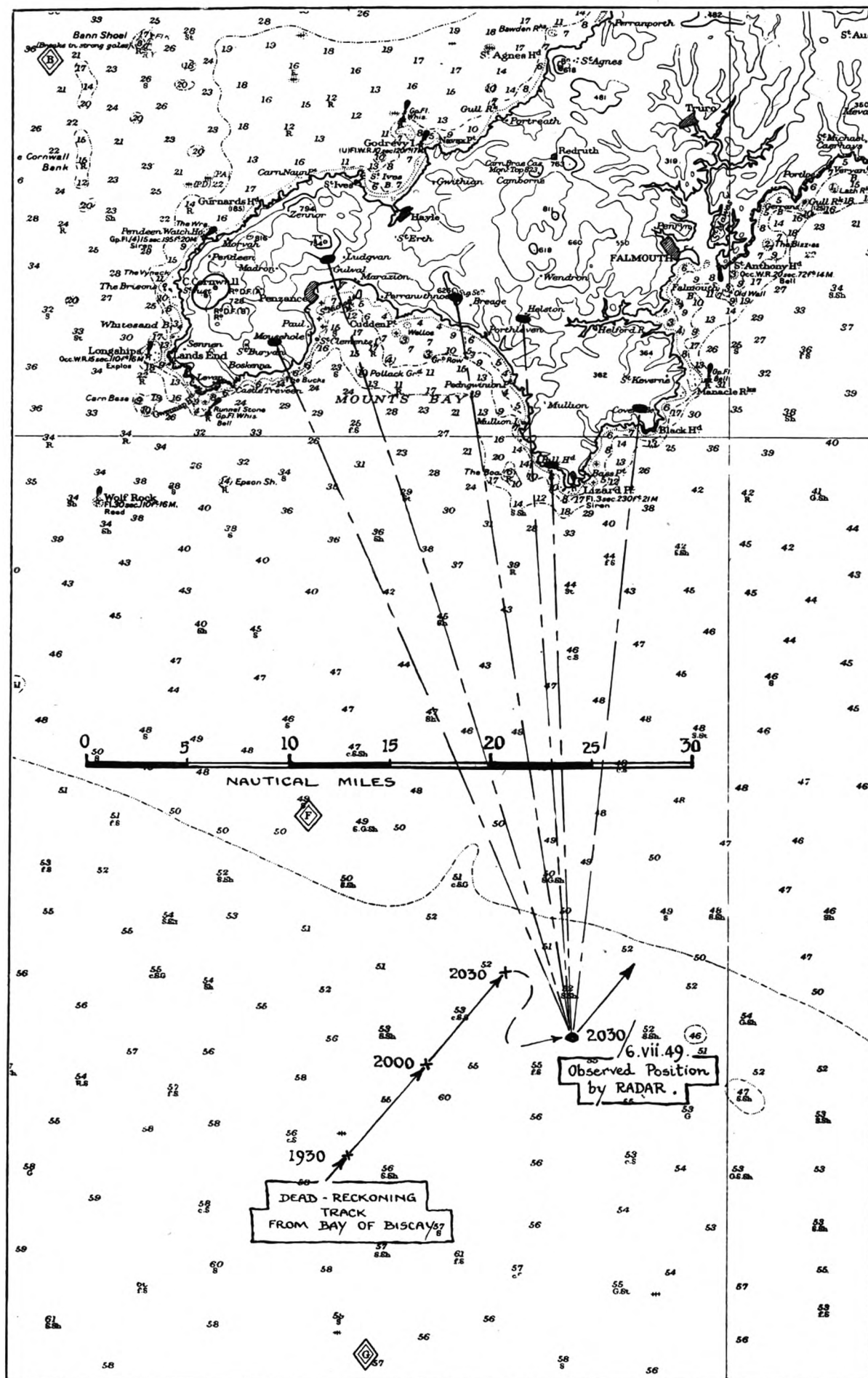


FIG. I

The dead-reckoning track of the ship, based on a previous astronomical position obtained at dawn on 6th July, 1949, is shown as the Lizard Head was approached on a north-easterly course. About 2000 hours on this day the first radar echoes were obtained from some portion of the land area to the northward; but these did not become sufficiently firm for positive identification until 2030, at which time the ship's position was fixed from the six land echoes shown plotted in their respective positions on the chart.

The true position obtained by radar was 27·8 miles 180° from the Lizard Head, and the relevant meteorological situation has been analysed as follows :

Pressure was high to the south-west of Ireland and the surface air stream had a trajectory from the Atlantic (north-west of Scotland) across the Hebrides, south-west Scotland, Wales and Devon to the English Channel, with anti-cyclonic curvature. There was a fall in air temperature with height of some 9°F. in the first 1,000 ft. ; but there was also a sharp fall in dew-point temperature in this surface layer. Propagation may be classified as standard, with the landfall picture undistorted by non-standard refractive conditions.

Meteorological conditions at 1800 hours, 6th July, near the ship's position approaching south-west England from the Bay of Biscay :

Surface wind from 015° (T), 12 knots.

Temperatures : Sea surface, 63½°F.

Air at	Dry bulb	Dew point
50 ft.	63°	56°F
200 ft.	60°	46°F
1,000 ft.	54°	42°F
3,000 ft.	45°	34°F

The second chartlet (page 166) shows the central and eastern portions of the English Channel and illustrates the particularly interesting radar conditions existing at 1500 hours on 12th July, 1949.

The observer's ship was in the central part of the Channel in a position 50 miles south-east of Portland Bill, 74 miles south-west of Beachy Head, 90 miles to the westward of Dieppe and 31 miles north-east of Cap de la Hague (on the Cherbourg Peninsula).

From this position the radar display showed approximately 90 miles of the English coastline (between Portland Bill and Beachy Head) and 115 miles of the French coastline (between Dointe d'Ailly, near Dieppe and Cap de la Hague). There was an almost complete absence of inland topographical echoes.

The meteorological situation was as follows. Shallow low-pressure systems were lying over the Bay of Biscay and south-west France, with an anticyclone situated to the north-west of the British Isles. Air reaching the observer's ship on this fine summer's afternoon came from North Central Europe across the Low Countries and was crossing the French coast in the Boulogne-Dieppe region at a temperature of about 87°F. The air stream was extremely dry over land, and with a sea-surface temperature of only 65° a sharp surface inversion developed with the resulting intense super-refraction of radar waves.

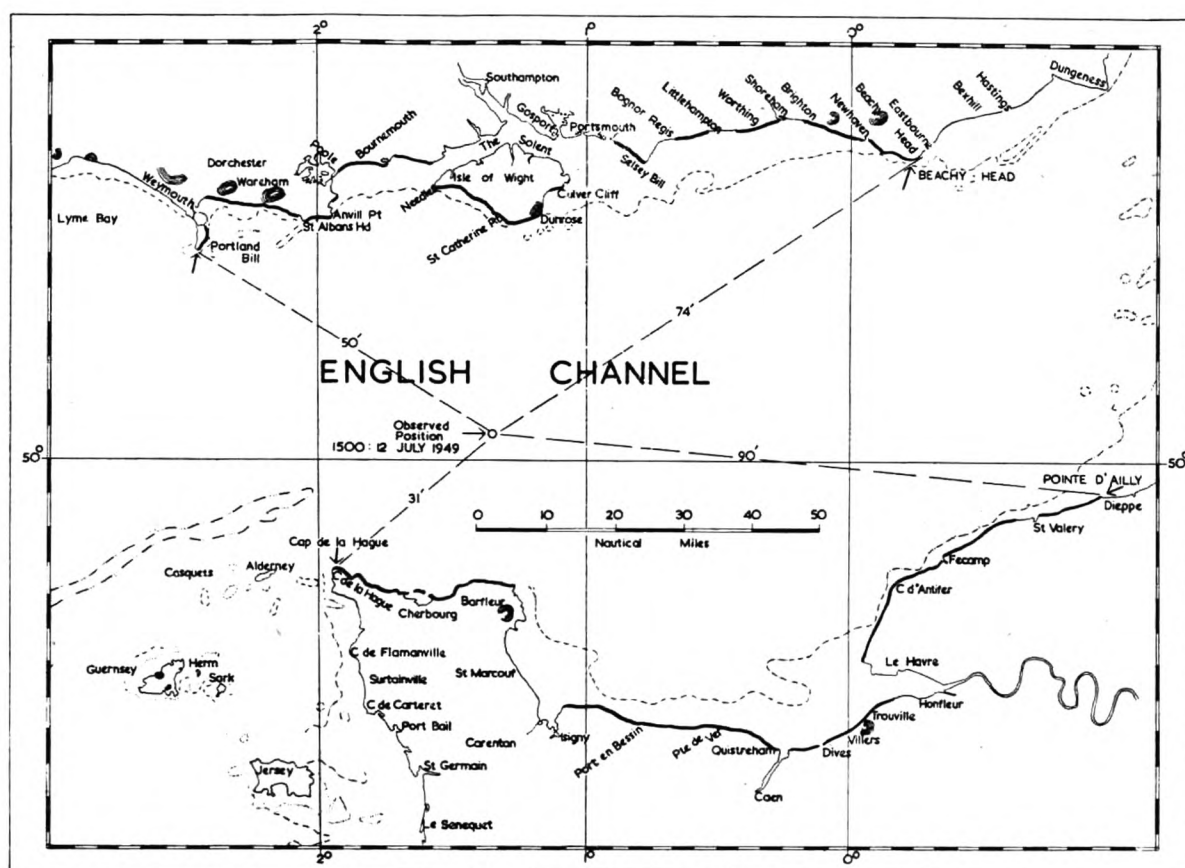


Fig. 2

Conditions at the ship's position at 1500 on 12th July :

Surface wind from  $095^{\circ}$  (T), 13 knots.

Temperatures : sea surface  $65^{\circ}\text{F}$ .

Air at	Dry bulb	Dew point
50 ft.	$70^{\circ}$	$56^{\circ}\text{F}$
200 ft.	$74^{\circ}$	$55^{\circ}\text{F}$
1,000 ft.	$82^{\circ}$	$54^{\circ}\text{F}$
3,000 ft.	$70^{\circ}$	$44^{\circ}\text{F}$

A study of the International Section of the Daily Weather Report reveals that on this day maximum afternoon temperatures of  $93^{\circ}\text{F}$ . at Paris and of  $100^{\circ}\text{F}$ . at Bordeaux were recorded, and had the surface wind had a more southerly component the temperature inversion might well have reached  $30^{\circ}\text{F}$ .

### Conclusions

The author's personal experience of the experimental Chart 2649 must naturally have a very limited value ; but the Institute of Navigation is conducting an investigation on a much larger scale, and the results will be published in due course in the journal of that particular scientific body.

The influence of varying atmospheric refraction on radar detection and the interpretation of echoes is already fairly widely known, and the need for careful study of this subject in any form of radar survey or trials should now be obvious.

The three main headings of radar, meteorology and charts are almost inextricably bound up together throughout the daily work of the navigator at sea, and considerable work remains to be completed before it can be determined to what extent any long-term modification of existing charts may be either desirable or practicable.

It should be appreciated, however, that although recent trials have been concentrated in an area adjacent to the British coastline, Great Britain is one of the few areas in the world in which a complete triangulated survey has been carried out, and the mariner will not find such detail or accuracy available in other countries. The requirements for marine charts are world wide, and the results of any local trials must be carefully interpreted and applied in the light of conditions elsewhere.

#### LIGHTHOUSES OF THE BRITISH ISLES



*Crown copyright reserved*

#### SUMBURGH HEAD

Sumburgh Head, the most southerly point in the Shetland Islands, forms the southernmost tip of a narrow peninsula connected to the Shetland mainland by a low sandy isthmus separating the West Voe of Sumburgh and Grutness Voe. The lighthouse, viewed here from the south-west, is situated on Sumburgh Head at a height above sea-level of 300 ft.



## THE ROYAL RESEARCH SHIPS *Discovery II* AND *William Scoresby*

In the Fleet List of Voluntary Observing Ships in the present number of *The Marine Observer*, the names of two vessels that were often in the list before the war once more appear. They are the Royal Research Ships *Discovery II* and the *William Scoresby*, both now operating for the newly-formed National Institute of Oceanography, which has taken over the duties of the "Discovery" Committee. The Institute as a whole covers a wider field, but for the next two years both ships will be engaged in the continuation of the "Discovery" Committee's programme.

During the past twenty-five years the "Discovery" Committee has worked under the Colonial Office and organised a series of expeditions for scientific research, mainly in the Southern Ocean and Antarctic seas, but sometimes in sub-tropical and tropical waters. The work has been concerned principally with deep-sea oceanography and especially with research on whales. The name "Discovery" was adopted because the work at sea began with Captain Scott's old ship the *Discovery*, but most of the investigations have been carried out in the two vessels mentioned above. The two ships have independent programmes, but their work is principally in continuation of the *Discovery* investigations.

The *William Scoresby* sailed from London on the 11th January, 1950, on her present voyage, and the *Discovery II* sailed from London on the 20th April, 1950. As can be seen from the accompanying photographs, both are small ships.



*National Institute of Oceanography*

R.R.S. *William Scoresby* leaving Grytviken Harbour (South Georgia).

The *William Scoresby* (Lt.-Cdr. A. F. Macfie, O.B.E., R.D., R.N.R.) has some of the features of a trawler and some of a whale catcher. She was built in 1926, and is named after William Scoresby the younger, who was a famous captain in the Greenland whaling in the early part of the last century, when he explored a good deal of the east coast of Greenland.



The ship is first to make a survey of the Benguela current off the coast of South-West Africa. She will call at Cape Town, East London and Mauritius, and will do various oceanographical work in both shallow and deep waters. This will be continued on the voyage across the Indian Ocean from Mauritius to Fremantle. She will also mark whales off the north-west coast of Australia in the southern winter (July and August) and is expected to return to England in October, 1950.

The *Discovery II* (Cdr. J. F. Blackburn, D.S.O., R.N.) is an oil-burning steamship of 1,036 tons gross, specially designed as a research ship and with some protection against ice. She was built in 1929, and before sailing on her present voyage she underwent an extensive refit. Her complement is fifty-six all told, including four scientific officers and three assistants. The senior scientist is Dr. H. F. P. Herdman.



*Discovery II* in light pack

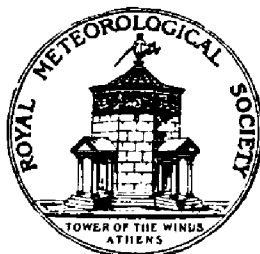
National Institute of Oceanography

The voyage is to be through the Mediterranean and Red Sea to Colombo, after which the main part of her work will be done on an oceanographic survey southward along the meridian of  $90^{\circ}\text{E}$ . She will call at Fremantle in July and then complete the line of stations southwards to the pack-ice. Work will be continued in Australian, New Zealand and Antarctic waters. With the work done before the war, these observations will provide a network covering the whole Southern Ocean.

As mentioned at the beginning of these notes, both vessels are carrying out the meteorological duties of Selected Ships; the *Discovery II* has been equipped, in addition to the usual instruments, with small balloons and hydrogen gas for filling them, for use in measuring the height of the cloud base, as a special check on visual estimates made by the ship's officers.

C. H. W.

## CENTENARY OF THE ROYAL METEOROLOGICAL SOCIETY



In April, 1850, at Hartwell House, Aylesbury, Bucks., the British Meteorological Society was formed, as a result of a meeting of some Fellows of the Royal Society and Royal Astronomical Society. The aims of the Society were :

- (1) To consider how meteorological observations could best be recorded, summarised and published, in order that they might be available for study and research.
- (2) To discuss scientific papers on meteorology, contributed for the most part by its members.

Meetings of the Society have been held without a break since 1850 up to the present time. In 1866 the Society was granted a Royal Charter of Incorporation by Queen Victoria, and in 1883 was renamed the Royal Meteorological Society. His Majesty King George VI is Patron of the Society.

An earlier society, called the Meteorological Society of London, was formed in 1823, but this was wound up about 1849.

It is, perhaps, of interest that the Royal Meteorological Society is older than the Meteorological Office, which was not formed until 1854. There is no doubt that the Society has, during the first 100 years of its existence, done much to further our knowledge about the science of the atmosphere. Fellowship is not confined to the purely professional or scientific meteorologist, but has included many enthusiastic amateur meteorologists—among them being numbered sailors, farmers, airmen and men of all walks of life. One very active member at present is a London taxi-driver. Members of the Society have all one common interest—the atmosphere and its vagaries—and the Society provides an admirable forum wherein all meteorologists, be they in the Meteorological Office or outside of it, can freely air their views upon this fascinating and world-wide subject.

Among the famous Presidents of the Society one might mention James Glaisher, F.R.S. (1867–68), an inventor of several meteorological instruments, G. J. Symons, F.R.S. (1880), founder of the British Rainfall Organisation, W. H. Dines, F.R.S. (1901), a pioneer in upper-air investigation, Sir Napier Shaw, F.R.S. (1918), a Director of the Meteorological Office and author of many meteorological textbooks, Sir George Clarke Simpson, F.R.S. (1940), a Director of the Meteorological Office, and Sir David Brunt, Sec.R.S. (1942), British Professor of Meteorology in London University.



*Crown copyright reserved*

One of the Marine Branch tableaux at the "Science of the Weather" exhibition at the Science Museum (see page 172). This depicts, in a pictorial fashion, various events in the passage of a deep depression across the British Isles. The oil paintings were painted specially for the exhibition by Mr. C. A. Jupp, of the Marine Branch.

This year's President is Sir Robert Watson-Watt, C.B., F.R.S., whose pioneer work in the field of radar is so well known that he needs no introduction. He is also President of the Institute of Navigation.

The growing interest in meteorology in Britain is shown by the number of Fellows, which has risen from 150 in 1850 to 793 in 1939, and to 1,650 in the present year.

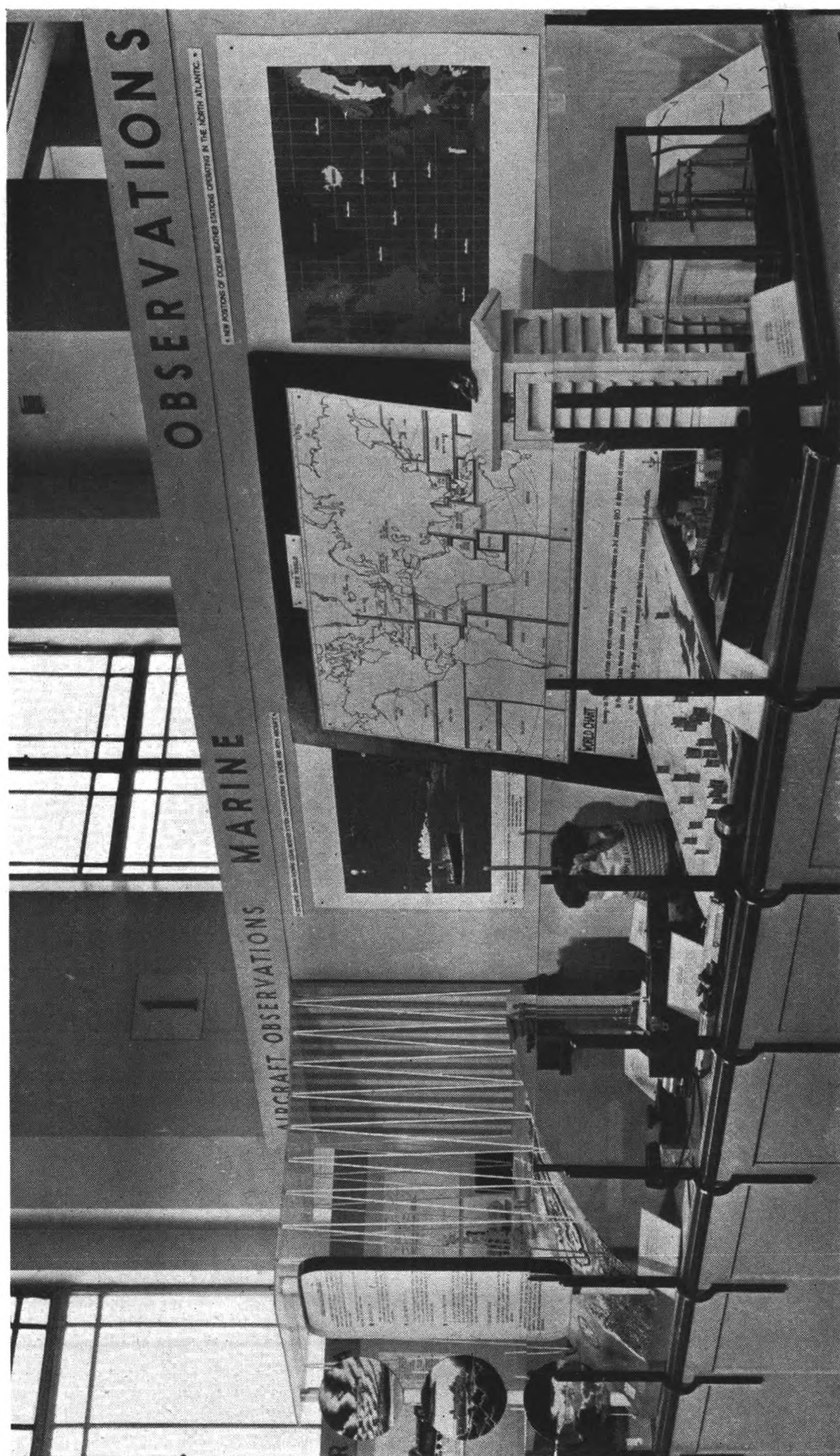
The activities of the Society have included the administration of the British Rainfall Organisation (a voluntary association of some 5,000 rainfall observers in the British Isles) until 1919, when it was transferred to the Meteorological Office; investigations into wind force, thunderstorms and the upper atmosphere; and the publication of a quarterly journal as well as the monthly magazine *Weather*. Another activity, only recently discontinued, was the annual production of a phenological report, which recorded the first appearance of flowers, birds, etc.

The centenary celebrations of the Society, which were attended by a number of distinguished meteorologists from abroad, were opened at the Science Museum on 27th March, and terminated with a dinner on 3rd April. The occasion at the Science Museum was the official opening ceremony of an exhibition "The Science of Weather", which Fellows and their guests attended, the guests of honour being the Lord President of the Council and the Minister of Education. The exhibition was in five sections: "A Century of Meteorology"; "Observing the Weather"; "Forecasting the Weather"; "Weather in our Daily Lives"; and "Meteorological Research". The Marine Branch of the Meteorological Office styled two exhibits, one depicting the observing and reporting of weather at sea, both by Selected Ships and Ocean Weather Ships, and the other the value of the gale-warning service to shipping.

From 28th until 31st March the Society and their guests enjoyed the academic atmosphere and architectural charm of Oxford, where they held a series of discussions each day at the Clarendon Laboratory. The subjects included: "Radiation and its Effect on the Troposphere and Lower Stratosphere"; "Physics of Clouds and Precipitation"; "The Structure of Weather Systems"; "The General Circulation"; "Climatic Change"; and "Meteorology and the Community". Such is the enthusiasm of the meteorologist for his subject that some of the discussions went on till far into the night. Maritime meteorology only figured in a general sense in these papers until the last day, when the various aspects of the value of meteorology to the shipping industry were discussed. During their stay in Oxford the delegates were accommodated at Christ Church, where they took their meals in the lovely old hall under the surveillance of (oil paintings of) King Henry VIII and Cardinal Wolsey. The Society and their guests returned to London on Saturday, 1st April, where, at the invitation of the Director of the Meteorological Office, they inspected the work of that Office at Harrow and were entertained to tea there.

The exhibits at Harrow included the work of the Instruments and Instrument Development Branches, Marine Meteorology, British and World Climatology, Agricultural Meteorology and the Library. A forecasting unit was shown in operation and a radio-sonde ascent was made from the roof of the Office.





*Crown copyright reserved*

A part of the "Science of the Weather" exhibition at the Science Museum. This illustrates the collection of weather observations from ships. In front are some of the instruments used in making the observations, a chart showing the positions of all ships in the eastern North Atlantic which sent in reports on the day the photograph was taken, and a model of an Ocean Weather Ship.

In the Marine Branch the history of maritime meteorology was exemplified by ships' logbooks, weather maps and atlases of climatology and ocean currents, dating from about 1850 up to the present day. Visitors were reminded of the maritime origin of the Meteorological Office when it started life under Admiral Fitzroy as a department of the Board of Trade in 1854. The work of the Selected Ships and Ocean Weather Ships was illustrated with maps and instruments. Members of the staff were on duty, extracting data from ships' logbooks, punching them on Hollerith cards and sorting the cards, as necessary for statistical purposes, in Hollerith machines.

On Monday, 3rd April, the Society and their guests, at the invitation of Sir David Brunt, inspected the Department of Meteorology at the Imperial College of Science and Technology, where much theoretical and practical research work is in progress. Lectures were given by members of the staff upon atmospheric turbulence, a subject into which investigations are now being made at the College, and some practical experiments into fluctuations in wind force, temperature and humidity in the lower layers of the atmosphere which had been undertaken at Lough Neagh, and the ingenious instruments which were used for the purpose were discussed. Some of these fluctuations mentioned above, having a period of only a few seconds, shown to occur over a sea surface, are quite remarkable, and experiments suggest that the existence of waves affects their magnitude quite considerably.

The Fellows and their guests were entertained to luncheon by Mr. A. H. Whiteley, a manufacturer of British radio-sondes, and during the afternoon the official Centenary Meeting was held in the Society's rooms at Cromwell Road, Kensington. Sir Robert Watson-Watt presided and congratulatory messages were read, including one from H.M. the King and many from foreign countries. A very thoughtful address was given by Professor Vening-Meinesz, Director of the Royal Netherlands Meteorological Institute, in which he stressed the important part that meteorology plays in atomic research, and the moral and social problems which confront the scientist who is engaged upon such work. Professor Vening-Meinesz, like most of his countrymen, has more than a sprinkling of salt water in his veins, for he has spent considerable time in submarines engaged upon gravity measurements in various parts of the world.

In the evening the Society's Centenary Dinner was held at the Connaught Rooms, at which the guest of honour was the Secretary of State for Air. Many foreign meteorologists of international fame were present as honoured guests of the Society. The Merchant Navy was suitably represented by Sir Frederick Bowhill, Master of the Honourable Company of Master Mariners, and among the other distinguished persons present were Lord Digby, Vice-President of the Royal Agricultural Society; the Astronomer Royal; the President of the Royal Society; the Editor of *The Times*; the Director of the Meteorological Office; and the Director of the Naval Weather Service.

C. E. N. F.



## A MEETING OF THE ROYAL SOCIETY

On 30th March, at the Royal Society's charming apartments at Burlington House, where above the President's chair the rather quizzical face of Charles II gazes from its canvas, two papers of considerable interest to seamen, to oceanographers and to meteorologists were read.

The first, by Mr. R. H. Corkan of the Liverpool Tidal Institute, discussed some investigations into the levels of the North Sea associated with a storm disturbance on 8th January, 1949. An article by Mr. Corkan upon a similar subject appeared in *The Marine Observer* in January, 1949.

Tidal observations around the North Sea were used to deduce the disturbance of the sea level around the coast before, during and after the storm, and from these deductions maps of co-disturbance lines over the whole of the North Sea were drawn at appropriate intervals and compared with the existing meteorological conditions. The advance of the resulting coastal disturbance, in a counter-clockwise direction around the North Sea, was examined and found to resemble that of the diurnal tide. The resulting amplitude of the tidal waves was at some stages of the storm quite considerable, but it was shown to depend very much upon the exact "situation", as depicted in the weather map, thus demonstrating the need for co-operation between meteorologists and tidal workers when considering exact heights of the tides in areas like the North Sea. Those who are familiar with the intricacies of the North Sea tides and tidal streams will appreciate the potential importance to the mariner of investigations of this nature. Memories of North Sea convoys, and perhaps particularly of the Sherringham Shoal area, will undoubtedly arise before many of our readers' eyes.

The second paper, by Mr. M. S. Longuet-Higgins, a young research worker from the Admiralty Research Laboratory at Teddington, discussed a new theory of the origin of microseisms, those minute seismic disturbances in the bed of the ocean and elsewhere which are recorded by seismographs all over the world. The author showed mathematically that under suitable conditions of wave formation, disturbances due to those waves would be communicated to the sea bed in the form of microseisms, even when the depth of water considerably exceeded the wave-lengths in question. For this to occur, the frequency spectrum of the waves at the surface need to contain components of equal wave-length travelling in opposite directions. The author showed that the theoretical disturbance of the sea bed due to a tropical storm, is comparable with actual observations of microseism amplitudes. Owing to the fact that water is compressible (under enormous pressure such as occurs in the ocean bed), the amplitude of the microseisms would depend considerably upon the depth of the ocean.

This question of microseisms is of considerable interest to meteorologists, as well as to oceanographers, for it seems possible that by studying these, as they are received on the seismograph, it is possible to locate and track areas of tropical storms when other means of observations are unobtainable, and some similar application might conceivably be made in the case of temperate latitude storms.

C. E. N. F.

## OCEAN WEATHER STATION " JIG "

### A JOINT ANGLO-NETHERLANDS VENTURE

On 15th April, 1950, a new chapter in the history of international relations was opened when the Netherlands Ocean Weather Ship *Cumulus* took over duty from the British *Weather Recorder* at Station " Jig " in the North Atlantic (lat.  $52^{\circ} 30' \text{N.}$ , long.  $20^{\circ} 00' \text{W.}$ ).<sup>\*</sup> The *Cumulus* will perform five periods of twenty-one days' duty at Station " Jig " during the year, and also in 1951 and 1952, thus doing alternate duties with her British colleagues *Weather Observer*, *Weather Recorder*, *Weather Watcher* and *Weather Explorer* during the periods in question. This is in accordance with the International Ocean Station Agreement signed in London in 1949, under the auspices of the International Civil Aviation Organisation, under the terms of which the number of stations in the North Atlantic was reduced from thirteen to ten, and some adjustment of the responsibility for operating the various stations was made.

During the period that *Cumulus* is at Station " Jig " each year the four British weather ships will be enabled to have a well-deserved " lay-up " period of about two months in turn, during which survey and overhaul work will be done and extended leave given to their ships' companies. Up to the present the British ships have been running on a regular schedule of twenty-seven days at sea and fifteen days in port, which is a bit strenuous both for the ship's companies and for the ships themselves, when one considers the sort of weather which is experienced at Stations " Item " and " Jig ".

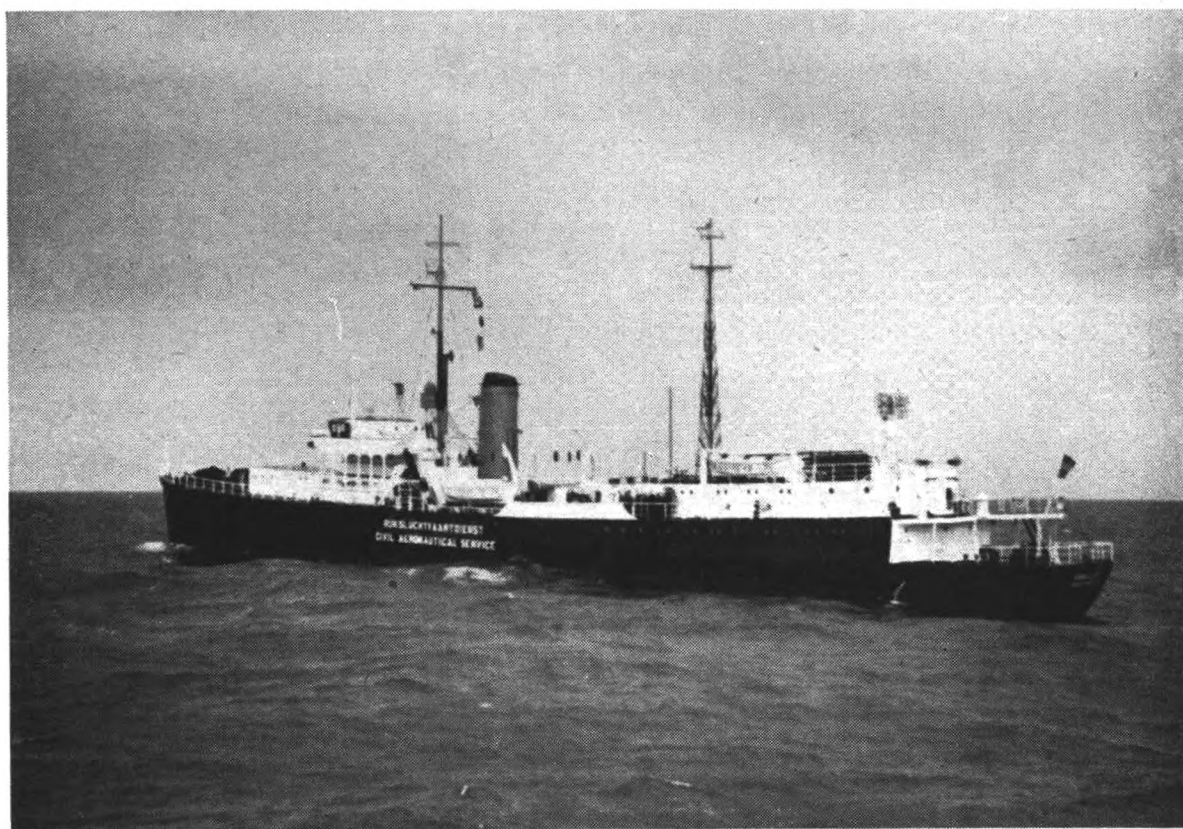
While on duty at " Jig " the *Cumulus* will carry out the same general procedure as her British colleagues and will use the same radio communication channels with Dunstable and Prestwick, although she will at the same time be in direct communication with Holland. Her routine meteorological programme will be the same, and arrangements have been made for her to do the same oceanographical observations as are made by the British ships. R.A.F. aircraft of Coastal Command will carry out Methop exercises with *Cumulus* as they do with the British ships, and arrangements have been made for them to drop mails, newspapers, etc., to the ship.

The writer had the pleasure of visiting *Cumulus* and meeting her master and officers, by whom he was most kindly and hospitably received, when she called in at Plymouth to collect some oceanographical apparatus *en route* for Station " Jig " on 12th April.

The *Cumulus* was originally a frigate of the U.S. Navy, and she has been extensively reconstructed for her new function. She is considerably larger than the British vessels, having a length of 287 ft. compared with the 205 ft. of the British corvettes, and consequently has much more commodious accommodation, which is very tastefully furnished and has typical Dutch comfort. There are commodious dining rooms and recreation rooms. The ship has similar radio apparatus to that fitted aboard the British weather ships,

<sup>\*</sup>This is not the first time that an ocean weather station has been internationally manned, for vessels of the U.S.A. and Canada shared Station " B " for some considerable time, while Belgium and the Netherlands shared Station " K ". The United Kingdom has been sharing with Norway and Sweden the cost of operating Station " M " with Norwegian-manned vessels, but our share of this is now the responsibility of Belgium and Denmark. More recently vessels of the Netherlands and France have been jointly operating Station " K ". The arrival of *Cumulus* at Station " Jig " marks the first occasion that British vessels have shared the operation of a station with vessels of another nationality.

and in addition to her radar for meteorological purposes and for navigational "tracking" of aircraft, is fitted with a 5 cm. Decca radar for navigational purposes, and has a special apparatus on the bridge for receiving Consol bearings. She is fitted with Sperry gyro-compass and echo-sounding apparatus. Her meteorological office is situated beneath the balloon shelter, as in the British ships, but is above the main deck and is very commodious and extremely light and airy. British radio-sondes are used. The fifty large hydrogen cylinders for filling the radio-sonde balloons are stowed in permanent racks above the balloon shelter. The ship has twin propellers, the motive power being triple-expansion, four-cylinder reciprocating engines. The water-tube boilers in two separate boiler rooms are oil-fired. The *Cumulus* has a black hull, white upperworks and an orange-coloured funnel. She carries a crew of about sixty persons, including the meteorologists and radio and radar technicians.



O.W.S. *Cumulus* at Station "Jig"

*Crown copyright reserved*

Apart from a relatively brief interlude of rather chivalrous warfare in the times of Cromwell and Charles II, when the names of Van Tromp and Blake, of broom and whip fame, stand out in the minds of most British school children, the maritime history of the Netherlands and Britain has been one of friendly commercial rivalry. The marine interests of the two countries were brought very close together during the last war, and we in Britain had first-hand opportunity of confirming the fact that the Dutchman is, as we have always thought him to be, a sailorman and a good shipmate. The presence of *Cumulus* at Station "Jig" will undoubtedly forge yet another link in our Anglo-Netherlands friendship.

The report which follows, submitted by Captain A. W. Ford, Master of *Weather Recorder*, describes the exchange of courtesies which took place when *Cumulus* relieved his ship at Station "Jig" on 15th April, 1950.

C. E. N. F.

"The day before the *Cumulus* was due to relieve us on Station "J" I requested permission from the master to board her upon her arrival.

Fortunately the morning dawned with bright sunshine, but a choppy sea, and at 1000 hours I called my dinghy away and boarded the *Cumulus*.

Greetings were exchanged and I welcomed the Master of the *Cumulus*, Captain Groen, on behalf of the Director. Captain Groen made a suitable response.

I then inspected the ship from truck to keel, and could not help being impressed by the quiet air of efficiency that existed and the spotless state of the ship with its modern furnishings.

I thought it would be a good idea to bring the existing station-keeping chart up to date by adding Consol Lugo and the corrected Bush Mills, and give the *Cumulus* a copy. The Master of the *Cumulus* has agreed to give careful attention to these stations and give them an additional check.

After drinking the health of the Service, the Master of the *Cumulus* accompanied me back to the ship, where we had lunch and an inspection of the *Weather Recorder*.

Captain Groen seemed very much impressed with the system we have on board here of the handling of aircraft from the bridge with the use of the aircraft control table.



*Copyright reserved*

*Weather Recorder* at "Jig" in heavy weather (8th April, 1950, 1800 G.M.T.): a striking contrast to the placid conditions experienced at "Jig" the day *Cumulus* took over duty.

At Captain Groen's request the Meteorological Officer in charge, the Radio Overseer and the 2nd Officer went over to the *Cumulus* to discuss various details concerning their departments. This exchange of view and experiences was of the utmost value to all concerned.

Several photographs were taken.

This was really a very delightful day, somewhat reminiscent of the days of Captain Hornblower, from the smart ship's dinghy with its crew in correct battledress rowing with strong strokes alongside the *Cumulus*, to the polite exchange of signals before parting, our ensigns being dipped as we finally parted.

Altogether we spent seven hours in each other's company, and these hours were really well spent. O.W.S. *Cumulus* is not just another weather ship, but the *Cumulus*, a good friend of ours."

A. W. F.

---

### Beaufort Weather Notation, Letter g

The Beaufort notation for weather, which was introduced by Admiral Beaufort more than a century ago, is still of considerable use as a concise method of reporting weather. Although modifications have since been made in the code, such as the addition of certain letters, the use of capitals to denote intensity, etc., no changes were made in the meanings of the symbols. A recent amendment, which entirely changes the meaning of one of the symbols, is therefore of some interest.

The letter g up to now has been used to indicate gloom. It is difficult, however, to specify exactly what constitutes a gloomy sky, and what differentiates it from an ugly, threatening sky (symbol u), and it was found in practice that g was rarely used. It has now been decided to use this symbol, together with its capital form G, with the following meanings :

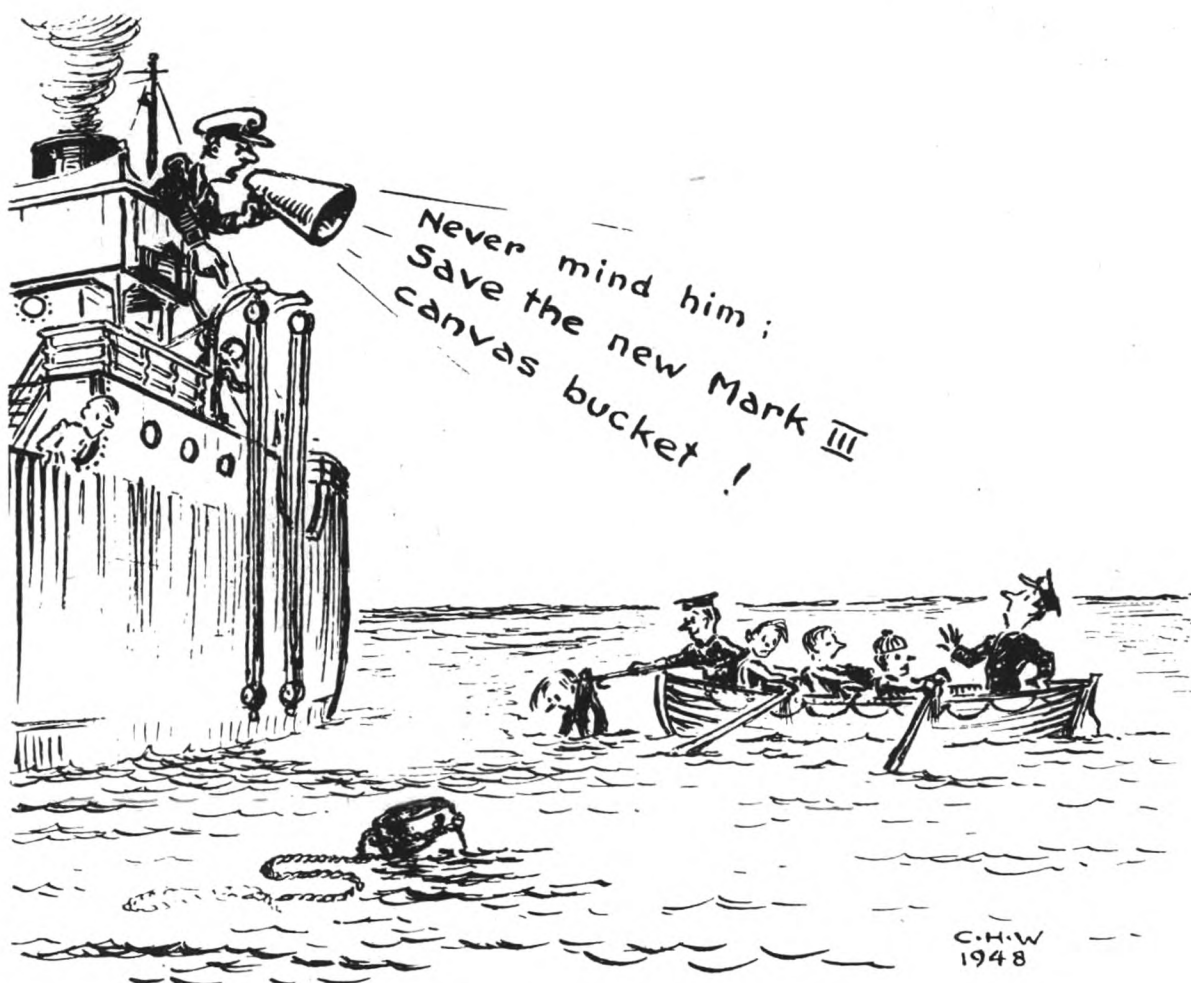
g = gale (Beaufort Force 8 or 9 maintained for at least 10 minutes);

G = whole gale (Beaufort Force 10 or over maintained for at least 10 minutes).

The suffix o, indicating slight, will not be used in association with the symbol g. In other words, g will never be used to report winds less than force 8.

Although the existence of a gale is always evident in meteorological records under the heading of "wind force", there are, nevertheless, advantages in also recording this important element under the heading of "weather". This new use of g in meteorological records will therefore emphasize the existence of a gale for climatological purposes, and will also be a check on the wind force recorded. This is one of the reasons for the change.





The above drawing calls to mind a feeling which all voluntary observers have experienced some time or another—the vicious jerk that a canvas bucket can give when it fills and tightens on the line from a moving ship. The master of a ship did tell me of one lascar who fell overboard in this way when attempting to get a water sample ; he had not made the end of the line fast!

The Mark III canvas bucket is a very much improved version of the old canvas bucket, as it has a double wall for insulation purposes and other improvements. It has so far only been supplied to a few ships for experimental purposes, but we hope to issue it to all ships before very long. A description of this bucket is contained in the April, 1949, number of *The Marine Observer*.—EDITOR.

## SOUTHERN ICE REPORTS

During the years 1948 and 1949

July, August and September. No reports received. Reports of ice for July, August and September previous to 1948 will be found in *The Marine Observer*, Vol. XVIII, No. 141, page 169.



### Letter to the Editor

The note on page 63 of *The Marine Observer* for April, 1950, from M.V. *Stirling Castle*, reminds me of a phenomenon which I saw three times during the 1914-18 war.

Once in France and twice in Italy all gun flashes round the horizon (guns from perhaps three to twenty miles from where I was) appeared as vertical streaks of light against a dark sky. It was rather as if slits in a heavy curtain, illuminated behind, kept opening and closing. Presumably it is some kind of refraction phenomenon, with atmospheric conditions so adjusted as to draw out a point of light into a continuous vertical column. There is a note about my experiences in the *Quarterly Journal*, Royal Meteorological Society, October, 1919.

On the night when I observed the phenomenon in France a great ammunition fire occurred at a place some six miles from where I was stationed. The glow from the fire appeared a great lurid vertical column in the sky—an awesome sight.

Professor Stormer told me he had, on one occasion in Norway, seen the glow from a distant fire refracted as a vertical column.

Meteorological Office.

A. H. R. GOLDIE.

### BOOKS RECEIVED

*Wireless at Sea.* By H. E. Hancock. 8vo.  $5\frac{5}{8}$  in.  $\times$   $8\frac{3}{4}$  in. xxxiv+233.

*Illus.* Marconi International Marine Communication Co. 1950. 15s.

This book is rightly dedicated to "those British marine radio officers who, in the performance of their duty, laid down their lives in order that we, their fellow countrymen and the peoples of the world, should survive to live in freedom and in peace".

In a very readable style it traces the history of marine radio from Marconi's early experiments up to the present day, and vividly brings home to the reader the enormous strides which have been made during these first fifty years of wireless at sea. Although written around the history of Marconi and the Marconi Company, the book manages to avoid a commercial bias, and is instead an interesting historical record. It is profusely illustrated with photographs of personalities, ships and instruments.

C. E. N. F.

*Meteorology for Seamen.* By Cdr. C. R. Burgess, O.B.E., R.N. 8vo.  $5\frac{1}{2}$  in.  $\times$   $8\frac{1}{2}$  in. xii+252. *Illus.* Brown, Son & Ferguson, Ltd., Glasgow. 1950. 15s.

Although the aviator has been well served during recent years with practical meteorological literature to meet his requirements, the seaman, by contrast, has suffered from a lack of it. Now, at last, a book has appeared which is devoted entirely to the seaman, firstly as a reference in the fundamentals of meteorology, and secondly as a stimulant to his interest in this science which is so closely related to his daily life. The book, naturally, has a maritime flavour; nevertheless the fundamentals of land meteorology are included. It is written in an easy style and the basic ideas are conveyed in a manner such as to be understood with minimum mental effort. The only general criticism is that there is inclined to be an occasional loss of strict

technical accuracy in the attempt to avoid involved explanations which may be a strain on the reader. However, perhaps this cannot be avoided when the aim is to present the main principles and ideas of modern meteorology to the mariner, who has not the time to go into the subject too deeply, yet who desires to obtain a picture in his mind of the mechanism of the atmosphere.

The book is nicely produced and very well illustrated with diagrams and maps, and many good and unusual photographs, and it is reasonable in price. The contents are divided into four parts :

Part I. " Factors which go to make up Weather "

This covers the general theory of meteorology, including the composition of the atmosphere, winds, air masses and fronts, various phenomena and sea and swell.

Part II. " The Climates of the Oceans "

Included in this section is a chapter upon the principal mean positions of the principal air masses.

Part III. " Weather Forecasting "

In this part are discussed both the work of the professional meteorologist ashore and the forecasting which a seaman can undertake with the help of an analysis, as issued to shipping. The use of radar to the meteorologist and the effect of meteorology on radar are also discussed here.

Part IV. " Observing and Recording the Weather "

Includes a chapter on instruments and observation, both instrumental and non-instrumental, as well as a chapter on the organisation of voluntary meteorological work at sea.

At the end of each chapter there are some useful questions for students upon the context of the chapter concerned.

There are one or two incidental inaccuracies that should be mentioned.

Page 61 : The bow at a radius of  $50^\circ$  is the secondary bow, not a supernumary bow.

Page 62 : In a discussion of the position and shape of the moon it is stated, referring to the new moon, " only in autumn does it lie with its horns pointing downwards in middle latitudes " ; the new moon cannot lie with its horns pointing downwards at any season anywhere in the evening when it is seen.

Page 65 : The upper limit of the height of aurora is at times considerably higher than 100 miles.

Page 91 : There are two currents in the Davis Strait region, the West Greenland Current flowing north along the Greenland side of the Strait, and the Baffin Land Current flowing south along the western shore. The Labrador Current is the continuation of the Baffin Land Current. The current referred to as the " Koya Siwo " should be the " Oya Siwo ".

Page 129 : The statement that bergs draw two to three times the depth of water that they extend above the surface is somewhat inaccurate ; they may draw up to five times this depth.

There is a misplacing of lines at the bottom of page 22.

The appendices provide exceedingly useful information, including all the conversion tables normally required, together with the international code and specifications.

A. H. G.

*Metric Conversion Tables.* Designed by Otto Klein and computed by the Scientific Computing Service Ltd. 8vo.  $6\frac{3}{4}$  in.  $\times$   $8\frac{1}{2}$  in. pp. 104. Frederick Warne & Co. Ltd., London. 1950. 15s.

This ready-reckoner is aptly described by the publishers as a quick and efficient system of converting Imperial or American measures into the Metric System, and vice versa.

A perusal of the numerous tables contained in the book brings home to the reader the complications due to the existence of these different methods of measurement, which confront those who have to deal with international trade and similar work. For example, we read that 1 ounce = 16 drams = 23.349 53 grams. Our Imperial measures with their difficult and irregular steps date back beyond the medieval period, whereas the Metric System was not introduced until 1801, but these tables tend to show that there is much to say in favour of the latter. The Metric System has for some years been in use on the Continent and in other countries of the world, and was, in fact, legalised in Great Britain in 1897, but was not officially adopted.

The contents include measures of weight, length, speed, surface, volume capacity, temperature and pressure, as well as a table for converting sterling into decimals of a pound. The tables are well arranged—the figures being in steps of one unit—and might well be useful to ships' officers and others engaged in international trade. The book would, however, have been much more useful to seamen if it had included tables for converting metres to fathoms and kilometres to nautical miles and *vice versa*. Although this is a book of *metric* conversion tables, its value would have been enhanced had it also included tables for the direct conversion of American short tons to English tons and *vice versa*.

On page 101 the formulae for converting Centigrade and Reaumur to Fahrenheit should read

$$F = \frac{9}{5} C + 32 \text{ not } F = \frac{9}{5}(C + 32)$$

$$\text{and } F = \frac{9}{4} R + 32 \text{ not } F = \frac{9}{4}(R + 32)$$

as printed.

The various conversion factors have been carefully gone into by the authorities to ensure accuracy, and some interesting notes which appear upon this subject show certain difficulties in determining exact ratios.

C. E. N. F.

#### Naval Weather Service

The Admiralty have recently reorganised the Naval Meteorological Service and renamed it the Naval Weather Service. Formerly the Naval Meteorological Branch of the Hydrographic Department, the new Service will be a separate department under the Vice-Chief of Naval Staff.

## PERSONNEL

RETIREMENT.—CAPTAIN R. B. G. WOOLLATT, R.D., R.N.R., has retired from the Cunard Line after commanding the *Aquitania* on her last voyage from Southampton to the shipbreaker's yard at Gareloch in February last.

Captain Woollatt served his apprenticeship in the barque *Dovenby* of Liverpool. On obtaining his masters' certificate (square rigged) in March, 1914, he joined the Cunard Line in the same month as Fourth Officer of the *Campania*. Within a few months, being a permanent officer of the Royal Naval Reserve, he was mobilised on the outbreak of hostilities and served throughout the 1914-18 war in H.M.S. *Lynn*, based at Scapa Flow, and in H.M.S. *Staunch* during the Galipoli campaign. In July, 1919, he returned to the Cunard Line, passing through the usual grades in many ships of that company. In 1937 he was Chief Officer of the *Queen Mary*, and from November, 1939, to June, 1942, was Chief Officer and later Staff Captain of the *Queen Elizabeth*. Captain Woollatt's first command was the *Franconia* in 1943, and subsequently such famous ships as the *Pasteur*, *Milwaukee*, *Britannic*, *Mauretania*, *Queen Elizabeth* and finally to the *Aquitania* in 1948.

During the recent war Captain Woollatt was engaged principally in trooping duties all over the world, taking part in the North African and Sicilian landings and also took the R.A.F. to Terceira Island in the Azores in 1943.

An interesting trooping voyage in the *Mauretania* encircled the globe, from Liverpool to Panama, Pearl Harbour, Wellington, Sydney, Fremantle, Durban, Cape Town, Freetown and back to Liverpool, the voyage being completed in a few hours over 56 days, the average daily steaming being 509.28 miles, which must be a record.

We wish Captain Woollatt health and happiness in his retirement. J. R. R.

RETIREMENT.—CAPTAIN R. A. THORBURN, R.D., R.N.R., has retired from the sea after serving 48 years afloat, nearly 42 years of which were in ships of the Elders & Fyffes Line.

Captain Thorburn first went to sea in the barque *Myrth Holme*, belonging to Hines Brothers of Maryport, and at the completion of his apprenticeship passed for second mate in June, 1906. In October, 1908, he joined Elders & Fyffes as a junior officer, obtaining his masters' certificate (square rigged) in 1911. During the 1914-18 war, being a permanent officer of the Royal Naval Reserve, he served in H.M. submarines, and returning to Elders & Fyffes on cessation of hostilities was soon promoted to command of the *Pacuare* in 1920.

Captain Thorburn subsequently commanded many of his company's ships and during the recent war had command of H.M.S. *Ariguani*, which had been converted to a fighter catapult ship. His last command was the *Golfito*, the commodore ship of the fleet, which he joined on her maiden voyage in December last, making two voyages in that ship before retiring on her arrival at Southampton on the 2nd March. His service of nearly 42 years, 30 years of which in command, with Elders & Fyffes constitutes a record for that company, no one having previously served that length of time in their ships.

Captain Thorburn has been a voluntary marine observer in all the ships he commanded for over twenty years, and since the war appeared in the list of "Excellent Awards" in 1948 when in command of the *Matina*.

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

# FLEET LIST (Great Britain)

## VOLUNTARY OBSERVING SHIPS

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

All returns received from observing ships will be acknowledged, direct to 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. (See under Notices to Marine Observers.)

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 Captains, 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.

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Accra</i>	GJSW	A. G. Baptiste	J. R. Smith, L. Austin, C. Morrison, T. A. Holson	J. A. Stuart	Elder Dempster Lines, Ltd.	18.1.49
<i>Afghanistan</i>	GNYP	W. A. Chappell	R. L. Cain, J. Linton, K. J. Evans	T. D. Sullivan	F. C. Strick & Co., Ltd.	3.1.49
<i>Ajaox</i>	GJXM	P. Cross	E. B. Bertelsen, S. Barbour, N. Robertson	W. Akhurst	A. Holt & Co.	18.3.50
<i>Akaroo</i>	GMLP	J. Steele	F. S. Yeoman, R. Munro, A. R. Stephenson	J. W. Soulsby	Shaw, Savill & Albion Co., Ltd.	22.3.49
<i>Alcantara</i>	GLQR	G. A. Bannister	J. Fulford, D. Clark, F. Williams	R. E. Hammond	Royal Mail Lines, Ltd.	
<i>Alcyone Fortune</i>	MAQC	T. Bowen-Rees	J. A. Leech		Alcyone Shipping Finance Co., Ltd.	
<i>Amakura</i>	MCPN	S. E. Jenks			Booker Bros., McConnell & Co., Ltd.	
<i>Amastira</i>	GYDD	R. Ashby Todd	R. Hedley, C. Close, J. Bizzey	R. Dunne	Anglo-Saxon Petroleum Co., Ltd.	23.1.50
<i>Amersham</i>	GNTQ	A. Spence	G. Halliday, E. T. Ward, W. Gray	J. Paulley	Thompson S.S. Co., Ltd.	12.8.49
<i>Andes</i>	GQCV	B. K. Berry, R. D., Cmde., R.N.R.	W. B. Avison, F. M. Dickenson, M. Wingate, P. Anthony, — Williams	W. Smith	Royal Mail Lines, Ltd.	30.9.49
<i>Apapa</i>	MACE	J. J. Smith	R. G. Williams, C. A. Smith, J. Wright, S. S. Jenkins, T. A. Nicholson	R. F. Barrett	Elder Dempster Lines, Ltd.	16.12.40
<i>Arabia</i>	GLKF	G. H. Morris	J. Robinson, R. Jones, T. A. Bell, F. W. Diggle	B. A. Long	Cunard Steamship Co., Ltd.	19.1.50
<i>Arabistan</i>	GCKK	— Cook	A. K. Linton, P. Hewitt, J. C. Purdy	W. Davies	F. C. Strick & Co., Ltd.	21.3.50
<i>Araby</i>	GMZL	C. E. Mason	K. M. Cutler, P. J. Robinson, J. M. Cres, M. G. Boyd	K. J. Roberts	Royal Mail Lines, Ltd.	19.12.49
<i>Arakaka</i>	GDVN	R. Harrison	D. Douglas-Kerr, C. Nolan, H. Adler	J. A. Davis	Booker Bros., McConnell & Co., Ltd.	5.8.49
<i>Argentina Star</i>	GTKF	D. R. Macfarlane, O.B.E., D.S.O.	K. White, D. G. Hastie, T. Ripley	J. Eastwood	Blue Star Line, Ltd.	14.3.50
<i>Argyll</i>	GBWB	J. Dodds	A. W. Fielding, J. W. Millbank, G. Galloway	J. J. Smith	B. J. Sutherland & Co., Ltd.	16.1.50

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Arguani</i> ..	GMBL	G. S. Gracie ..	R. D. Phillpotts, J. A. Cruickshanks, J. B. Hughes ..	A. N. Taylor ..	Elders & Fyffes, Ltd. ..	4.1.49
<i>Armadale</i> ..	GMCR	E. I. Ridout ..	C. F. Woodcock, D. A. Keats, L. Browne ..	J. S. Buchanan ..	Trinder, Anderson & Co. ..	14.11.49
<i>Ashburton</i> ..	GNJN	F. W. Mould ..	M. T. Dodds, D. J. Steff, P. King, R. Parry ..	W. J. Rainey ..	Cunard Steamship Co., Ltd. ..	23.1.50
<i>Asta</i> ..	GLJV	B. Harrison ..	—, Cutler, —, Rutter, —, Edwards, C. Hartley ..	Hunt ..	Royal Mail Lines, Ltd. ..	13.2.50
<i>Asturias</i> ..	GLQS	H. G. Whittle, O.B.E. ..	R. V. Parkiss, N. Jones, A. Green ..	W. Bradbury ..	Tankers, Ltd. ..	16.1.50
<i>Athelchief</i> ..	GCRG	J. H. Flockhart ..	R. Nicholson, R. McGregor, W. H. Buckle ..	A. Williams ..	Athel Line, Ltd. ..	4.1.50
<i>Athelregent</i> ..	GQWL	J. A. Russell ..	A. E. Warren, W. A. Hutchison, P. G. Clifford, C. A. Brodie, R. Reid ..	D. Haggart ..	Shaw, Savill & Albion Co., Ltd. ..	22.2.50
<i>Athenic</i> ..	GBLS	B. Forbes-Moffatt ..	—, Beaumont, —, McNeil, —, Evans ..	J. H. Summers ..	Union Castle Mail S.S. Co., Ltd. ..	30.12.49
<i>Athlone Castle</i> ..	GYTK	J. McReynolds, D.S.C. ..	J. F. Anderson, M. Bialowski, J. Upton, C. C. Wightman ..	H. Mathews ..	Royal Mail Lines, Ltd. ..	14.3.50
<i>Atlantis</i> ..	GLTM	A. R. Osburn ..	C. K. Powell, C. Close, G. Blackwood ..	J. Casey ..	Anglo-Saxon Petroleum Co., Ltd. ..	20.8.49
<i>Auracula</i> ..	GKPV	H. Sangster ..	D. Ewan, J. B. McGowan, R. Mattingley ..	H. J. Griffiths ..	Blue Star Line, Ltd. ..	12.8.48
<i>Australia Star</i> ..	GYCS	G. M. Duff, G.M. ..	J. R. Dixon, R. L. Jones ..	J. Smallwood ..	Trinder, Anderson & Co. ..	8.11.49
<i>Australind</i> ..	GJKF	J. F. Wood ..	G. A. Dando, W. C. L. Sturrock, G. L. Fraser, R.D., R.N.R., R. L. Collins ..	J. J. Mytton ..	Dene Shipping Co., Ltd. ..	3.3.50
<i>Avondene</i> ..	MAWG	G. Doyle ..	E. E. R. Roberts, R. E. G. Simmonds, —, Davies ..	J. J. Mytton ..	United Whalers, Ltd. ..	16.1.50
<i>Balaena</i> ..	GLDG	P. Virik ..	R. Pollok, J. Baxter, R. Gunn ..	C. James ..	Royal Mail Lines, Ltd. ..	16.1.50
<i>Balanitia</i> ..	GBNM	C. C. Dingle ..	D. Harlock, R. Cameron, A. J. Hutcheson ..	J. Freel ..	United Baltic Corporation, Ltd. ..	4.1.49
<i>Baltara</i> ..	CTXM	G. E. Thomas ..	F. Smith, J. Peck, J. B. Harbord ..	J. Dowdall ..	H. Hogarth & Sons ..	28.9.49
<i>Baron MacLay</i> ..	GKXW	A. Campbell ..	A. J. Cox, A. Ferguson, M. G. King ..	G. Shilson ..	Ellerman's Wilson Line, Ltd. ..	28.9.49
<i>Baron Yarborough</i> ..	GNID	D. B. Ramsbottom, D.S.C. ..	S. Fieldhouse, T. F. Hercus, G. W. R. Graves, P. A. LePatourel ..	A. D. Garden ..	Watts, Watts & Co., Ltd. ..	30.11.49
<i>Basiano</i> ..	GNXK	J. W. Gardiner ..	D. P. Blois, R. D. P. Gillett, J. H. Fraser, R. R. Rawlings ..	T. Ainsworth ..	Canadian Pacific S.S., Ltd. ..	20.3.50
<i>Beaconsfield</i> ..	GNNO	J. B. Smith, O.B.E. ..	R. W. Savage, W. Williams, —, Bateman ..	J. A. McAskill ..	Canadian Pacific S.S., Ltd. ..	20.12.49
<i>Beaverburn</i> ..	MAGB	C. E. Duggan, R.D., R.N.R. ..	E. R. Connerton, E. R. Shaw, D. Wallace ..	L. Norton ..	Canadian Pacific S.S., Ltd. ..	31.1.50
<i>Beavercore</i> ..	GNLX	N. C. H. Scallon, R.D., R.N.R. ..	L. Kinross, B. Dunham, J. Mackay, D. Robertson, R. A. Jones ..	W. Pongdestre ..	Canadian Pacific S.S., Ltd. ..	11.1.49
<i>Beaverdell</i> ..	GBBS	R. A. Leicester, O.B.E. ..	R. Savage, B. Snell, J. Waling, T. Sargent ..	R. Burch ..	Canadian Pacific S.S., Ltd. ..	6.2.50
<i>Beaverford</i> ..	MOJG	J. Soame ..	G. T. Sharpe, W. Gibson, M. G. King ..	W. Chick ..	Canadian Pacific S.S., Ltd. ..	14.3.50
<i>Beaverglan</i> ..	GBCP	C. L. deH. Bell, D.S.C. ..	M. J. Peyton-Bruhl, A. King, J. Bain, G. M. Gall ..	A. W. T. Camp ..	Watts, Watts & Co., Ltd. ..	18.1.50
<i>Beaverlake</i> ..	GBCQ	R.D., Capt., R.N.R. ..	R. Winn, K. Parker ..	R. Dixon ..	W. Thomson & Co. ..	14.3.50
<i>Beckenhams</i> ..	GCGK	D. Carrierson ..	J. Brown, J. T. Fyffe, E. H. Booth ..	J. E. Kemp ..	W. Thomson & Co. ..	16.12.48
<i>Benarty</i> ..	GCZZ	D. S. Sinclair ..	L. C. Finn, R. M. Snowie, N. Mackie ..	H. Mackay ..	W. Thomson & Co. ..	13.5.49
<i>Bendoren</i> ..	MYSF	H. Masson ..	W. O. Atkinson, J. Clements, I. Bruce, A. J. King ..	I. M. Fraser ..	W. Thomson & Co. ..	12.10.49
<i>Bentbor</i> ..	GDVV	J. D. Wilson ..	E. N. Stone, G. Speira, G. K. Harrison ..	J. L. Wells ..	W. Thomson & Co. ..	26.1.49
<i>Bentloch</i> ..	GDJT	I. B. Hastie ..	F. E. Barley, D. L. Craven, R. Brooks ..	J. Whyman ..	Houlder Bros. & Co., Ltd. ..	9.3.49
<i>Bentrackie</i> ..	GBYZ	W. C. Wilson ..		R. G. Thomson ..	Hector Tankers, Ltd. ..	
<i>Bennyvis</i> ..	MYPW	K. Hardie ..				
<i>Bibury</i> ..	GIFC	W. E. Brett ..				
<i>Biscoe</i> ..	GDCW	D. Cornwell ..				



<i>Boynton Wyke</i>	GBZV	G. Clixby	L. J. Thompson, F. P. McGuckin, F. Wood	J. Waddell	West Dock Steam Fishing Co., Ltd.	22.11.49
<i>Bransfield</i>	GDRK	F. A. Gjersten	C. Everingham, J. McAndrew, J. H.	..	United Whalers, Ltd.	..
<i>Brasil Star</i>	GTLF	T. Williams	Spandler	..	Blue Star Line, Ltd.	..
<i>Bravo</i>	GLDZ	H. Tyler	R. H. Stark, M. R. Bremberg, G. Munro,	F. E. Smith	Ellerman's Wilson Line, Ltd.	..
<i>Brisbane Star</i>	GZCJ	S. Foulkes	A. H. White	D. J. Eastwood	Blue Star Line, Ltd.	19.5.48
<i>Britannic</i>	GDXF	R. Sell, R.D., R.N.R.	M. J. Dodds, R. McDougall, J. Rawlinson	..	Cunard Steamship Co., Ltd.	4.9.48
<i>British Colonel</i>	GFDB	A. Derrick	W. S. Jaeger	R. A. MacLeod	British Tanker Co., Ltd.	11.1.50
<i>British Endeavour</i>	GFCN	I. E. Stead	J. Irvine	..	British Tanker Co., Ltd.	..
<i>British Endurance</i>	MLZM	W. Watkins Thomas, O.B.E.,	..	..	..	..
<i>British Energy</i>	GLBK	D.S.C.	A. D. Millar, S. H. Falconer, P. C. Coyne	A. E. Adams	British Tanker Co., Ltd.	29.12.47
<i>British Escort</i>	GCRB	R. Smyth	A. Davies, J. A. Frost, D. P. Monaghan	N. Holdridge	British Tanker Co., Ltd.	3.3.50
<i>British Hussar</i>	GJVR	H. G. Jeary	J. A. G. Millar, S. A. Sanderson, F. Darby	A. Murray	British Tanker Co., Ltd.	31.1.50
<i>British Lancer</i>	MAGS	R. Phillips	A. P. Watson, G. W. Reeve, A. V. Sard	A. John	British Tanker Co., Ltd.	..
<i>British Marquis</i>	GWVL	T. S. Hall	K. W. Nicholls, E. G. Freeman, C. G.	C. R. A. Ball	British Tanker Co., Ltd.	20.9.49
<i>British Patience</i>	GUFF	J. W. Kemp	Cowdry, C. Onslow	R. Lee	British Tanker Co., Ltd.	25.10.49
<i>British Pilot</i>	GCQT	J. Beatie	U. A. Maggs, C. F. Williams, P. N.	R. Stevenson	British Tanker Co., Ltd.	25.8.49
<i>British Piper</i>	GDNN	J. H. Nelson	Dawson	A. J. Williams	British Tanker Co., Ltd.	19.1.50
<i>British Pioneer</i>	GZGG	J. P. M. Samson	J. H. Picken, S. B. Wade, P. Budge, C.	M. A. H. Kenneison	British Tanker Co., Ltd.	16.11.49
<i>British Prestige</i>	GMBF	K. M. Mitchell	Herbert	F. G. Rimmington	British Tanker Co., Ltd.	15.10.48
<i>British Resource</i>	GFCD	I. H. Wilson	G. MacLeod, T. McDonald, J. Baird	F. Giuller	British Tanker Co., Ltd.	24.2.49
<i>British Respect</i>	MAGU	J. C. Lea, O.B.E.	A. Fraser, P. F. Mason, E. C. Ford	V. Dalton	British Tanker Co., Ltd.	22.3.50
<i>British Statesman</i>	GINR	E. L. Mitchinson	I. A. Macleod, T. Horne, G. A. Gee	I. G. Laurie	British Tanker Co., Ltd.	3.3.50
<i>British Scaurfish</i>	GCOV	H. A. Wright	R. M. Jary, R. I. Elder, A. Rouse	W. I. Briggs	British Tanker Co., Ltd.	28.9.49
<i>Brittany</i>	GMZS	D. J. Jones	J. Foster, T. Owen, B. Richards	G. Mitchell	British Tanker Co., Ltd.	23.2.49
<i>Brockleymoor</i>	GDWP	E. L. Jernyn	B. Halvorsen, T. J. Taylor, A. C. Robinson	N. W. Hodgson	Royal Mail Lines, Ltd.	26.11.49
<i>Bronte</i>	GSKW	J. Byrne	J. Fox, J. Kavanagh, — Wood	T. J. Keily	Walter Runciman & Co., Ltd.	18.9.48
<i>Byron</i>	GNFL	I. W. Scott	F. K. Venus, G. Ball, J. S. Clarke	T. Scambler	Lampport & Holt Line, Ltd.	7.3.49
<i>Cairmaxon</i>	GMKR	I. G. Foster	L. A. Sayers, Lt.-Cdr., W. T. Pitcher,	W. P. Greaves	Cairns, Noble & Co.	10.10.49
<i>Cairnesk</i>	GQKM	G. R. Norvell	B. E. Cole	E. Johnston	Cairns, Noble & Co.	12.10.49
<i>Cairnvalona</i>	GCKR	E. Stormont, M.B.E.	F. Gribben, J. Roberts, R. Garcia	T. W. Lawson	Cairns, Noble & Co.	8.11.49
<i>Caledonia</i>	GDDT	G. Stable	C. Sutherland, C. Percy, J. Holland	S. J. D. Taylor	Anchor Line, Ltd.	9.11.49
<i>Canton</i>	GZFY	F. Yeomans	J. Hogg, W. Errington, J. Baxter, R.	J. R. C. Johnson	Peninsular & Oriental Steam Navi-	14.12.48
<i>Cape Mariato</i>	GCZS	C. A. Jones	Campbell	R. N. Dixon	gation Co.	13.2.47
<i>Cape York</i>	GKGM	R. Wren, D.S.O.	N. E. Forth, J. W. Cuthbertson, T. D.	S. Gracie	Hudson Bros. Trawlers, Ltd.	19.1.50
<i>Capetown Castle</i>	GIFE	K. Wardale	Ridley, J. Nelson	J. Gibbard	Lyle Shipping Co., Ltd.	16.1.50
<i>Carlton</i>	GYKS	D. W. Sorrell	W. Thompson, T. L. Langlands, G.	J. Parsons	Union Castle Mail S.S. Co., Ltd.	20.4.49
<i>Caronia</i>	GRNX	S. H. French	Murdoch, A. McAdam	W. H. Chick	R. Chapman & Son	..
<i>Carthage</i>	MCJR	J. M. Cherry	G. S. Gordon-Christian, J. M. Donkin,	A. E. Morton	Cunard Steamship Co., Ltd.	..
<i>Caslon</i>	GKFF	T. H. Bull	C. E. R. Waller	A. Austin	Peninsular & Oriental Steam Navi-	4.1.49
<i>Castina</i>	GCDX	R. E. Richardson	R. N. Dixon	..	gation Co.	21.1.49
<i>Caston</i>	..	..	J. Fairgreaves, J. Macleod, J. Bruce	..	Runciman (London), Ltd.	19.1.49
<i>Caston</i>	..	..	D. Lamb, H. W. Madden, C. R. Kelso	..	Elders & Fyffes, Ltd.	..
<i>Caston</i>	..	..	A. Dodd, W. A. Morriss, A. A. Abdullah	..	Runciman (London), Ltd.	..
<i>Caston</i>	..	..	I. C. Borland, — Jolliffe, R. Ibbertson	..	..	..
<i>Caston</i>	..	..	D. Parsons, P. J. Passmore, D. T. Bolas	..	..	..
<i>Caston</i>	..	..	L. C. Burton	..	..	..
<i>Caston</i>	..	..	R. Laycock, B. Noble, D. Hamilton	..	..	..
<i>Caston</i>	..	..	F. Hamilton, R. Crawford, J. G. Wilson	..	..	..

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Celtic Monarch</i>	GSRF	R. L. Barr	E. C. Muir	H. Littlecot	Raeburn & Vérel, Ltd.	19.3.48
<i>Ceramic</i>	GFLM	A. V. Richardson	P. Goodson, W. Foster, H. M. Hignett.	C. Hagon	Shaw, Savill & Albion Co., Ltd.	24.9.49
<i>Cerinthus</i>	GCRM	J. F. Auld	B. P. Payling, D. J. Stone		Bibby Bros. & Co., Ltd.	22.12.49
<i>Cheshire</i>	GLXV	P. H. Potter	D. Hine			
<i>Chinese Prince</i>	GDJC	F. S. Thornton, O.B.E.	M. Musson, H. Jennings, H. Bragg, C. Farmer, M. Howell			
<i>Chiral</i>	GLKN	D. Hockley	J. A. P. Crichton, E. Snowden, J. A. Lefevre	T. Bailey	Prince Line, Ltd.	25.7.49
<i>Cilicia</i>	GDGL	R. Blake	D. McDiarmid, R. Ballantyne, A. Mackendrick	A. R. Porter	Peninsular & Oriental Steam Navigation Co.	25.11.49
<i>City of Barcelona</i>	GTKR	E. M. Jenkins	A. M. Bowman, P. Appleton, R. E. Greenwood	J. Malcolm	Anchor Line, Ltd.	10.10.49
<i>City of Bristol</i>	GCPN	G. Vickers	W. E. James, D. Cumming, R. A. Reid, V. Y. Dymock	W. Dobbie	Ellerman Lines, Ltd.	10.1.50
<i>City of Calcutta</i>	GLYX	H. Johnson	D. Wardlaw, D. Campbell, D. McKinnon	K. P. Grocock	Ellerman Lines, Ltd.	16.11.49
<i>City of Capetown</i>	GBBQ	W. S. Coughlan, O.B.E.	W. E. Fletcher, P. Redhead, A. Ramsden	H. Elder	Ellerman Lines, Ltd.	6.2.50
<i>City of Carlisle</i>	GBIK	— Hannah	J. G. Stott, B. H. Pickering, R. H. Halcrow	D. S. Crombie	Ellerman & Bucknall S.S. Co., Ltd.	15.8.49
<i>City of Chester</i>	MAHN	E. M. Robertson	B. Williams, E. Cumming, R. E. Gariach	— Vernal	Ellerman Lines, Ltd.	17.3.50
<i>City of Delhi</i>	GLBW	J. W. Wotherspoon	J. P. Mason Price, I. Irvine, W. Smith	J. Ellis	Ellerman Lines, Ltd.	30.12.49
<i>City of Derby</i>	GFWC	W. A. Hannah	R. Tyrell, J. Twomey, R. Huntingdon	A. Dennis	Ellerman Lines, Ltd.	8.11.49
<i>City of Dieppe</i>	GSVQ	E. G. Chapman	I. Thompson, M. Graham, D. Roe	R. M. Jones	Ellerman Lines, Ltd.	30.8.49
<i>City of Dundee</i>	GDYQ	F. M. Womersley	R. Jones, J. A. Whieldon, L. G. Powell	R. Macdonald	Ellerman Lines, Ltd.	30.12.49
<i>City of Durham</i>	GBJM	H. G. Williams, O.B.E.	D. S. Taylor	H. M. O'Gorman	Ellerman Lines, Ltd.	26.1.49
<i>City of Evansville</i>	GINF	D. C. Hamilton	A. Fry, J. S. Schofield, J. Checkley	W. B. Noonan	Ellerman Lines, Ltd.	21.3.49
<i>City of Falmouth</i>	GBKW	A. G. Freeman	H. Routledge, H. Lewis, C. Craddock	J. Oultram	Ellerman Lines, Ltd.	14.11.49
<i>City of Kharطوم</i>	GBZC	J. A. Beynon	D. L. Cox, W. Folder, D. A. Appleton	A. R. Henderson	Ellerman Lines, Ltd.	4.1.49
<i>City of Lille</i>	GSLN	W. A. Owen	R. B. May, H. M. Steele, G. S. Garner	J. Dolan	Ellerman Lines, Ltd.	5.11.48
<i>City of Lyons</i>	GMCN	F. Barnard	A. R. Horan, R. Clark, J. Morrison	A. Julius	Ellerman Lines, Ltd.	14.11.49
<i>City of Paris</i>	GFQM	H. Percival, O.B.E., R.D., Cdr., R.N.R.	P. S. Morrison, M. A. Perry, R. N. Caldwell, J. Wharry	W. Anderson	Ellerman Lines, Ltd.	29.3.49
<i>City of Pretoria</i>	GBLN	R. Longstaff, D.S.C.	D. Salt, F. Braddick, W. Taggart	B. Holyoake	Ellerman Lines, Ltd.	14.11.49
<i>City of Swansea</i>	GBZT	M. L. Herman, M.B.E.	E. G. O'Driscoll, J. A. Whieldon, E. N. Williams	J. Booth	Ellerman & Bucknall S.S. Co., Ltd.	29.3.50
<i>City of Sydney</i>	GSMF	J. B. MacLaren	B. Walker, J. Blanch, E. E. Cooper	W. Bateman	Ellerman Lines, Ltd.	17.3.50
<i>City of Tokio</i>	GFMW	R. L. Stewart	E. Bonfield, R. H. Bellhouse, E. Redshaw	H. D. Smythe	Ellerman Lines, Ltd.	24.8.49
<i>City of Windsor</i>	GIYR	W. S. Doidge	A. Brockebank, W. Singleton, T. H. Peirce	— McTighe	Ellerman Lines, Ltd.	
<i>Clan Brodie</i>	GKPD	B. Vernon-Browne	J. Jones, S. F. Nicholson, E. J. E. Owen, I. Williamson	A. C. Macaulay	Ellerman & Bucknall S.S. Co., Ltd.	17.3.50
<i>Clan Buchanan</i>	GKNM	T. W. Inman, O.B.E.	I. H. Wright, F. King, W. T. Richardson	W. M. Morrison	Cayzer, Irvine & Co., Ltd.	28.3.50
<i>Clan Campbell</i>	GDZK	J. A. Forster	D. S. Tosh, E. M. Crawley, J. Beynon, J. Hay	W. Harper	Cayzer, Irvine & Co., Ltd.	10.12.49
<i>Clan Chatan</i>	GFBX	H. C. Simpson, O.B.E.	F. T. Turtori, J. W. Ward, J. Campbell	R. F. Cole	Cayzer, Irvine & Co., Ltd.	4.1.49
<i>Clan Chisholm</i>	GFBY	J. McCrone	R. D. Helm, D. W. Pennel, A. G. Allison, J. A. Lionnet	E. Stillaber	Cayzer, Irvine & Co., Ltd.	3.4.50
<i>Clan Davidson</i>	MAWU	H. J. Anchor, O.B.E., R.D., R.N.R.	A. M. Kennedy, E. R. Smith, D. R. Godfrey, P. Ingram	J. A. Gray	Cayzer, Irvine & Co., Ltd.	27.2.50
				J. E. Appleton	Cayzer, Irvine & Co., Ltd.	19.1.50

<i>Clan Forbes</i> ..	GPGB	W. R. Woodriffe	..	A. S. Palethorpe-May, R. H. Field, J. L. Easton	W. Saville	..	Cayzer, Irvine & Co., Ltd.	..	1-4.50
<i>Clan Macaulay</i> ..	GZCS	A. G. Storkey	..	T. R. Halliday, M. P. R. Turner, D. S. Clark	J. Ormerod	..	Cayzer, Irvine & Co., Ltd.	..	12.7.49
<i>Clan MacDonald</i> ..	GCPG	H. Cater	..	J. P. Dunphy, F. Lionnet, D. Milner	G. Martyn	..	Cayzer, Irvine & Co., Ltd.	..	7.12.48
<i>Clan MacDougall</i> ..	GFBQ	P. McMillan	..	S. R. J. Woods, J. A. Molyneux, D. E. Milner	C. E. C. Crew	..	Cayzer, Irvine & Co., Ltd.	..	16.12.49
<i>Clan MacLaren</i> ..	GSSC	E. H. O. Stone	..	T. O. Marr, Lt.-Cdr., R.N.R., J. A. Baxter, D. Richardson	R. W. Moore	..	Cayzer, Irvine & Co., Ltd.	..	11.10.49
<i>Clan Macnair</i> ..	GFNK	J. Dunphy	..	A. Mair, A. Graham, J. Brackenbridge	R. D. Dingley	..	Cayzer, Irvine & Co., Ltd.	..	16.1.50
<i>Clan Macneil</i> ..	GFWP	J. West	..	John A. N. Laws, K. M. Thomson, H. J. Jakobsens	M. P. Clarkson	..	Cayzer, Irvine & Co., Ltd.	..	24.11.49
<i>Clan Macrae</i> ..	MAHP	E. Coulthart	..	J. D. W. Chapple, R. E. Heywood, J. Nichols	W. Bryce	..	Cayzer, Irvine & Co., Ltd.	..	7.3.49
<i>Clan Macraish</i> ..	GUBB	H. S. Pengelly	..	G. Owen, G. S. Russell, G. Dubery	W. A. Elmers	..	Cayzer, Irvine & Co., Ltd.	..	17.4.50
<i>Clan Macraughart</i> ..	GFBK	T. W. Inman	..	W. Graham, M. N. Ure, A. D. Rumble	A. F. MacIntyre	..	Cayzer, Irvine & Co., Ltd.	..	27.2.50
<i>Clan Macraughart</i> ..	MAHQ	J. Wharmond	..	G. Ratcliffe, I. Isaacs, A. Pringle	R. R. Bromham	..	Sir R. Kopner & Co., Ltd.	..	30.12.49
<i>Clan Macraughart</i> ..	GKLM	J. W. Greig	..	B. H. Smith, A. R. Howson, E. A. D. Vargas	A. G. Roberts	..	Hunting & Son, Ltd.	..	28.7.49
<i>Clan Macraughart</i> ..	GSNK	A. S. Reid	..	P. B. Goudie, J. C. Wheeler	J. Layton	..	Blue Star Line, Ltd.	..	13.4.50
<i>Clan Macraughart</i> ..	GQGT	D. J. Stratta	..	F. C. T. Wood, D. E. Ortnier, D. B. Wright, B. W. Baillie	A. Etheridge	..	Esso Transportation Co., Ltd.	..	10.12.49
<i>Clan Macraughart</i> ..	GYRX	P. Snewin	..	P. Davies, D. Rees, I. D. A. Macintosh	J. Kelleher	..	T. & J. Harrison	..	28.10.49
<i>Clan Macraughart</i> ..	GPTJ	H. T. Wells	..	J. Bean, D. Bloom, A. Waring	J. Pye	..	Andrew Weir & Co., Ltd.	..	1.6.49
<i>Clan Macraughart</i> ..	GKLL	J. Townsley	..	A. J. Whiston, A. Brown, E. J. Stoddart	R. Holding	..	Furness-Houlder Argentine Lines, Ltd.	..	6.9.49
<i>Clan Macraughart</i> ..	MAHU	H. Heal	..	R. Tinnmouth, S. Edgington, D. Parkin	J. Bishop	..	P. & O. Steam Navigation Co.	..	13.4.50
<i>Clan Macraughart</i> ..	GRNW	C. S. Parker	..	K. H. S. Renshaw, D. M. Johnstone, C. C. Vickers	J. T. Macdonald	..	Shaw, Savill & Albion Co., Ltd.	..	30.9.49
<i>Clan Macraughart</i> ..	GZYL	G. M. Robertson, D.S.C.	..	R. Frisby, J. W. Woodbridge, D. S. Upton, H. F. Singleton	A. W. Allen	..	Donaldson Bros. & Black, Ltd.	..	13.7.49
<i>Clan Macraughart</i> ..	GFPT	W. Anderson	..	R. Allan, R. Aitken, J. H. Stark	H. Reynolds	..	Lambert Bros., Ltd.	..	17.4.50
<i>Clan Macraughart</i> ..	MAHZ	G. Robison	..	W. Birnie, P. McKellar, I. Cloherty	E. Yard	..	T. & J. Harrison	..	17.4.50
<i>Clan Macraughart</i> ..	GPZT	W. F. O'Neill	..	W. E. Williams, I. M. Ritchie, J. Macaulay	R. J. Francis	..	Federal Steam Navigation Co., Ltd.	..	24.11.49
<i>Clan Macraughart</i> ..	GPPY	H. E. Reilly, D.S.C., R.D.	..	P. M. N. Busby, N. Ethernott, R. G. Ford	T. J. Constable	..	Ltd.	..	2.12.49
<i>Clan Macraughart</i> ..	GCLS	R.N.R.	..	T. W. D. John, P. H. Banks, A. M. Robson	G. Lowe	..	Royal Mail Lines, Ltd.	..	30.12.49
<i>Clan Macraughart</i> ..	MAID	D. W. Boutcher	..	J. Green, R. J. Kistler, J. C. Derby, J. S. Kent	J. B. Smith	..	Lampport & Holt Line, Ltd.	..	27.10.49
<i>Clan Macraughart</i> ..	GRPR	W. H. Grimshaw, G.B.E.	..	G. T. Clarke, R. Clarke, A. H. Pickles	A. A. Macpherson	..	Andrew Weir & Co., Ltd.	..	11.1.50
<i>Clan Macraughart</i> ..	GTDB	H. W. Underhill	..	K. Maguire, M. C. Roberts, D. Simpson	M. C. Pickering	..	Lampport & Holt Line, Ltd.	..	11.1.49
<i>Clan Macraughart</i> ..	GNWF	B. Rivett	..	B. M. Metcalfe, L. J. Roberts, C. T. Skerstin	J. Care	..	Donaldson Bros. & Black, Ltd.	..	4.4.50
<i>Clan Macraughart</i> ..	MMNW	H. Pratt	..	A. S. Kerr, J. H. Small, D. Hyndman	W. J. Read	..	Lampport & Holt Line, Ltd.	..	5.10.49
<i>Clan Macraughart</i> ..	GJSQ	R. McNie	..	W. Jones, A. Bennett, B. Walker	R. Pryer	..	Glen Line, Ltd.	..	7.3.50
<i>Clan Macraughart</i> ..	GZSY	A. W. Mitchell	..	P. Wilks, L. Henshall, G. Bower	G. Heapy	..	McCowan & Gross, Ltd.	..	13.2.50
<i>Clan Macraughart</i> ..	GQGW	D. Hey	..	M. Drew, D. Kingsland	G. Williams	..	Royal Mail Lines, Ltd.	..	3.4.50
<i>Clan Macraughart</i> ..	GCKN	N. Bellwood	..	N. J. Oliver, R. D. Jones, P. C. T. Davies	N. Roberts	..	Lampport & Holt Line, Ltd.	..	9.7.48
<i>Clan Macraughart</i> ..	MAIH	S. I. G. Hill	..	P. Casey, J. Bicknell, G. Trickey	J. Care	..	Federal Steam Navigation Co., Ltd.	..	8.11.49
<i>Clan Macraughart</i> ..	GFKT	T. J. Sweeney	..	R. Stewart-Scott, J. D. Cubitt, R. D. Baillie, J. D. Helings	L. Carter	..	Bibby Bros. & Co.	..	31.1.50
<i>Clan Macraughart</i> ..	GDRF	H. Hocken	..	R. Phillips, T. Sheldrake, J. F. W. Farrow	G. Talbot	..		..	
<i>Clan Macraughart</i> ..	GTTV	A. Beharrel	..			..		..	

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Discovery II</i> ..	GWVM	J. F. Blackburn, D.S.O., Cdr., R.N. (Retd.)	— Clarke-Lens, — Beaumont-Jones, H. A. Howe	— McMurray	National Institute of Oceanography	18.8.49
<i>Dominion Monarch</i> ..	GRGG	Sir Henry Gordon, K.B., D.S.C. ..	A. J. Dougall, D. Brown, D. Langwell .. J. B. Whyte, K. M. Hamilton, W. D. Blingow ..	J. Cooper ..	Shaw, Savill & Albion Co., Ltd. .. Donaldson Bros. & Black, Ltd. ..	5.12.49
<i>Dorelian</i> ..	GJTL	D. MacQueen ..	C. A. Miller, M. Mortimer, P. C. T. Davies ..	G. M. Hargreaves ..	Clunies Shipping Co. ..	4.11.48
<i>Doris Clunies</i> ..	MSLB	J. G. Stevenson ..	J. McCool, S. N. Coe, D. Beighton ..	A. Allen ..	Royal Mail Lines, Ltd. ..	20.9.49
<i>Drina</i> ..	MAIL	D. R. Miller ..	K. Quirk, M. Fair, W. Overhill ..	R. H. Heard ..	Furness, Withy & Co., Ltd. ..	20.9.49
<i>Dromore</i> ..	GDSF	J. R. Moreby ..	T. Walton, L. Labistour, J. G. Perrin, N. Beattie ..	J. Gerrity ..	Lampert & Holt Line, Ltd. ..	28.9.49
<i>Dryden</i> ..	MQFT	F. A. Griffiths ..	J. D. B. Wylie, A. J. Hawkes, D. W. Hobday ..	D. R. Uglow ..	Trent Maritime Co., Ltd. ..	13.2.50
<i>Duke of Athens</i> ..	GMYS	J. G. Lomas, A.I.N.A. ..	H. Neal, A. Gibbs, T. C. Mullings ..	A. B. Ewart ..	Pha. Van Ommeren (London), Ltd. ..	14.11.49
<i>Dunkery Beacon</i> ..	GUFS	L. E. Thomas ..	E. Card, J. Pastill, J. A. Martin, W. L. D. Bayley ..	I. S. Humphrey ..	Houlder Bros. & Co., Ltd. ..	8.3.49
<i>Dunster Grange</i> ..	GCSD	R. S. Grigg, O.B.E. ..	— Freer, — Cutcliffe, D. A. Bird ..	W. Ferguson ..	Royal Mail Lines, Ltd. ..	20.9.49
<i>Durango</i> ..	MAIM	P. M. Burrell ..	— Smith, G. Whitlam, — Hargreaves ..	H. A. Liggins ..	Union Castle Mail S.S. Co., Ltd. ..	18.1.49
<i>Durban Castle</i> ..	GPGP	— Gorringe ..	E. F. H. Allen, J. K. Thomas, I. Batley, D. E. Moran ..	— Wigglesworth ..	British India Steam Navigation Co., Ltd. ..	18.3.50
<i>Durenda</i> ..	GFSL	R. Stone ..	D. Simon, D. Elkington, D. Grant ..	C. Robinson ..	Federal Steam Navigation Co., Ltd. ..	29.8.49
<i>Durham</i> ..	GWWK	R. J. Dunning ..	J. W. Rogers, W. G. Shaw, G. W. Mitten, G. D. Attwood ..	E. C. Bovel ..	Eastern & Australian S.S. Co., Ltd. ..	28.3.49
<i>Eastern</i> ..	GFTV	H. C. G. Stratford ..	W. B. Sawyers, W. Hallum, R. Watt, H. Keenan ..	J. Hodgson ..	Union Castle Mail S.S. Co., Ltd. ..	17.4.50
<i>Edinburgh Castle</i> ..	GOHN	T. W. McAllen ..	J. Smith, D. O. Robertson, J. Channing- Pearce ..	R. Hartley ..	H. Croft Baker & Sons, Ltd. ..	..
<i>Edward East</i> ..	GYXZ	J. A. Whittleton ..	H. Tomson, N. Dalziel, S. Ewing ..	A. J. Lunt ..	Anchor Line, Ltd. ..	..
<i>Egidio</i> ..	GJZD	J. L. Gibson, O.B.E. ..	G. Ramage, D. McL. Mechen, W. Marshall ..	L. Hooper ..	C. T. Bowring & Co., Ltd. ..	4.1.50
<i>El Gallo</i> ..	MAIP	P. Pederson ..	W. Mottram, C. Phillips, R. Minter ..	D. Robson ..	Donaldson Bros. & Black, Ltd. ..	4.3.50
<i>Empire Brent</i> ..	GLBX	J. Cook ..	R. D. Fielder, R. Hammond, A. Cameron ..	W. Mackenzie ..	Anchor Line, Ltd. ..	6.3.50
<i>Empire Halladale</i> ..	GPVQ	J. McGill Brown ..	T. Hender, M. R. Bremberg, J. Edwards, P. Ellett ..	D. Robson ..	Bolton S.S. Co., Ltd. ..	3.3.50
<i>Empire Martaban</i> ..	GBSV	J. D. Burns ..	D. G. Great ..	A. Mallett ..	Orient Steam Navigation Co., Ltd. ..	..
<i>Empire Orzell</i> ..	GRCB	A. C. G. Hawker, C.B.E., R.N.R. (Ret.) ..	A. C. Cable, A. Purvis, D. L. Jardine ..	H. Smith ..	Bibby Bros. & Co. ..	5.8.49
<i>Empire Pride</i> ..	MAIB	N. F. Fitch, M.B.E. ..	W. J. P. Roberts, R.D., R.N.R., A. G. Ingram ..	G. R. Stuart ..	Blue Star Line, Ltd. ..	28.10.49
<i>Empire Star</i> ..	GCDP	G. E. Barnard ..	A. H. R. Peace, R. Walgate, J. H. Fraser, B. Snell ..	R. Porter ..	Fenton S.S. Co., Ltd. ..	5.8.49
<i>Empire Touy</i> ..	GDKL	M. L. Thomas ..	J. M. Brackenridge, R. G. Roberts, J. Richardson ..	W. Campbell ..	Pandelis Shipping Co., Ltd. ..	4.11.47
<i>Empire Viceroy</i> ..	MAJN	J. B. S. Bland ..	..	..	Canadian Pacific S.S., Ltd. ..	15.12.48
<i>Empress of Australia</i> ..	GFSB	C. E. Duggan, R.D., R.N.R. ..	..	..	..	..
<i>Empress of Canada</i> ..	GSVR	J. P. Dobson, D.S.C., R.D., R.N.R. ..	..	..	..	..
<i>Empress of France</i> ..	GNTV	B. B. Grant, R.D., R.N.R. ..	..	..	..	..

<i>Epsom</i>	..	GCYD	R. D. Griffiths, O.B.E.	G. T. Sharpe	R. M. King, E. M. Thomson	R. T. Jones	Watts, Watts, & Co., Ltd.	20.7.49
<i>Eros</i>	..	GYSB	R. C. Vigurs	V. Irving, C. P. Turquand, M. L. Mitchell	R. McEwan	..	Steamship Eros, Ltd.	2.12.49
<i>Esperance Bay</i>	..	GSMP	T. V. Roberts, R.D., Cdr., R.N.R.	G. S. Sheldon, M. J. Locke, J. D. Rendle, J. F. Scott	..	..	..	..
<i>Essex Trader</i>	..	GCMS	D. G. Evans	D. Owen, F. Stamps, D. Harris	M. J. Sheehan	..	Shaw, Savill & Albion Co., Ltd.	1.3.50
<i>Esso Glasgow</i>	..	GTXC	C. G. Broughton	R. J. Davies, J. C. Young, D. J. Harrison	G. Moore	..	Trader Navigation Co., Ltd.	29.11.49
<i>Explorer</i>	..	GYJX	J. L. Curle	W. C. Johnstone, H. Cowley, W. C. T. Pennant	P. J. Everett	..	Esso Transportation Co., Ltd.	14.11.49
<i>Fanad Head</i>	..	GNQQ	W. A. Haddock	J. McCauley, R. Harris, C. R. Wilson, J. R. Coffey	B. Tallon	..	T. & J. Harrison	29.3.50
<i>Finland</i>	..	MJYZ	A. Wilson, O.B.E.	J. S. Drynan, J. W. Phinister	J. J. Dunne	..	Heyn & Sons, Ltd.	14.3.50
<i>Fordale</i>	..	GSMW	T. T. Oliver	K. D. A. Lamb, N. MacAlister, D. Calvert	H. Knight	..	Currie Line, Ltd.	18.3.48
<i>Fort Cadotte</i>	..	MAKS	J. C. Dawson	E. N. Prior, M. McPhee, K. Stuart	E. S. Pillow	..	Shaw, Savill & Albion Co., Ltd.	25.11.49
<i>Fort Nakasley</i>	..	MAMM	A. Cromarty, O.B.E.	R. G. McClymont, D. H. Lee, — Ogilvy	R. James	..	Cunard Steam Ship Co., Ltd.	11.10.49
<i>Fort Spokane</i>	..	MXLY	W. T. Fitzgerald, R.D., R.N.R.	P. T. Drake, A. M. Thomson, J. Millington	— Norton	..	J. & J. Denholm, Ltd.	1.3.50
<i>Franconia</i>	..	GBRQ	M. Stewart	A. B. Parkhouse, W. P. Davis, P. C. W. Power	G. M. Parsons	..	Cunard Steam Ship Co., Ltd.	30.8.49
<i>Fresno City</i>	..	GBYD	W. V. Doughty	..	T. H. Owen Ffoulkes	..	Cunard Steam Ship Co., Ltd.	24.6.48
<i>Flyingdale</i>	..	GKSR	R. Coultas	W. R. Davies, W. W. Gatenby, W. W. Carnish	..	..	Sir William Reardon Smith & Sons, Ltd.	16.1.50
<i>Geologist</i>	..	GIMR	A. E. Jackson	S. Richardson, R. H. Douglas, W. Owen	J. Ellis	..	Headlam & Son	20.2.50
<i>Geo. W. McKnight</i>	..	GQCM	R. A. Swan, O.B.E.	D. Aubrey, F. Eastman, S. M. Garside	M. H. Whitehead	..	T. & J. Harrison	6.1.49
<i>Georgic</i>	..	GRLJ	C. S. Williams	G. H. Drinkwater, A. R. M. Graham, T. O'Sullivan	J. Everitt	..	Esso Transportation Co., Ltd.	28.3.49
<i>Glaucus</i>	..	GDYZ	J. Macarthur	R. G. Edwards, F. A. S. Millar, H. Bell	A. G. Hill	..	Cunard Steam Ship Co., Ltd.	28.9.49
<i>Glenartney</i>	..	GBLG	W. E. Coates	C. Lortimer, J. B. Mothersill	E. Roberts	..	A. Holt & Co.	31.12.47
<i>Glenbank</i>	..	GKLC	T. Fraser	W. Murphy, D. V. Hoskins	F. Wilson	..	Glen Line, Ltd.	11.2.49
<i>Glenorchy</i>	..	GBLL	C. Houghton	C. C. J. Neaves, H. Bell, C. J. Sawle	W. Lingbottom	..	Andrew Weir & Co., Ltd.	7.12.48
<i>Gloucester</i>	..	MANK	H. D. Horwood, R.D., Cdr., R.N.R.	L. James, P. Slocombe, P. D. Moran	E. H. Power	..	Glen Line, Ltd.	5.12.49
<i>Golfio</i>	..	GBYL	S. A. Sapsworth	R. A. Laycock, E. Hodgson, P. W. Howells	R. J. Devlin	..	Federal Steam Navigation Co., Ltd.	20.4.49
<i>Gracia</i>	..	MANN	J. McInnes	D. M. Allan, G. B. Manson, I. Barbour	R. W. Smith	..	Elders & Fyffes, Ltd.	..
<i>Granford</i>	..	MOGC	E. C. I. Morgan	J. Gray, A. Kopec, W. Harris	M. Grant	..	Donaldson Bros. & Black, Ltd.	20.8.49
<i>Haparangi</i>	..	GYX	C. R. Pilcher, O.B.E.	J. R. Ramsay, H. P. Lunn, J. T. Beattie, J. P. B. Bushell	..	..	Goulondris Bros., Ltd.	..
<i>Harmatris</i>	..	GTWP	A. R. Phelps	G. S. Robinson, A. H. Barber, J. R. Morford	L. P. Rayner	..	New Zealand Shipping Co., Ltd.	22.7.49
<i>Helicina</i>	..	GKBC	D. Keddie	I. M. L. McLean, W. P. Abley, M. B. Mactavish, E. C. Hall	L. C. Morris	..	J. & C. Harrison, Ltd.	17.10.49
<i>Herdman</i>	..	GPZX	W. A. Short, O.B.E.	J. W. Embleton, K. Cobb	J. T. Moran, A. W. Hutchinson	..	Anglo Saxon Petroleum Co., Ltd.	22.8.49
<i>Herefordshire</i>	..	GOFG	H. Davies	H. Knapper, J. W. MacKinlay	I. Donald	..	T. & J. Harrison	..
<i>Highland Brigade</i>	..	GJKN	H. G. Whittle, O.B.E.	D. W. Buckle, D. N. G. East, L. H. Paine	F. W. Greaves	..	Bibby Bros. & Co.,	12.10.49
<i>Highland Chieftain</i>	..	GCTY	H. D. Hooper	M. Wardle, J. P. Martin, G. W. T. Griffiths, H. R. Wright	W. Gay	..	Royal Mail Lines, Ltd.	6.2.50
<i>Highland Monarch</i>	..	GMZF	B. C. Dodds, O.B.E.	N. Lawson, C. B. Lambert, R. L. Collins, A. M. B. Ferguson, R. Tysoe	T. Desboro	..	Royal Mail Lines, Ltd.	8.1.49
<i>Highland Princess</i>	..	GEMN	W. Roberts	J. Anderson, W. M. Morton	F. Dunk	..	Royal Mail Lines, Ltd.	18.8.49
<i>Hilary</i>	..	GQVM	J. W. Binns, O.B.E.	F. R. Hughes, J. A. Rowan, A. C. R. Murray	F. Goodall	..	Royal Mail Lines, Ltd.	7.10.49
	..				T. Cornwell	..	Booth S.S. Co., Ltd.	3.4.50

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Himalaya</i> ..	MCDY	H. C. C. Forsyth, R.D., Cmde., R.N.R. ..	G. C. Barrett, G. B. Thom, E. A. W. Mortleman-Lewis, R.D., R.N.R. ..	F. E. Ash ..	P. & O. Steam Navigation Co. ..	4.4.50
<i>Hopetown</i> ..	GZZG	Stewart Wilson, O.B.E. ..	H. G. Strickland, D. Barfoot, J. D. Todd ..	P. Probert ..	Stephens, Sutton, Ltd. ..	14.12.48
<i>Hopetown</i> ..	GKGI	C. R. Laing ..	J. Pattison, J. Meeks ..	M. O. Lacey ..	Stott, Mann & Fleming, Ltd. ..	10.1.50
<i>Horatia</i> ..	MANZ	E. H. Hopkins ..	W. Stevens, P. Jeannes, G. Munson, B. Hewitt ..	D. E. Hoddling ..	New Zealand Shipping Co., Ltd. ..	8.11.49
<i>Hubert</i> ..	GFWW	G. G. Roberts ..	T. E. Williams, D.S.C., R.D., Lt.-Cdr., R.N.R., K. Grayson, F. Forster ..	D. Swindon ..	Booth S.S. Co., Ltd. ..	23.6.49
<i>Hurmus</i> ..	GJZF	F. Loughheed ..	G. Naylor, N. I. Collett, P. R. Moulton ..	F. Wilman ..	New Zealand Shipping Co., Ltd. ..	8.11.49
<i>Inishowen Head</i> ..	MAOC	I. Alexander ..	N. C. Stark, C. O'Connor, I. Pigott ..	J. J. Dunne ..	G. Heyn & Sons, Ltd. ..	20.2.50
<i>Inverbank</i> ..	GKML	A. F. King ..	G. Cheyne, A. Teale, A. Findlay ..	S. Dewsnap ..	Andrew Weir & Co., Ltd. ..	21.7.49
<i>Jamaica Producer</i> ..	VPLM	G. E. M. Jenkins ..	E. G. J. Roberts, F. Saunders, P. R. K. Davis ..	A. C. Webb ..	Kaye, Son & Co., Ltd. ..	3.1.50
<i>Jersey City</i> ..	GIGA	I. Williams ..	D. L. Beynon, D. Baker, H. M. Keavill ..	D. R. Davies ..	Sir Wm. Reardon Smith & Sons, Ltd. ..	30.9.49
<i>Jetmore</i> ..	MAOF	G. Brown ..	P. V. McCullough, K. H. Rowland, E. B. Pratt ..	S. J. Schuster ..	Furness, Withy & Co., Ltd. ..	20.12.49
<i>John Biscoe</i> ..	GFLF	Cdr. H. Kirkwood, D.S.C., R.N. ..	P. Bathurst, W. L. Harrison, R. J. Griffiths ..	P. A. Senior ..	John Holt Line, Ltd. ..	12.10.49
<i>John Holt</i> ..	GNFD	J. Shaw ..	I. R. Suffren, F. Le Messurier ..	F. Matthews ..	Trinder, Anderson & Co. ..	21.8.48
<i>Kaipaki</i> ..	GOGJ	T. Fenwick ..	D. M. Steven, N. Strizaker, A. E. Carter ..	R. M. Evans ..	Trinder, Anderson & Co. ..	16.12.49
<i>Kaipara</i> ..	GZFY	G. F. Parkinson, O.B.E. ..	C. F. Turner, J. Milne, J. Newing ..	T. Herbert ..	Trinder, Anderson & Co. ..	4.1.49
<i>Katuna</i> ..	GQGG	R. F. Hellings ..	W. Watson, F. I. Callanan ..	A. Robbins ..	United Africa Co., Ltd. ..	10.3.50
<i>Kano Palm</i> ..	GVRM	H. Coffey, R.D., R.N.R. ..	Ross, J. H. Drummond, I. Bigham ..	C. Robinson ..	Union-Castle Mail S.S. Co., Ltd. ..	24.2.49
<i>Kentworth Castle</i> ..	MQLP	L. H. Farrow ..	B. Linklater, A. Stalker, S. Twyford ..	C. Jones ..	Federal Steam Navigation Co., Ltd. ..	10.12.49
<i>Kent</i> ..	GPDC	N. A. Thomas ..	W. Keith, G. Griffiths, P. Kidd ..	W. Fielding ..	Dodd, Thomson & Co., Ltd. ..	10.10.47
<i>King Robert</i> ..	MAON	G. Craze ..	J. C. Davies, G. F. Hogg, A. J. Moore ..	P. Kelly ..	Dodd, Thomson & Co., Ltd. ..	8.11.49
<i>King William</i> ..	GNVF	E. B. Driver ..	W. G. Smith, A. L. Rugden, P. H. Alexander ..	P. Goss ..	F. C. Strick & Co., Ltd. ..	24.8.49
<i>Kohistan</i> ..	GSFZ	C. M. Henderson ..	R. H. Scauff, W. Johnston, L. J. Nurse ..	K. W. Baddeley ..	Pacific Steam Navigation Co. ..	20.9.49
<i>Laguna</i> ..	GJKC	R. D. S. Eckford ..	J. Orr, A. M. Brown, O. Wilson ..	J. J. Brennan ..	Galbraith, Pembroke & Co., Ltd. ..	4.4.50
<i>Lambrook</i> ..	MAOS	H. F. McIntnes ..	A. Muir, M. T. Morton, W. W. S. Arnott ..	J. B. Allan ..	Turnbull, Martin & Co., Ltd. ..	12.7.49
<i>Lanarkshire</i> ..	GCTC	A. R. Coosor ..	W. H. Mailey, H. Treasurer, O. Ashcroft ..	A. Jones ..	Bibby Bros & Co. ..	3.3.50
<i>Lancashire</i> ..	GLZC	E. W. Jeffries ..	S. Dickenson, J. Bicknell ..	N. Moore ..	Lampert & Holt Line, Ltd. ..	1.6.49
<i>Lansell</i> ..	GFND	D. Roberts ..	A. P. S. Jackson, N. Morganti, R. J. Stanley ..	J. Brownlee ..	Anglo-Saxon Petroleum Co., Ltd. ..	12.10.49
<i>Latia</i> ..	GLCF	J. B. Ritchie ..	H. Owen, J. Sutherland, C. Single, T. Rowland ..	E. Howarth ..	Federal Steam Navigation Co., Ltd. ..	8.11.49
<i>Leicester</i> ..	GBTG	S. W. Andrews ..	C. R. Eaddy, C. G. Watterson, J. M. Whitridge, L. Anderson ..	W. C. Doyle ..	Andrew Weir & Co., Ltd. ..	12.7.49
<i>Leverbank</i> ..	GLPZ	D. Gillies ..	F. Methan, J. Williams, J. Beer ..	K. W. Baddeley ..	Ellerman's Wilson Line, Ltd. ..	1.6.48
<i>Linguist</i> ..	GOBC	A. H. Frew ..	D. Leitch ..	J. Eager ..	Union-Castle Mail S.S. Co., Ltd. ..	16.11.49
<i>Liorno</i> ..	GPWF	E. S. Green ..	C. Lines, D. W. Verniers, A. H. Benson ..	M. Riley ..	Crest Shipping Co., Ltd. ..	25.2.49
<i>Liombby Castle</i> ..	GFLV	B. W. B. Lloyd ..	J. H. Allenby, F. Hutchings, R. Pass ..	E. Fisher ..	Pacific Steam Navigation Co. ..	25.2.49
<i>Lloydcross</i> ..	MAOY	L. Barwell ..				
<i>Lobos</i> ..	GDXL	P. Ray ..				



Loch Avon	GMZT	—, Mason ..	G. E. Leech, D.S.C., R. Phillips, J. V. Bradbury, J. M. Ashworth ..	M. R. Littlejohn	Royal Mail Lines, Ltd.	18.3.48
Loch Garth	GMZY	R. N. Fletcher	E. A. E. Littlewood, J. N. Kavanagh, A. Hanily ..	D. Morgan ..	Royal Mail Lines, Ltd.	17.11.49
Loch Ryan	MAOZ	H. H. Treweeks	R. C. Hunnisett, V. Charles, B. Stark, C. Cowley ..	R. Turner ..	Royal Mail Lines, Ltd.	22.11.49
Lord Gladstone	MAPA	P. S. Kenning	A. H. Treikelder, J. Janczak, J. S. Armstrong ..	J. Seidler ..	Ships Finance & Management Co., Ltd.	4.3.49
Lord Glentoran	GRMK	W. J. Leinster	A. F. James, C. O. Connor, S. Thompson	J. J. Sheridan	G. Heyn & Sons, Ltd.	21.12.49
Lord O'Neill	GRLZ	R. A. Ferguson	R. M. Hall, R. Harper, J. Blaney, E. L. Harper ..	C. A. Murphy	G. Heyn & Sons, Ltd.	1.3.50
Loriga	GCLM	S. E. Aylard	A. S. Maclean, R. Dootson, C. Pringle ..	J. Murray	Pacific Steam Navigation Co.	4.3.50
Losada	GDXM	P. L. Hockey	F. I. Leicester, W. Jenkins, J. G. Galston	E. O'Neill ..	Pacific Steam Navigation Co.	29.7.49
Luminous	MAPB	S. Weatherston	A. W. Banks, R. M. Chalmers ..	D. Whireling	H. E. Moss & Co.	20.6.49
Machann	GDPS	H. S. Wood	—, Collins, —, Sawle, E. Hill, —, Naylor	W. S. Ogilvie	A. Holt & Co.	30.12.49
Magharda	GKKF	R. A. Penston	A. Jackson, L. T. S. Saxty, J. Robertson	I. Caddy ..	T. & J. Brocklebank, Ltd.	20.2.50
Magdabur	GBIX	A. Hill, O.B.E.	H. Ackertley, L. Burn, G. Kay ..	H. Halton ..	T. & J. Brocklebank, Ltd.	6.2.50
Mahanada	GOFM	J. W. B. Robertson, R.D., R.N.R.	J. Brand, J. C. Long, P. Greenall, G. P. Huris ..	T. Williams ..	T. & J. Brocklebank, Ltd.	4.1.49
Mahia	GNZV	G. Campbell	R. F. Hamilton, N. E. Wood, D. M. Heynes ..	F. Jones ..	Shaw, Savill & Albion Co., Ltd.	1.3.50
Mahout	GDZN	H. F. Scouins	D. L. Campbell, E. G. Anderson, H. L. Burn ..	C. W. Jacobs	T. & J. Brocklebank, Ltd.	31.12.49
Mahseer	GZSV	L. T. Owen, O.B.E.	J. W. Ross, J. H. Moore, E. McAully ..	B. Pinn	T. & J. Brocklebank, Ltd.	6.9.49
Mahud	GSCP	L. E. Jeans	O. Pritchard, F. Mitchell, P. A. Gunson ..	F. C. Bailey ..	T. & J. Brocklebank, Ltd.	13.4.50
Mahbar	GSLC	S. Broughton	C. S. W. Gray, E. Watkins, R. F. Holland	G. Caddy ..	T. & J. Brocklebank, Ltd.	12.7.49
Makalla	GOFN	T. E. Eddy	J. P. Jackson, A. R. Davies, G. Pari Huws	A. E. Weston	T. & J. Brocklebank, Ltd.	27.3.50
Makaland	GOPF	J. Richardson	J. Clarke, J. R. Kemp, D. J. Evans ..	B. J. Smith, M.B.E.	T. & J. Brocklebank, Ltd.	9.9.49
Malanacha	GZRD	S. Broughton	E. Roberts, I. J. Sladen, K. Slapp ..	G. Close ..	Furness, Withy & Co., Ltd.	18.1.49
Malayan Prince	GFVW	I. D. Fraser	P. J. Leech, A. Jewers ..	W. Humphries	Houlder Bros. & Co., Ltd.	25.4.49
Malmesbury	MAOE	W. McMellin	R. M. Sinclair, R. N. Firth, J. C. Jenkins	A. Macbeth	P. & O. Steam Navigation Co.	16.1.50
Maloja	GFBD	E. J. Parry ..	W. Hine, J. A. McCarran, R. O. White, J. S. Ellis ..	A. S. J. Broadbent	Manchester Liners, Ltd.	6.4.50
Manchester City	GBBP	F. L. Osborne	W. E. Quirk, J. E. Askew, H. Rogers, M.B.E., Lieut. R.N.R.	M. Doran ..	Manchester Liners, Ltd.	20.2.50
Manchester Commerce	GKMY	H. Hancock	M. F. Robinson, C. Cuirid, T. H. Lynn ..	P. Cummins	Manchester Liners, Ltd.	2.2.48
Manchester Division	GBYR	E. W. Espley	J. E. Jones, J. S. Dalgarno, T. Field, A. H. Swan ..	P. B. McNab	Manchester Liners, Ltd.	10.1.50
Manchester Port	GYNF	F. Downing	F. Lewis, T. H. Lynn, N. W. Cockshott ..	W. C. Critchley	Manchester Liners, Ltd.	20.2.50
Manchester Progress	GPGD	W. H. Downing	W. R. McLaren, J. E. Askew, F. Jones ..	A. Reid ..	Manchester Liners, Ltd.	19.10.49
Manchester Regiment	GBRD	F. D. Scruss, O.B.E., D.S.C.	F. Lewis, D. Heaton, T. H. Lynn ..	E. Ambler ..	Manchester Liners, Ltd.	14.1.47
Manchester Shipper	MAPC	I. Barclay ..	D. A. Keller, A. W. Wiltshire, J. D. Guthrie ..	G. W. Hazel ..	T. & J. Brocklebank, Ltd.	8.11.49
Mandasor	GBNY	R. Humble	H. Edwards, C. R. Tutty, C. Main ..	G. Camm ..	Ellerman's Wilson Line, Ltd.	3.3.50
Marengo	GLFW	F. Barnard ..	A. J. Thompson, B. S. Kenn, R. W. Emeney ..	J. Moran	Kaye, Son & Co., Ltd.	29.3.50
Margay	GFYQ	E. A. Prentice	L. D. Forster, W. Huntley, W. Rothwell ..	A. Hadden ..	Dalhousie Steam & Motor Ship Co. Ltd.	6.3.50
Marietta Dal	GBQJ	J. G. F. Brighty	I. A. McLaren, J. Ritchie, —, Woodward	D. Owen ..	T. & J. Brocklebank, Ltd.	7.2.49
Markhor	GTFZ	I. B. Newman	R. J. Sinclair, W. Allen ..	K. C. Wright	Chr. Salvesen & Co.	27.8.48
Marna	MLPK	G. R. Nelson	J. Cush, T. Liddle, D. Parker ..		Kaye, Son & Co., Ltd.	4.1.49
Marquita	GQVY	F. C. Jennings	H. Jones, T. Tiers, L. Marsell ..			
Marsdale	GBKB	N. Ferguson				

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Marland</i> ..	GTGG	J. Fox-Lloyd ..	E. L. Jones, P. A. Litherland, D. L. de Landes ..	D. H. Butterworth ..	T. & J. Brocklebank, Ltd. ..	31.1.50
<i>Maritla</i> ..	GNQT	H. Bunn ..	M. G. Stevens, H. R. Watson, D. Johnston ..	D. Diver ..	Kaye Son & Co., Ltd. ..	21.12.49
<i>Mataroa</i> ..	GCSV	R. G. James, R.D., Capt., R.N.R. ..	H. G. Moss, P. M. Williams, R. McL. Munro ..	L. Boyce ..	Shaw, Savill & Albion Co., Ltd. ..	20.9.49
<i>Matheran</i> ..	GOFQ	A. B. Bannatyne, O.B.E. ..	H. Simpson, J. A. Miller, R. M. Lucas ..	P. Neeson ..	T. & J. Brocklebank, Ltd. ..	2.11.49
<i>Matina</i> ..	GSZX	H. Roberts, O.B.E. ..	Crane, R. W. Sims, E. Whitehouse ..	D. Knights ..	Elders & Fyffes, Ltd. ..	30.11.49
<i>Mauretania</i> ..	GTTM	C. Ivan Thompson ..	S. Dexter, — Jolliffe, — Elsom ..	F. Clarke ..	Cunard Steam Ship Co., Ltd. ..	12.12.49
<i>Media</i> ..	GSWR	D. M. Maclean ..	J. A. B. Munro, R. A. Elder, P. King, T. D. Ridley ..	W. M. MacArdle, M.B.E. ..	Cunard Steam Ship Co., Ltd. ..	25.11.49
<i>Melbourne Star</i> ..	GDFZ	F. N. Riley, D.S.O. ..	R. G. Taylor, D. S. Gilmour, D. A. R. James ..	J. Clarke ..	Blue Star Line, Ltd. ..	6.2.50
<i>Millais</i> ..	MAPH	A. R. Bibby, O.B.E. ..	J. Edgar, D. S. Leicester, A. B. Baines ..	J. Williams ..	Lampport & Holt Line, Ltd. ..	14.10.49
<i>Mirror</i> ..	GDFL	S. P. Sheldon ..	P. A. J. Edwards, G. W. Heron, J. Willmer ..	J. Crouch ..	Cable & Wireless, Ltd. ..	5.12.47
<i>Monarch</i> ..	GBDF	J. P. F. Benson ..	R. M. Tuchwell, R. H. Hardy, E. J. Evans ..	D. Randall ..	H.M. Postmaster General ..	5.12.49
<i>Mooltan</i> ..	GFBC	C. E. Pollitt ..	G. Buckley, J. W. Owen, P. Jeffries, M. Phelps ..	G. P. Carey ..	P. & O. Steam Navigation Co. ..	19.8.49
<i>Moveria</i> ..	GKYW	J. Jack ..	C. E. Waddel, A. T. Johnston, R. S. Hopkins ..	H. D. Robinson ..	Donaldson Bros. & Black, Ltd. ..	12.2.49
<i>Myrtlebank</i> ..	GLQB	F. Hale ..	P. A. Logan, A. Cockburn, I. S. Currie ..	R. Kehe ..	Andrew Weir & Co., Ltd. ..	1.3.50
<i>Napier Star</i> ..	MAPN	C. R. Horton, D.S.C. ..	R. W. Prince, M. E. Rideout, B. A. King ..	R. R. Mills ..	Blue Star Line, Ltd. ..	17.3.50
<i>Naticina</i> ..	GIGH	F. Mansfield ..	P. Kendall, M. Goddard, L. Stephens ..	J. E. Conway ..	Anglo-Saxon Petroleum Co., Ltd. ..	4.1.49
<i>Nestor</i> ..	GPYX	E. W. Powell, M.B.E., R.D., Cdr., R.N.R. ..	E. L. Stubbings, I. S. Todd, B. C. Pays ..	L. Booth ..	A. Holt & Co. ..	16.11.49
<i>New Zealand Star</i> ..	GYCR	G. Owen, O.B.E., R.D., Cdr., R.N.R. ..	R. Stewart, L. Berridge, P. Brecknell ..	C. J. Carter ..	Blue Star Line, Ltd. ..	26.11.49
<i>Newfoundland</i> ..	GNMC	C. H. Kenyon ..	J. B. Stewart, J. Sheffield, D. Beighton, R. B. Douglas ..	T. Cahill ..	Furness, Withy & Co., Ltd. ..	19.1.50
<i>Norfolk</i> ..	GJLV	B. Evans ..	R. Harding, E. Worster, J. Witchell, J. Gardyne ..	— Wilman ..	Federal Steam Navigation Co., Ltd. ..	20.8.49
<i>Northumberland</i> ..	GBSJ	L. W. Fulcher ..	J. M. James, P. N. Jeanes, T. G. Fuller ..	R. N. MacDonald ..	Federal Steam Navigation Co., Ltd. ..	13.4.50
<i>Norseman</i> ..	GDMC	C. S. Low ..	D. K. Dickson, J. Hunter, G. Clarke ..	R. Lennox ..	Donaldson Bros. & Black, Ltd. ..	24.3.50
<i>Nova Scotia</i> ..	GNNK	I. E. Wilson, O.B.E. ..	J. D. P. Williamson, R. Heys, D. Taylor ..	W. C. Brock ..	Furness, Withy & Co., Ltd. ..	31.10.49
<i>Novelist</i> ..	GMLG	T. E. Steel ..	D. O. Percy, G. B. Roberts, G. K. Watson, T. Maddox ..	J. Timmons ..	T. & J. Harrison ..	10.1.50
<i>Orari</i> ..	GJKX	F. Loughheed ..	M. D. Holden, J. A. Edmondson, R. S. Hales ..	J. W. Bundlewood ..	New Zealand Shipping Co., Ltd. ..	19.10.49
<i>Orbita</i> ..	GLTQ	J. Sutherland ..	E. G. Shephard, G. E. Nutshell, P. Wheelbourn ..	J. Stone ..	Pacific Steam Navigation Co. ..	1.3.50
<i>Orcaades</i> ..	MABA	T. L. Shurrock, O.B.E. ..	— Hardy, — Kingswood, — Finch, J. L. Radcliffe ..	N. A. Boon ..	Orient Steam Navigation Co., Ltd. ..	24.9.49
<i>Orduna</i> ..	GLTS	I. Williams ..	T. Wilcockton, A. L. Dixon, J. Owen ..	J. Clarke ..	Pacific Steam Navigation Co. ..	12.12.49
<i>Orion</i> ..	GYKL	N. A. Whinfield ..	D. P. Blois, A. Murray, D. K. Kinloch ..	T. Shannon ..	Orient Steam Navigation Co., Ltd. ..	14.11.49
<i>Ormonde</i> ..	GYLC	—, Vesty ..	C. S. Thomas, R.D., Lt.-Cdr., R.N.R., L. C. Kingswood, P. J. Collier ..	R. Oakley ..	Orient Steam Navigation Co., Ltd. ..	7.12.48
<i>Orontes</i> ..	GBXM	I. E. G. Goldsworthy, R.D., R.N.R. ..	R. F. Underwood, F. W. Woolley, G. McGowan ..	F. Murphy ..	Orient Steam Navigation Co., Ltd. ..	4.1.49

Otranto	..	GFKV	— Bernard	..	J. W. Terry, C. S. Thomas, —, Francis, R. L. Clark	C. J. Seaton	Orient Steam Navigation Co., Ltd.	16.1.50
Pacific Exporter	..	GBJC	E. A. Kemp	..	R. E. G. Simmonds, R. G. G. Bonney, —, Whitby, W. Sturt, —, Willoughby	A. Cory	Furness, Withy & Co., Ltd.	20.2.50
Pacific Fortune	..	GBFM	E. O. Evans	..	G. Cook, A. H. Linden, E. H. Gregson	—, Thomas	Furness, Withy & Co., Ltd.	17.3.50
Pacific Importer	..	GDKV	B. M. Collard	..	J. Ferrer, B. Gouldstone, P. Ross Farthing	J. A. Butcher	Furness, Withy & Co., Ltd.	10.1.50
Pacific Liberty	..	GDFQ	N. Coubrough	..	J. Sims, L. M. Morgan, R. A. Mastin	D. L. Oliver	Furness, Withy & Co., Ltd.	3.4.50
Pacific Nomad	..	GCRZ	W. Hutchinson	..	B. A. Newcomb, M. J. Brown, D. T. Lowes	B. Coghlan	Furness, Withy & Co., Ltd.	5.12.49
Pacific Shipper	..	GKBV	E. V. Richards	..	J. Clarke, D. R. Gibson, —, Keene	H. L. Hall	Furness, Withy & Co., Ltd.	1.3.50
Pacific Stronghold	..	GNSQ	F. H. Perry	..	M. Head, J. Purrier, E. McG. Hall	S. Vincent	Furness, Withy & Co., Ltd.	21.1.49
Pacific Unity	..	GUAN	H. S. Reavley, O.B.E.	..	J. Sheppard, W. H. Davis, E. Pepper	P. Allison	Furness, Withy & Co., Ltd.	20.2.50
Palacio	..	GNJW	J. P. Harris	..	—, Faulkner, J. Szhage, R. Lidgate, C. Long	T. A. Robinson	MacAndrews & Co., Ltd.	22.3.50
Palomares	..	GJGN	D. L. Thomas, M.B.E.	..		L. Phillips	MacAndrews & Co., Ltd.	19.1.50
Pampas	..	GC DL	R. C. S. Woolley, R.D., R.N.R.	..		J. Tuck	Royal Mail Lines, Ltd.	20.3.50
Papamui	..	GDJW	H. N. Lawson, R.D., R.N.R.	..	J. Allison-Jones, S. D. Gibson, B. Sugden	L. J. Roberts	New Zealand Shipping Co., Ltd.	1.2.50
Paparoa	..	GRCZ	D. H. Chadwick	..	B. Applegate, P. J. Field, T. A. Bennett	H. Hare	New Zealand Shipping Co., Ltd.	10.1.50
Paraguay	..	MAQS	H. V. Todd, R.D., R.N.R.	..	T. Train, R. Kinloch, M. Byrd	P. Goulden	Royal Mail Lines, Ltd.	31.1.50
Pardo	..	GMNZ	T. Powell	..	G. A. Gibbons, D. Davies, J. T. Jones	H. J. Coates	Royal Mail Lines, Ltd.	20.4.49
Parima	..	GCLQ	H. E. Sang	..	J. T. Jones, R. C. Hunnisett, J. M. Barber	N. H. Crocker	Royal Mail Lines, Ltd.	21.3.49
Paritanga	..	MMBD	H. P. Mallet	..	P. C. Reed, R. Elenor, C. B. Thompson	B. S. Magennis	P. & O. Steam Navigation Co	12.2.49
Parthua	..	GSWQ	C. B. Osborne, R.D., R.N.R.	..	R. Arnott, P. S. Taylor, J. K. Finlay	A. O'Sullivan	Cunard Steam Ship Co., Ltd.	16.11.49
Perim	..	GCCB	J. M. Peter	..	P. J. Jackson, P. Hewitt, R. T. Neve	F. Groves	P. & O. Steam Navigation Co.	7.10.49
Perthshire	..	GYWK	A. J. Hogg	..	J. Browne, M. P. R. Turner, G. Sharp, J. K. Horne	F. Rayner	Turnbull, Martin & Co., Ltd.	4.4.50
Philomel	..	GYPV	H. M. Selmer	..	D. C. Diggins, J. Mordin, W. Davies, P. Beech	A. Laurie	General Steam Navigation Co., Ltd.	14.11.49
Philosopher	..	MAQV	H. Coates	..		P. Hampson	T. & J. Harrison	4.1.49
Pileomayo	..	GBZX	T. Davies	..	D. P. Warren, P. Anthony, J. Egan	L. P. Sayer	Royal Mail Lines, Ltd.	1.6.49
Pipiriki	..	GDRQ	R. G. Rees	..	P. M. Busby, D. G. Seward, A. W. Finch	P. Curzon	New Zealand Shipping Co., Ltd.	10.1.50
Polar Maid	..	MAQX	J. T. Leask	..	E. D. Smith, W. Wilson		Chr. Salvesen & Co.	
Port Auckland	..	GWRB	W. G. Enright, O.B.E., Cdr., R.N.R.	..		I. Griffiths	Port Line, Ltd.	18.8.49
Port Brisbane	..	GWRC	H. Steele	..	G. K. Morris, P. Smith, W. M. Crossman	E. G. Gunner	Port Line, Ltd.	8.2.50
Port Chalmers	..	GWOR	H. W. Hazlewood	..	D. M. Mackeith, I. H. Stewart, C. Milne		Port Line, Ltd.	
Port Hobart	..	GKGC	T. F. Kippins, O.B.E., D.S.C.	..		B. Morley-Evans	Port Line, Ltd.	16.12.48
Port Jackson	..	GZKR	H. Pinkney, D.S.O., M.B.E.	..	A. J. Braund, J. D. Atchison, R. G. Gilling	R. C. Crompton	Port Line, Ltd.	10.12.49
Port Lincoln	..	GFZK	L. Copeland	..	R. V. McKee, D. M. MacKeith, D. Sinclair	P. T. McKeon	Port Line, Ltd.	31.1.50
Port Macquarie	..	MAQY	E. E. Roswell	..	G. G. Carter, B. St. J. Smith, J. Wardell	R. Robertson	Port Line, Ltd.	23.2.49
Port Phillip	..	MAQZ	I. G. Lewis, O.B.E.	..	R. M. Liley, F. Lascelles, H. A. Sproul-Cran	B. McGovern	Port Line, Ltd.	16.12.49
Port Pirie	..	GLVQ	F. W. Bailey, M.B.E.	..	I. Rose, H. Thompson, H. R. Long	W. Miller	Port Line, Ltd.	8.3.50
Port Wellington	..	GDNJ	E. J. Syvret	..	E. R. Cliffe, W. Wakefield, J. T. Martyn	J. S. McPherson	Port Line, Ltd.	14.3.50
Port Wyndham	..	GYCW	E. E. Roswell	..	P. A. Rhodes, W. E. Bell, G. A. Blundell	I. N. Coutts	Port Line, Ltd.	8.11.49
Potaro	..	GNLJ	G. H. Taggart	..	C. R. Lewis, M. Field, C. M. Watkins	T. J. Berry	Royal Mail Lines, Ltd.	16.11.49
Pretoria Castle	..	GOAE	J. C. Brown, C.B.E., R.D., Cmde., R.N.R.	..	R. D. Jones, R. R. Thompson, J. T. Price		Union-Castle Mail S.S. Co., Ltd.	23.1.50
Rakia	..	GFGW	J. S. Oxnard	..	R. G. Patterson, W. Kitchen, —, Trayner	H. Oliver, M.B.E.	New Zealand Shipping Co., Ltd.	30.9.49
Ramore Head	..	MAXX	E. W. Black	..	J. Burry, T. Wadie, J. Wright	F. Ratley	G. Heyn & Sons, Ltd.	
Ranchi	..	GLKW	A. G. Jenkins	..	E. R. Rose, J. Clayton, P. W. Holmes, D. Lightly	R. V. Gregory	P. & O. Steam Navigation Co.	18.1.49
Rangitata	..	GSZN	G. Kinnell, O.B.E., M.V.O.,	..	M. Drake, G. Dunsford, C. Single	P. J. Smyth	New Zealand Shipping Co., Ltd.	3.11.48
Rangitiki	..	GSXW	P. B. Clarke, O.B.E., D.S.C.	..	M. J. Blake, R. E. Baker, W. M. Bell	S. Peeling	New Zealand Shipping Co., Ltd.	28.10.49

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Rangitoto</i> ..	GLMV	A. E. Lexington, D.F.C.	T. Moncrieff, J. Jones, M. D. Keogh ..	R. W. Jones ..	New Zealand Shipping Co., Ltd. ...	13.2.50
<i>Regent Hawk</i> ..	GMND	G. R. Arthur ..	J. A. Greenwood, J. B. Olsson, W. J. Campbell ..	J. Butler ..	Regent Petroleum Tankship Co., Ltd. ...	12.7.49
<i>Reina Del Pacifico</i> ..	GMPS	J. Whitehouse ..	D. M. Muir, W. Jones, O. N. Selwood ..	A. L. Lloyd ..	Pacific Steam Navigation Co. ...	27.3.50
<i>Repton</i> ..	GPFL	D. Cowrie ..	G. A. Horner, T. W. Jones, R. B. Escreet ..	A. R. Roe ..	Galbraith, Pembroke & Co., Ltd. ...	24.2.50
<i>Rhodesia Star</i> ..	GUAX	G. L. Evans ..	J. Fitches, H. Riley, B. A. Gash ..	J. Sanderson ..	Lanport & Holt Line, Ltd. ...	21.4.50
<i>Rialto</i> ..	GBLV	E. Tyler ..	— Chapman, C. J. Willis, — Hart ..	T. W. Shea ..	Ellerman's Wilson Line, Ltd. ...	12.9.49
<i>Richmond Castle</i> ..	GCSP	— Ferguson, O.B.E.	— Huggins, D. Goodwin, — Heppings- stone ..	— Longton ..	Union-Castle Mail S.S. Co., Ltd. ...	20.4.50
<i>Richmond Hill</i> ..	GMKJ	S. Sloan ..	H. Butler, A. J. Bulley, A. G. Bray, A. H. Fawcett ..	J. G. Mitchell, R. G. J. Alton ..	Counties Ship Management Co. Ltd. ...	29.8.49
<i>Ripplingham Grange</i> ..	GIGP	R. Owen, O.B.E. ..	G. D. Fowler, R.D., Lt.-Cdr., R.N.R., J. V. H. Drummond, D. Kerr ..	G. Mein ..	Union Castle Mail S.S. Co., Ltd. ...	25.4.49
<i>Rochester Castle</i> ..	GZQF	J. M. Rayner, R.D., Cdr., R.N.R. ..	R. J. Miller, G. E. Smith ..	J. Tuck ..	Union Castle Mail S.S. Co., Ltd. ...	3.3.50
<i>Rodin Castle</i> ..	GYIZ	F. R. Pope ..	T. Allan, M. W. Williams, M. N. R. Knowles ..	T. M. K. Knowles ..	Union Castle Mail S.S. Co., Ltd. ...	9.11.49
<i>Ronallan Castle</i> ..	GDFT	R. A. D. Cambridge, D.S.C., R.D., Cdr., R.N.R. ..	P. Eckford, M. Kenshole ..	L. W. Bettinson ..	Union Castle Mail S.S. Co., Ltd. ...	25.1.50
<i>Roxburgh Castle</i> ..	GBGS	J. D. B. Fisher ..	A. Borthwick, B. Edgington, P. Hunt ..	M. Cahill ..	Blair Star Line, Ltd. ...	23.11.49
<i>Royal Star</i> ..	MARJ	G. Aldridge ..	L. Haddock ..	..	Navigation & Coal Trade Co., Ltd. ...	..
<i>Rubystone</i> ..	MARK	E. I. Griffiths ..	..	..	Baltic Shipping Co. (Newcastle-on-Tyne), Ltd. ...	..
<i>Rumymede Park</i> ..	GNMZ	T. Stroughair ..	..	..	Currie Line, Ltd. ...	8.1.47
<i>Rutland</i> ..	GTCP	W. Thorn ..	I. A. Williamson ..	J. Macfarlane ..	Bolton S.S. Co., Ltd. ...	14.3.50
<i>Ruyssdael</i> ..	MAQP	B. F. R. Thomas ..	F. Howgego, J. T. Hibbert, P. Yorke ..	W. Vaughan ..	Ellerman's Wilson Line, Ltd. ...	20.2.50
<i>Sacramento</i> ..	GKCN	J. E. Robinson, M.B.E. J. H. Ellis, D.S.C. ...	W. White, W. Walker, J. A. Ryley ..	J. P. Carter ..	..	..
<i>St. Apollo</i> ..	GBBZ	..	J. H. Ellis, D.S.C., E. E. White, L. A. Abbey ..	E. E. White ..	..	..
<i>St. Cristpin</i> ..	MBSW	A. E. Hall ..	D. L. Verity ..	D. L. Verity ..	T. Hamling & Co., Ltd. ...	24.2.50
<i>St. Roman</i> ..	GBFJ	A. Robinson ..	G. M. Clark, J. Hunter, I. MacGregor ..	W. Docherty ..	B. A. Parkes ..	10.12.47
<i>Salacia</i> ..	GZRN	T. S. Graham ..	R. B. Bryant, E. L. Slemman, K. Williams ..	F. Fitzgerald ..	Thos. Hamling & Co., Ltd. ...	16.1.50
<i>Salamanca</i> ..	GLSG	D. W. Hutchison ..	P. D. O'Driscoll, J. Peters, R. Riley, K. Williams, G. A. Duffey ..	..	Donaldson Bros. & Black, Ltd. ...	13.4.50
<i>Salaverry</i> ..	GBLQ	D. J. Richards ..	A. Powell, R. Seaff, R. R. Williams ..	J. Slater ..	Pacific Steam Navigation Co. ...	11.1.50
<i>Salinas</i> ..	GLLK	A. G. Litherland ..	D. I. Jones, W. B. Holmes, G. D. Jeffrey ..	A. J. Fitzgerald ..	Pacific Steam Navigation Co. ...	27.6.49
<i>Samanco</i> ..	MARQ	A. Lyall ..	A. D. Hunt, N. Crook, R. G. Mossop, D. Calvert ..	A. Hatfield ..	Pacific Steam Navigation Co. ...	20.4.49
<i>Samaria</i> ..	GJCF	J. Chapman, R.D., R.N.R.	T. Magee, D. P. Carroll, D. Frazer ..	E. P. Bishop ..	Cunard Steam Ship Co., Ltd. ...	19.12.49
<i>San Adolfo</i> ..	GYKK	L. Mays ..	R. Auric, D. A. Ward, D. N. Richards ..	B. A. Palin ..	Eagle Oil & Shipping Co., Ltd. ...	16.11.49
<i>San Cirilo</i> ..	GZMR	T. L. Pearson ..	A. F. Walker, R. Wilkinson, B. T. Orange ..	C. Minihane ..	Eagle Oil & Shipping Co., Ltd. ...	20.2.50
<i>San Felipe</i> ..	GFJZ	C. Summers ..	J. J. Greener, A. T. Cross, A. G. Stephenson ..	W. L. Radcliffe ..	Eagle Oil & Shipping Co., Ltd. ...	12.9.49
<i>San Velino</i> ..	GCNY	M. A. Connell, O.B.E.	M. Holdron, D. Kennedy, J. Thomas ..	H. B. Hurst ..	Eagle Oil & Shipping Co., Ltd. ...	13.2.50
<i>San Veranico</i> ..	MASQ	I. Thomson, O.B.E.	W. F. Hunt, J. D. Nash, P. Johnson ..	J. Timmons ..	Eagle Oil & Shipping Co., Ltd. ...	14.10.49
<i>San Vuffrano</i> ..	MASR	F. R. H. Atkinson ..	..	B. Kimble ..	Eagle Oil & Shipping Co., Ltd. ...	3.5.49

<i>Santander</i>	GBNR	T. J. Naylor	K. Thomas, U. A. Baker, J. T. Bruce	C. Murray	Pacific Steam Navigation Co.	28.11.49
<i>Sarmiento</i>	MARX	G. H. Rice	T. Hiatt, F. Nuttall, T. A. Ireland	N. Roberts	Pacific Steam Navigation Co.	5.3.49
<i>Saxon Star</i>	GDCC	J. D. W. Davies	H. Tompsett, D. Gaffney, D. Irving	J. D. Fulton	Blue Star Line, Ltd.	16.1.50
<i>Scholar</i>	GDCC	D. Wolstenholme	D. A. Hancock, R. E. Harvey, J. M. Doran	C. Townley	T. & J. Harrison	30.12.49
<i>Settler</i>	GTIX	W. H. Slaughter	W. McInnes, W. Owens, O. H. Jones	J. Clark	T. & J. Harrison	3.3.49
<i>Sevill</i>	GDWM	R. T. Phillips	W. Baker, W. D. Aitken, R. H. Rowlands	— McKenzie	T. & J. Harrison	28.2.50
<i>Silverbriar</i>	GMVK	W. N. Tulloch	J. H. Tomlinson, M. Rawson Duke, D. Paget Clarke	T. Coughlan	Silver Line, Ltd.	20.4.49
<i>Silverguava</i>	GCQR	W. G. Cole	N. W. Rothwell, D. M. Lamont, N. C. Jones	R. Burrow	Silver Line, Ltd.	10.11.48
<i>Silveroak</i>	MABL	W. N. Tulloch	F. E. Godley, K. A. Wise, P. R. Miller	D. Will	Silver Line, Ltd.	8.9.48
<i>Silverplane</i>	GSFQ	R. H. Woodrow	P. C. Palmer, K. Allen, G. Stobo	— Arthurs	Silver Line, Ltd.	19.8.49
<i>Silversandal</i>	GSFR	J. H. Leask	E. Reed, A. R. Moore, M. J. S. Beaumont, M. A. A. Oldakosti	A. B. King	Silver Line, Ltd.	11.10.49
<i>Silverteak</i>	GSFT	E. Palmer	K. Allen, H. Rose, M. Bingham	J. Thomas	Silver Line, Ltd.	30.12.49
<i>Silvervalnut</i>	GDBS	G. A. Reay	W. J. Ross, J. B. de Wet, F. E. West	J. Hands	Silver Line, Ltd.	21.4.50
<i>Sneaton</i>	MASC	J. S. Pinkney, O.B.E.	E. Wilson, W. Locker, F. Newton, F. T. Lamb	C. Fletcher	Headlam & Son	29.3.50
<i>Socotra</i>	GIMN	J. C. Last, Cdr., R.N.R.	D. A. Hansing, J. L. Dunkley, R. B. Nowell, P. W. F. Holmes	H. J. Camp	P. & O. Steam Navigation Co.	20.7.49
<i>Somerset</i>	GBLY	P. S. Calcutt	C. Masson, C. Jackson, H. S. Collins	P. Broome	Federal Steam Navigation Co., Ltd.	16.1.50
<i>Southern Atlantic</i>	MASE	M. G. Oliver	D. Lawson	J. MacKinnon	Chr. Salvesen & Co.	20.4.50
<i>Southern Collins</i>	MASF	L. Robertson	W. Scott, R. Marshall, E. G. Sutton	W. J. Tullock	Chr. Salvesen & Co.	2.6.49
<i>Southern Garden</i>	MASG	W. J. Swanson	D. Watt, T. Fletcher, J. Budge	C. H. Houston	Chr. Salvesen & Co.	5.5.49
<i>Southern Opal</i>	GDDV	A. F. Baikie	J. L. James, H. E. Harrington, D. Gleadow	K. C. Morris	Vacuum Oil Co., Ltd.	13.2.50
<i>Sovac</i>	GCTT	H. Anthony	R. J. Abbott	J. Glover	T. & J. Harrison	10.11.48
<i>Speaker</i>	GCTT	C. C. Heaton	J. Bevan, A. F. Perry	A. Guy	Springwell Shipping Co., Ltd.	18.1.49
<i>Specialist</i>	GQYF	L. F. Harriman	J. Reid	M. K. Kavanagh	J. A. Bilmair & Co., Ltd.	10.12.49
<i>Springford</i>	GQKQ	T. R. Mackie	J. R. Jones, C. G. Smeaton, J. C. Nichol	O. R. Wilcox	J. A. Bilmair & Co., Ltd.	5.5.49
<i>Stancourt</i>	GKCP	S. G. G. Williams	P. J. Macpherson, L. A. Bowen-West	P. P. Williams	Union Castle Mail S.S. Co., Ltd.	28.9.49
<i>Stanhall</i>	GCOZ	H. V. Wightman	— McNish, R. Kirton, — Garman	N. J. Braddon	Turnbull, Martin & Co., Ltd.	31.1.50
<i>Stirling Castle</i>	GYPX	W. A. Pace, O.B.E.	T. R. Halliday, D. M. Geddes, J. M. Macivor	F. E. Ash	P. & O. Steam Navigation Co.	10.11.48
<i>Stirlingshire</i>	GQCD	E. W. Jenkins	M. H. D'aeth, A. J. Stephenson, J. Owen	H. S. Horn	P. & O. Steam Navigation Co.	19.1.45
<i>Strathaird</i>	GRSX	H. S. Allen, R.D., Cmde., R.N.R.	H. Toon, D. G. Daniel, D. C. Guthrie	W. Hayes	Chr. Salvesen & Co.	3.4.50
<i>Stratheden</i>	GDGT	S. W. S. Dickson	J. B. Wilson	H. Hare	Federal Steam Navigation Co., Ltd.	20.4.49
<i>Strathmore</i>	GYMS	E. Lee	— Donkin	J. McMahon	Crest Shipping Co., Ltd.	6.2.48
<i>Strathnaver</i>	GRPZ	J. C. Mellonie	S. Sutherland, I. Ross, P. Picknett	I. R. Lloyd	B. J. Sutherland & Co., Ltd.	3.1.50
<i>Struan</i>	MASJ	M. Polson	F. M. Williamson, N. A. Dennis, D. Nicholson	D. Ford	Sir R. Ropner & Co., Ltd.	24.2.49
<i>Suffolk</i>	GQQS	F. Pover	T. L. Ison, J. E. Collins, P. Tate	J. McConnell	Blue Star Line, Ltd.	12.7.49
<i>Suncrest</i>	GNWW	T. G. Barwell	E. F. Smith, C. R. Madsen, G. Lewis	W. Reich	Pacific Steam Navigation Co.	10.12.49
<i>Sunland</i>	GBYG	R. W. Nicholson	K. Jackson, A. C. Bolton, W. M. Fallon	D. McCres	Shaw, Savill & Albion Co., Ltd.	13.4.50
<i>Swinaby</i>	GPFS	J. E. Roddam	A. Kennedy, J. C. Davies, F. Bell, J. C. Mackintosh	F. Broomfield	Elder Dempster Lines, Ltd.	14.5.47
<i>Sydney Star</i>	MKSM	T. F. McDonald, O.B.E.	G. Patterson, R. Grace, H. Howes	G. Gilling	Elder Dempster Lines, Ltd.	6.1.49
<i>Talca</i>	GCOT	G. B. Wardale	J. H. Wilde, A. W. S. Cripps, J. E. Hurst	J. Williamson	Ellerman's Wilson Line, Ltd.	..
<i>Tamaroa</i>	GFWX	W. Thompson	P. J. Finan, D. Thompson, A. Lamper	..	..	..
<i>Tamela</i>	GCBF	W. J. Munt	R. Munro, G. Moore, A. Bird	..	..	..
<i>Tarkwa</i>	MASU	G. D. Simpson	D. J. C. Martin, R. Cudbertson, R. Whittleston	..	..	..
<i>Tasso</i>	GLMR	H. Scarborough	..	..	..	..
<i>Tekoa</i>	GJFQ	H. D. Horwood, R.D., R.N.R.	..	..	New Zealand Shipping Co., Ltd.	..

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS	LAST RETURN RECEIVED
<i>Telemachus</i> ..	GBLB	J. F. Webster	A. G. Reed, P. D. F. Cruickshank, E. Brown ..	J. Campbell Wilson ..	A. Holt & Co. ..	11.2.49
<i>Teviot</i> ..	MASX	H. E. Sang	D. Guinness, R. J. Kistler, G. F. I. Jamieson ..	L. W. Bell ..	Royal Mail Lines, Ltd. ..	6.12.48
<i>Thamesfield</i> ..	GDGK	R. Cunningham	J. P. Ross, R. L. Newcombe, P. B. Goldie ..	T. Carter ..	Hunting & Son, Ltd. ..	16.12.48
<i>Theliconus</i> ..	GBMT	T. W. A. Webster	S. H. Bennett, A. Ledger, E. J. Agar ..	G. Nicholls ..	Anglo-Saxon Petroleum Co., Ltd. ..	20.5.49
<i>Thule</i> ..	GCBL	S. Andersen	J. M. Mead, R. D. Parkin, J. B. Camping ..	J. A. Hasson ..	Hector Whaling, Ltd. ..	8.11.49
<i>Tinto</i> ..	GBYT	S. H. Bennett, M.B.E.	J. A. McConville, A. J. Farrel, E. McCudden ..	G. Penkeith ..	Ellerman's Wilson Line, Ltd. ..	2.11.49
<i>Tongariro</i> ..	GLFZ	D. H. Chadwick	J. Milne, P. Westcote, R. E. Dawson ..	L. B. Priestley ..	New Zealand Shipping Co., Ltd. ..	21.3.49
<i>Torr Head</i> ..	GZPW	M. Kennedy				
<i>Tower Grange</i> ..	MQJL	G. Robson ..				
<i>Trelyon</i> ..	GBPP	F. Piper	P. E. Maiden, D. M. Curror, F. D. Ingram ..	W. F. Kavanagh ..	Hain Steamship Co., Ltd. ..	9.9.49
<i>Tressillian</i> ..	GCKP	C. R. Mill, O.B.E.	R. B. Oliver, W. E. Lyons, D. R. Jenkins ..	D. W. Cross ..	Hain Steamship Co., Ltd. ..	17.10.49
<i>Treytaylor</i> ..	GCKG	A. G. Williams, O.B.E.	W. Lawton, J. S. Jones, J. Adams ..	J. T. W. Nixon ..	T. & J. Harrison ..	10.11.48
<i>Tribesman</i> ..	GBNZ	F. W. Wallace	L. G. Dennis ..		Anglo-Saxon Petroleum Co., Ltd. ..	24.4.50
<i>Tribulus</i> ..	GFJS	F. Leask ..	J. Banna ..		Chr. Salvesen & Co. ..	20.2.50
<i>Tronda</i> ..	MMLX	A. Goodlad ..				22.11.49
<i>Trued</i> ..	GBRP	D. G. Grant, R.D., Cdr., R.N.R.	G. C. W. Meldrum, J. Chester, R. B. Hill ..	B. Devine ..	Royal Mail Lines, Ltd. ..	
<i>Twickenham</i> ..	GNDC	J. A. Tully ..	H. Black, J. Porteous, J. C. Taylor ..	J. T. Berrie ..	Watts, Watts & Co., Ltd. ..	
<i>Umtati</i> ..	GYWB	F. E. J. O'Hea	T. Rigby, F. Evans, D. G. Jupp, D. McNeill ..	S. Hewitt ..	Bullard, King & Co., Ltd. ..	19.1.50
<i>Umtata</i> ..	GDOF	J. W. Miles	B. J. McAree, H. K. Underwood, L. Farrer ..	A. H. Coxhead ..	Bullard, King & Co., Ltd. ..	12.2.49
<i>Umsirito</i> ..	GIFQ	R. Harber ..	B. McAree, J. H. Beavan, J. L. B. Brocklesby ..	G. S. Sprunt ..	Bullard, King & Co., Ltd. ..	18.3.50
<i>Valacia</i> ..	MATR	J. G. Bradley, R.D., R.N.R.	J. B. Mort, A. R. M. Graham, L. R. W. Portet ..	J. Patterson ..	Cunard Steam Ship Co., Ltd. ..	10.3.50
<i>Vanconver City</i> ..	GIGT	H. Louttit ..	H. L. Evans, J. B. Cuckow, A. H. Bailey ..	B. Rowan ..	Sir Wm. Reardon Smith & Sons, Ltd. ..	6.9.49
<i>Vardulia</i> ..	GCFW	— Outill ..	J. M. Hughes, A. Crook, P. Walton ..	F. Berry ..	Cunard Steam Ship Co., Ltd. ..	14.10.48
<i>Vasconia</i> ..	MQY	G. S. Evans	J. H. W. Locke, M. V. Meardon, E. Hall ..	R. Burns ..	Cunard Steam Ship Co., Ltd. ..	10.1.50
<i>Vestra</i> ..	MNNB	D. S. Archibald	D. C. White, H. M. Third ..		J. T. Salvesen & Co. ..	23.1.50
<i>Volo</i> ..	GPCJ	A. Morrill ..	T. Briggs, T. A. Firth, T. Johnson ..	G. Williams ..	Ellerman's Wilson Line, Ltd. ..	22.4.48
<i>Waimana</i> ..	MATW	L. J. Hopkins	A. S. D. Masters, J. W. Webster, J. B. Cousins, R. H. Dennison ..	J. Robinson ..	Shaw, Savill & Albion Co., Ltd. ..	1.2.50
<i>Waipawa</i> ..	GWXQ	F. A. Smith	J. Carroll, B. Hammond, H. M. Hignett, P. Arrowemith ..	J. Murphy ..	Shaw, Savill & Albion Co., Ltd. ..	3.4.50
<i>Wairangi</i> ..	MATX	W. G. West	B. H. Clarke-Lens, K. C. Davis ..	E. W. Robson ..	Shaw, Savill & Albion Co., Ltd. ..	14.3.50
<i>Waiwera</i> ..	GBJB	B. Forbes-Moffatt	F. Charnley, J. Gunning, A. C. H. Childs ..	J. Downie ..	Watts, Watts & Co., Ltd. ..	25.1.50
<i>Wanstead</i> ..	GFLS	A. E. Woodcock				
<i>Warwick Castle</i> ..	GRRJ	I. Trayner	D. Hart, M. M. Melson, R. G. Patterson ..	G. Shaw ..	Union-Castle Mail S.S. Co., Ltd. ..	13.2.50
<i>Wendover</i> ..	GFML	W. Donald	E. Peirce ..	D. I. J. Townsend	Watts, Watts & Co., Ltd. ..	
<i>William Scoresby</i> ..	GFNM	A. F. Macfie, Lt.-Cdr., R.N.R.				
<i>Winchester Castle</i> ..	GTPZ	C. Page, R.D., R.N.R.	S. K. Smith, — Sayles, E. C. Bennett ..	R. Brew ..	National Institute of Oceanography	12.11.48
<i>Yoma</i> ..	GLPN	S. Thompson	J. Whitehead, D. Wilson, T. F. Fields ..	W. Allen ..	Union-Castle Mail S.S. Co., Ltd. ..	14.11.49
<i>Zealandic</i> ..	MAGI	P. F. Owens	P. J. Brentnall, I. Saunders, B. Ditchburn ..	A. McLennan	Rio Cape Line, Ltd. ..	16.11.49
<i>Zent</i> ..	GRDW	F. P. Inch ..			Elders & Fyffes, Ltd. ..	28.1.48



*Queen of Bermuda ..	GZKF	L. F. Banyard, O.B.E. ..	N. E. James ..	H. Stennett ..	Furness, Withy & Co., Ltd. ..	
Conway, H.M.S. ..	—	E. Hewitt, R.D., Capt., R.N.R. ..	The Senior Cadets ..	—	—	10.1.50
Pangbourne Nautical College ..	—	H. C. Skinner, O.B.E., Cdr., R.N. ..	The Senior Cadets ..	—	—	3.4.48
Worcester, H.M.S. ..	—	G. C. Steele, V.C., Cdr., R.N. (Retd.) ..	The Senior Cadets ..	—	—	3.4.50

\* This ship has been recruited by the Bermuda Meteorological Service.

## FLEET LIST (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	CAPTAIN	OBSERVING OFFICER	RADIO OFFICER	OWNERS
<b>Selected Ships :</b>				
Kaitake ..	A. F. Inman ..	G. R. Inkster ..	L. M. Harvey ..	Union S.S. Co., Ltd.
Karitane ..	C. W. Dovey ..	W. Weatherup ..	A. E. Whalley ..	Union S.S. Co., Ltd.
Kauri ..	J. Billingham ..	R. E. P. Williams ..	G. B. Blake ..	Union S.S. Co., Ltd.
Komata ..	W. J. Hill ..	P. Nash ..	R. H. Willis ..	Union S.S. Co., Ltd.
Kopua ..	F. T. Chapman ..	I. G. Sykes ..	W. L. Lambie ..	Union S.S. Co., Ltd.
Korowai ..	R. Blampied, M.B.E. ..	L. J. Lynch ..	T. Roberts ..	Union S.S. Co., Ltd.
Koromiko ..	H. S. Collier ..	H. G. Harwood ..	W. Hawkins ..	Union S.S. Co., Ltd.
Karoa ..	F. W. Gibson ..	A. W. Hannam ..	B. G. Hart ..	Union S.S. Co., Ltd.
Lautoka ..	A. Meldrum ..	F. Wright ..	L. MacAllum ..	Pacific Shipowners, Ltd.
Matua ..	A. R. Russell ..	R. D. Bennett ..	H. A. Shields ..	Union S.S. Co., Ltd.
Maui Pomare ..	L. C. Boulton ..	I. Hare ..	W. A. Taylor ..	Government of New Zealand
Monowai ..	G. B. Morgan, D.S.O. ..	K. D. Mitchell ..	J. G. Rea ..	Union S.S. Co., Ltd.
Piri ..	M. W. Monaghan ..	J. Drummond ..		Union S.S. Co., Ltd.
Port Waikato ..	C. Keith ..	J. Flette ..		I.C.L., Ltd.
Waipori ..	S. C. Angus ..	R. K. Brown ..	J. Anderson ..	Holm & Co.
Waipata ..	W. E. Jones ..	P. W. Callender ..	A. A. Lindsay ..	Union S.S. Co., Ltd.
Waipuru ..	C. Burgess ..	I. G. Waites ..	C. Ward ..	Union S.S. Co., Ltd.
Waitaki ..	E. F. Rainbow ..	R. G. Anderson ..	B. Sword ..	Union S.S. Co., Ltd.
Waitemata ..	D. M. Keith ..	J. A. Barbour ..		Union S.S. Co., Ltd.
<b>Supplementary Ships :</b>				
James Cook ..	A. Deed ..	E. G. Rapley ..	A. J. Jeans ..	H. C. S. Coasters
Kaitiro ..	D. C. Champion ..	H. A. Hodgkinson ..	E. A. Miller ..	Union S.S. Co., Ltd.
Kakapo ..	R. Ainsworth ..	E. G. Trousdale ..		Union S.S. Co., Ltd.
Kamo ..	A. W. Pert ..	S. Peterson ..		Union S.S. Co., Ltd.
Karepo ..	W. Kehoe ..	E. M. Bieneman ..		Union S.S. Co., Ltd.
Karigi ..	G. M. Schofield ..	A. B. MacDonald ..	R. N. Dennis ..	Union S.S. Co., Ltd.
Kiwia ..	E. J. Johnston ..	H. J. Southworth ..	H. T. Fernandes ..	Chatham Fishing Co.
Manuka ..	L. P. Brown ..	L. Lindsay ..		Union S.S. Co., Ltd.
Omana ..	F. A. Barrett ..			Tasman S.S. Co., Ltd.
Viti ..				

# FLEET LIST (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 OPERATORS
Anhui	I. McKinlay	A. J. Keddle, F. W. Ridley	Chan Cheong	China Navigation Co., Ltd.
Caroline Moller	W. J. Lang	I. E. Mathieson, E. Hugman, F. McKay	C. D. Joshi	Mollers' (Hong Kong), Ltd.
Chang Sha	C. P. Miller	H. J. Bunney, S. Ferguson	R. Gooseman	China Navigation Co., Ltd.
Choy Sang	A. G. Robjant	H. A. Greenwood, H. F. Smith, K. C. Young	E. Belard	Indo-China Steam Navigation Co., Ltd.
Chum Sang	D. G. R. Kinnear	E. M. Norman, R. P. Farquar, T. Y. Yuan	E. A. West	Indo-China Steam Navigation Co., Ltd.
Eastern Glory	L. McRae	W. E. Reeve, C. Thomson, R. Grievie	C. D. Evans	Indo-China Steam Navigation Co., Ltd.
Eastern Saga	S. Schofield	G. Parish, J. D. Markland, A. D. Lamb	R. E. Stewart	Indo-China Steam Navigation Co., Ltd.
E Sang	J. Fotheringham	L. C. Cox, E. P. Ladbrooke, A. O. Jakobsen	Im Ki	Indo-China Steam Navigation Co., Ltd.
Fengtien	F. Gibbs	W. D. Leighton, D. I. Robertson	Leung Shu Fun	China Navigation Co., Ltd.
Foochow	E. G. Thomas	C. L. Phillips, G. S. Ireland	Leung Man Hin	China Navigation Co., Ltd.
Fort Charlotte	F. P. Hennin	G. D. Penney, T. J. Owen, P. P. Garbutt	G. H. Parker	Royal Fleet Auxiliary
Frosty Moller	L. Colmans	B. I. Alger, H. J. Young	A. G. Pearce	Mollers' (Hong Kong), Ltd.
Fukien	G. T. M. Ramsay	G. Abbs, L. Walker	Leung Tjeuk Shing	China Navigation Co., Ltd.
Greytoke Castle	F. R. Milwright	F. Kelly, E. Docherty, R. W. Frappell	D. G. Sims	Mollers' (Hong Kong), Ltd.
Hai Lee	J. Hansen	A. Andreasen, J. Mikkelsen, H. Andersen	Chan Tze Yau	China Siam Line
Hang Sang	L. W. Harrison	K. P. Wilkinson, A. Moyne, A. Nelson	Young Shang	Indo-China Steam Navigation Co., Ltd.
Han Yang	G. P. Cope	E. J. Bower, W. E. S. Cream	P. Johnke	Jebsen Steamship Co., Ltd.
Henrich Jessen	B. Eliassen	J. P. Johannsen, C. S. Jensen, I. Yap	Th. Pedersen	China Siam Line
Hermelin	M. I. Groundwater	L. I. Ovaisnikoff, P. D. Coles, H. Wood	Ho Hung Ki	Indo-China Steam Navigation Co., Ltd.
Hsu Sang	C. R. Harris	B. D. Hoatson, T. W. Scott, D. Dekker	Lok Yung	Indo-China Steam Navigation Co., Ltd.
Hin Sang	S. Olsen	T. Torkildsen, H. Berge, J. Jacobsen	Chan Kam Tsun	China Siam Line
Hiram	M. Bjerknes	N. Fiskesen, B. Maeland, O. Lindanger	H. Bru	Karsten Larsen Shipping Co.
Hoi Wong	R. E. Agar	R. Goss, J. M. McHaughton, K. B. Indros	E. A. West	Ho Hong Steamship Co.
Hong Sang	A. H. Finnie	D. P. Manthorpe, P. Flory	Choi Pong Cheung	China Navigation Co., Ltd.
Hunan	W. E. Awcock	W. Pollock, E. W. Woodcock	Tsang Kau	China Navigation Co., Ltd.
Hupoh	D. G. Burleigh	F. H. Main, S. A. Sheridan, F. L. Rowden	G. McDonald	Indo-China Steam Navigation Co., Ltd.
Kut Sang	J. Taylor	H. M. Stanfield, V. Walker	Leung Kan	China Navigation Co., Ltd.
Kwaiyang	R. I. Groundwater	F. W. Cross, J. McK. Marshall, J. K. Keng	J. E. Chew	Indo-China Steam Navigation Co., Ltd.
Loh Sang	J. Mathiasen	J. H. Thomas, D. R. McFadden, D. D. Battell	A. G. Lum	Chin Seng Hong
Mai Am	R. G. Gillespie	W. A. Finlay, L. L. Watson, P. Potts, A. Layfield	V. B. Risson	Indo-China Steam Navigation Co., Ltd.
Mau Sang	A. G. Gorham	S. I. Yeandle, E. C. C. Trestail	Chau Wing	Mollers' (Hong Kong), Ltd.
Muncaster Castle	I. W. Evans	J. F. O'Dowd, C. Stark	Liu Yuk Kong	China Navigation Co., Ltd.
Nanchang	M. Defty	S. H. Liu	Lo Kin Chak	China Navigation Co., Ltd.
Newchwang	F. Kelly	S. Davidson, R. Perry	Tang Chung Fiu	China Navigation Co., Ltd.
Ning Hui	D. Wilson	A. V. Harrison, W. T. Masters	Li San Kau	China Navigation Co., Ltd.
Pakhoi	D. M. Holmes	G. A. Brignall, J. Roberts, J. R. Snelgrove	J. E. Martineu	British India Steam Navigation Co.
Poyang	J. B. Cooke			
Sangola				



## FLEET LIST (India)

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

NAME OF VESSEL	OWNERS
<b>Selected Ships :</b>	
<i>Alavi</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Bahadur</i> .. .. .	Asiatic Steam Nav. Co. Ltd.
<i>Chanda</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Dara</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Dumra</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Dwarka</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Englishtan</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Havildar</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Islami</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Jaladuta</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalaganaga</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalayoti</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalamani</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalamohan</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalarashmi</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalaveera</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalavihar</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalayamuna</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Yehangir</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Kampala</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Karanjia</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Karapara</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Khandalla</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Khosrou</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Maharaja</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Masimpur</i> .. .. .	Burma Oil Co.
<i>Nadir</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Nahadevi</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Nurjehan</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Pundit</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Rajput</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Rajula</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Shahjehan</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Shirala</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Singu</i> .. .. .	Burma Oil Co.
<i>Sirsa</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Subedar</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Tairea</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Vasna</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Yenang Young</i> .. .. .	Burma Oil Co.
<b>Supplementary Ships :</b>	
<i>Akbar</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Badarpur</i> .. .. .	Burma Oil Co.
<i>Bamora</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Barla</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Barpeta</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Begum</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Binfield</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Itaura</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Jaladurga</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalagopal</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalakrishna</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalaratna</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Jalavijaya</i> .. .. .	Scindia Steam Nav. Co., Ltd.
<i>Malika</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Nurani</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Pasha</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Risalder</i> .. .. .	Asiatic Steam Nav. Co., Ltd.
<i>Rizwani</i> .. .. .	Asiatic Steam Nav. Co., Ltd.

## LIGHT VESSELS

The following Light Vessels voluntarily observe and report from coastal waters of Great Britain.

NAME OF VESSEL	MASTERS
<i>Dowsing</i> .. .. .	J. R. Audley, S. R. Smith
<i>East Goodwin</i> .. .. .	A. Giblin, F. M. England
<i>Galloper</i> .. .. .	
<i>Humber</i> .. .. .	F. I. Butcher, L. A. Brett
<i>Newarp</i> .. .. .	B. Hadden, R. J. Middleton, E. A. Sparks.
<i>Royal Sovereign</i> .. .. .	W. J. Sheaf
<i>Shupwash</i> .. .. .	G. W. Broom, C. G. Isaac
<i>Smith's Knoll</i> .. .. .	W. J. Hall, J. W. R. Reeve

## FLEET LIST (Canada)

### VOLUNTARY OBSERVING SHIPS

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

NAME OF VESSEL	OWNERS
<b>Selected Ships</b>	
<i>Aorangi</i> .. .. .	Canadian Australasian Line.
<i>Canadian Challenger</i> .. .. .	"Canadian Challenger", Ltd. (Canadian National Steamships).
<i>Canadian Constructor</i> .. .. .	"Canadian Constructor", Ltd. (Canadian National Steamships).
<i>Canadian Cruiser</i> .. .. .	"Canadian Cruiser", Ltd. (Canadian National Steamships).
<i>Fort Amherst</i> .. .. .	Furness, Withy & Co.
<i>Fort Townshend</i> .. .. .	Furness, Withy & Co.
<i>Imperial Alberta</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Quebec</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Toronto</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Winnipeg</i> .. .. .	Imperial Oil, Ltd.
<i>Lady Nelson</i> .. .. .	"Lady Nelson", Ltd. (Canadian National Steamships).
<i>Lady Rodney</i> .. .. .	"Lady Rodney", Ltd. (Canadian National Steamships).
<i>Lake Minnewauka</i> .. .. .	Western Canada Steamship Co.
<i>Ottawa Valley</i> .. .. .	Montreal, Australia, New Zealand Line
<i>Waihemu</i> .. .. .	Canadian Union Line, Ltd.
<i>Waikawa</i> .. .. .	Canadian Union Line, Ltd.
<i>Wairuna</i> .. .. .	Canadian Union Line, Ltd.
<i>Waitomo</i> .. .. .	Canadian Union Line, Ltd.
<i>Yamhill</i> .. .. .	Imperial Oil, Ltd.
<b>Lightships :</b>	
<i>Lurcher Lightship</i> .. .. .	Minister of Transport.
<i>Sambro Lightship</i> .. .. .	Minister of Transport.
<b>Supplementary Ships :</b>	
<i>Lake Maitou</i> .. .. .	Western Canada Steamship Co.
<i>Pinnacles</i> .. .. .	Shell Canadian Tankers Ltd.
<i>Rupert Island</i> .. .. .	Hudson's Bay Co.
<i>Tahsis</i> .. .. .	Johnson Walton Steamships
<i>Tantara</i> .. .. .	Johnson Walton Steamships

## FLEET LIST (Australia)

### VOLUNTARY OBSERVING SHIPS

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

NAME OF VESSEL	OWNERS
<b>Selected Ships :</b>	
<i>Chupra</i> .. .. .	British India Steam Nav. Co., Ltd.
<i>Duntroon</i> .. .. .	Melbourne Steamship Co. Ltd.
<i>Koolinda</i> .. .. .	Government of Western Australia
<i>Koomilya</i> .. .. .	McIlwraith McEacharn, Ltd.
<i>Koorunga</i> .. .. .	McIlwraith McEacharn, Ltd.
<i>Lowana</i> .. .. .	Melbourne Steamship Co., Ltd.
<i>Nellore</i> .. .. .	Eastern and Australian S.S. Co., Ltd.
<i>Orestes</i> .. .. .	A. Holt & Co.
<i>River Burnett</i> .. .. .	Commonwealth of Australia (Department of Shipping and Fuel)
<i>River Clarence</i> .. .. .	Commonwealth of Australia (Department of Shipping and Fuel)
<i>River Mitta</i> .. .. .	Commonwealth of Australia (Department of Shipping and Fuel)
<i>Triadic</i> .. .. .	British Phosphate Commissioners
<i>Trienza</i> .. .. .	British Phosphate Commissioners
<i>Triona</i> .. .. .	British Phosphate Commissioners
<b>Supplementary Ships :</b>	
<i>Diomed</i> .. .. .	A Holt & Co.
<i>Dorrigo</i> .. .. .	Commonwealth of Australia (Department of Shipping and Fuel)
<i>Kybra</i> .. .. .	Government of Western Australia
<i>Labuan</i> (H.M.A.S.) .. .. .	Royal Australian Navy

# 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	W. Conn .. ..	F. T. Everard & Sons, Ltd.
<i>Allurity</i> .. ..	MQFS	A. Fisher .. ..	F. T. Everard & Sons, Ltd.
<i>Angelo</i> .. ..	GQFY	H. Greenhill .. ..	Ellerman's Wilson Line, Ltd.
<i>Antwerp</i> .. ..	GDFV	R. V. Adams .. ..	British Railways (Eastern Region)
<i>Ariosto</i> .. ..	GKPW	W. Hill .. ..	Ellerman's Wilson Line, Ltd.
<i>Atlantic Coast</i> .. ..	GWSY	P. A. Johnson .. ..	Coast Lines Ltd.
<i>Baltraffic</i> .. ..	GTXX	F. Waldron .. ..	United Baltic Corporation Ltd.
<i>Belhaven</i> .. ..	MNXZ	P. L. Irvine .. ..	London & Edinburgh Shipping Co., Ltd.
<i>Belravock</i> .. ..	MKGX	T. Wallace .. ..	London & Edinburgh Shipping Co. Ltd.
<i>Belvina</i> .. ..	MLZF	J. Philip .. ..	London & Edinburgh Shipping Co. Ltd.
<i>Cambria</i> .. ..	GBKT	A. Marsh .. ..	British Railways (London Midland Region)
<i>Clupea</i> .. ..	GOAJ	J. Jappy .. ..	Scottish Home Department (Fishery Division).
<i>Corfen</i> .. ..	GDJX	E. Allen .. ..	Wm. Cory & Son, Ltd.
<i>Corfleet</i> .. ..	GWTD	L. A. Griffin .. ..	Wm. Cory & Son, Ltd.
<i>Corfoss</i> .. ..	MAHX	F. W. Farrant .. ..	Wm. Cory & Son, Ltd.
<i>Cormain</i> .. ..	MAHT	R. Armstrong .. ..	Wm. Cory & Son, Ltd.
<i>Cormead</i> .. ..	GDBX	T. Slack .. ..	Wm. Cory & Son, Ltd.
<i>Cormist</i> .. ..	GDVT	R. Barrow .. ..	Wm. Cory & Son, Ltd.
<i>Cormoat</i> .. ..	GLKV	J. V. Hansen .. ..	Wm. Cory & Son, Ltd.
<i>Cormull</i> .. ..	MAHS	E. Keene .. ..	Wm. Cory & Son, Ltd.
<i>Corncrake</i> .. ..	MJKL	—, Laurie .. ..	General Steam Nav. Co. Ltd.
<i>Crane</i> .. ..	MMCS	C. C. Reynolds .. ..	General Steam Nav. Co. Ltd.
<i>Drake</i> .. ..	MMYC	R. Langley .. ..	General Steam Nav. Co. Ltd.
<i>Duke of Argyll</i> .. ..	GNVX	F. Adern, D.S.C. .. ..	British Railways (London Midland Region).
<i>Duke of Lancaster</i> .. ..	GCPO	E. B. Serjeant .. ..	British Railways (London Midland Region).
<i>Duke of Rothesay</i> .. ..	GNVL	H. Thompson .. ..	British Railways (London Midland Region).
<i>Duke of York</i> .. ..	GYKV	C. Baxter .. ..	British Railways (Eastern Region).
<i>Eildon</i> .. ..	MLZL	J. Little .. ..	G. Gibson & Co., Ltd.
<i>Empire Cedric</i> .. ..	GRSC	W. N. Johnson .. ..	Frank Bustard & Sons, Ltd.
<i>Empire Doric</i> .. ..	MAVQ	.. ..	Frank Bustard & Sons, Ltd.
<i>Empire Gaelic</i> .. ..	MAVR	H. T. Green .. ..	Frank Bustard & Sons, Ltd.
<i>Explorer</i> .. ..	MRCZ	D. S. Sandison .. ..	Scottish Home Department (Fishery Division).
<i>Falcon</i> .. ..	MNXL	S. W. Develin .. ..	General Steam Nav. Co. Ltd.
<i>Golden Dawn</i> .. ..	—	Lt. A. Adamson, M.B.E., R.N.R.	The Captain.
<i>Grebe</i> .. ..	MAEY	E. C. Painter, D.S.C. .. ..	General Steam Nav. Co. Ltd.
<i>Guernsey Coast</i> .. ..	MANS	F. C. Lucas, M.B.E. .. ..	British Channel Islands Shipping Co., Ltd.
<i>Harrogate</i> .. ..	MNDB	C. H. Tully .. ..	Associated Humber Lines
<i>Hibernia</i> .. ..	MBMT	A. Marsh .. ..	British Railways (London Midland Region).
<i>Highwood</i> .. ..	MLQQ	J. Coupland .. ..	E. R. Newbiggin, Ltd.
<i>Hindlea</i> .. ..	GWDO	A. E. Holder .. ..	Hindles Shipping Co. Ltd.
<i>Isle of Guernsey</i> .. ..	GQYJ	F. E. Trout .. ..	British Railways (Southern Region).
<i>Isle of Jersey</i> .. ..	GRBQ	A. Light .. ..	British Railways (Southern Region).
<i>Isle of Sark</i> .. ..	GTSR	C. E. Durely .. ..	British Railways (Southern Region).
<i>London Merchant</i> .. ..	MBRZ	C. A. Piper .. ..	London Scottish Lines, Ltd.
<i>Malmo</i> .. ..	GQCN	A. D. Seath .. ..	Ellerman's Wilson Line, Ltd.
<i>Melrose</i> .. ..	MCFD	G. Simpson .. ..	Geo. Gibson & Co., Ltd.
<i>Melrose Abbey</i> .. ..	GSYW	J. Laverack .. ..	Associated Humber Lines.
<i>Minna</i> .. ..	GKPS	T. Mather .. ..	Scottish Home Department (Fishery Division).
<i>Ocean Coast</i> .. ..	GYMP	D. C. Byrne .. ..	Coast Lines, Ltd.
<i>Otterhound</i> .. ..	MNVZ	A. M. Kennedy .. ..	Coastal Tankers, Ltd.
<i>Petrel</i> .. ..	MBGV	G. W. Lawrey .. ..	General Steam Nav. Co., Ltd.
<i>Plover</i> .. ..	MLLV	E. Hobbs .. ..	General Steam Nav. Co. Ltd.
<i>St. Helier</i> .. ..	GLBT	R. Pitman, D.S.C. .. ..	British Railways (Western Region).
<i>St. Julien</i> .. ..	GLBV	L. J. Richardson .. ..	British Railways (Western Region).
<i>Salerno</i> .. ..	GSPW	—, Poultney .. ..	Ellerman's Wilson Line, Ltd.
<i>Scotia</i> .. ..	GPYM	E. A. Bruce .. ..	Scottish Home Department (Fishery Division).
<i>Selby</i> .. ..	MLFT	A. W. Johnston .. ..	Associated Humber Lines.
<i>Slieve Bawn</i> .. ..	MQCC	J. L. Williams .. ..	British Railways (London Midland Region).
<i>Slieve Bernagh</i> .. ..	MLNL	A. E. Willmott, D.S.C., R.D., R.N.R.	British Railways (London Midland Region).
<i>Slieve Bloom</i> .. ..	MQDD	W. E. Meade .. ..	British Railways (London Midland Region).
<i>Slieve Donard</i> .. ..	MQCQ	.. ..	British Railways (London Midland Region).
<i>Slieve League</i> .. ..	MQCM	F. G. J. Manning, D.S.C. .. ..	British Railways (London Midland Region).
<i>Slieve More</i> .. ..	MQBM	R. Woodhall .. ..	British Railways (London Midland Region).
<i>Southern Coast</i> .. ..	MASD	J. Studholm .. ..	Coast Lines, Ltd.
<i>Vanellus</i> .. ..	GDVW	J. E. Green .. ..	British & Continental S.S. Co., Ltd.
<i>Vienna</i> .. ..	GTBR	A. P. Sutton .. ..	British Railways (Eastern Region).
<i>Wandle</i> .. ..	MKBB	J. B. Dry .. ..	South-Eastern Gas Board.



## 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.

### Ice Observation

Drifting ice, derelicts, and other floating dangers to navigation are reported by all means of communication at the disposal of the master.

See Appendix III, pages 106-108 of the *Marine Observer's Handbook*, Sixth Edition.

It is also desirable that more detailed information than can be given in a TTT wireless message should be available to the Meteorological Office for the purpose of research, and for Admiralty Charts and Sailing Directions.

Marine observers will greatly assist by noting the conditions of ice, either drifting or fast, in the pages provided at the end of the logbook (Form 911), or on Form 912, which may be supplied to the captain of any British ship on application to a Port Meteorological Officer or Merchant Navy Agent.

Observing ships using the Trans-North Atlantic tracks are requested to record not only when ice is encountered, but also when they have passed through the ice region during the ice season without encountering ice. In this case a "nil" report should be returned, since it is desirable as far as possible to determine when tracks have been clear of ice.

### RETURN OF LOGBOOKS

Owing to the need for strict economy in the use of paper, observing officers should endeavour to fill up their logbooks (Forms 911), before returning them to the appropriate Meteorological Service, except when insufficient space remains for the recording of observations during a further complete passage.

### Meteorological Services for Shipping

Captains of British ships are requested to notify the Marine Branch of the Meteorological Office of areas in which meteorological services for shipping appear inadequate. Suggestions for the improvement of these services are always welcome.

### Fleet List Call Signs

The inclusion of the signal letters (call signs) of the British Selected Ships in the Fleet List is largely for the benefit of those meteorological service who might wish to identify the ships concerned in a "collective" message.

## GREAT BRITAIN—LOCAL WEATHER FORECASTS

Masters of ships and others interested in the movements of shipping and in the loading and discharging of cargo can obtain local weather forecasts from the forecast centre nearest to the port, free of charge.

The addresses and telephone numbers of the forecast centres nearest to the main ports of Great Britain are given below, corrected to May, 1950.

**Enquirers by Telephone should ask for "The Forecaster."**

PORT	ADDRESS OF NEAREST FORECAST CENTRE	TELEPHONE No.
Aberdeen	The Meteorological Officer, Dyce Airport, Aberdeenshire	Dyce 331. Ex. 70
Bristol	The Meteorological Officer, Bristol Airport, Whitchurch, Bristol	Bristol 26451. Ex. 22
Cardiff	The Senior Meteorological Officer, Air Traffic Control Centre, Royal Air Force, Eastern Avenue, Barnwood, Gloucester	Gloucester 24465/6 7. Ex. 110, 111.
Dundee	The Senior Meteorological Officer, H.Q. No. 18 Group, Royal Air Force, Pitreavie Castle, Dunfermline, Fife	Inverkeithing 264/5 Ex. 118/9.
Falmouth	The Senior Meteorological Officer, H.Q. 19 Group, Royal Air Force, Mount Batten, Plymouth, Devon	Plymstock 2224. Ex. 108/9.
Glasgow	The Meteorological Officer, Renfrew Airport, Renfrewshire	Renfrew 2352. Ex. 21/3.
Hartlepool	The Senior Meteorological Officer, Royal Air Force, Watnall, Nottingham	Nottingham 45731/5. Ex. 230/1.
Hull	The Senior Meteorological Officer, H.Q. No. 1 Group, Royal Air Force, Bawtry, Doncaster, Yorkshire	Bawtry 363/7. Ex. 105
Kirkwall	The Meteorological Officer, Hatston Airport, Orkneys	Kirkwall 421. Ex. 2.
Leith	The Senior Meteorological Officer, H.Q. No. 18 Group, Royal Air Force, Pitreavie Castle, Dunfermline, Fife	Inverkeithing 264/5 Ex. 118/9.
London	The Director, Meteorological Office, Air Ministry, Kingsway, London, W.C.2	Holborn 3434. Ex. 629.
Liverpool	The Senior Meteorological Officer, Speke Airport, Liverpool, 19	Garston 1240. Ex. 21/2.
Milford Haven	The Senior Meteorological Officer, H.Q. No. 19 Group, Royal Air Force, Mount Batten, Plymouth, Devon	Plymstock 2224. Ex. 108/9.
Newcastle	The Senior Meteorological Officer, Royal Air Force, Watnall, Nottingham	Nottingham 45731. Ex. 230/1.
Plymouth	The Senior Meteorological Officer, H.Q. No. 19 Group, Royal Air Force, Mount Batten, Plymouth, Devon	Plymstock 2224. Ex. 108/9.
Southampton	The Senior Meteorological Officer, Southampton Airport	Eastleigh 87228. Ex. 8/10.
Swansea	The Senior Meteorological Officer, Air Traffic Control Centre, Royal Air Force, Eastern Avenue, Barnwood, Gloucester	Gloucester 24465/6/7. Ex. 110.

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

Captains and observing officers of the Voluntary Corps of Marine Observers will always be welcomed at headquarters, where the Marine Superintendent will be pleased to show them how their observations are utilised in meteorological research and weather forecasting.

### **Headquarters**

Commander C. E. N. Frankcom, O.B.E., R.D., R.N.R., Marine Superintendent, Meteorological Office, Air Ministry, Headstone Drive, Harrow, Middlesex. (Telephone : Harrow 4331, Ext. 324.)

Commander J. Hennessy, R.D., R.N.R., Deputy Marine Superintendent. (Telephone : Harrow 4331, Ext. 323.)

### **Mersey**

Commander M. Cresswell, R.N.R., Port Meteorological Officer, Room 617, Royal Liver Building, Liverpool, 3. (Telephone : Central 6565.)

### **Thames**

Commander C. H. Williams, R.D., R.N.R., Port Meteorological Officer, Room 4, Ibex House, Minories, London, E.C.3. (Telephone : Royal 1721.)

### **Bristol Channel**

Mr. J. C. Matheson, Port Meteorological Officer, 2 Bute Crescent, Cardiff. (Telephone : Cardiff 4474.)

### **Southampton**

Captain J. R. Radley, Port Meteorological Officer, 19 Queen's Terrace, Southampton. (Telephone : Southampton 4295.)

## **AGENTS**

### **Clyde**

Captain W. W. Elliott, c/o Thomas Hastie & Son, 2-4 Tullis Street, Bridgeton, Glasgow. (Telephone : Bridgeton 3219.)

### **Forth**

Captain G. More, " Craigneuk ", Dechmont, West Lothian. (Telephone : Dechmont 19.)

### **Humber**

Captain R. E. Dunn, c/o Principal Officer, Ministry of Transport, Trinity House Yard, Hull.

### **Tyne**

Captain F. B. West, Custom House Chambers, Quayside, Newcastle-on-Tyne. (Telephone : Newcastle 23203.)

## **OFFICERS OF THE METEOROLOGICAL SERVICES OF THE BRITISH COMMONWEALTH**

### **AUSTRALIA**

#### **Melbourne**

Lt.-Cdr. S. W. S. Robertson, D.S.C., R.A.N. Port Meteorological Officer,  
Meteorological Branch, Dept. of Interior, P.O. Box 1289K, Melbourne,  
Victoria (Telephone F.J. 9171).

### **CANADA**

#### **Headquarters**

Controller, Meteorological Division, Department of Transport, 315 Bloor  
Street W., Toronto, 5.

#### **Halifax**

O.I.C. Dominion Public Weather Office, 728 Dominion Public Building, Halifax,  
N.S. (Telephone : 3-8314.)

#### **Saint John**

Officer in Charge, The Observatory, Saint John, N.B. (Telephone : 3-3500.)

#### **Vancouver**

Mr. C. H. Bromley (acting), 815 Bower Building, 543 Granville Street,  
Vancouver, B.C. (Telephone : Pacific 3032.)

### **NEW ZEALAND**

#### **Wellington**

The Director, Meteorological Office, Kelburn, Wellington, New Zealand.  
(Telephone : 44418.)

Marine Meteorological Officer, Post Office Box 72. (Telephone 44-418 ;  
Ext. 930.)

#### **Auckland**

Port Meteorological Officer, Meteorological Office, Mechanics Bay,  
Auckland. (Telephone : 49551.)

#### **Lyttleton**

Officer-in-Charge, Meteorological Office, Wigram Aerodrome. (Tele-  
phone : 32-585.)

#### **Dunedin**

Officer-in-Charge, Meteorological Office, Taieri Aerodrome, Dunedin.  
(Telephone : 21-666.)

### **SOUTH AFRICA**

#### **Cape Town**

A. B. Crawford, Meteorological Office, Post Office, Maitland, Cape Town.



# E. WILMAN & SONS, LTD.

Spinners and Manufacturers of

**SPONGE CLOTHS, SCOURERS, DORSETS,**  
etc., of all types and descriptions

**DECK AND HOUSE FLANNEL**  
in various widths, weights and qualities

**SILK NOIL CLOTH FOR EXPLOSIVE  
CHARGE BAGS**

**SILK NOIL YARNS FOR CHENILLES**

**Station Mills, Hadfield, Manchester**

Telephone: Glossop 160

Telegrams: Noils, Hadfield

## ***CADET SCHOOL SHIP***



# **H.M.S. "CONWAY"**

## ***TRAINING AFLOAT***

**For the Royal Navy and  
the Mercantile Marine**

Age of admission: Between  
13½ and 16½ years. Fees  
£200 p.a. (including cost of  
uniform). Reductions for  
Members of M.M.S.A. &  
N.E.O.U. The ship is stationed  
in the Menai Straits.

16, Nautilus House,  
Rumford Place, Liverpool, 3.

**WRITE FOR PROSPECTUS** →



## ABRIDGED LIST OF PUBLICATIONS OF THE METEOROLOGICAL OFFICE

*Publications may be ordered directly from the Sales Offices of His Majesty's Stationery Office at the Addresses shown on the title page or through any bookseller*

**Cloud Forms.** Definitions and descriptions, with photographs of clouds. M.O. 233, 6th Edition, 1949. 8vo. 1s. 3d. (1s. 4d.) *Out of stock, being reprinted.* Amendment List No. 1 (1950). 1d. (2d.)

**Weather Map.** An introduction to modern meteorology. M.O. 225 i, 3rd edition, 1939. 8vo. (see also Meteorological Glossary, in continuation of the "Weather Map"). 3s. (3s. 2d.) *Out of Stock, being reprinted.*

**Meteorological Glossary** (continuation of the "Weather Map", q.v.). M.O. 225, ii, 3rd edition, 1939. 8vo. 7s. 6d. (7s. 11d.)

**Handbook of Weather Messages, Codes and Specifications.** M.O. 510. 8vo.

Part I. Transmission schedules and station index numbers 1949. 2s. 6d. (2s. 8d.)

Amendment List No. 1 (1950). 6d. (7d.)

Amendment List No. 2 (1950). 1d. (2d.)

Part II. Codes and specifications. 1948. 1s. 6d. (1s. 8d.)

Amendment Lists Nos. 1-4. Each 1d. (2d.)

Part III. Coding, decoding and plotting. 1948. 2s. (2s. 2d.)

Amendment Lists Nos. 1-3. Each 1d. (2d.)

*(Amendments issued as necessary and priced separately.)*

**Instructions for the preparation of weather maps with tables of the specifications and symbols.** M.O. 515. 1949. 8vo. 9d. (10d.)

**International Meteorological Code** adopted by the International Meteorological Organisation, Washington, 1947. **Decode for the use of shipping**, incorporating the code for weather reports from and to ships and the analysis code for the use of shipping. M.O. 509. 1948. 9d. (10d.)

**Meteorological Handbook for Pilots and Navigators.** M.O. 448, 2nd edition, 1942; reprinted 1949. 8vo. 2s. 6d. (2s. 8d.)

**A Short Course in Elementary Meteorology.** By W. H. Pick, B.Sc., F.C.P., F.Inst.P. M.O. 247, 5th edition, 1938; reprinted 1949. 8vo. 2s. 6d. (2s. 9d.)

**Meteorology for Aviators.** By R. C. Sutcliffe, Ph.D. M.O. 432, 1940. 8vo. 7s. 6d. (8s.)

**Meteorology of Airfields.** By C. S. Durst, B.A. M.O. 507, 1949. 8vo. 2s. (2s. 2d.)

Prices in brackets include postage