

Enal Marine

C. Met. O.

M.O. 589

The Marine Observer

*A quarterly journal of Maritime
Meteorology*



Volume XXV No. 167

January, 1955

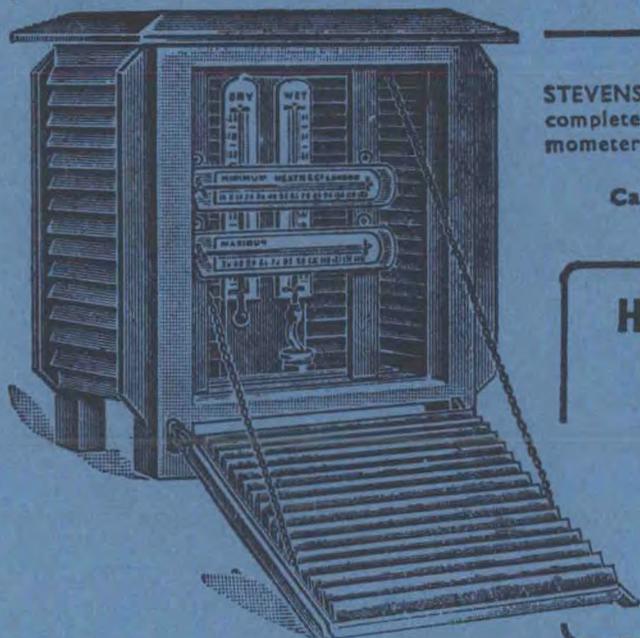
1855 - Meteorological Office Centenary - 1955

FIVE SHILLINGS NET



Specialists in Meteorological and Scientific Instruments

There is a century of rich experience behind the manufacture of every "Hezzanith" instrument.



STEVENSON'S SCREEN (No. E691), as illustrated, complete with maximum thermometer, minimum thermometer, and Wet and Dry Bulb thermometer.

Catalogues are available upon request.

HEATH, HICKS & PERKEN (Thermometers) LIMITED NEW ELTHAM, LONDON, S.E.9.

Phone: Eltham 3836
Grams: Optimus, Souphone, London
Showrooms:
8, Hatton Garden, London, E.C.1
Phone: Holborn 1743

THE METEOROLOGICAL MAGAZINE

Founded by G. J. Symons, F.R.S. in 1866, publication was suspended in June 1940 and resumed with the issue for January 1947.

In its new and enlarged form the Magazine contains authoritative articles in non-technical language 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, official notes of interest to observers, notices of Meteorological publications, reviews of new books, notes and figures of interesting weather of the past month, and letters from correspondents.

*Price 2s. By post 2s. 1½d.
Annual subscription 25s. including postage.*

Obtainable from
HER MAJESTY'S STATIONERY OFFICE
at the addresses on the title page
or through any bookseller

THE MARINE OBSERVER

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

VOL. XXV

No. 167

JANUARY, 1955

TABLE OF PRINCIPAL CONTENTS

	<i>Page</i>
Message from the Director	2
Editorial	2
Extracts from Admiral FitzRoy's first report	5
Early Synoptic Charts	9
Some Landmarks in Meteorological Progress. Part I. By R. F. M. HAY	11
Ocean Meteorology. Part I. By P. G. PARKHURST	16
Old Time Marine Observer's Log	21
Notes on Early Observing Ships	25
Marine Observer's Log—January, February and March	26
South African Weather Bureau—Excellent Awards	38
Weather reporting in South-West Pacific	39
Honourable Company of Master Mariners	40
The Association of Navigation Schools	41
Institute of Navigation	42
Shipping Operations in Hudson Bay	43
Book Reviews:	
<i>The Way of a Ship</i>	44
<i>Teach Yourself Motor-Boating</i>	45
<i>Aloft and Afloat</i>	46
Personalities	46
Sea Water Samples	48
Notice to Marine Observers	48
Fleet Lists	49

*Letters to the editor, and books for review, should be sent to The Editor, "The Marine Observer,"
Meteorological Office, Headstone Drive, Harrow, Middlesex*

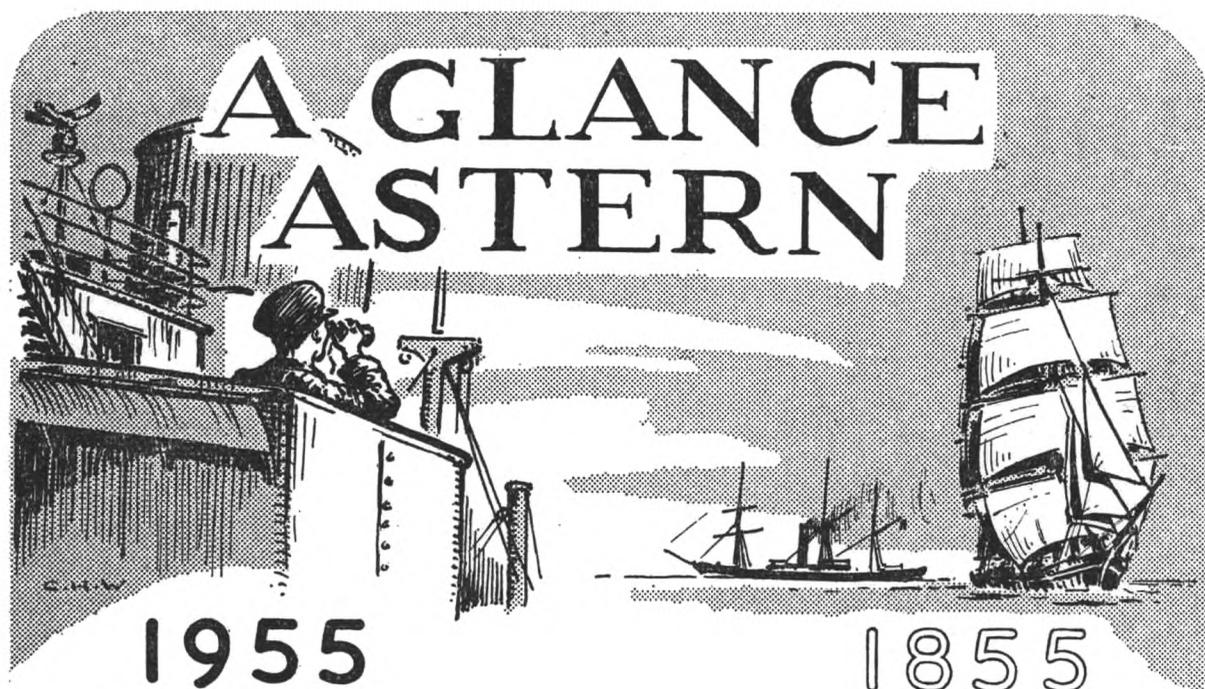
Published for the Meteorological Office by

HER MAJESTY'S STATIONERY OFFICE

Crown Copyright Reserved

To be purchased from York House, Kingsway, LONDON, W.C. 2, 423 Oxford Street, LONDON, W. 1, P.O. Box 569,
LONDON, S.E. 1, 13a Castle Street, EDINBURGH, 2, 109 St. Mary Street, CARDIFF, 39½ King Street, MANCHESTER 2,
Tower Lane, BRISTOL 1, 2 Edmund Street, BIRMINGHAM 3, 80 Chichester Street, BELFAST, or from any Bookseller

PRICE 5s. NET or £1 1s. per annum (including postage)



A Message from the Director to Voluntary Observers in British Ships

It is appropriate that in this, the centenary year of the Meteorological Office, I should send a special message to those who, over so many years, have contributed to our work by voluntary observation at sea. The Meteorological Office arose out of the need for a storm-warning system for mariners, and its first Director was a sailor. Today, as ever, we are acutely conscious of the debt our science owes to those who go down to the sea in ships, and I am proud to inherit the great tradition which links the Meteorological Office with the Merchant Navy. On behalf of all in the Office I send to our sailor friends greetings and thanks for all that has been done by voluntary observers in our ships during the past century, and express the hope that this bond may continue in the years to come.

O. G. SUTTON,
Director.

Editorial

Early in the year 1855 a small office with a staff of four people, under the direction of Admiral Robert FitzRoy, F.R.S., was set up under the Board of Trade in London for the purpose of collecting meteorological observations from British ships at sea, the eventual object being to compile meteorological atlases and provide other statistical information about the weather and surface currents of the oceans, for the benefit of shipping. Thus was born the Meteorological Office, and FitzRoy, who was given the title of "Meteorological Statist", was in effect the first Director of the Meteorological Office.

One hundred years have passed and the January, 1955, edition of *The Marine Observer* thus marks the centenary of the Meteorological Office. Under the present Directorship of Dr. O. G. Sutton, F.R.S., the staff has now grown to 3,097, and the information and advice provided by the Office is now utilised in all walks of life (shipping, aviation, agriculture, industry and the general public).

This occasion provides a suitable opportunity for looking back over the years to see what the Meteorological Office has accomplished, and on another page in this number is an article which discusses various aspects of this in some detail. It was

fitting that in this maritime country the history of the Meteorological Office should be linked so closely with the sea. Organised meteorology in this country owes its origin to merchant shipping, and the first Director of the Office was, appropriately enough, a distinguished seaman. These facts are not surprising when one considers how important knowledge about winds, weather and currents in all oceans was and still is to those who go down to the sea in ships, and when one considers that the very existence of our island population depended then, as it does do now, upon our merchant shipping. It is in fact surprising that the Meteorological Office was not formed earlier.

The Marine Branch of the Meteorological Office, which in the earlier days virtually comprised the whole Office, is now only one link in the chain of branches of which the modern Office is composed. The Meteorological Office at present has branches dealing also with general forecasting, communications, services for Army, R.A.F. and Civil Aviation, British and world climatology, agricultural meteorology, upper-air observations, general research, development and provisioning of instruments, training and administration, and from this one can form some impression as to how the scope of meteorology has extended.

Throughout these 100 years the control of Maritime Meteorology in this Office has been in the hands of a seaman, as the following list shows:

Admiral FitzRoy	1855-1865
Captain Toynbee	1865-1888
Lieutenant Baillie, R.N.	1888-1899
Captain Hepworth, R.N.R.	1899-1919
Captain Brooke Smith, R.N.R.	1919-1938
Commander Frankcom, R.N.R.	1938 to present date.

Since Admiral FitzRoy the Directors of the Meteorological Office have been as follows:

Mr. Scott (under the title of Secretary),	1865-1900
Sir Napier Shaw	1899-1919
Sir George Simpson	1919-1938
Sir Nelson Johnson	1938-1953
Dr. O. G. Sutton	1953 to present date.

The Marine Branch has consistently maintained contact with the shipping industry by the medium of personal visits of the Port Meteorological Officers and Merchant Navy Agents and by correspondence, and has also been responsible for all aspects of maritime meteorology except forecasting. No matter how far mankind advances scientifically and technically there will always be a need for synoptic and climatological information concerning the meteorology of the oceans, not only for the benefit of mariners and those connected with the shipping industry and for aircraft crossing the ocean, but also indirectly in connection with the meteorological needs of industry, agriculture and innumerable other activities. As the years roll by it seems that more and more practical use is being made of meteorological knowledge.

During these 100 years something like 6,000,000 observations have been received in this Office from voluntary observers aboard British merchant ships trading in all parts of the world. Thanks to wise planning in the early days, all the instrumental observations are comparable because they have consistently been made with officially tested instruments. The non-instrumental observations are equally important, and there seems little doubt that the bulk of the observations of such elements as wind and visibility, as well as the ocean current observations, have been made with a high degree of accuracy, since they come easy to a seaman as being part of his normal duty.

There is thus a mass of reliable information available which provides the basis for a day to day, month to month and year to year scientific study of the weather and surface currents in all the oceans. But although 6,000,000 observations look a lot on paper, they have proved by no means sufficient for the detailed climatological

study of some areas, which is hardly surprising when one considers the vast expanse of the oceans and the fact that the observations cover the period of 100 years, with gaps in the war years of 1914-18 and 1939-45. The net result comes to about 180 individual observations per day, and assuming each ship makes four observations per day it implies observations from about 45 ships each day. This does not make a very good network when spread all over the oceans, particularly when one thinks that ships normally keep to the established trade routes. Nevertheless, this library of observations has, with the aid of the Hollerith machine method for the statistical treatment of the data, enabled the Marine Branch of the Meteorological Office to study the climatology and currents of the oceans in some detail, and to prepare comprehensive atlases and other information for the benefit not only of shipping but of aviation, and it has proved of considerable value for numerous scientific investigations.

As the years have gone by so has the application of meteorology to various activities extended. FitzRoy introduced the visual storm warning system for shipping in 1861, and coined the word "forecasting" when he began to issue the first weather bulletins in the daily newspapers for the information of those interested in the operation of ships and for the general public. These bulletins were of necessity very limited in scope, as he had to depend entirely on telegraphic reports from land for drawing his maps, and there was then no means of passing on the information to shipping out of sight of land. It was the arrival of radio which provided the meteorologist with an instantaneous and extensive picture of the weather at a stated time both at sea and ashore, and enabled them to issue comprehensive and up-to-date weather forecasts at frequent intervals for ships at sea, for aircraft in flight and for all the various interests ashore.

There is no doubt that the meteorological needs of the aviator have increased the scope and activities of the Meteorological Office enormously. As the atmosphere is the medium in which aircraft operate, this is perfectly natural just as it was natural for the formation of the Office in 1855 to be due to the needs of another and older form of transport—shipping. In 1855 there were no reliable world-wide statistics of weather at sea, and such information was urgently needed for the safe and economic operation of sailing ships. We do now have a fairly accurate statistical picture of ocean climatology but there are still big gaps in our knowledge. The passing of the sailing ship has not lessened the mariners' need for accurate advice about present and future weather; we only need to think of recent storm disasters at sea to realise this. But the aviators' need for frequent and up-to-date meteorological information both on the surface and in the upper air is even more vital—in fact they just cannot operate safely and economically without it. And now we have the mariner and the aviator—serving rival but complementary forms of transport—both supplying the meteorologist with up-to-date information about the weather they encounter upon their voyages. The meteorologist, in his turn, is thus able to provide navigators both on the sea and in the air with a picture of the weather covering a large area, and can advise them on the meteorological changes which he anticipates.

Progress in the field of meteorology is necessarily slow; one must remember that it is a difficult, and as yet inexact, science which has only been organised for the past 100 years. For progress, international co-operation is a first essential, and there is no doubt that meteorologists, through the medium of the International Meteorological Organisation, recently renamed the World Meteorological Organisation, have made enormous strides in this direction, and show an example to the world. From the seaman's viewpoint very considerable advances have been made during this 100 years towards ensuring meteorological safety at sea. Practically all coastal areas throughout the world and most oceanic areas are now provided with radio weather bulletins and forecasts and storm warnings in one form or another. The weather bulletins issued by various means for shipping around the British Isles and in the Eastern Atlantic are as comprehensive as anywhere in the world,

and meteorological advice is readily obtainable by telephone ashore by anybody who needs it. The accuracy of meteorological forecasts provided in the United Kingdom is usually of a high standard, provided that the period covered does not exceed 24 hours. However, the accuracy, whether the information be of a synoptic or climatological nature, depends to a considerable extent upon the available number of ship reports in the area concerned. The presence of the North Atlantic chain of ocean weather stations, by providing both surface and upper-air observations from fixed points at frequent intervals, has proved to be of considerable help to the meteorologist, primarily for the eventual benefit of trans-Atlantic aviation but also in connection with general surface forecasts and for research purposes. But reports from a large number of merchant ships are always necessary in that ocean as in any other in order to prepare a reasonable synoptic map. "We cannot have too many ship reports" is a frequent comment of a forecaster.

If those members of the Royal Society who had the foresight and faith to persuade the Treasury to establish the Meteorological Office could read Dr. Sutton's Annual Report for the year 1954, there seems little doubt that they could say with some satisfaction that quite a lot had been accomplished. And FitzRoy could surely and justifiably say that he gave the Meteorological Office a good departure with a fair wind.

On behalf of the Director and staff of the Meteorological Office we wish all our readers a very happy New Year.

MARINE SUPERINTENDENT.

EXTRACTS FROM ADMIRAL FITZROY'S FIRST REPORT ON THE OFFICE

The Right Honourable LORD STANLEY OF ALDERLEY,
President of the Board of Trade.

MY LORD,

In obedience to your Lordship's orders, I have the honour to present the following Report of the Meteorological Department of the Board of Trade. . . .

The maritime commerce of nations having spread over the world to an unprecedented extent, and competition having arrived at such a point that the value of cargoes and the profits of enterprise depended more than ever on the time and nature of voyages, it became a question of the greatest importance to determine the best tracks for ships to follow, in order to make the quickest as well as the safest passages. The employment of steamers in such numbers—the prevalent endeavour to keep as near the direct line between two places (the arc of a great circle) as the intervening land, currents and winds would allow—and the general improvement in navigation—caused a demand for more precise and readily available information respecting all frequented parts of the oceans. . . .

"It is one of the chief points of a seaman's duty", said Basil Hall,* "to know where to find a fair wind, and where to fall in with a favourable current": but with the means hitherto accessible, the knowledge of such matters has only been acquired by years of toil and actual experience, excepting in the great thoroughfares of the oceans, which are well known. By the Wind and Current Charts published of late years, chiefly based on the great work (of the United States' Government) superintended by Lieut. Maury; and by studying his Sailing Directions, navigators have been enabled to shorten their passages materially—in many cases as much as one-fourth, in some one-third, of the distance or time previously employed. . . .

In 1853 . . . the principal maritime Powers sent duly qualified persons to assist at a Conference, held at Brussels, on the subject of Meteorology at Sea. The report of that Conference was laid before Parliament, and the result was a vote of money

* Captain Hall, a retired naval officer, was author of several scientific papers.—Editor.

for the purchase of instruments and the discussion of observations, under the superintendence of the Board of Trade.

Parliament having sanctioned the expenditure necessary, arrangements were made—in accordance with the views of the Royal Society and the British Association for the Advancement of Science—for a supply of instruments so constructed and tested as to be strictly reliable and inter-comparable. A communication was made by Government, in consequence of which the Royal Society obtained the opinions and suggestions of many eminent meteorologists in Europe and America; and then addressed an elaborate letter to the Board of Trade, expressing their views of the principal objects sought for, and more especially desirable, in the investigations of meteorological science with the hope of ascertaining important laws.

An officer was appointed to execute the duties of this new department (assisted by other persons) and, at the beginning of this year, an office was established at the Board of Trade: but during the previous interval agents had been named at the principal ports, through whom instruments and documents might be furnished to a limited number of very carefully selected ships, and the supply had commenced; since which time instruments, charts and books have been placed on board more than fifty merchant ships, and thirty men-of-war; in which officers have undertaken to make, record and transmit observations.

Many more ships might have been similarly provided with instruments, had the willingness of their captains alone affected the supply: but as good marine barometers require time for their construction, and cannot be well made except by skilful and practised opticians, the supply of them has not quite equalled the sudden demand. Moreover, only a certain number can be purchased by Government annually (with due regard to the Parliamentary vote of money): each of the agents requires a set of instruments to be kept by him, for the purpose of comparison with those sent or returned; and some are wanted for comparisons with the Trinity House barometers at numerous lighthouses.

Attention to these preliminary arrangements, and those of the numerous books, forms and correspondence of the office, has not prevented a reasonable advance towards some first practical results, in return for an appropriation of public funds. While forms have been prepared for collecting observations, and arranging them methodically, previous to their reduction or discussion—and records have been received for examination—an extensive digest of Lieut. Maury's Pilot Charts has been commenced, by which their substance will be rendered available to the seaman by a graphical instead of a numerical form.

The mode of exhibiting barometrical and thermometrical oscillations by diagrams is familiar to most persons; but, as the method here adopted to show the results of observations of wind and weather graphically is new, it may require explanation.

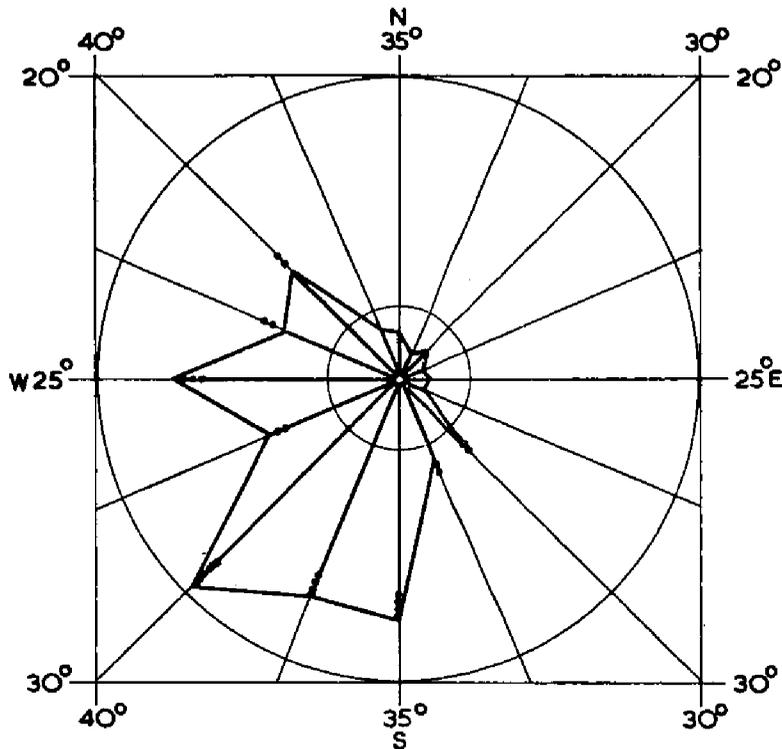
The surface of the globe is supposed to be divided into squares of ten degrees each. Beginning at the meridian of Greenwich, on the Equator, the numbers go westward until the same meridian is regained; then on the next circle, northwards, between the parallels of ten and twenty degrees of latitude, and so on, omitting the ten degrees space of latitude around the Pole. . . .

Every observation made in any square is referred to the centre of that square—as to an observatory, at which observations are made at least three times a day. If between each such time eight hours elapse, three winds (or calms) may be noted for one day.

In such spaces it is supposed that meteorological occurrences will not generally be very dissimilar; and that if all are referred to the centre of that square, or subdivision of it, in which they occur, the mean result of a great number of observations will give a reliable, and approximately correct, general average for practical use.

During a certain interval of weeks, months, seasons, or years, a number of observations are collected. These are classified as to winds, and totalled under points of the compass. A circle is inscribed in each square of ten degrees, and the radius of that circle, drawn to leeward, is taken as indicating the greatest number

of observations of wind from any one point (that of the most prevalent wind). The number of observations of winds from each other point is then marked by a line in the same proportion to the radius (according to scale) that the number of observations bears to the greatest number. Through the extremities of these lines, on points or alternate points of the compass, a line is drawn (as a curve is drawn through ordinates) and the resulting diagram, more or less resembling a star, is called a wind-star.



Wind Star for Marsden Square 375 (off coast of Brazil).
From *The Weather Book*, by Admiral FitzRoy.

The greater area of the figure being to leeward indicates at a glance the relative prevalence of wind from particular points, and its relative duration. . . .

The average strength of wind may be shown by parallel lines, or, numerically: the proportion of calms by a circle of which the radius equals their number (according to the scale of the diagram); the proportion of rain by a dotted circle, on a similar principle; and oceanic currents by the usual arrows and numbers. In addition may be given, without overloading the paper, confusing the eye, or using colours, the proportion of gales or storms (by marks on the point lines), deep-sea soundings, temperature, atmospheric pressure, and the specific gravity of sea water; besides the dip and variation of the magnetic needle.

In accordance with these arrangements, eight charts are now well advanced at the Board of Trade, which will show much of what is at present recorded of the above-mentioned subjects, for the four quarters of the year, in the North and South Atlantic—between the parallels of fifty degrees. . . .

The effect of such compilations will be that a person interested in a voyage, or distant locality, may at once ascertain the average and relative meteorological facts hitherto unknown about the part of the world in question—including such information about the sea and its currents, as well as the atmosphere over it, as should influence the selection of courses to be steered. . . .

It is obvious that by making a passage in less time, there is not only a saving of expense to the merchant, the shipowner, and the insurer, but a great diminution of the risk from fatal maladies—as, instead of losing time, if not lives, in unhealthy localities, heavy rains, or calms with oppressive heat, a ship, properly navigated, may be speeding on her way under favourable circumstances.

There is no insuperable reason why every part of the sea should not be known as well as the land—if not, indeed, better, generally speaking, because more accessible and less varied in character. . . . Meteorological information collected at the Board of Trade will be therefore discussed with the twofold object in view—of aiding navigators, or making navigation easier, as well as more certain—and amassing a collection of accurate and digested observations for the future use of men of science. . . .

As it is desirable that observations of the wind and barometer should be made and recorded more frequently than those of other kinds, and as every vigilant commander requires them to be made regularly for his own information at least once in each watch, there can be no great additional trouble imposed by the new meteorological register, or "abstract log" (which perhaps might as well be called the Weather Book).

Regular attention to the barometer tends directly to the safety of the ship, as well as the comfort of all on board, and the economy of material; but to make such an inspection of full value the results should be recorded, in order that the movements of the mercurial column may be known during previous days as well as hours. These prolonged comparisons and the judicious inferences drawn from them, afford the means of foretelling wind and weather during the next following period of more or less time, and therefore have an immediately important as well as a future value.

Their record, compared subsequently with many other records, will assist the meteorologist in tracing and investigating atmospheric waves, and circulating meteors, or cyclones, as well as ordinary gales—subjects by which every seafaring man is vitally interested. . . .

By collecting and digesting the observations already made, but not yet turned to general account, and by means of more correct and extensive investigations in future, the "highway of nations" may yearly become more safe, and the intercourse between distant parts of the world remarkably facilitated.

To the well-informed and experienced seaman there may be comparatively little to offer; but property and life, to a great extent, must at times be entrusted to inexperienced men. Every commander of a ship must have a beginning.

During late years the great increase (by the wider diffusion) of nautical knowledge, has not only much shortened sea passages, but has rendered them more secure, and less liable to mistakes, as well as to the uncertain delays which occurred so often formerly. . . .

If a frigate, with important dispatches, is some days later in arriving at her destination than might be the case, the possible consequences may be disastrous—but the expense is not thought of, because it does not affect individuals—and because the ship is maintained in continuous service for a considerable period, probably some years. But for every day that a merchant ship is delayed beyond the expected or an average time of passage, not only do passengers suffer more or less inconvenience, affecting health, it may be, if not life itself, but the merchant loses, and the shipowner loses. The expense of pay, provisions and wear of a large ship, full of cargo and passengers, is from £50 to £100 daily: besides which direct expense, there is the diminution of that ship's annual earnings, by the delay unnecessarily caused before she can commence another voyage. . . .

It may be, and often has been asked—what inducement has the captain of a ship to make and record meteorological observations, to embarrass himself with extra logs and delicate instruments? To which it may be replied: that those very instruments, if used at reasonable intervals (not too frequently) become more and more interesting as well as useful, not only to others, with reference to the future, but to himself at the time. . . .

Attempts to attain an extreme degree of accuracy by notations claiming more minute precision than the instruments themselves, or even the ultimate exhibition of results, are capable of affording, only perplex and unnecessarily waste valuable time. On land, and in the calculation and discussion of meteorological observations, several places of decimals are appropriately used; but in observing and recording at sea, two places of decimals seem to be sufficient in reading and recording the barometer, and one place in marking the thermometer.

Attempts to ask for more may be inexpedient, and, like a demand for too frequent observations, are not unlikely to discourage those who have many other claims on their time and thought.



Vice-Admiral Robert FitzRoy, C.B., F.R.S., 1805-1865.

Board of Trade.

Marine Department.

Minute Paper.

No. 5380 Registered the 4 day of May 1860

Referred to

Mr Booth

Minutes.

(With initials and date at foot of each Minute.)

I submit the accompanying papers, in continuation of the subject of your letter (N^o 1555. Dsd. 19. 1859) to the Secretary of the British Association — and request that they may be laid before the President.

Admiral FitzRoy
Apr. 18/60

See 1555/General
/59

See for mem^o on this proposal 1555 / a cba
/59
222

N.B.—The Person to whom the above Minute is addressed, is requested, after making a note of it for his own guidance, to write his observations on this Sheet, and return it to the Board of Trade, with the papers attached, as soon as possible.

Minute written by Admiral FitzRoy, dated 18th April, 1860, from an old file of the Board of Trade.

the greater phenomena and complicated combinations are not much contemplated.

Recent series of simultaneous observations have proved that nearly similar pressure, and even (though less ^{similar} nearly) temperature, with analogous weather, prevail over wider areas than was supposed, formerly, to be the case. Therefore, by intercomparison, and knowledge of normal or mean states, or conditions, at various places, ^{weather} may even now be predicted approximately.

And such an approximation may save agriculturists' crops - ships - even lives!

No personal anxiety, no trouble, ought to be spared in such a cause.

Robt. FitzRoy
April 24/60

Opposite page 9.



[Photo by Elliot & Fry.
Dr. O. G. Sutton, Director of the Meteorological Office.

Allusion may here be permitted to the condition of observers at sea in bad weather—in war-time or at other critical periods; and to the risk as well as difficulty of using instruments under such circumstances—while a comparison may be suggested between their case and that of observers in a convenient building on land.

In consequence of the assistance given by the Kew Committee of the British Association, the instruments offered by Government are not only more correct, but less liable to error, if not injury, than those hitherto used; and they are, generally speaking, lent gratuitously, though they may be purchased for a ship at their cost price, and this (their tested value being considered) is a great advantage.

Those who undertake to keep the registers, or records (abstract logs), are supplied with them free of all expense—and they are asked to insert observations only when taken at such times as may be most convenient among the numerous hours stated. . . .

The Meteorological Office being but recently established, and not having yet received a large supply of records, only four persons are at present engaged in it, including the officer in charge.

The sum estimated for 1854-55 was £3,200; but, as no expenses were incurred till half the financial year had expired, a balance remained in hand which may diminish the estimate necessary for 1855-56.

£700 is the amount asked for this year, in addition to the unexpended proportion (about £2,000) of the amount voted for the last financial year. . . .

I have the honour to be,
Your Lordship's obedient Servant,
ROBERT FITZROY.

Board of Trade,
May 23rd, 1855.

EARLY SYNOPTIC CHARTS

In October, 1859, a great storm swept across the British Isles. The *Royal Charter*, an iron steamship but also sail rigged, had made her way round Anglesey to an anchorage on the north side of the island. There she met the full force of the N'y gale and was blown ashore with the loss of nearly all on board. Some small wooden sailing vessels, amongst them the *Cumming*, were only a few miles off, but managed to ride out the storm.

Admiral FitzRoy described the storm (called the *Royal Charter* storm) in his *Weather Book*, and printed synoptic charts of all the observations taken during that time. Fig. 1 (opposite page 24) is a reproduction of part of one of these charts (one of the first synoptic charts to be drawn). It is for 0900 on 26th October, 1859, when the centre of the depression was over the Midlands. The winds are represented by arrows drawn to leeward of the station, the force being shown by the length (1° longitude = 1 Beaufort force). The pressure is indicated by a thick line, each value being calculated in inches by the distance from the line of latitude below and labelled at the side of the chart 28 in. For example, on the original chart the distance between the pressure line and the "base" line (49°N) at the longitude of Land's End is 1.68 in. Adding this to 28 in. (the value of the "base" line) gives 29.68 in., which is the value of pressure at Land's End. In a similar way the temperature, indicated by a thin line, is measured. The weather is shown by symbols; curves for clouds, vertical lines for rain, dots for fog, etc.; the larger the area depicted, the more intense the phenomenon.

Fig. 2 shows the chart for the North Atlantic for the same period. It gives some idea of the number of ships which were making observations of the weather at that time. These observations were of course collected over a considerable time, as there was no radio by which to transmit messages, and the Meteorological Department had to wait until ships completed their voyages before obtaining any information, which had to be extracted from their meteorological logbooks.

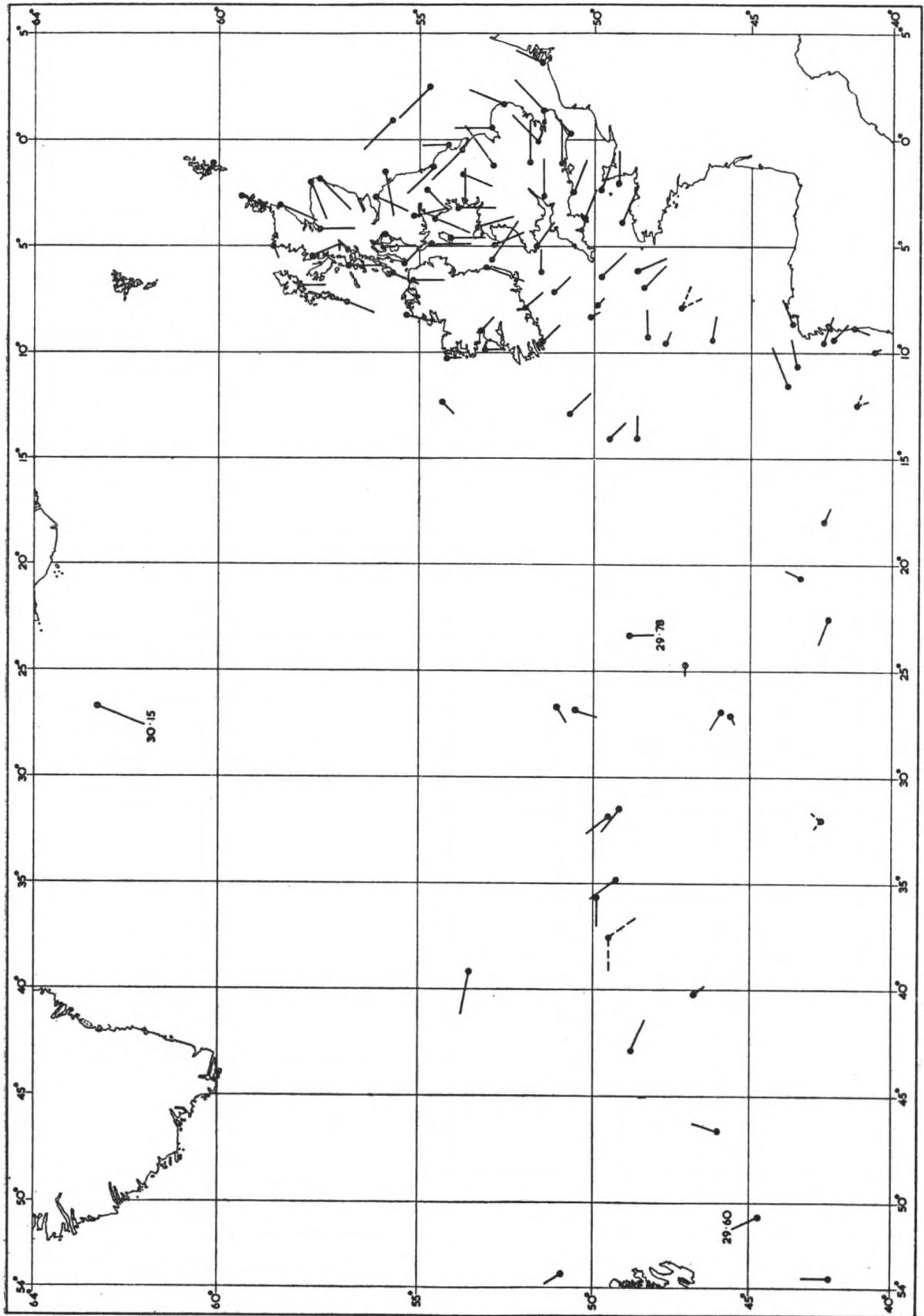


Fig. 2. Weather chart of the North Atlantic for Wednesday, 26th October, 1859.

Some Landmarks in Meteorological Progress 1855–1955

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

PART I

At the start of a survey of the progress of meteorology over the past 100 years two thoughts are uppermost, the first of dismay at having to compress even the most important achievements of the science on the technical side into a brief article, the second of wondering whether meteorologists born in any other period will ever be in a position to look back directly through such an exciting century. For meteorology is one of the youngest of the sciences, and our 100 years begins when the electric telegraph was first used in an official meteorological service to speed up the drawing of synoptic charts, making possible the issue of weather forecasts based upon scientific principles for the first time; it ends with the pioneer efforts made in the last two or three years to devise methods of using electronic computers in numerical evaluation of forecast surface and upper-air charts over a large area of the North Atlantic with a view to supplementing forecasts made by conventional methods. In the exploration of the upper air progress has been almost as striking. One hundred years ago kites had afforded the sole means of securing instrumental readings from the free air, and these had reached heights of only a few thousand feet above the surface, but higher levels were about to be reached by means of manned balloons. Now that the radar-sonde and rocket are available the upper limit to exploration of the atmosphere tends to be set by economic rather than technical factors.

In the early days of the Meteorological Department of the Board of Trade, which was the predecessor of the present Meteorological Office, Admiral FitzRoy, as its head, successfully built up an organisation for the making of meteorological observations at sea and their collection and reduction by the staff of the Department. The foundations of this work were laid at the first International Meteorological Conference in Brussels in 1853, when the design of a meteorological register for use by shipping was approved. The details and times of observations were decided, and the Beaufort scale of wind force, in terms of sails carried, which had been evolved by the author in 1805, was adopted internationally. Within a few years the essential features of the selected ship organisation as it exists today had been established, and the long and fruitful association between meteorological officials at ports and masters of shipping had begun. For a long time the main emphasis of the work of the Department was upon the compilation of charts of wind direction and force and of ocean currents. Using all available data these charts were prepared for "squares" bounded by meridians and parallels at intervals of 10° , which are known as "Marsden squares" after a former Secretary to the Admiralty, who in 1831 introduced this method of subdividing the earth's surface. The information on these charts enabled certain shipping companies to effect considerable financial saving before the turn of the century, and in recent years atlases for all the principal oceans have been produced by the Marine Branch of the Meteorological Office.

At the same time forecasting of wind and weather was not neglected. Modern forecasting by means of synoptic charts can be said to date from 1859, when Admiral FitzRoy organised the issue of gale warnings in this country. Although he had been making weather forecasts before this date and circulating them amongst the staff of the Meteorological Department, he was anxious to give them greater publicity, but it was not until 1861 that he was allowed to issue storm warnings and forecasts to the public, owing to scepticism within the Board of Trade about his ability to forecast with sufficient accuracy. In subsequent years the

Department retained the support of the Board of Trade, but not always that of the Treasury, with the result that gale warnings to the public were suspended for a time during 1866-68.

Shortly after FitzRoy's death in 1865 a Meteorological Committee was set up composed of Fellows of the Royal Society, and this Committee assumed responsibility for the work of the Department. A special study of the weather in the North Atlantic was made by the Marine Superintendent (Capt. Toynbee), facilitated by the laying of the trans-Atlantic cable, and an improved system of storm warnings was introduced in 1874. The most valuable work of this period was inspired by Sir Francis Galton. This consisted in drawing daily weather maps together with short written notes on the behaviour of each cyclone and anticyclone. The results of this work were all made available in an official publication, the *Quarterly Weather Report*, which was issued for 12 years beginning in 1867. The weather maps in this report, which included isobars for the first time, showed closed isobars surrounding areas of high pressure as well as of low pressure (Galton first used the term "anticyclone"), and the publication also included facsimile reproductions of the autographic records (to use the modern term) from the recording instruments then in operation at seven observatories in the British Isles.

The next landmark was the formulation by Abercromby of the principles of forecasting based upon the behaviour of cyclones and anticyclones. This work was founded on the earlier investigations and on detailed maps covering the North Atlantic area drawn for a short period from data which had been collected during the first International Polar Year in 1882-83. At this period optimism prevailed and the complexity of the forecasting problem was not realized. Some enterprising newspapers in this country arranged for the eastward movement of depressions from the American Atlantic coast to be notified, so that their arrival over Britain a few days later could be foreshadowed. The establishment of the Ben Nevis observatory in 1883 was characteristic of the enthusiasm of that period, and of the opinion that it was only necessary to make regular observations in a few specially chosen localities to determine the positions and tracks of the pressure systems. These, it was confidently thought, would eventually be found to move in accordance with definite rules, having some resemblance to planetary motions in the solar system.

The following quarter of a century witnessed the failure of these hopes, and it was gradually realised that this was due as much to a lack of information as to inadequate theoretical knowledge. Ship reports from the Atlantic were extremely scanty and information from the upper air even more so. The importance of the latter was hardly realised so long as the belief prevailed that the air circulations in depressions and anticyclones were limited to a few thousand feet above the surface. In 1906 Sir Napier Shaw and R. G. K. Lempfert of the Meteorological Office published a report entitled *The Life History of Surface Air Currents*, which helped to clarify ideas on the structure of depressions but just failed to present the notions of fronts and air masses which were advanced by the Norwegians some 12 years later.

This Norwegian work is well known to meteorologists and will be referred to only briefly here. Led by Bjerknes, whose name will always be linked with the "Polar Front Theory", they were the first to introduce the concepts of fronts and air masses. The value of their work has been that it gave a lasting stimulus to synoptic meteorology, and the ideas have had application to synoptic charts drawn in all the temperate regions of the globe. In addition they have made some contribution towards understanding the synoptic meteorology of the tropics. In the forecasting of local weather conditions earlier theories emphasised the relation between pressure distribution and the weather sequence at a locality, whereas the Norwegian work showed how to take air masses into account, and to consider the influence upon the physical state of the air mass of such factors as the region of origin of the air and the nature of the surface over which it has passed, change of latitude and season.

In spite of the impetus which the Norwegian work gave to practical forecasting, the "polar front theory" only served to explain, in broad terms, the stages in the life history of the majority of depressions. It offered a qualitative explanation of certain events but did not explain the essential dynamical features of depressions and anticyclones, that is, the removal or accumulation of air, nor could it be used for any numerical purposes such as estimating rates of deepening of individual pressure systems or amounts of rainfall at fronts. There was no means of explaining the abnormal behaviour of many systems and their associated fronts, and the relation between wind and pressure gradient had been investigated only for the simplest cases, that is, for uniform gradients with straight, and curved, isobars, and conditions of steady pressure. For instance, in a region where the isobars are straight and parallel, air moving far enough above the ground to be beyond the effect of friction (i.e. above 1,500 ft) is acted upon by two forces, due to the pressure gradient and the deflection of the earth, the latter force always being directed at right angles to the direction of motion of the air. The velocity of the steady wind which must blow in order to balance these forces is known as the geostrophic wind velocity, and it is evident that this wind—known as the "geostrophic wind"—must blow parallel to the isobars, and with low pressure on its left in the Northern Hemisphere. Considerable use was made in practice of this idea of a "geostrophic wind", although it referred to conditions which seldom existed in reality. In 1937 Sutcliffe drew attention to an inconsistency in these ideas, which had been pointed out many years earlier by Jeffreys, namely, that with true geostrophic motion surface pressure cannot change. Since in a real synoptic situation the surface pressure is continually varying, the assumption that all motion in the atmosphere takes place in conditions of geostrophic balance was shown to be absurd. Sutcliffe was therefore led to consider the mechanism whereby pressure change is effected in the atmosphere and to relate it with convergence and divergence of air at different levels and with variation of wind speed and direction with height, among other factors.

Until the time of the Second World War the practice of forecasting was almost entirely dependent upon the surface chart. Within a very few years, with the advent of the radio-sonde and radar wind-finding techniques, a large amount of upper-air data was made available to the forecaster in Europe and North America, and routine preparation of upper-air charts became possible. In this country the Meteorological Office makes most use of the 1000–500 mb thickness chart for day-to-day forecasting purposes, although contour charts for 700, 500 and in some cases 300 mb levels are also drawn, and these charts can be used to find the thickness pattern between 1000 mb and the appropriate level. For the benefit of the reader who is unacquainted with the method of obtaining these charts, it should be explained that a radio-sonde ascent determines the height above the station at which the pressure is 500 mb, and similarly the height of the 1000 mb surface above (or below) mean sea level can readily be found by making simple assumptions regarding the lapse rate near the surface, when the surface pressure (corrected to mean sea level) is known. The radio-sonde ascents over Europe, the North Atlantic and North America, among other areas, give a geographical distribution of values which can be plotted on a map to show the vertical distances which separate the 1000 mb and 500 mb surfaces at various points. This vertical separation is known as the "1000–500 mb thickness", and it usually varies between values of about 17,400 ft in polar regions and 19,000 ft over the sub-tropical Atlantic. Isopleths of equal "thickness" for 17,400, 17,600, 17,800 ft, etc., are drawn on this map by interpolation, to show the "thickness pattern". (Similar patterns can be drawn for 1000–700 mb and 1000–300 mb but have proved less valuable in practice.) The procedure actually used to obtain the 1000–500 mb thickness chart is a little more complicated than described here, but the details do not affect the argument.

The value of the thickness chart lies in the fact that the thickness lines behave

rather as though they were embedded in the surface geostrophic wind field, and usually move in the direction of the geostrophic wind. Their speed is usually less than the geostrophic wind. They can thus be used as a check upon the forecast surface charts drawn up by the forecaster for 24 hours ahead by means of the older methods. Assuming firstly that his forecast surface chart is correct, the thickness lines on the latest actual thickness chart can be moved ahead in the surface geostrophic wind pattern (as given in the latest surface chart and the forecast "prebaratic" chart for 24 hours ahead), whence a forecast thickness chart for about 24 hours ahead can be obtained. It is found that closed pressure systems are to a large extent "steered" along the 1000-500 mb thickness isopleths near their centres, and this fact can be used to verify the accuracy of the forecast thickness chart and the forecast surface chart (prebaratic) and to make adjustments in both forecast charts, if necessary until they are both mutually consistent. With practice and some background knowledge a forecaster can make considerable use of thickness charts which, besides being intimately related to the thermal gradients and the thermal wind pattern at the 500 mb level, can also be used to forecast intensification or weakening of surface pressure features in some cases, and thereby afford further insight into the physical processes in operation in the atmosphere.

At about the same time Professor Rossby, who was then working at the Massachusetts Institute of Technology, and his co-workers made successful studies of the regional circulation patterns of the upper-air flow in temperate latitudes over nearly the entire Northern Hemisphere. (Previously Bjerknes had studied the wave-like patterns found in the large-scale flow of the upper air, which are rather simpler than the flow at the surface, but had only related individual waves to his cyclone models.) Namias of the United States Weather Bureau has written recently in regard to this work by Rossby: "For the first time a physical framework was provided for . . . the interconnections between remote parts of the hemisphere. New life was breathed into a subject which, because of its complexity, was being ignored by an increasing number of meteorologists." The subject to which Namias refers is that of the regional circulations of the atmosphere, a better understanding of which is still essential for future progress. Namias and his team have tried out some methods in the U.S.A. in recent years which aim at foreshadowing the mean character of the temperature and precipitation differences from the normal for a month ahead in such general terms as "above/below normal", "much above/below normal", but the degree of success they have achieved is uncertain. The potential economic value of this work to the farmer and to public utilities can be readily understood, while it has a similar value to port authorities in connection with such problems as the length of ice-free seasons and navigability of channels.

Within the last few years a start has been made with the application of electronic computing machines to the forecasting problem. Recent theoretical advances have now made it possible to use the relatively dense network of upper-air observing stations in Europe and North America (including the ocean weather stations which here play a vital part) to provide data which can be used to produce a forecast synoptic chart for 24 hours ahead for both the surface and the upper air at the 500 mb level (18,000 ft approximately). The method adopted is to feed an electronic computing machine with data for a large number of points, which have to be read directly from the most recent surface and upper-air synoptic charts. The data and instructions needed are fed into the machine, which then performs the calculations fast enough to allow a forecast chart for a time eight hours ahead to be drawn after about one hour. The value of the electronic computer is that it obtains results in an hour which would take months to compute by hand. To date this work has been undertaken as research, but the experience so far gained shows that the accuracy of the forecast charts obtained in this manner has proved to be fairly high and that, had they been available to the forecaster at the time, they would have afforded him valuable assistance.

The work of the Marine Branch of the Meteorological Office has already been

described in many articles in these pages, and it will be sufficient here to refer to two notable achievements during the 100 years under review. The first is the introduction in 1921 of Hollerith sorting and tabulating machines, which effected an enormous saving of time in the work of the Branch. Before that date all marine data had to be extracted by hand from the original ships' logbooks before being analysed. Now the observations are all punched on to cards, and the cards handled by means of a machine which sorts them into packs so that a given observed element has the same chosen magnitude or range, such as an air temperature between 45° and 50° , or a visibility of between 500 and 1,000 yd. Similarly, the frequency with which wave heights within a certain range occur with a particular wind direction can be obtained. The Marine Branch also possesses a tabulating machine by means of which the figures on the punched cards are printed in columns together with the numerical sum of these figures and the total number of figures in the column.

With the aid of these machines a large number of statistical investigations have been made into meteorological problems, and charts and atlases have been prepared which have greatly added to our knowledge of the climatology of the oceans. During the 1939-45 War climatological atlases were published for the principal ocean areas of the world which included monthly maps showing the distribution of mean pressure, percentage frequencies of observations of winds grouped by Beaufort force, mean air temperature, mean sea temperature, range of air and sea temperature, percentage frequencies of snow, precipitation, lightning, cloud and visibility between certain amounts and distances, etc. The information in these atlases is thus very comprehensive, and they are continually being used to answer routine enquiries from shipping firms and other marine interests. The information which has been placed on punched cards extends over the past 100 years, and covers every part of the oceans, although naturally few observations are available for some of the less frequented areas of the world such as the fringes of the Arctic and Antarctic regions, parts of the South Atlantic and the southern regions of the Indian and Pacific Oceans. In all nearly 12,000,000 punched cards are now held by the Marine Branch including copies of German cards.

A problem about which fresh information has been gained by means of this library of punched cards is that of the long period changes of air and sea temperature through the past few decades. Investigations have been made into this problem for the north-east Atlantic, the tropics and the polar regions. Our knowledge of the complex balance maintained between incoming solar radiation and outgoing radiation from the earth's surface and atmosphere is being extended for certain oceanic areas, since the bulk of the data needed to calculate the quantities involved with fair accuracy is available on punched cards for the oceans. The number of observations received from certain routes where the density of shipping is high is now almost sufficient to allow of investigations being made into the variation of certain elements over quite short periods, such as a few days, a month or a season; this may help towards unravelling some of the problems of the general or regional circulation of the atmosphere which have engaged the attention of many meteorologists through the past two decades as described earlier. Finally, the positioning of the ocean weather ships in the North Atlantic and North Pacific has enabled such problems as the diurnal variation of air and sea temperature, and the variation of vapour pressure with wind speed and air-sea temperature differences, to be attacked using homogeneous data from fixed points for the first time.

In this account emphasis has naturally been laid upon the activities of our own Meteorological Office. However, at an early stage in the history of most Meteorological Services it became clear that the problems involved in collecting and exchanging meteorological information for forecasting, and for most other purposes, could only be solved internationally. As a result the International Meteorological Organisation was formed in 1878. The Conferences of this body were semi-official, the Directors of Meteorological Services attending in their respective capacities

and not as representatives of governments. As an outcome of a Convention drawn up at the twelfth Conference of Directors in 1947, the functions of the International Meteorological Organisation were taken over by the World Meteorological Organisation, which began its official existence in April, 1951.¹ The work of the W.M.O. is carried out under the guidance of a President, two Vice-Presidents, an Executive Committee, six Regional Associations and eight Technical Commissions. In the past four years there have been meetings of all these commissions, and as a result many proposals for standardising procedures have been approved by the Executive Committee, for adoption by all member States. From time to time the W.M.O. also publishes technical notes which summarise the results of recent research in such problems as cloud seeding, energy derivable from the wind and measurement of sea temperature. At the present time it is sponsoring an investigation into the frequency of thunderstorms over the whole world on behalf of the Consultative Committee of International Radio, and for this purpose is using a considerable proportion of the data punched on cards in the Marine Branch of the Meteorological Office.

¹ The W.M.O. has the status of a United Nations specialized agency.

Part II of this article, dealing with meteorological instruments, will appear in the April number.

Ocean Meteorology

A CENTURY OF SCIENTIFIC PROGRESS

By P. G. PARKHURST, M.B.E.

PART I

The following article has been written by Mr. Parkhurst, who started as a clerk in the Board of Trade in 1909, and since the Second World War has been Librarian to the Ministry of Transport until retiring in 1950. The material was based mainly upon information found in the old records of the Board of Trade. The photographic reproductions of Admiral FitzRoy's notes in 1860 show how earnestly he strove to improve our knowledge of the weather, in order to assist not only his brother seamen, but all people. The article may give readers some idea of the growth of the Meteorological Office from those small beginnings as a section of the Board of Trade to the great and important public service it now is.

It was in the spring of 1852 that the British Government first became officially interested in the study of weather over the oceans, where British merchant ships were engaged in world-wide trade.

Before that time, however, several private individuals had attempted to collect data regarding weather conditions over the seven seas, but difficulties, such as lack of adequate funds to carry on so large a project to give satisfactory results, soon led to cessation of the schemes. In 1831 Mr. Wm. Marsden, who was Secretary of the Admiralty, commenced, with the aid of the Hydrographic Office of the Navy, the first systematic endeavour to collect and discuss meteorological observations made at sea, and he suggested a plan of dividing the ocean into squares, thus affording a means of grouping and averaging observations, as well as identifying spaces at sea, like provinces of land. The "Marsden squares" are used for maritime climatological work to this day.

In 1838 Sir William Reid published his *Law of Storms*, in which he strongly advocated a system of meteorological observations on an extensive scale, and, in consequence of his arguments, officers of the Royal Engineers at detached stations abroad and Consuls in foreign ports were requested to collect and transmit to the Headquarters of the Royal Engineers at home observations and data regarding the weather. Probably the more immediate object in view at that time was the investigation of storms affecting the safety of ships rather than the duration of their passages.

Shortly afterwards the first practical step in assisting the mariner was taken by Lieut. Maury, of the United States Navy, who published a series of wind and

current charts based on information taken from the logbooks of American ships; so that by studying his sailing directions, navigators were enabled to shorten their passages materially, in many cases by as much as one-third of the distance or time previously employed.

The scheme for obtaining observations from officers of the Royal Engineers had been prepared by Major-General Sir John Burgoyne, Inspector-General of Fortifications. He prepared detailed instructions as to the kind of data his officers were to send home, and in time a considerable amount of data arrived from many parts of the world. In 1851 Sir John Burgoyne sent, through the British Ambassador in Washington, to the United States Government a copy of his scheme for collecting meteorological data with a view to co-operation between the two countries. Meteorological observations were carried on to a much greater extent in America than in this country, as an Act of Congress had given authority for ships of the Navy to carry out the necessary observations, and upwards of 1,000 merchant ships had also been enrolled for recording data. Lieut. Maury was put into communication with Sir John Burgoyne and both welcomed the offer of co-operation enthusiastically. A conference was agreed upon. Sir John Burgoyne, however, wished it to be restricted to representatives of the two countries, chiefly on account of the similarity of language and weights and measures; but Maury was anxious to include men of science from other maritime countries.

In the spring of 1852 the question was brought to the notice of the British Foreign Office. After obtaining warm support for the scheme from the Royal Society, the Foreign Office suggested that the Admiralty and the Board of Trade might be interested in sending delegates to the conference. The Admiralty were prepared to support the plan but they did not propose to form a separate establishment for the purpose of recording the observations. The Board of Trade were strongly in favour of the scheme, and told the Foreign Office that both science and navigation would benefit from the execution of the proposed plan. They offered to do all they could to carry out the scheme, but they explained that they had no funds with which to pay expenses. The Treasury was next invited to provide funds for sending representatives to the conference. Realising the importance, not only to the seafaring fraternity but to "most of the other operations of the human family", they expressed their intention to sanction any well-considered plan.

In the meantime the United States Government had sent out invitations to the Governments of Belgium, Denmark, France, Great Britain, Holland, Norway, Portugal, Russia and Sweden to send representatives to meet Lieut. Maury to discuss the question of a universal system of observations at sea.

First Meteorological Conference

The International Conference met at Brussels in August, 1853, and carried on its deliberations until 8th September. The British delegates were Captain F. W. Beechey, R.N., F.R.S., the professional naval officer of the Marine Department of the Board of Trade, and Captain H. James, F.R.S., M.R.I.A., F.G.S., of the Royal Engineers, who had assisted Sir John Burgoyne in preparing the original plan for meteorological observations. On the refusal of Maury to take the chair, the Conference appointed M. Quetelet, Director of the Observatory of Brussels, as chairman. Capt. Beechey appeared to have stamped his personality upon the discussions and his name appeared frequently in the minutes as either the proposer or seconder of the more important resolutions. Maury stated that he had received instructions from his Government to propose a form of meteorological register for the use of men-of-war, but Capt. Beechey explained that he had set out from England with the idea that the proceedings would include both the Royal Navy and the Merchant Service. Although at the outset the Conference decided to confine itself exclusively to ships-of-war, Capt. Beechey was able to persuade it to produce a meteorological register, the first dozen columns of which would be suitable for use aboard a merchant ship.

The report of the Conference was the joint effort of Lieut. Maury and Capt. Beechey. Their observations on the need for good and accurate instruments to be carried on board ship may be summed up in the following paragraph regarding the marine barometer then in use:

That an instrument so rude and abundant in error should in this age of invention be found on board any ship, will doubtless be regarded hereafter with surprise; and it will be wondered how an instrument so important to meteorology and so useful to navigation, should be permitted to remain so defective that meteorologists, in their investigations concerning the laws of atmospheric pressure, are compelled in great measure to omit all reference to the observations which have been taken with them at sea.

With regard to the question of the different scales in use in the different countries, the Conference decided to leave each nation to continue its scales and standards with the exception of thermometers, which should have the centigrade scale marked upon them in addition to the scales in use in any particular service.

The basis of the observations was the register which was to be maintained by every officer enlisted under the scheme. Observations were to be made every two hours¹ and recorded in the register under the following headings: latitude and longitude (by observation and dead reckoning); currents (direction and rate); magnetic variations observed; winds (direction and force); barometer (height); hours of fog, rain, snow and hail; state of sea; water (temperature at surface, specific gravity, temperature at depth); state of weather; remarks on tempests, tornadoes, whirlwinds, typhoons, hurricanes, waterspouts, temperature of rain, description of hailstones, dew, fog, dust, height of waves, tide-rips, colour of ocean, soundings, ice, shooting stars, Aurora Borealis, halos, rainbows, meteors, birds, insects, fish, seaweed, driftwood and tidal observations.

A table of force of wind was set out as follows:²

- | | |
|-----------------------------------|---|
| 0. Calm. | 7. Double reefed topsails. |
| 1. Ship has steerage way. | 8. Triple reefed topsails. |
| 2. Clean full, 1 or 2 knots. | 9. Close reefed topsails and courses. |
| 3. Clean full, 3 to 4 knots. | 10. Close reefed main topsail and reefed
foresail. |
| 4. Clean full, 5 to 6 knots. | 11. Stay sail. |
| 5. With royals. | |
| 6. Topgallants over single reefs. | |

On the last day of the Conference Lieut. Maury proposed a "vote of thanks to Capt. Beechey for the ability and zeal he had displayed in the amendments to the report, which set forth, in so clear a light, the objects of the Conference and the benefits to be derived by commerce and navigation from the adoption of the plan of observations recommended".

On his return to London, Capt. Beechey reported to the Board of Trade the results of the Conference, and with the help of Dr. Lyon Playfair drew up a scheme and estimate of expenditure for a separate department to carry out the proposals approved at Brussels. In due course Parliament voted a sum of £3,200 for the new work, and the Admiralty added £1,000 for the services to be performed in connection with the Royal Navy.

Meteorological Department formed

Captain (afterwards Admiral) Robert FitzRoy, R.N., F.R.S., was appointed head of the Meteorological Department of the Board of Trade. He had been in command of the *Beagle* during her famous voyage round the world with Charles Darwin, the naturalist. From 1843 to 1845 he was Governor of New Zealand. In 1848 he was given command of H.M.S. *Arrogant*, the first experimental frigate to be fitted with a screw. The new Department commenced work at the beginning of 1855. A letter was sent to the largest shipowners inviting their co-operation in the scheme. The Board of Trade offered to lend suitable instruments to any master

¹ This was soon altered to every four hours, i.e. at the end of each watch.

² Admiral Beaufort's specification, which he evolved in 1805.

who volunteered to keep a register, but the hope was expressed that, owing to the smallness of the money made available by Parliament, the more wealthy shipowners would purchase instruments from the Board at cost price. A complete set of instruments, consisting of one marine barometer, six thermometers, four hydrometers and one azimuth compass cost about £11. As an acknowledgement of the trouble taken by masters, it was proposed to place a distinguishing mark against their names in the Mercantile Navy List and to make a present of copies of the charts and books when they were published from time to time.¹ These books were to contain information as to the wind and ocean currents and the most desirable tracks to follow in order to make the surest and quickest passages. The United States Government also placed at the disposal of the Department sets of charts and sailing directions prepared by Lieut. Maury, to be distributed gratis to masters.

Later, agents were appointed in most of the large ports to interview masters desirous of co-operating in the scheme. They also took charge of instruments when masters were on shore and checked their accuracy before the masters commenced a fresh voyage.² All instruments were periodically checked at Kew. By 1857 some 200 merchant ships had been fitted with instruments. Owing to the number of British men-of-war engaged in the Crimean War, the assistance rendered by the Admiralty was not so great as was originally expected.

While awaiting the arrival of data from British ships Admiral FitzRoy worked over the mass of data collected by Maury, which was almost unintelligible to the ordinary mariner. Admiral FitzRoy devised wind charts or "wind stars" (as he called them) which he produced in a readily understood form of graph, the various points of the star showing the direction of the prevailing winds at different times of the year. The surface of the globe was divided into squares of 10° each side (Marsden squares, see above). Beginning at the meridian of Greenwich on the Equator, the squares were numbered westward until the same meridian was regained and then on the next circle northwards between the parallels of 10° and 20° of latitude and so on, the 10° around the Pole being omitted. These squares numbered 300; a similar system of squares was formed south of the Equator, the squares being numbered from 301 to 600. The use of these squares instead of degrees of latitude and longitude simplified matters considerably for statistical purposes ashore. The data relating to the various features of air and sea, such as direction and force of wind, currents, etc., were extracted from the logs and recorded in its appropriate square, and in this way a graph or "star" was built up, showing the direction of the prevailing winds, the longest point of the star being the direction in which the wind mostly prevailed. Four quarterly charts were prepared and it was Admiral FitzRoy's ambition to provide a volume of monthly graphs for the whole year for every square which represented navigable waters.

By 1858 the Department had published the following pamphlets: (1) on the deviation of the compass; (2) a passage table showing the length of passage between frequented seaports and giving the least possible distance to be traversed between them; (3) concise and ready methods of applying the principles of Great Circle sailings; (4) a manual of instruction for the use of barometers and thermometers as "weather glasses"—one for the use of fishermen and one for young officers at sea.

Storm warnings and weather forecasts

Admiral FitzRoy appeared to have in mind that sooner or later the ultimate aim of his work would be the issue of storm warnings, and in December, 1859, he brought before the British Association for the Advancement of Science the question of using the electric telegraph for the purpose of warning distant parts of the coast of the approach of gales. The Council of the British Association, presided over by the Prince Consort, met at Buckingham Palace and approved Admiral FitzRoy's

¹ Here appears to be the first mention of "awards" for meteorological work at sea.

² This seems to be the first mention of "Port Agents".

scheme. The Prince Consort personally brought the scheme to the notice of the Board of Trade, and the following sets out Admiral FitzRoy's proposals as approved by the British Association:

1. Great Britain and Ireland to be divided into three districts; North, East and South-West. The first including all Scotland; the second thence by the East Coast to Dover Straits and the third all the south-west coast of England with the south and west coasts of Ireland.
2. In each of these three districts, officers now on duty there to be selected, instructed and provided with instruments.
3. These officers (only three or four in each district) will send such telegraphic messages to London occasionally as their instructions specify.
4. These messages will be posted at Lloyd's and transmitted to other selected stations, where they will likewise be conspicuously posted.

Admiral FitzRoy explained to the meeting of the British Association that storms were preceded by distant warnings, as, for example, rough seas at Valentia preceded a gale by some 24 hours, and that they advanced in particular directions towards places where their influence was felt some time after it had been marked elsewhere. Therefore warning might be conveyed by telegraph in time to caution those places likely to be visited by bad weather. With regard to the cost of the telegrams, Admiral FitzRoy pointed out that the cost of supplying instruments to ships and agency fees had been greatly reduced, and he suggested that a sum of £700 saved from the amount voted by Parliament for his Department should be used to defray the cost of the telegrams.

At this time the French Government became interested in the study of weather, and invited the co-operation of Admiral FitzRoy by establishing a system of exchange weather reports, the French asking for reports from five stations—Scarborough, Portland, the Lizard, Cork and Galway. The French Government offered in exchange reports from any five places in France. Admiral FitzRoy approached the Board of Trade for permission to accept the offer of the French Government. He explained that he could use the reports from the five stations mentioned by the French Government as part of the eight stations from which he expected to receive reports, and by having the reports from France he would gain by knowing the weather occurring in places farther afield. There was a marked difference between the FitzRoy scheme and that of the French; the latter proposed simply to publish the reports of the weather actually prevailing; Admiral FitzRoy wished not only to publish the reports but to issue a forecast of the weather for the following day. (See the photograph of Admiral FitzRoy's minute dated 24th April, 1860, opposite page 9.)

The Board of Trade was dubious of the ability of Admiral FitzRoy to forecast weather correctly. Mr. T. H. Farrer (afterwards Lord Farrer), the Permanent Secretary, wrote to the Office: "These telegrams you propose to send from your Office seem, so far as we can understand, to go far beyond what the French propose, and without the least giving an opinion on what science can do, of which we are no judges, official timidity prompts us to question whether, in the first instance, it might not be better to follow the French example and confine ourselves to registering and publishing facts, and leave foretelling the weather for a subsequent stage."

Admiral FitzRoy replied that during the preceding five years he had been collecting and digesting information with the object of issuing weather forecasts.¹ He agreed that his telegrams would go far beyond what the French proposed but six months' trial would prove their character. It had been found from simultaneous observation that similar atmospheric pressure, temperature and weather prevailed over a much wider area than was usually supposed and that by intercomparison, changes and conditions might be foretold approximately. It had been ascertained that atmospheric changes on an extensive scale were not sudden, and that premonitions were more than a day in advance, sometimes several days. When a storm

¹ Admiral FitzRoy thus appears to be the originator of the word forecast.

occurred it was its own herald. It was shown, he said, by hundreds of wind-charts executed in his Office that the conflict of N'ly or S'ly currents in the atmosphere promoted storms which moved more or less circularly, and in general from south-westward towards the north-east, over the British Isles and Western Europe in nearly the same latitude. These differed from the continuous (sometimes very strong) winds which blew for days together from nearly the same quarter. Of both these classes of wind ample notice was given by the barometer and thermometer. The details of lesser features of weather could not be predicted by ordinary observers, but the general character might be—when it was of so marked a nature as to affect seaports materially.

Admiral FitzRoy said (without presumption) that the vice of meteorologists of his day seemed to be in making an infinite number of microscopic observations and attaching extreme importance to minute details, while the greater phenomena and complicated combinations were not much contemplated. He offered to initial the forecasts of the weather which he proposed to issue to *The Times* and *Shipping Gazette* so as to avoid compromising the higher authorities.

The President of the Board of Trade (Mr. Milner Gibson), however, declined to authorise the issue of weather forecasts. He wrote to Admiral FitzRoy: "I don't see any objection to the collection of facts as to weather, posting them at Lloyd's and transmitting them to various ports and to Paris, but it appears to me that the Government cannot take the responsibility of drawing conclusions and foretelling the weather for the practical guidance of merchant shipping. The Committee of the British Association might use the facts supplied by the Government aid for such purposes as they might think fit, but on their own exclusive responsibility." The Treasury, however, expressed its approval of Admiral FitzRoy's scheme by adding £500 to the estimate of the Meteorological Department.

The first storm-warning signal was sent out early in 1861. It was disregarded in the Tyne district, with the result that several ships were lost with considerable loss of life.

In August, 1861, the first regular weather forecasts were compiled and published in six daily newspapers. Besides these forecasts, storm warnings were sent to the ports likely to be affected, and when it appeared advisable to Paris, Hamburg and Oldenburg, the respective Governments in these cases paying for the service.

(This article will be concluded in the April, 1955, number of *The Marine Observer*.)

Old Time Marine Observer's Log

(Extracts from Meteorological Registers kept in observing ships of the year 1855.)

The Marine Branch of the Meteorological Office has in its possession a number of old logbooks, or meteorological registers as they were then called. Among these are fourteen logs of the year 1855. The books were large, about double the size of our modern ones, and with more pages. There was ample space for remarks, and very full directions for keeping the log.

It was stated in the foreword that:

"All contributors will have their names distinguished as such in the Mercantile Navy List and will be supplied by the Board of Trade with the results of their own and other officers' observations, when published."

Observers were asked to record all unusual phenomena, much as we do today, but including such additional items as notes on magnetic variation, deep-sea soundings and tidal observations, matters that are not nowadays considered to be marine meteorology. Ocean currents were of course recorded whenever possible, but as a sailing ship's speed and course varied much during a day's run, accurate current observation was difficult.

Most of the logs were most carefully kept, and with very full remarks in good handwriting, although the ink has naturally faded somewhat in 100 years. Six of the 14 logs mentioned above were classed "Excellent".

Although there were some steamers in 1855 not many of them were on long ocean voyages. The logbooks from which the following extracts are taken were all full-rigged ships. The logs contain many references to sails set or furled, tacking or wearing ship and so on. There are also many remarks of comparisons of the ship's compasses and references to other ships sighted and signalled, ice and weed seen, etc., and sudden shifts of wind were of course noted. Sea birds, whales and other animal life were logged. Practically all the logs make favourable mention of Maury's sailing directions, which were then comparatively new.

The following are specimens of some of the more interesting entries in these old logbooks.

Ship *Medway*, 653 tons. Capt. J. B. Kennedy. London towards Melbourne.

27th Oct., 1855. Noon. Lat. $6^{\circ} 02'N$, Long. $24^{\circ} 38'W$. Wind SSE, 2. 3 p.m. Calm. Lowered down a boat and boarded the American ship *Pequot*, Capt. G. A. Webb. 84 days from Calcutta bound for London.

(It remained dead calm for two days, the two ships laying about 2 miles apart.)

30th Oct. If I understand Maury's tables of crossing certain parallels, we should cross $5^{\circ}N$ in $27^{\circ}W$. I have tried hard to get there but have not been able, yet if I understand the Pilot Chart between 5° and $10^{\circ}N$ and 25° and $30^{\circ}W$ our chance of head winds and calms are as 527 to 217 fair winds and leading winds. But this is my first passage with the Charts and Sailing Directions on board and most likely I am in a wrong position.

(There were several other references to Maury's directions.)

6th Nov. Noon. $2^{\circ} 52'N$, $20^{\circ} 05'W$. Wind S, 6. Strong wind and moderate squalls, all possible sail set. I think we have caught the SE Trades at last. We have been 15 days in the doldrums and have had the most unfavourable chances of making southing I have ever experienced.

8th Nov. . . . crossed the Line 4° further to the westward than I have ever been before. I will stand on and place confidence in Maury's Directions, but I fear the Brasil Coast.

(Capt. Kennedy feared he would not weather cape St. Roque, but his confidence in Maury's Directions was later justified.)

9th Nov. Noon. $2^{\circ} 34'S$, $31^{\circ} 38'W$. At 11.45 p.m. Made Fernando de Nerohna, about 6 miles to leeward. Weathered it and passed on in fine style.

(The *Medway* ran her Easting down in about 48° s and encountered a good deal of ice.)

8th Dec. Noon (DR). $48^{\circ} 13'S$, $23^{\circ} 56'E$. Wind N, 6. Strong wind and thick fog. It appears that we are never to have any more clear weather. At 4 p.m. saw a large ice berg (third of a mile in length and 300 ft high) ahead. Passed close to leeward of it. Directly after we passed it we were surrounded with small pieces of loose ice and among several small bergs. A dense fog also came on and the wind freshened. We had great difficulty in clearing the small bergs. Ship going very fast. Reduced sail from Royals to single reefed Topsails. I do not at all like these Ice Islands.

9th Dec. Three bergs in sight. . . . I think the largest one was 2 miles long and nearly square with a high part in the centre, like the transept of the Crystal Palace. The bluff perpendicular face of it about the height of the South Foreland, and the high centre about a third higher. . . . We are falling in with a great deal of ice.

12th Dec. Noon. $48^{\circ} 28'S$, $45^{\circ} 58'E$. Wind WNW, 8. Fresh gale with hard squalls and frequent showers of snow; a slight frost. Heavy w'ly sea.

(The ship had much of this kind of weather until 26th December, when she was in $47^{\circ} 01'S$, $115^{\circ} 53'E$, by observation.)

4th Jan., 1856. Anchored in Hobson's Bay. 101 days from the Lizard.

Ship *Statesman*. Capt. J. F. Trivett. London to Port Philip.

24th July, 1855. $23^{\circ} 47'N$, $22^{\circ} 56'W$. Examined some of the water from alongside by a microscope. I believe the water was full of "infusoria" as several minute

globules appeared to dart about in the water, and one of the Medusae with its umbrella shaped disc was distinctly made out.

Homeward voyage. Port Philip to London.

2nd May, 1856. At 1 p.m. saw the Islands of Scilly bearing NE'E about 12 miles. The chronometer 15' too far East. Hove-to for Pilot Boat No. 6 off Scilly and delivered the mails. 99 days from Port Philip, distance made 15,142 miles, daily average 154. From Port Philip to Cape Horn a distance of 6,107 miles was made in 31 days, or nearly 200 miles a day—not meeting with such favourable winds as is generally experienced.

At end of log:

Remarks are not so full or so complete as I could have wished. It has entirely devolved upon myself, as I cannot get my officers to take any interest in the matter; being members of what is called the old school, they cannot or will not see the utility of bothering themselves (as they term it) with these affairs.

(There are two track charts in Log 288A of the *Statesman*.)

Iron ship *Swarthmore*. Capt. T. Lidbetter. Liverpool to Bombay.

12th Dec., 1855. $43^{\circ} 47'S$, $12^{\circ} 41'E$. Noon. Pleasant breeze and cloudy weather. These are Maury's "bonny west winds" with a vengeance and truly delighted I am with them. . . .

18th Dec. $43^{\circ} 02'S$, $39^{\circ} 12'E$. Most beautiful forms of clouds in the sw and coloured so very brightly that should any painter succeed in putting such vivid yet soft and most lovely colours on canvas 999-1000 ths of the world would exclaim: "ridiculous, preposterous, such scenes exist only in the imagination". "Those who go down to the sea in ships", however, would not be of the 999.

Ship *John Bibby*. Capt. Thos. Oates. Liverpool to Sydney.

19th Nov., 1855. $47^{\circ} 13'S$, $52^{\circ} 44'E$. 2 p.m. Passed 3 miles to the N'ward of a large iceberg, more than 200 ft high. The temperature of the surface water was 36° when abreast of it, only falling 1° . This makes me think that this berg cannot have been drifted towards the East or we should have sailed through the colder water of its track.

On passage from Sydney to Shanghai:

Sudden severe dry squall. Carried away flying jibboom. 6 a.m. While over the bows clearing away the wreck, the seaman Thos. Whitehead fell overboard. Brought ship to the wind on port tack and lowered a boat, but he had not succeeded in reaching the lifebuoy and he sank before the boat reached the place.

Ship *Fulwood*. Capt. W. I. Fitzsimons. Liverpool to Akyab.

14th Sept., 1855. $9^{\circ} 39'N$, $29^{\circ} 35'W$. The NE Trades failed and were succeeded by a light breeze from the WNW, which freshened a little and hauled to the sw in some passing showers of rain. Position of losing the NE Trades agrees with the limits of the Trades for the month of September as laid down on the Track Chart of Lieutenant Maury.

20th Sept., 1855. Noon. $1^{\circ} 07'S$, $31^{\circ} 39'W$. 3 a.m. Crossed the Equator in Long. $30^{\circ} 50'W$. Out from Liverpool $27\frac{1}{2}$ days; from leaving Scilly Light 20 days 8 hours. There is no questioning the western route (as recommended by Lieut. Maury). It is a saving of a week or 10 days on the old route besides the wear and tear of a ship's sails during squally, rainy and calm weather which is invariably found further East.

And next day:

The same weather. Cape St. Roque a long way under our lee in spite of the old bugbear of a "horseing" current. Emigrant ships would do well to pass this way, if only on the score of having a healthy breeze to keep their lower decks sweet.

I expect to clear Cape St. Augustine tomorrow by noon, then away we go with Topmast Studdings, etc., set.

(He later on mentioned the ship making 14 kt, by log.)

5th Nov., 1855. Sighted Amsterdam Island bearing ESE 10 to 12 miles, and the next day signalled the British ship *Eliza* from London for Calcutta, out 82 days.

(The *Fulwood* arrived at Akyab on 6th December, 1855, 105 days out.)

Ship *Queen's Hill*. Capt. A. D. Wood. Liverpool to Bombay.

10th August, 1855. $4^{\circ} 32'N$, $19^{\circ} 13'W$. The water very sparkling and has undergone a great change of temperature since 4 p.m.

9 p.m. to midnight. I caught about a dozen specimens of the animal "illumina-tors" (not medusae), two of which I have endeavoured to preserve. I have met with them before in this region but cannot find any notice or description of them in Chambers's *Zoology*. They do not at all resemble medusae, being a harder substance, and are more like a cucumber with one end cut off than anything that occurs to me. They absorb a good deal of water and diminish in size as they part with it, and emit a brilliant light when disturbed (blue at first) and by day they are transparent.

Capt. Wood waxed poetical on one occasion, as follows:

6 a.m. Wind freshening slightly with a swell from the ENE, the sky almost cloudless, except about sunrise, when a deputation from all quarters seems to assemble to usher in and adorn the first appearance of the orb of light, and to disperse as soon as that duty is performed.

Bombay towards Liverpool.

1st March, 1856. $34^{\circ} 25'S$, $23^{\circ} 28'E$ (off the Cape). 2 p.m. Tacked to the wsw. Sounded in 60 fms. fine brown and black sand and shells.

4 p.m. Calm. The swell setting in NE very fast. Many streaks of what appeared to be spawn on the surface water, but on being taken up and examined they turned out to be little animals of a spherical form with a long tail attached: apparently of the same substance as medusae but possessed of very rapid locomotive power. When removed from the water they burst and became a shapeless little jelly-like mass.

(Capt. Wood made a number of similar notes of sea life.)

4th March, 1856. $34^{\circ} 44'S$, $20^{\circ} 51'E$. 1 a.m. Light airs from N to NE. A black bank rising in the NW to SW, coming up against the wind and overcasting the sky as it reached the zenith; a very hard squall from S struck us with very heavy rain and a shower of large hailstones; vivid lightning chain and sheet in all quarters and very loud thunder at times right overhead. Fireballs and corposants on the fore topgallant yardarm.

(They experienced a number of these violent squalls that day. These would be of little importance to a modern steamship but it is easy to imagine that they would be dangerous to a ship under sail.)

On 23rd March the Captain noted rather sadly in the log:

Fine weather and strong winds with which a smart clipper ship ought to make 250 to 300 miles a day; *we* effecting $7\frac{1}{2}$ knots—sometimes.

Ship *Gloriana*. Capt. Henry Toynbee.

A series of three meteorological registers was received from Capt. Toynbee in 1855 and 1856, all well kept and clearly written. He made many references to lunars for checking his chronometers, and wrote quite long notes on the subject in the additional remarks at the end of the log. He also suggested some improvements in the meteorological instruments of his time.

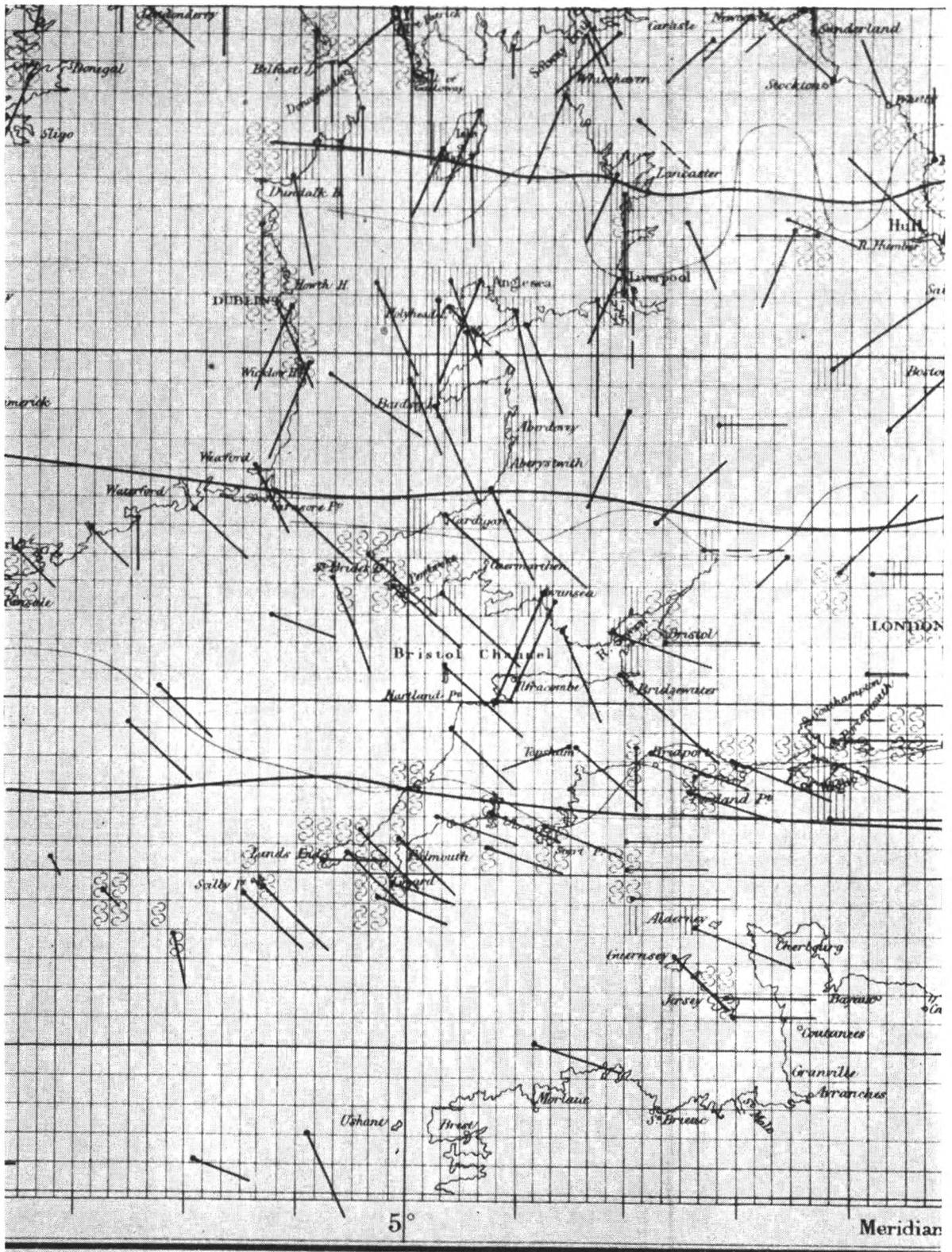


Fig. 1. Section of a synoptic chart for Wednesday, 26th October, 1859. (See page 9.)

Year 1850

Meteorological Register kept on board the

Leopard

DATE.			BAROMETER. No. 501.		THERMOMETER.		WINDS.		CLOUDS.		WEATHER.	WATER.				
Month.	Day.	Hour.	Height.	Attd. Therm.	Wet Bulb. No. 55.	Dry Bulb. No. 56.	Direction.	Force.	Form or Character.	Amount.	Direction, Upper Strata.	Fog, Rain, Snow, Hail, Thunder, Lightning.	State of the Sea.	Specific Gravity of the Sea Water.	Temp. at Surface.	Temp. Dep. No.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
7	2	4 3	30.100	41	68	41	SE	4		10		b	High			
		4 4	30.076	46	69	43	SE	4		10		m	Short			
		12 6	30.032	43	70	43	SE	6		10		b	SE	28	43	
		3 8	29.976	45	70	44	SE	6		10		m	Swall			
		5 9	29.950	44	70	44	SE	4		10		b				
		10														
	NOON	12	Lat Obs		Lat DR		Long Obs	DR	Current	Rate			Var Obs	Ship's Head		
		2					107.04 E		107.06 E, N 12 W	5 mks						
		3	26-25		26-30											
8	7	4	29.922	40	67	40	SE	6	Variable	9	NW	a	High			
		9 8	29.902	47	73	47	SE	6		10	m	m	Swall			
		12 8	29.866	49	75	49	East	4	Variable	1	West	c m	Swall	28	47	
		3 10	29.860	49	75	49	E. N. E.	1		0		g m.	Swall			
	MIDT.	8 12	29.866	48	74	47	East	9		0		"	SE			
			Latitude.		Longitude.		Currents.		Magnetic Variation.							
			Observed.	D. R.	Observed.	D. R.	Direction.	Rate.	Observed.	Ship's Head						
	A.M.	4														
	NOON	12	25. 22' S		105. 25' E		105 50	SE	1/2 m per hour							

Photograph of part of the pages of the meteorological log of the barque *Leopard*, 300 tons, Captain P. Richard on passage from Liverpool to Hong Kong; showing observations taken during 7th and 8th February, 1856, and giving the position on the 7th as 26° 25'S, 107° 04'E.

Ship *Medway* of Scarborough, 654 tons register. Captain James B. Kennedy. Owners, W. J. and R. Tindall and Co. (See page 22.)

[National Maritime Museum]



Captain *H. Richard* from *Liverpool* to *Hong Kong*

REMARKS.

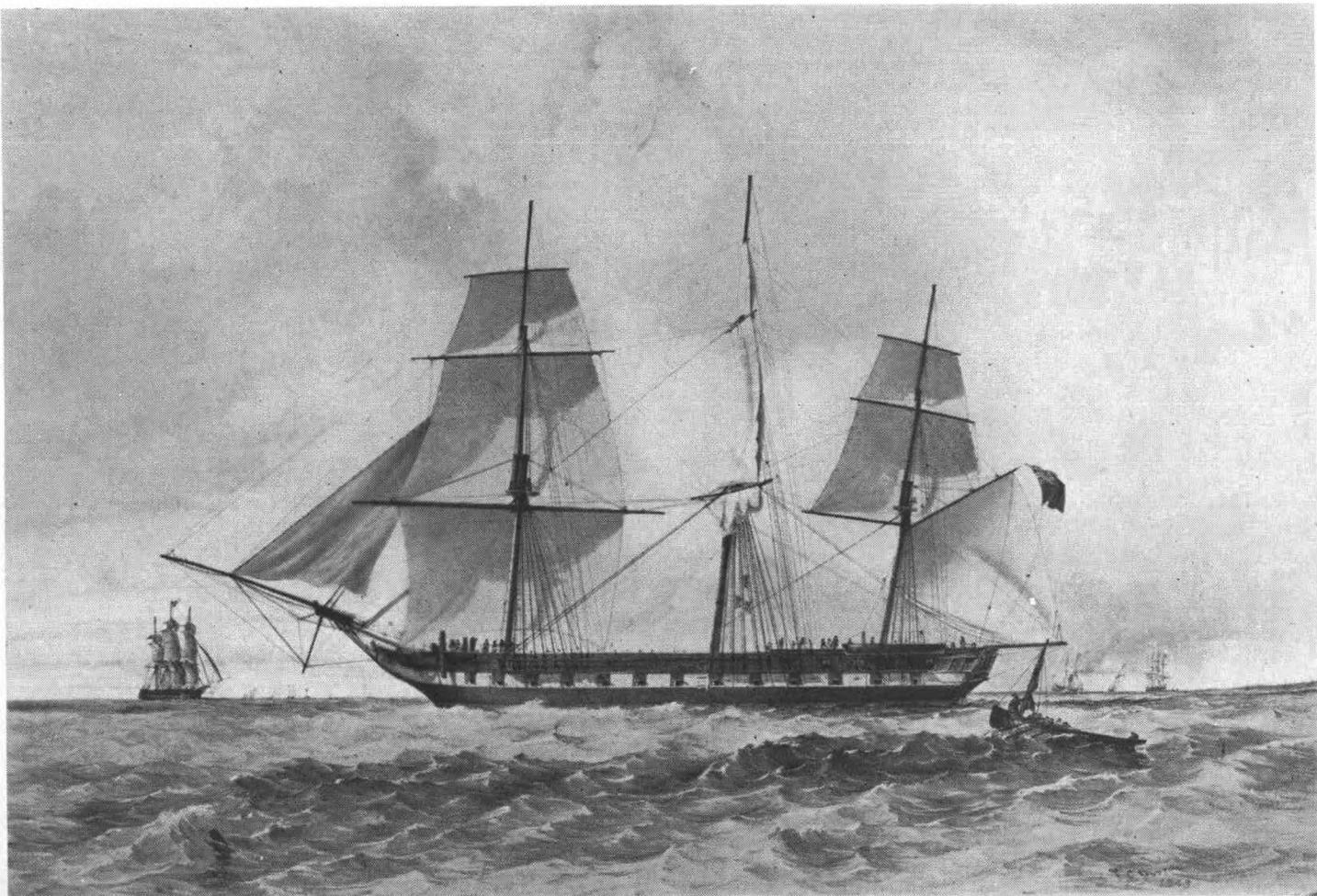
Strong breeze throughout the day, with a clear sky though misty at times about the horizon. Swell high and short.

At 4 fresh breeze and hot sultry weather. Sky low. Towards noon the sea took a gloomy appearance. The wind also dying away. At 2 P.M. it fell calm. Weather threatening. At 4.30 A strong gale broke down upon us from the Eastward. Blowing with great fury and on heavy gusts. The sea was a perfect sheet of white foam! At sunset there was a low patch of the Western horizon very close, the sun going down unusually bright & clear, as at midday. Latter part of the day continued a strong gale with heavy gusts. Sea high & tumbling in all directions. Ship labouring very heavily and making more water than usual.

Page of the log of the *Leopard* corresponding to that shown opposite and giving remarks of the weather of 7th and 8th February, 1856. There is a description on 8th of the threatening sky and the breaking of a gale after an almost flat calm.

Ship *Gloriana* of London, 1,056 tons register. Captain Henry Toynbee. Owners, Messrs. T. and W. Smith.
(See page 24.)

[National Maritime Museum]

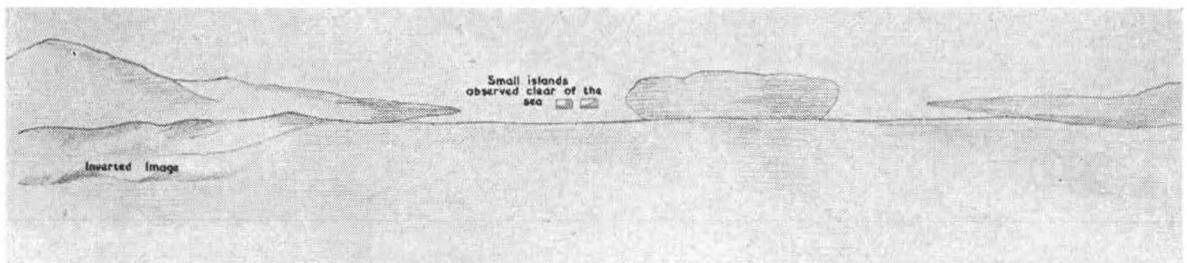


Opposite page 25



[Photo by Mr. S. Phillips.]

The above photograph was taken from R.M.S. *Nova Scotia*, Captain J. E. Wilson, O.B.E., on 18th March, 1954, at $47^{\circ} 37'N$, $46^{\circ} 10'W$. The iceberg was 600 ft in length, 135 ft in height and distant 800 yd from the ship.



Mirage observed from R.R.S. *John Biscoe* in the vicinity of Pebble Island, West Falkland.
(See page 31.)

Toynbee's method of logging wind direction was by a cross representing the N-S and the E-W lines, with a figure showing points from N and S thus:

⊥¹⁰ NE by E.

⊥ W by S

and so on.

Capt. Henry Toynbee followed Admiral FitzRoy as Marine Superintendent of the Meteorological Office, a post he held for 23 years, from 1865 to 1888. He co-operated with Maury of the U.S. Hydrographic Office in investigating ocean conditions, for the benefit of all sea navigators.

NOTES ON EARLY OBSERVING SHIPS

As was mentioned in the extracts from old meteorological registers above, there are, in the Marine Branch, logbooks kept by 14 sailing ships in the year 1855. The following is a list of these vessels:

<i>Ship</i>	<i>Master</i>	<i>Owner</i>
<i>Gloriana</i>	Henry Toynbee	T. & W. Smith
<i>Queen's Hill</i>	Albert D. Wood	James Alexander
<i>Statesman</i>	John F. Trivett	Marshall & Eldridge
<i>Charles Holmes</i>	Charles H. Boulby	Thos. Chilton, Jnr.
<i>Fulwood</i>	W. J. Fitzsimons	Jones Palmer & Co.
<i>Swarthmore</i>	Thos. Lidbetter	Jas. Thompson & Co.
<i>Cornelia</i>	Francis Vinnis	Ed Johnston & Son
<i>Leopard</i>	Phillip Bichard	John Bichard & Co.
<i>John Bibby</i>	Thomas Oates	Taylor Potter & Co.
<i>Constance</i>	D. Smith	
<i>Conflict</i>	Robert Deas	
<i>Madras</i>	Geo. H. English	Avery
<i>Medway</i>	James B. Kennedy	W. & R. Tindall & Co.
<i>Golden Age</i>	Geo. A. Lewis	

They were all small vessels by modern standards, the largest, the *Cornelia*, being 1,282 tons register, and the smallest, the *Leopard*, only 300 tons. They all made long voyages to Australia, India or China.

In Admiral FitzRoy's report of the activities of the newly formed Meteorological Department of the Board of Trade, published in 1857, he listed 9 ships as having sent in logbooks classed "Excellent", 38 classed "Very Good" and 43 classed "Good". Among the ships named there were at least two that were owned by companies which are still in existence: the P. & O. S.N. Co's *Alma*, 2,500 tons, and Messrs. J. Brocklebank's ship *Robert Pulsford*, and there were owners' names well known in shipping history such as Thomas Royden, Richard Green and James Baines & Co.

The list contained names of several famous clippers: the *Tippoo Saib*, *Fiery Cross*, *Lightning*, *Donald McKay*, *Marco Polo*, *James Baines*, *Champion of the Seas* and others.

We have been fortunate in obtaining from the National Maritime Museum, Greenwich, photographs of two of the ships of the 1855 list, the *Gloriana* and the *Medway*. These are shown between pages 24 and 25.

At the time of Admiral FitzRoy's report there were 15 Meteorological Office agents at ports in the British Isles. They were at Bristol, Hull, Liverpool, London, Newcastle, Plymouth, Southampton, Aberdeen, Dundee, Glasgow, Greenock, Leith, Belfast, Cork and Dublin.

C. H. W.

THE MARINE OBSERVERS' LOG



January, February March

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

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

Responsibility for each observation rests with the contributor.

SEA SNAKES

South China Sea

S.S. *Lancashire*. Captain A. M. Williamson. Singapore to Hong Kong. Observer, Mr. J. W. Waldie, 3rd Officer.

20th March, 1954. At 1400 ship's time observed one sea snake swimming on the surface, approximate length 3 ft. Colouring dark and light-brown bands, the bands being approximately 3 in. wide. Large number of flying fish also observed at the same time. Air temp. 83.5°F, sea temp. 85°F. At 1450 ship's mean time a second snake similar in size and colouring to the first was observed.

Position of ship: 04° 55' N, 106° 43' E.

Note. This observation was forwarded to Dr. H. W. Parker, Keeper of Zoology at the British Museum (Natural History) who commented as follows:

"I regret that it is not possible on the information given to identify the snake seen in the South China Sea. There are probably no less than 25 sea snakes that occur in this region or in the adjacent coastal waters. Assuming that the bands of colour described were transverse bands (what we should call bars), this is a very common type of coloration and occurs in very many of the species which range in size up to 9 ft in length. One of the commonest species in the area is the *hydrophis cyanocintus*, and this could perhaps have been the species seen."

VOLCANIC CLOUD

China Sea

M.V. *Cingalese Prince*. Captain B. R. Simons. Hong Kong to Kobe. Observer, Mr. P. Norwood, 2nd Officer.

16th March, 1954, 2300 G.M.T. The volcano on Suwanose Shima was observed to be active. The cloud present was at first as in the first sketch with the volcanic cloud similar in appearance to Cb, gradually spreading into Sc. While watching the phenomenon a second cloud rapidly formed as in the second sketch, this cloud also rising and spreading out. There was a distinct area of sky between the two clouds.

Position of ship at 0000 on 17th: 29° 36' N, 130° 12' E.

Note. This observation was forwarded to the Hydrographer of the Navy. It is stated in Japan Pilot, Vol. II, that eruptions and explosions sometimes occur.



FALL OF SEA TEMPERATURE, GULF STREAM

North Atlantic Ocean

H.M.T. *Empire Clyde*. Captain A. C. Johnston. Liverpool to Bermuda. Observer, Mr. W. S. Thomson, Chief Officer, Mr. J. A. Scrimgeour, 2nd Officer.

25th February, 1954, 1930 G.M.T. With a cloudless sky low banks of fog could be seen spreading from the N over the northern and western horizons; air temp. 61°F , sea 62° . At 2118 the southern and eastern horizons were still clear but there were light fog patches to N and W; air temp. 50° , sea 42° . At 2200 air temp. was 48° while the sea temp. had risen to 46° . By 2243 the vessel was running through moderate fog, very low-lying, with a clear sky; air temp. had risen to 50° and sea temp. to 54° . At 2400 the sky, which until now had remained clear, became obscured as the fog rolled up from ahead, but suddenly lifted, cleared away astern and left perfectly clear conditions once more.

Positions of ship: at 1930: $41^{\circ} 57' \text{N}$, $48^{\circ} 00' \text{W}$; at 2400: $41^{\circ} 23' \text{N}$, $49^{\circ} 07' \text{W}$.

H.M.T. *Empire Clyde*. Captain A. C. Johnston, Bermuda to Liverpool. Observers, Mr. G. K. Murdoch, 2nd Officer, and Mr. R. Sinclair, 3rd Officer.

17th March, 1954, 2230 G.M.T., to 18th March, 0730. The following table gives values of air and sea-surface temperatures:

Time G.M.T.	Temperature $^{\circ}\text{F}$.	
	Air	Sea Surface
2230	52	63
2330	52	63
0215	52	58
0245	50	49
0305	49	44
0400	49	44
0430	46	43
0500	46	45
0530	50	53
0630	51	49
0700	52	63
0730	52	62



Positions of ship: at 2230: $39^{\circ} 00' \text{N}$, $50^{\circ} 40' \text{W}$; at 0730: $39^{\circ} 56' \text{N}$, $48^{\circ} 23' \text{W}$.

Note. These observations are very interesting as they are in positions near to that of a similar observation made by S.S. *Hudson Firth* in May, 1952, published in Vol. 23, page 73, of this journal. The temperature fall recorded by H.M.T. *Empire Clyde* on 25th February, 1954, showed a drop of 20° , from 62° to 42° . That recorded by S.S. *Hudson Firth* was also a fall of 20° , from 68° to 48° , in an almost identical position, $41^{\circ} 25' \text{N}$, $49^{\circ} 00' \text{W}$. The observation of 17th March above, made in a somewhat more s'ly position, again gives a drop of 20° , from 63° to 43° . It is a remarkable coincidence that the three falls were identical in amount. These observations establish the interesting fact that pockets of cold water can occur within the main e'ly flow of the Gulf Stream in this region. It seems very unlikely that portions of the cold Labrador Current should have penetrated so far south, and, in the case of the observations of 25th February above, a normal Gulf Stream current, setting 083° , 34 miles per day, was recorded between noon on this date and noon on 26th February.

PHOSPHORESCENCE

South Atlantic Ocean

M.V. *Port Wyndham*. Captain D. F. Morgan. Las Palmas to Durban. Observer, Mr. R. G. Forbes, 3rd Officer.

14th February, 1954, 0400 G.M.T. The sea around the vessel was illuminated by numerous brilliant phosphorescent patches, having the appearance of light bulbs scattered over the surface. The patches lasted for about half an hour.

Position of ship: $00^{\circ} 48' \text{S}$, $08^{\circ} 22' \text{W}$.

West African waters

S.S. *Umzinto*. Captain P. N. V. Rewell. London to Cape Town. Observer, Mr. J. G. Campbell, 2nd Officer.

14th January, 1954, 0315 G.M.T. Large quantities of phosphorescence were observed, much of it in disc-like patches which varied in size from about 2 ft to 6 ft or 8 ft in diameter. A large number of porpoises were also observed in the area, which left vivid trails as they swam alongside the vessel.

At 0500 the echo-sounder recorded depths of 16 fathoms, but the trace was not the definite one normally obtained from the sea bottom. As the vessel was in a position where the depth was known to be over 500 fathoms, the recorded trace must have been caused by shoals of fish or something similar. Air temp. 76°F, wet bulb 68.5°, sea 71°.

Position of ship: off Cape Verde.

Arabian Sea

S.S. *Mahanada*. Captain H. C. Kinley. Aden to Colombo. Observers, Mr. A. B. Davis, Chief Officer, and Mr. D. Peers, 4th Officer.

13th March, 1954, 1500 G.M.T. The vessel appeared to pass down a lane of phosphorescent patches which seemed to bubble up from beneath the surface and break into bright patches when close to. The patches appeared to extend to about 50 ft on each side of the vessel. The phenomenon lasted for about half an hour. Sea slight. Air and sea temp. 86°F.

Position of ship: 11° 50'N, 58° 20'E.

Indian Ocean

M.V. *Port Lincoln*. Captain J. L. Porter. Brisbane to Aden. Observer, Mr. J. Farmer, 4th Officer.

2nd March, 1954, 0930 G.M.T. Small flecks of phosphorescence were observed; at intervals one of these would erupt into a bright patch about 20 ft to 50 ft in diameter. Where the reflection of the ship's lights lay on the water it was quite brilliant with phosphorescence. An Aldis signal lamp was shone on to the surface and it was found wherever the light was shone a trail of phosphorescence followed (even at 150 yd range) and remained quite bright for about 30 sec. Air temp. 81°F, wet bulb 78.6°, sea temp. 81°. Waves appeared to be of short period, height approximately 2 ft.

Position of ship: 10° 02'N, 61° 02'E.

South Pacific Ocean

M.V. *Cumberland*. Captain P. P. Harrison. Balboa to Wellington. Observer, Mr. D. Handley, 3rd Officer.

7th January, 1954, 0750 G.M.T. Several very bright areas of phosphorescence were observed; two of these took the form of long narrow bands approximately 2 miles long and 50 yd wide. They appeared to be slightly curved but were not concentric, and were apparently stationary. The other areas were bright patches of about 40 yd diameter. The sea surrounding these bright areas was thickly speckled with bright fish-shaped but inanimate objects about 6 in. long. While passing through this speckled area the ship's wake glowed brightly with a pale blue light. The whole display was unusually brilliant and illuminated a large area. Air temp. 57.3°F, sea 60.2°. Calm sea.

Position of ship: 39° 50'S, 152° 47'W.

TORNADO

Equatorial waters

S.S. *Twickenham*. Captain J. A. Tully. Tyne to Monrovia. Observer, Mr. E. W. Reay, 2nd Officer.

15th March, 1954, 2330 G.M.T. The wind sprang up from 320° and increased rapidly to force 9-10, with torrential rain. The wind veered through N and E to 140° during the ensuing 65 min. There was heavy, low Ns type of cloud throughout, but no deviation from the normal diurnal range was apparent on the barograph. Position of ship: at anchor 1 mile w of Monrovia breakwater.

WATERSPOUT

Indian Ocean

S.S. *Empire Fowey*. Captain W. T. C. Lethbridge. Southampton to Hong Kong. Observer, Mr. M. N. Elrington, 3rd Officer.

5th January, 1954. At 1650 a waterspout was observed about 30° on the port bow, 5 miles distant. Water and spray on the sea surface were rotating anticlockwise at a moderate speed. There was Cu at 700 ft from which the spout emerged at an angle of 20° from the spray. At 1712, when the greatest velocity was apparent, the spout at its upper (cloud) end divided into two parts, and then before it dispersed at 1725 the two parts merged together again. There was no intense activity at sea level but spray rose to about 25 ft. Wind NNE, force 3-4.

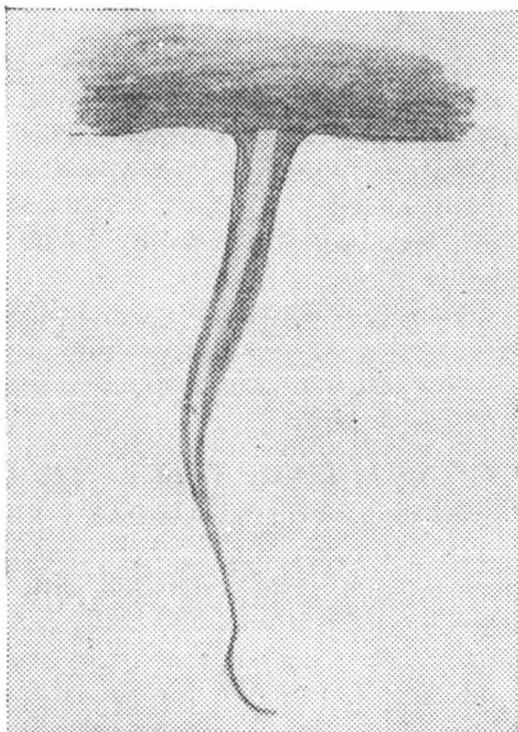
Position of ship: $08^\circ 37'N$, $70^\circ 31'E$.

Pacific Ocean

M.V. *Port Napier*. Captain D. Bradley. Wellington to Panama. Observer, Mr. G. L. Danton, 3rd Officer.

16th January, 1954, 1445 G.M.T. A waterspout was observed bearing 360° and distant 2 miles. The sky was heavily overcast with frequent and violent rain showers. The waterspout emerged from the base of a very black Cb at about 2,000 ft in height, and caused great agitation of the sea, although the spout never actually reached the sea surface. Its duration was 2 min, and then suddenly vanished. While visible it appeared to be moving at an unusually high speed. Wind NNE, force 6-7, gusty. Rough, confused sea and short, heavy E'ly swell.

Position of ship: $27^\circ 32'S$, $123^\circ 05'W$.



SHIPS STRUCK BY LIGHTNING

West Indian waters

S.S. *Gothic*. Captain Sir David Aitchison, K.C.V.O. London to Kingston, Jamaica. Observers, Mr. R. N. Reid, Chief Officer, and Mr. H. Riding, 2nd Officer.

20th November, 1953. At 0906 G.M.T. the vessel entered a violent thunderstorm, during which the foremast was struck by lightning. A lookout in the crow's nest reported that the mast was shaken and he could smell electrical burning, but no actual damage resulted. No electric shock was felt.

Approximate position of ship: $23^\circ 50'N$, $67^\circ 10'W$.

Western Mediterranean Sea

S.S. *Clan Buchanan*. Captain J. A. Forster. Port Said to London. Observers, the Master, Mr. P. C. W. Hoblyn, 2nd Officer, and Mr. R. Ross Will, 3rd Officer.

1st February, 1954. Between 1200 and 1210 G.M.T. the vessel was struck four times by lightning. The foremast truck was dislodged by the lightning and fell on the foredeck. On inspection the truck was not found to bear any ill effects, but later it was noticed that the paintwork at the top of the mast was burned, otherwise not harmed. Several flashes and sparks were observed on the aerial wire halyard. A shower of sparks was also noticed to fall from the end of the wire, a few feet above the bulwark; the last few feet is a rope pendant. The truck, which is made of wood, is fitted on to a square key on the steel topmast. During the whole period of the storm the wireless aerials were all earthed.

Position of ship at 1200: $37^{\circ} 00' N$, $03^{\circ} 06' E$.

Note. In a note to the observation of S.S. *Manistee* in Vol. 23, page 140, of this journal, it was pointed out that in almost every case when a ship is struck by lightning it is on the foremast. The above observation provides two further examples, bringing the number of occasions when a ship was so struck up to 11, as against only one where the ship was struck elsewhere. In addition, there is the one instance given in the note above referred to, where the foremast received the charge and acted as a lightning conductor, without being damaged.

ST. ELMO'S FIRE

North Pacific Ocean

M.V. *Mapledell*. Captain W. C. Halliday. Yokohama to Vancouver. Observer, Mr. P. Ainsworth, 3rd Officer.

1st January, 1954, 0300 G.M.T. White balls of light were seen at each end of the yard, along the wireless aerial and down the foremast stay. These were only apparent in the heavy snow squalls, but were as bright as an approaching steamer's navigation lights. There was sheet lightning around at the time and the phenomenon lasted on and off for about half an hour in varying strength. Air temp. $43^{\circ} F$, wet bulb 39° , sea 66° , wind 326° , force 7-8. Sky $6/8$ Cb, frequent snow squalls.

Position of ship: $36^{\circ} 25' N$, $142^{\circ} 50' E$.

HAIL

Persian Gulf

S.S. *City of Lyons*. Captain I. R. Pulford. Bahrein to Vizagapatam. Observers, the Master and Mr. J. Kinley, Chief Officer.

8th February, 1954, between 0220 and 0250 G.M.T. a violent hailstorm was experienced. The stones fell with sufficient force that the brass binnacle cover of the standard compass was badly dented. The stones averaged about $1\frac{1}{2}$ in. diameter, and it was observed that many were perfectly hemispherical in shape, as though split in half, and showing ringed layers of ice on the flat surface. At the beginning of the storm the barometer rose abruptly from 1003 to 1013 mb, the wind dropped from force 7 to 2 and backed from SE to N.

Position of ship: $26^{\circ} 30' N$, $51^{\circ} 24' E$.

Eastern Mediterranean

M.V. *Bellerophon*. Captain A. R. McDavid. Malta to Port Said. Observers, the Master, Mr. H. Owen, Chief Officer, and Mr. J. H. Watterson, 4th Officer.

10th February, 1954, 1500 G.M.T. A severe shower of hail was encountered which lasted for 3 min. At its greatest intensity visibility was reduced to 30 ft; this stage occupied only 1 min, but as the shower approached and passed away visibility did not exceed 200 ft. On deck against bulkheads drifts formed with an average depth 7-8 in., showing drops as being perfectly round with a mean diameter of

$\frac{3}{16}$ in, opaque and with a tendency to coagulate into a brittle mass as it became warmer. The warming process was extremely slow, small drifts were still distinguished four hours later, although air temperature fell only 1° from 56°F . Sky overcast with rain squalls; strong w'ly breeze; rough sea, moderate swell.

Position of ship: $34^{\circ} 30' \text{N}$, $21^{\circ} 42' \text{E}$.

ABNORMAL REFRACTION

North Atlantic Ocean

S.S. *Rialto*. Captain H. Greenhill. Middlesbrough to New York. Observers, Mr. J. A. Pettinger, 2nd Officer, and Mr. A. M. England, 3rd Officer.

23rd February, 1954. Throughout the day considerable refraction was experienced, ships sighted were observed at great distances and they took on many varied shapes and sizes. Four horizons were seen at different times during the morning. The horizons were rapidly and continually changing form and position. All these conditions faded away by about 1430 ship's time.

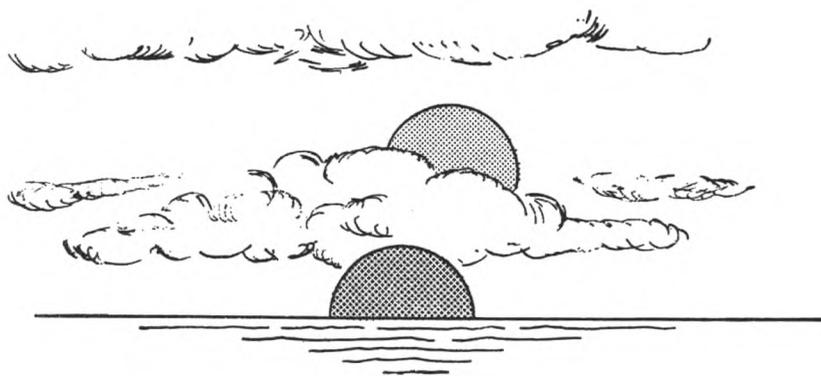
Position of ship at 0600: $44^{\circ} 30' \text{N}$, $47^{\circ} 42' \text{W}$.

Off Cape Finisterre

M.V. *Lotorium*. Captain W. S. Atkinson. Mena-al-Ahmadi to Liverpool. Observer, Mr. J. Behrsing, 3rd Officer.

2nd March, 1954, sunset. Two suns were observed at sunset, the image being above the true sun. The observation was not very good because the true sun was obscured by clouds until a few minutes before sunset, and consequently the period of this phenomenon is not known.

Position of ship: off Cape Finisterre.



Falkland Islands

R.R.S. *John Biscoe*. Captain W. Johnston. At Port Stanley. Observer, Mr. F. W. Brown, 3rd Officer.

5th January, 1954. In the waters in the vicinity of Pebble Island (West Falkland) a marked "turned up" effect was seen on the edges of an island and on the mainland. It gave the appearance of the land being suspended above the water. Some cliffs in the vicinity showed an inverted image of the cliffs very clearly, and small islands appeared to be clear above the sea. Air temp. 48.7°F , wet bulb 45° , dew point 40° , sea 51° .

Vicinity of Cape Town

M.V. *Port Vindex*. Captain E. E. Roswell. Las Palmas to Cape Town. Observers, the Master, Mr. A. J. Starkey, 3rd Officer, and Mr. J. C. Naylor, Junior 3rd Officer.

8th February, 1954, 1400 A.T.S. Pronounced refraction was observed both on land and sea. To the E land at a distance of 6 miles appeared as very high cliffs, but viewed through binoculars it was clear that it was a line of breakers super-

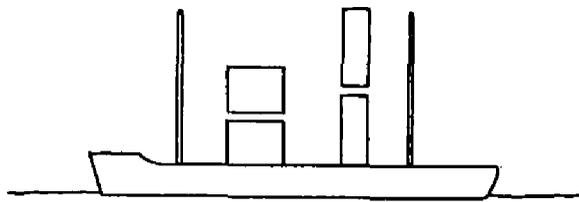


Fig. 1

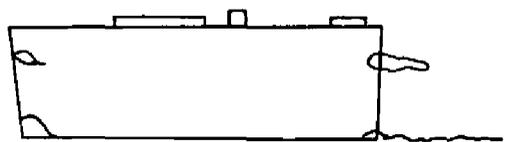


Fig. 2

imposed on the actual breakers. This phenomenon lasted for half an hour. To the s a ship at 3 miles distance appeared to have a second bridge and funnel above the true funnel and bridge as in the sketch, and masts appeared elongated. This phenomenon appeared and disappeared rapidly, sometimes as often as three or four times a minute in the course of half an hour. Later the hull appeared to increase greatly in height and acquire a box-like shape, while the superstructure almost disappeared, giving the ship the appearance of a floating dry dock. Additional bow and stern waves appeared (Fig. 2). A shallow haze lay all round the horizon. Air temp. 61°F , wet bulb 59° , sea 68° .

Position of ship: $33^{\circ} 46'S$, $18^{\circ} 16'E$.

Off Cape Town

M.V. *Carnarvon Castle*. Captain W. S. Byles, R.D., R.N.R. At Cape Town. Observers, the Master and Mr. J. P. E. Baines, 4th Officer.

19th March, 1954, 1400-1800 G.M.T. Fig. 1 shows two ships beyond Robben Island, as observed from Cape Town breakwater.

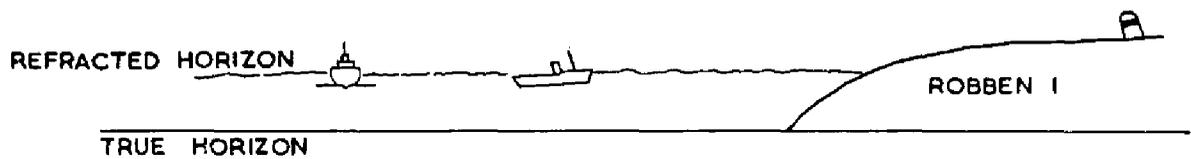


Fig. 1

Fig. 2 depicts breakers round Dassen Island which appeared to rise to a fantastic height; the buildings appeared to reach to the height of the refracted horizon.



Fig. 2

A fishing fleet observed off Dassen Island appeared to take up different shapes rapidly, as shown in Fig. 3.



Fig. 3

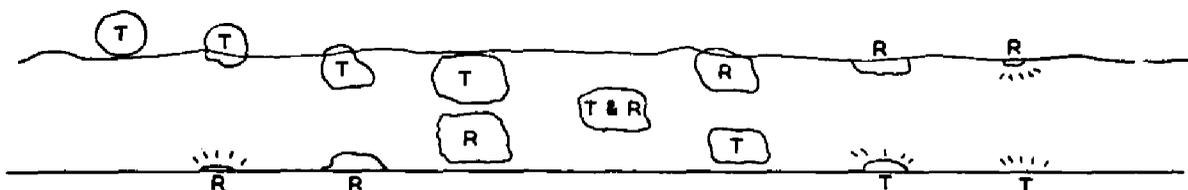


Fig. 4

Fig. 4 shows seven successive stages in the appearance of the sun near sunset, T being the true sun and R the refracted image. Light SE wind, very slight sea. Sea temp. 64° – 66° F. Air temp. fell throughout the period from 85° to 61° F. Position of ship: Cape Town breakwater.

Off North African coast

S.S. *City of New York*. Captain T. F. Labey. Port Said to Boston (Mass.). Observers, all officers.

2nd March, 1954. Mirages of land and ships were seen from 1300 S.T. to sunset. The effect was first noticed when a large tanker, sighted at 1300, appeared to be flat and low. A vessel sighted at 1430 appeared first to be elongated and then as a horizontal line (Figs. 1 and 2). Land sighted during the afternoon appeared to be either floating above the horizon or to be much nearer than it actually was. At 1810 a tanker, distant 6 miles, appeared with superstructure elongated, and at 1815 the superstructure and masts appeared to join together (Figs. 3 and 4). At the same time another vessel, distant 10 miles, appeared to be above the horizon, with no superstructure (Fig. 5). The above distances were given by radar. At 2300 Cape Carbon Light (range 29 miles) was sighted at 47 miles, and Ras Afia Light (range 18 miles) at 31 miles. Sea temp. throughout 58° F. Air temp.: 1200, 69° ; 1600, 65° ; 1800, 70° ; 2000, 68° . Wind SE, force 1–2; at 1600, SSW, force 2.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

Position of ship at 1200 G.M.T.: $37^{\circ} 18'N$, $09^{\circ} 24'E$.

Canterbury Bight

S.S. *City of Edinburgh*. Captain J. W. Wotherspoon, M.B.E. New Zealand waters. Observer, Mr. J. F. Turvill, 2nd Officer.

17th March, 1954, 1430–1550 local time. A vessel was observed at a distance of 12 miles (by radar), about two points on the starboard bow, and steaming on a similar course. Soon after sighting the horizon gave the impression of a low fog bank extending from the coast on the port side right round to the starboard beam. At the same time the observed vessel appeared to be lifted about 2° above the horizon, and on sighting with a telescope there was a superior mirage of the vessel inverted at the upper edge of the fog bank, seemingly joined to the actual ship by masts and funnel. Observation was kept for nearly an hour, during which no change was observed except the apparent rising and falling of the image as the fog bank

fluctuated in depth. At approximately 1540 shimmering heat waves passed round the horizon and our own ship, while the image changed to an upright one and soon disappeared completely. Air temp. 62°F, wet bulb 58°, sea 57°. Sky 2/8 covered, Cu, Cs, Cu, Sc.

Positions of ship: at 1430: 45° 15'S, 171° 24½'E; at 1550: 45° 00'S, 171° 45'E.

St. Vincent's Gulf

S.S. *Perim*. Captain L. Porter. Adelaide to Melbourne. Observer, Mr. A. F. Petrie, 4th Officer.

23rd January, 1954. One hour after departure from Adelaide a complete but inverted image of the city of Adelaide was visible in full colour at an elevation of about 5° over the city, distant about 15 miles. Ships to seaward were similarly affected. As the distance increased the inverted image of the city became lower and less distinct, but large buildings were visible in the mirage up to a distance of 25 miles.

Position of ship at 1200: 36° 00'S, 138° 18'E.

DOUBLE MOON South Pacific Ocean

M.V. *Cumberland*. Captain P. P. Harrison. Balboa to Wellington. Observers, Mr. O. Springett, 2nd Officer, and Mr. G. Lowery, 4th Officer.

2nd January, 1954, 1100 G.M.T. When the moon had attained an altitude of 18½° an image of it was observed resting on the tip of the right-hand crescent of the true moon. The edges of the image showed four colours of the spectrum, red, orange, yellow and green. Sky completely cloudless, but previous to this phenomenon heavy rain showers had occurred.

Position of ship: 26° 35'S, 120° 12'W.

Note. This is the fifth observation of a double moon or sun received since the war, all observed at fairly high altitudes, 10° to 20°. As stated in the note to the observation of S.S. *Rialto*, Vol. 24, page 147, of this journal, no explanation can yet be given. The special point of interest in the present observation is the colour fringes, which clearly point to some abnormality of refraction.

LUNAR RAINBOW South Pacific Ocean

S.S. *Hororata*. Captain E. H. Hopkins. Avonmouth to Wellington. Observer, Mr. B. S. Smith, 4th Officer.

17th February, 1954, 1409 G.M.T. As the moon was setting a shower of rain passed over the ship; a rainbow was formed which had all the colours of the spectrum, but very faint. There was also a very faint secondary bow. The altitude of the moon was approximately 10°.

Position of ship: 24° 42'S, 139° 6'W.

Note. The secondary rainbow is always considerably fainter than the primary, and usually the light of the moon is not sufficient for the secondary bow to be visible. We do, however, get occasional observations of it.

LUNAR CORONA North Atlantic Ocean

S.S. *Dallas City*. Captain D. W. Boucher. Panama to London. Observer, Mr. W. N. Andrew, 3rd Officer.

15th February, 1954, 2225 G.M.T. A clear and vivid lunar corona was observed. The aureole was shaded light to dark pink towards the outside. From the outside of the aureole to the outside of the first ring of the corona the colours changed gradually from green to red, all colours of the spectrum being present. This

phenomenon lasted for 8 min till 2233, when a second ring formed outside the first with similar coloration. The corona disappeared at 2244, but during the whole time the colours were intense. Approximate measurements: diameter of aureole, $2^{\circ} 56'$; diameter of inside ring, $6^{\circ} 23'$; diameter of outside ring, $7^{\circ} 10'$. Moon bearing $150^{\circ}T$, age 11 days.

Position of ship: $48^{\circ} 35'N$, $11^{\circ} 10'W$.

Note. Coronae showing the outer coloured rings are not rare but are comparatively infrequent, especially when the series of coloured rings is repeated a second time. A third or fourth series has, however, been seen on rare occasions. In the present observation each series was not complete; when fully developed there is violet, then blue, before the green is reached, so that violet is the next colour exterior to the brownish-red ring which marks the limit of the aureole.

HALOS

Atlantic Equatorial waters

M.V. *San Adolfo*. Captain J. H. Gay. Curaçao to Recife. Observer, Mr. E. Kemp, 3rd Officer.

25th January, 1954, 1355 G.M.T. A solar halo was observed forming and beginning to show the colours of the spectrum. The sun's altitude was 77° and azimuth $203^{\circ}(T)$. The inside radius of the halo was 22° and breadth 1° . The sky inside the halo, apart from an area close to the sun, was considerably darker than that outside. By 1410 most of the spectrum colours were visible, not vividly but quite distinctly, red being on the inside edge, and orange, yellow, green and then a very faint blue in that order, followed by a colour which can only be described as "mother of pearl". The colours in that part of the halo nearest the horizon were seen to be consistently brighter than those in the rest of the halo. The sky was carefully searched for traces of mock suns or arcs of the halo, but none was found. At about 1445 the veil of Cs was seen to be dispersing, and by 1500 all trace of the halo had disappeared. Cloud at 1355, a white fibrous veil of Cs and also fair weather Cu.

Position of ship: $05^{\circ} 12'S$, $34^{\circ} 40'W$.

Red Sea

S.S. *City of Bristol*. Captain E. M. Robertson. India to United Kingdom Observer, Mr. D. R. Townson, 3rd Officer.

25th March, 1954, 0730 G.M.T. A solar halo was observed of radius $21^{\circ} 20'$ when the sun's altitude was 64° . At times the halo was a full circle and at others only arcs were visible. The colours, viewed from the sun outwards, were: thin faint red, broad bright orange (the most conspicuous colour in the halo), an equally broad pale yellow, very pale green (difficult to see and only half the breadth of the orange band), pale blue and finally a thin violet. The colours and their brightness varied as clouds drifted over, and the green and blue circles were only visible for a short period towards the end of the observation at 0800. Cloud, $3/8$ Cu, bank of Cu on one horizon, some Ci and Cs, making $7/8$ in all.

Position of ship: $13^{\circ} 36'N$, $43^{\circ} 00'E$.

Note. The colours in the observations of M.V. *San Adolfo* and S.S. *City of Bristol* appear to have been exceptionally clear. It is unusual to see blue and the violet colour is rarely observed.

North Atlantic Ocean

S.S. *Prospector*. Captain H. T. Wells. London to Trinidad. Observer, Mr. J. B. Glen, 2nd Officer.

15th January, 1954. At 0430 G.M.T. a lunar halo was observed, the altitude of the moon was $20^{\circ} 15'$ and bearing 291° . At 0500 two "spokes" in the form of a

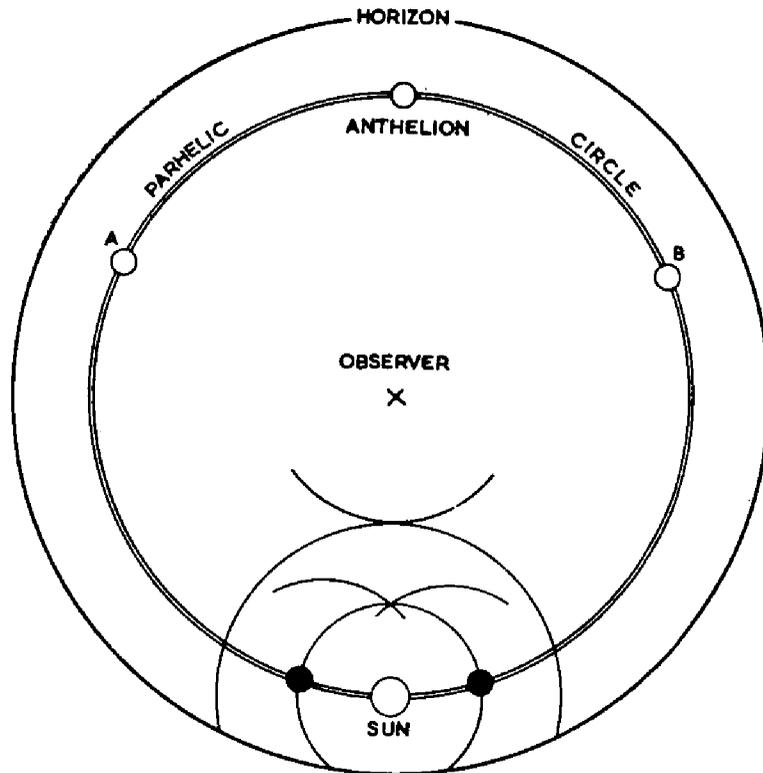
cross became apparent and at the same time the veil of Cs in the vicinity of the halo became more discernible.

Position of ship: $26^{\circ} 30'N, 42^{\circ} 23'W$.

Note. The cross is not very often seen. It is formed by a vertical shaft of light through the moon (moon-pillar) and a portion of the mock moon ring inside the 22° halo.

O.W.S. *Weather Observer.* Captain H. Sobey. On station "India". Observer, Mr. A. R. J. Jones, meteorological officer.

17th February, 1954. At 1300 G.M.T. a solar halo, with the sun at an altitude of about 17° , was observed forming. With reference to the sketch, a mock sun at A appeared at 1310; mock sun at B appeared later but was obscured by lower cloud



at first. The parhelic circle was also observed and traced round till the halos of 22° and 46° and the anthelion were sighted. The arc of contact of the 46° halo was very bright. The arc of contact of the 22° halo appeared to be formed by two further arcs. The phenomenon lasted till 1400, when Cs cleared. Cloud, Cs 8/8 with variable Cb and Sc.

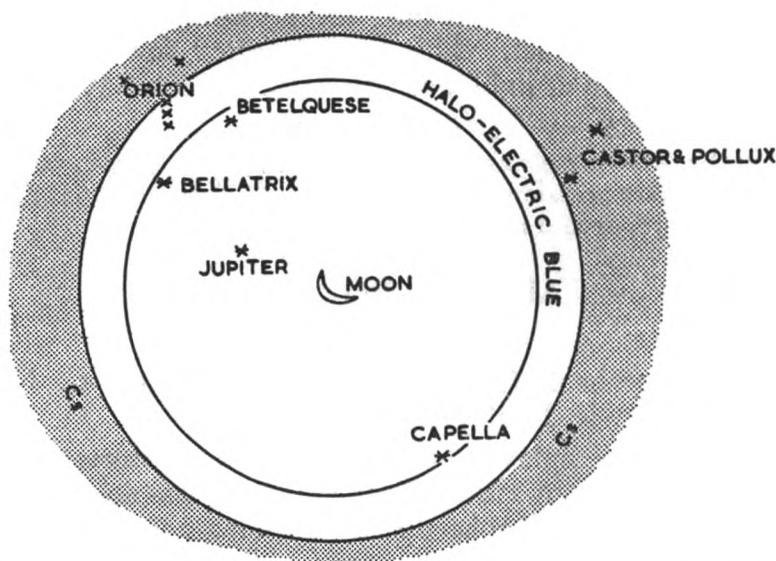
Position of ship: $61^{\circ} 00'N, 15^{\circ} 20'W$.

Note. This is a fine halo complex, which must have presented a remarkable spectacle. The most uncommon part of it is the white anthelion at 180° from the sun which is seen rather rarely. The parhelia of 120° from the sun (A and B) are not infrequently seen. The arc of contact of the 22° halo is formed as shown by two intersecting arcs when the sun is at relatively low altitudes, but it is often seen as a single arc convex to the sun, probably on account of some degree of blurring owing to imperfect observing conditions. The continuation of the arcs inside the 22° halo is an uncommon feature.

Mozambique Channel

S.S. *Baron Maclay.* Captain D. MacGregor. Lourenço Marques to Bombay. Observer, Mr. J. E. Oliver, 3rd Officer.

12th February, 1954, 1845 G.M.T. A lunar halo was observed with radius $15^{\circ} 00'$, whitish-blue in colour and very wide. The sky inside the halo appeared to be clear, but the hardness of colour of the halo gradually faded although it was



visible until 2015, when sky cleared to 3/8 Cu and the halo abruptly disappeared. Cloud, Cu 3/8 to southward, Cs 4/8.

Position of ship: $13^{\circ} 20'S$, $44^{\circ} 21'E$.

Note. Presuming that the radius was measured to the inside edge of the halo, this must be classed as an abnormal halo. Halos of about 11° and 17° radii are known.

GREEN SUN AND MOON

Antarctic Ocean

M.V. *Biscoe*. Captain D. J. Mackinnon. In whaling grounds. Observer, Mr. D. M. Hannah, 2nd Officer.

24th January, 1954, 0253 M.T.S. The sun rose above the horizon a vivid green. The colour became less and less pronounced until the sun reached an altitude of 3° , when the colour disappeared. The sky, except for a clear belt around the horizon at about 5° , was overcast with large Cu and Sc. Visibility excellent.

Position of ship: $64^{\circ}S$, $80^{\circ}E$.

West Pacific Ocean

M.V. *Ajax*. Captain S. C. Llewellyn. Yokohama to San Francisco. Observer, Mr. J. K. Marshall, 3rd Officer.

24th January, 1954, 1030 G.M.T. A light Cu cloud passed across the face of the moon which then appeared as a bright emerald green ball with a green corona. After about 30 sec the cloud passed clear and the corona disappeared, but the moon retained a definite green tint for 5 min before becoming obscured by a heavy Cu. After this cloud cleared later watchkeepers reported that the green tint remained for the rest of the night.

Position of ship: $39^{\circ} 37'N$, $157^{\circ} 18'W$.

Note. The observation of M.V. *Biscoe* is a very remarkable one, the explanation of which is difficult. The green colour might have been due to the presence of a small amount of volcanic dust in the atmosphere, insufficient to affect the colour of the sun above an altitude of 3° . The explanation of the observation of M.V. *Ajax*, made on the same day in a very different part of the world, is also difficult except in the volcanic dust theory, but we have no knowledge of the widespread diffusion of such dust at this time. Smoke in the upper air from forest fires is also a plausible explanation of a green moon.

GREEN FLASH AND RAYS

Indian Ocean

R.M.S. *Otranto*. Captain A. E. Coles, R.D., R.N.R. Colombo to Fremantle. Observer, Mr. J. W. Spiers, 3rd Officer.

20th March, 1954. At sunset the green flash was distinctly observed, and shafts

of green light were radiating from below the horizon, evenly spread around the position where the sun had set. This display lasted for about 5 min, and the observed length of the rays of light was about 10° of arc. Sky clear, no haze.

Position of ship: $07^\circ 45'S$, $92^\circ 56'E$.

Note. As stated in the note on page 213 of Vol. 24 of this journal, green rays or sky coloration above the point of sunset are occasionally seen. The above observation is of particular interest as both the green flash proper and the green rays were seen.

AURORA BOREALIS

North Atlantic Ocean

S.S. *Cairngowan*. Captain I. G. Foster. St. John, N.B., to Newcastle upon Tyne. Observer, Mr. A. R. Fairley, 2nd Officer.

21st February, 1954. A display of aurora borealis was observed from 2100 G.M.T. to 2230 (approximately). From 2100 to 2200 arcs were visible of moderate intensity from NE-W. At 2203 the arcs broke up and curtains appeared from N-NE in the same position as the arcs; the curtains were vivid. Starting from the N end the curtain began pulsating and then vanishing in a straight line from horizon to zenith. After about 2 min the arcs reappeared in a rather broken line, but soon settled down as the previous pattern. At 2210 rays appeared to come from the arcs towards the zenith, though many did not reach the zenith. This began in NE and spread across the sky to NW, then slowly faded in the same order. The rays appeared to meet at a point at the zenith, but not altogether. At 2215 arcs were once more visible in their original position and seemingly stable.

Position of ship at 1800: $58^\circ 24'N$, $12^\circ 48'W$.

METEOR

Gulf of Aden

S.S. *Karmala*. Captain E. J. Spurling. Aden to Colombo. Observer, Mr. D. H. R. White, 3rd Officer.

6th February, 1954, 1844 G.M.T. Observed meteor of magnitude brighter than the moon. Brilliant blue-green head, but red on the side nearest the tail. It left a bluish-white trail with showers of white sparks. Arc of travel was from bearing $115^\circ(T)$, altitude 19° , to $080^\circ(T)$, altitude 8° . Sky $1/8$ clouded.

Position of ship: $12^\circ 18'N$, $49^\circ 14'E$.

New Zealand waters

M.V. *Rakaia*. Captain C. P. Robinson. Balboa to Wellington. Observer, Mr. J. Cosker, 3rd Officer.

24th January, 1954, 0948z. An extremely brilliant meteor was observed at bearing 250° and altitude about 70° . It moved in a direction from the constellation Eridanus towards Orion. The meteor was visible for about 4 sec and its trail for about 10 sec. The brilliancy of the meteor when it first appeared was such that it was impossible to look directly at it with the naked eye. Sky cloudless.

Position of ship: $41^\circ 27'S$, $176^\circ 49'E$.

SOUTH AFRICAN WEATHER BUREAU

Excellent Awards for Ships

We have received a letter from Dr. T. Schumann, the Director of the South African Weather Bureau, an extract from which is as follows:

"Ten British selected ships are to be presented with Excellent Awards for outstanding co-operation during 1953. They are as follows: *Athlone Castle*, *Biscoe*, *City of Pretoria*, *Clan Macrae*, *Dominion Monarch*, *Eastbank*, *Imperial Star*, *Southern Harvester*, *Southern Venturer*, *Thule*. In addition it has been decided to present the following non-selected British ships with awards for their special voluntary services

by reporting during 1953: *Benin, British Seafarer, City of Poona, Cottonwood Creek, Rogue River, Stanmore*. These six ships sent in a combined total of 1,360 radio reports during the year, which was a very high contribution to weather forecasting in these difficult waters.

“With the recent extension of the reporting area in the South Atlantic up to the Equator, the South African Weather Bureau is especially indebted to the mailships of the Union-Castle Company, which sent in a grand total of 1,688 reports during the year.

“As in previous years, the awards will be framed photographs of South African scenery, with suitably engraved plates attached to record their services.”

We should like to congratulate the ships concerned on their good work.

WEATHER REPORTING IN THE SOUTH-WEST PACIFIC

The President of the Commission for Maritime Meteorology of the World Meteorological Organisation has sent us the following notes which were received from the Director of the New Zealand Meteorological Service.

New Zealand, though a small country with a population of only 2,000,000 people, is responsible for the meteorological servicing of one of the larger oceanic areas of the world, extending southward from the Equator between longitudes 120°W and 160°E. Owing to the sparseness of the land-based weather reporting networks available in the region, the New Zealand Meteorological Service is very largely dependent on shipping for weather information from the surrounding oceans.

To exploit to the full the possibility of obtaining information from ships operating in the region, the New Zealand Meteorological Service has been active in seeking the voluntary co-operation of deep-sea mariners. Personal liaison is maintained through two marine officers stationed at Wellington and Auckland. Every New Zealand ship engaged in regular overseas trade is enrolled in the New Zealand Observing Fleet. Twenty-two of these vessels are equipped for full observations (corresponding to the British selected ships) and 13 are equipped on a lesser scale (corresponding to the British supplementary ships).

In addition to the ships of the New Zealand or other observing fleets, all ocean-going vessels of whatever nationality which do not normally make weather reports are invited to do so while in the area. As a measure of the generous response obtained, in the period 1950-53 inclusive no less than 540 such additional ships made reports while in this part of the world. Many of these ships have, in addition, continued to report to the Australian collecting centre after passing the 160°E meridian.

The success of the measures to obtain co-operation from shipping is reflected in the following figures for the total number of weather reports received from ships in the area each year since the war:

<i>Year</i>	<i>No. of ship reports received</i>
1946	4,820
1947	8,210
1948	11,920
1949	15,567
1950	16,597
1951	17,317
1952	20,697
1953	20,063

It is evident that masters and officers of ships appreciate that their active participation in weather reporting is in the interests of both the seafaring community and humanity in general.

The New Zealand Meteorological Service wishes to record its deep appreciation of the co-operation given by the officers of vessels which visit the south-west Pacific and by the shipping companies and agents.

HONOURABLE COMPANY OF MASTER MARINERS

A Memorable Occasion

At 11.45 a.m. on Tuesday, 8th June, 1954, the Master (Air Chief Marshal Sir Frederick Bowhill), Deputy Master, Wardens, the Honorary Chaplain and Members of the Court of Assistants assembled on board the headquarters ship *Wellington* at London, in preparation for the installation of H.R.H. the Duke of Edinburgh as Master of the Honourable Company of Master Mariners.

At 12.10 p.m. the Duke of Edinburgh arrived on board, his personal standard being broken at the main masthead. He was welcomed by Sir Frederick Bowhill, who escorted him to the Committee Room on the upper deck where the Deputy Master (Captain H. F. Chase), the Senior Warden, Wardens, the Honorary Chaplain and Senior Assistants were assembled. Sir Frederick presented them to the Duke, after which His Royal Highness, the Master-elect, was seated on the right of the chair and the Master and others sat in their usual places. Sir Frederick Bowhill then recited the loyal declaration by which all meetings of the Company are preceded, and invited His Royal Highness to make the declaration as Master of the Honourable Company of Master Mariners, after which the Clerk invested the Duke of Edinburgh with the Master's robe and the Mace Bearer took the badge and chain from the shoulders of the retiring Master and handed same to Sir Frederick, who placed them on His Royal Highness's shoulders.

The Master then took the chair, and his first duty was to invite Air Chief Marshal Sir Frederick Bowhill to make the declaration appropriate to the office of Deputy Master. Sir Frederick having made his declaration then paid tribute to His Royal Highness. This concluded the official installation, following which the Master, Deputy Master and Wardens adjourned to the Model Room where the remaining Members of the Court of Assistants were presented to the Master.

A luncheon on board followed over which His Royal Highness the Master presided. After the loyal toasts the Rt. Hon. Alan Lennox Boyd, Minister of Transport and Civil Aviation, rose to propose the toast of "The Master". He said the Duke of Edinburgh's installation was a mark of the lively interest he always showed in the welfare of British mariners, and of the brilliant way in which he had constantly proclaimed the role of the Royal Navy and the Merchant Fleet in the life of our nation.

The Minister then handed to the Duke of Edinburgh a certificate of competency as Extra Master, remarking that he doubted whether in all naval history a Lieutenant, R.N.V.S.R., had ever had an opportunity to set such a seal on the career of an Admiral of the Fleet.

In responding, the Master said that he hoped he would be of help to the Company in the work it did for the Merchant Navy officers, from their training to their old age. He had been feeling slightly embarrassed because he realised that the qualification for membership of the Honourable Company was a master's certificate, and until a short time ago he felt he was going to be in the invidious position of being without one. Luckily, he said, the Minister of Transport had saved him from any further embarrassment by making good the deficiency.

The Duke referred to his early training for a sea career and declared that he had had the very good fortune of serving with officers of both the Merchant Navy and the Royal Navy. He added that he really did understand the importance and significance of the position of Master of the Honourable Company and realised the qualifications of a master's certificate. He concluded: "I am not only honoured but slightly overwhelmed to find myself at the head of such a very distinguished company of seamen."

M. C.

THE ASSOCIATION OF NAVIGATION SCHOOLS

The annual conference of the Association of Navigation Schools for 1954 was held at Plymouth on 28th May. It took place in the new annexe of the Plymouth and Devonport Technical College, the top floor of which has been allocated to the Navigation School. It is a very fine building of modern structure and the Navigation School contains separate lecture rooms for all grades of candidates; also for the cadets who come for pre-sea training for a period of up to 12 months. There are separate rooms for chart-work and an instrument room containing much of the up-to-date equipment found in the modern steamship—radar, gyro compass, echo-sounding instruments, etc., and in addition a library where most of the technical books likely to be required can be studied. The flat roof of the building has been allocated to the Navigation School and is used for practical training in signalling; it provides an excellent site for the meteorological instruments, and for taking daily observations, which is done by the cadets.

The meeting was opened by the Director of Education for Plymouth, Dr. Andrew Scotland, M.A., PH.D., followed by an interesting talk by Dr. G. A. Steven, of the Marine Biological Association, Plymouth, on the research being carried out to discover the principles and perfect the method for accurately predicting the fluctuations in fish stocks in the various fishing grounds. The eventual aim will be to establish a "fish prediction" similar to the present weather forecast. It would seem that the survival of the baby haddock in the North Sea, for example, depends greatly on the strength and direction of the mean winds throughout the year. The number of survivals were higher when the S and E winds were strong and the N and W winds weak, and the survivals were lower when the reverse conditions prevailed.

In an address on the subject "Educational Development in Her Majesty's Forces", Instructor Rear-Admiral Sir Arthur Hall, R.N., said that the object of the general educational facilities in the three Services were twofold, to increase the "fighting efficiency" and also to prepare men for return to civil life, and every assistance was given to men keen to learn, both through courses and spare-time studies.

In presenting his annual address to the conference, which is always received with great interest, Captain Quick, Principal Examiner of Masters and Mates, said that the year 1953 had been a disappointing one, as although the number of certificates issued had risen from 2,009 in 1952 to 2,278 in 1953, the percentage passes had again dropped, from 70.5 per cent to 59.1 per cent, and it appeared that some candidates presented themselves for examination who were obviously quite unprepared. In the oral part of the examination, candidates met with greater success than in either the written or signals part. In general the paper on "Meteorology" was quite satisfactory, but quite a few candidates had little idea about how to deal with questions on Part IV of the "Weather messages for shipping", which involved constructing a weather map and the use of an analysis; it seemed that in such cases little attempt to learn this part of the subject had been made.

Comparative figures of percentage passes by candidates of the various categories during the last three years are as follows:

	<i>Masters</i>	<i>1st Mate</i>	<i>2nd Mate</i>
	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>
1951	84.6	84	76.5
1952	71.2	76.2	65.9
1953	61.9	65.5	55.2

J. R. R.

THE INSTITUTE OF NAVIGATION

At a meeting of the Institute of Navigation on 23rd April, 1954, papers were read on "Surface Currents of the Oceans and their effect on Navigation" by Commander C. E. N. Frankcom, Marine Superintendent, and Mr. E. W. Barlow, also of the Marine Branch of the Meteorological Office.

Commander Frankcom began with some general remarks on ocean currents and their causes, illustrated with a slide showing the currents and winds of the Atlantic Ocean. He then dealt briefly with the historical side of the growth of our knowledge about currents from the time of Dampier, who in 1688 published *Discourse of Winds, Breezes, Storm Tides and Currents*. Rennell was the first to plot current observations and show the directions of the general current circulation from these; his charts of the Atlantic and part of the Indian Ocean were published in 1832. Nearly 20 years later Maury, working on similar lines, published his wind and current charts of all oceans, from United States observations. As a result of the recognition of the practical importance of this work to seamen, the first International Meteorological Conference was held in Brussels in 1853 to organise the collection of marine observations by other countries. The British Meteorological Office was formed in 1855, and marine meteorological and current observations have since been received regularly from British merchant ships. The meteorological and current atlases prepared by the Marine Branch of the Meteorological Office are based mainly on these observations, supplemented by those made by ships of the Royal Navy.

Commander Frankcom then dealt with the value of the current atlases to navigation, and instanced some shipping casualties that had occurred as the result of the neglect of information available on the charts or in sailing directions. He referred to the economic value of knowledge about current and weather in choosing routes, and to the effect of sudden sea temperature changes on the care of cargo. From the air-sea rescue viewpoint, reliable information about currents has been shown to be invaluable. The factors affecting the accuracy of current observation, including the estimation of leeway, were described.

Oceanographical research will do much to help solve some of the problems concerning the vicissitudes of ocean currents, but so many factors are involved in producing the current at any one time and place that it is unlikely that we shall ever be able to forecast for certain what the current will be.

Mr. Barlow began his talk with a short historical account of modern current charting. Current charting in the Marine Branch of the Meteorological Office began in 1923, and the greater part of the talk was concerned with the methods of computation of these charts and the information they provided. This was illustrated by slides showing the same part of the Gulf Stream area of the North Atlantic on the three different charts given in the current atlases, the vector mean, the rose and the predominant charts. The vector mean chart indicates the net transport of water and the rose chart shows how current direction and rate can vary from the average. The predominant chart gives the average rate of current and its degree of constancy, together with the most likely direction of current in regions where the current is sufficiently constant to make such information possible. In ordinary navigation, the predominant chart and the rose chart should be consulted in conjunction.

The Atlantic and Indian Oceans have been charted but work on the Pacific Ocean is not yet complete. The charts are mainly quarterly, but the ultimate aim is to make all the charts monthly, when sufficient observations are available. Slides of monthly charts in the China Sea area were shown to illustrate changes of monsoonal current. Much new information about currents and their seasonal variation has been derived, and the more accurate knowledge now available is being used to revise the information about currents in the Admiralty Sailing Directions. Remarks on currents are now also being supplied to the Admiralty for insertion on navigational charts.

A short account of current charting in other countries was also given; the United States and Holland are the only countries doing this work over extensive regions of the oceans.

After the papers were read a long and interesting discussion took place.

SHIPPING OPERATIONS IN HUDSON BAY

The thirteenth Report on Hudson Bay Marine Insurance Rates, produced by the Commonwealth Shipping Committee, shows the increasing use and importance of what has become familiarly known to seamen as the "Churchill run". The development of Port Churchill as a major port for the export of Canadian grain is not surprising when one considers that it is by far the nearest port to the great grain provinces of Manitoba, Saskatchewan and Alberta, though at the same time it is only about 180 miles further from Liverpool than is Montreal.

Shipments from Port Churchill in 1946 numbered nine; in 1953 there were 31, representing a total lift of 10,785,000 bushels of grain. This was about the maximum capacity of the port with its present elevator facilities; but by October, 1955, it is hoped to double the grain storage facilities and with this increase of elevator capacity it should be possible to ship up to 20,000,000 bushels of grain through the port each season.

Knowledge of the meteorological and ice conditions of this region and the advent of radar and radio aids, has enabled the safe navigational season to be extended from the original 10th August until 30th September, to 23rd July until 10th October, whilst subject to a surcharge of 25 per cent on the additional voyage insurance premium required for this run, a ship is permitted to leave Port Churchill up to 15th October. In 1953 the first ships inward were given permission to enter Hudson Strait on 22nd July, and it is interesting to note that the last two ships left on 12th and 13th October, that is during the permissible extension period.

Navigation in a region so near to the magnetic pole makes a gyro compass an essential piece of equipment. This is reflected in the difference in the additional premiums paid by ships with and without the gyro. In 1947 this additional premium was 2s. per gross registered ton. For gyro-equipped ships this has been progressively reduced, until in May, 1953, it stood at 9d. per gross registered ton, whilst the non-gyro-equipped ship was still called upon to pay 2s. Whilst the percentage on insured value payable by a gyro-equipped ship has been reduced from 20s. 3d. per cent to 6s. 8d. per cent in the six years, it has remained around 40s. per cent for the non-gyro-equipped vessel.

The Canadian Government takes practical steps to make the route navigationally safe, and during the year their vessels *C. D. Howe* and *N. B. MacLean* were available for advice and assistance to shipmasters using the route. Aerial surveys were made of ice conditions in Hudson Bay, the results of which were transmitted to the radio stations and to the *N. B. MacLean* for the information of masters of vessels in the area. These reports were also cabled to London and circulated to the shipping press for publication.

Aboard the *N. B. MacLean* also was a small team of British and Canadian scientists investigating ice formations in relation to radar navigation in the course of the vessel's routine voyage from the St. Lawrence to Hudson Strait and Hudson Bay.

An unattended responder-type marine radio beacon was established as an experiment in a position close to the light station at the east end of Charles Island. This beacon is automatic in operation, being brought into use by a radio signal from the ship desiring to obtain direction-finder bearings. Its use was well reported on.

It is our endeavour to recruit to the selected or supplementary list all British ships who go on this run, and we have been proud to notice that for a number of years past the first ship to make this passage has been one of our regular voluntary

observing ships. In 1953 this same ship was also the last British ship to leave port, having made two runs during the season.

Much remains to be learnt about this important route before our knowledge becomes adequate, and though the scientists may devise all sorts of radar and aids, it is only the ships which can provide the essential observations.

L. B.

Book Reviews

The Way of a Ship. By Alan Villiers. 9½ in. × 6½ in. pp. 282. Hodder Stoughton, London, 1954. 30s.

This book is described as "The story of the square-rigged Cape Horners, some account of the ultimate development of the ocean-going square-rigged sailing vessel and the method of her handling, her voyage making, her personnel, economics, her performance and her end".

In writing it the author has done a good turn to all who are interested in the history of sailing ships. His intention is to make this type of vessel comprehensible now that she is a thing of the past. In a few years it will be too late. Already there are comparatively few people who have ever seen one of these big ships under way at sea, and there remain fewer still who have sailed in them and so can describe from first-hand experience, the methods of their handling. Alan Villiers is qualified to do this for he has sailed deep water in all kinds of ships, even dhow.

The fine steel ships of the last days of sail described in this book were certainly splendid and powerful vessels; the culmination of hundreds, perhaps thousands of years of experience in the shipbuilders' and the seaman's arts. Now not one of the large sailing ships remains in service. The book commences with a description of one of the greatest sailing ships ever built; the German five-masted full-rigged ship *Pruessen*. As well as many authentic records of their fast passages and best speeds, the nautical historian of the future will value the smaller details of the handling of these ships, the orders given and the notes of their crews, etc. While a book of this sort must necessarily contain many technical sea terms, the author has taken care to explain the meaning of many of these so that not only the seaman or the ship enthusiast can enjoy it, but the general reader as well who can thus sit in his armchair and beat to the westward round Cape Horn, by far the pleasanter way of doing it. The book is well illustrated with the author's photographs and many clear drawings. The latter are by Mr. Harold A. Underhill, well known for his excellent scale drawings of sailing ships. Alan Villiers's love of the ocean-going square-rigged ships shows on almost every page. He is still an enthusiast for training, but agrees sadly that as far as this country is concerned it is dead. A chapter on school ships is nevertheless interesting. The author has done a good service in pointing out that life in a sailing ship was not necessarily an unpleasant one. It was certainly preferable to the life in the poorer type of tramp steamer of the same period. It is rather a pity that such a book was not written 40 or 50 years ago, when there were several hundred fine big sailing ships still in service; British, French, American, as well as German. Villiers is probably correct in saying that 17 kt is about the maximum speed attained under sail. There is an error on page 17 where, speaking of the North Atlantic Ocean, it is stated that "the wind twists itself across from west to east with a procession of clockwise spiralling motions". This refers to the easterly moving cyclonic depressions and their "spiral motion" should of course be described as *anti-clockwise*. If one may venture some slight criticisms of what is really an excellent and readable book, they are that rather than being made of the German achievements, and there is comparatively little mention of the fine French, British and American ships. Another point is that Villiers se

less than just in the matter of the navigational abilities of the masters of sailing ships. He states that: "The general standard of accomplishment was remarkably poor . . . practice in most British sailing ships for the master to lock his chart away immediately he had pencilled his guess of the ship's position on it." The writer of these notes only recently read in the logbook of the full-rigged ship *Chevy Chase*, written in 1873, "Exchanged signals with ship *Clyde* of London from the Bass Straits. His Greenwich date is three minutes later than mine, deduced from the means of lunar distances east and west of the moon". One wonders how many modern navigators could tackle the problems of lunar distances to check their chronometers. Readers of this journal will probably be surprised to read on page 76 that "Hydrographers appealed to masters to send in reports of winds and weather . . . but few bothered to send in such information". The author seems never to have heard of the British Meteorological Office, its voluntary observing ships and its century of effort for the mariner. If he had enquired at the Marine Branch of the Meteorological Office he would have learned of the many hundreds of meteorological logs sent in by British sailing ships from 1855 onwards, and which formed the basis of the Pilot Charts and the climate and current atlases of the oceans. It is therefore not correct to infer that only the Deutsche Seewarte could supply the information, as that excellent organisation would be the first to acknowledge. Nevertheless, in spite of the above slight "moans" the book is one that can be heartily recommended. It gives a clear description of a kind of sea life that has vanished.

C. H. W.

Teach Yourself Motor-boating. By Dudley Noble and A. J. Shimin. 7¼ in. × 4½ in. pp. 167. *Illus.* English Universities Press, 1954. 6s.

In the October, 1954, *Marine Observer* we had the pleasure of reviewing *Teach Yourself Seamanship*. The latest companion volume, *Teach Yourself Motor-Boating*, in the now extensive series of Teach Yourself books, is equally worthy of attention.

Few sports have become more popular in recent years than motor-boating, and few sports provide such a wealth of lasting pleasure. This book forms a complete, practical and handy guide for the enthusiast who wishes to get afloat in a small or medium-sized power craft.

The first chapter, "Getting Afloat", gives some very sound advice on hiring, buying, building or converting a boat, and the writer has very wisely cautioned the reader against impetuous action in starting out. There follows a chapter on boat construction, wherein it is shown that the building of a boat, with the variety of new materials now available, is not such a difficult matter as may at first be imagined. We fear, however that this side would not directly concern the mariner until he has "swallowed the anchor".

Chapters on engines and accommodation follow, together with ventilation and fire precautions, deck gear and auxiliary sails, fitting out and handling the motor-boat. This last chapter is full of sound common and seamanlike sense. In it we are glad to notice that the writer has emphasised that, after all, nature is the master. "If it looks as if a storm is blowing up, swallow your pride and run for shelter. . . . If you have a steadying sail, set it before things become too bad—you may not be able to later. . . . When the sea becomes really rough, forget about your intended course and concentrate upon keeping the bows of your boat into the waves . . ." are samples of the advice given. What a lot of distress and expense would be spared around our coasts by more attention to these simple rules. The chapter on handling concludes with some advice on obtaining weather forecasts through the B.B.C., although unhappily this already needs revising to include the additional forecasts which are now given at 0915 on Sundays in the Home Service and at 2350 in the Light Programme. There are also a few paragraphs of good advice on watching the barometer, wind, weather and clouds.

The penultimate chapter takes the reader on a quick cruise from Inverness so about to Oban and through the Caledonian Canal back to Inverness, including run up through the 47 locks of the Thames as far as Oxford and Lechlade. In chapter we can glimpse the wonderful wealth of cruising grounds and harbours which is available in this country.

Appropriately enough the last chapter is devoted to laying-up, whilst the whole 32 rules for Preventing Collision at Sea are printed as an appendix. There is also a bibliography, a list of useful names and addresses and a very complete index.

This is a book which is well worthy of study by those who are fond of "messing about in boats . . . or with boats", and though to many seamen it will probably arouse a feeling of nostalgia, some may be able to put its teachings into practice whilst there will be very few for whom it will not form a basis of an agreeable pipe-dream.

L. B.

Aloft and Afloat in Deep-Water Sail. By Dewar Brown. 8½ in. × 5½ in. pp. 188. Illus. Putnam and Co. 18s.

This book is of interest in depicting the life of a hand before the mast in or the last of the big square-rigged ships, the Finnish barque *Winterhude* in about the year 1933. The voyage, which occupied the best part of a year, was from the Cape in ballast to Australia via the Cape of Good Hope and back to the United Kingdom by way of Cape Horn.

Deep-water sailing ships were on their last legs by 1933, and this one seen to have been poorly found and very short-handed. The routine of watches and tacking at the wheel and other matters was evidently somewhat different in Finnish ships from that of the British sailing ships of the early years of this century.

The author is not a professional sailor but had made other voyages and is able to describe the life very well. There is, as often in books of this sort, a tendency to place rather much emphasis on the unpleasant and dangerous events of the voyage, and in this story there also seems an undue amount of fighting among the crew. Chapter XI, "The Roaring Forties", is perhaps the best in the book, but naturally the bad weather part makes more dramatic reading.

As the author points out, the life in sail had remained essentially the same for a long time. Some of his terms are unusual, such as "girt line" for gantline, "unshipped" when he meant "unbent" and "orlop deck" for an extension of the poop.

On page 43 there seems to be some confusion between the evolution of tacking and wearing ship; the helm being put hard up for wearing ship, and yet the "Lee Ho" from the poop as for tacking ship (meaning "helm's a lee" or helm down).

However, these are perhaps small matters in an otherwise very readable book.

C. H. V.

Personalities

OBITUARY.—It is with deep regret that we announce the death, on 4th July at the age of 83, of CAPTAIN SIR BENJAMIN CHAVE, K.B.E.

Sir Benjamin was born in Southampton and educated at King Edward School there. He began his sea career in 1885 at the age of 15, serving his apprenticeship in the sailing ship *Torridon* of Aberdeen. After obtaining his second mate certificate he served for a while in steamships trading to the West Indies, but he returned to sail as second mate of the full-rigged ship *Morna*. Remaining in the service until 1894, he then passed for extra master (sail) and joined the Castle Line, which later became the Union Castle Line upon the amalgamation of the two companies. Sir Benjamin served the remainder of his sea career with this company, which he served for 38 years.

In 1914 Sir Benjamin was promoted to his first command, the *Sabine*; but at the outbreak of the First World War he volunteered for service with the R.N.

Navy, and as Commander R.N.R. was appointed to command one of his Company's ships, the armed merchant cruiser *Armada Castle*. Later he served as Naval Transport Officer in Charge at Luderitzbucht, South-West Africa, during which time he piloted to and from the anchorage, in dense fog, the vessel carrying General Botha to an important conference; some time later he was mentioned in despatches by General Botha.

With the completion of the campaign in South-West Africa, Sir Benjamin was released from naval service and returned to command the *Alnwick Castle*, later torpedoed in the Atlantic 350 miles from the Scillies. Only two out of eight life-boats survived, one in charge of Captain Chave being picked up after six days, during which time six of the crew had died from exposure.

For his services during the war Sir Benjamin received in 1920 the honour of knighthood, the K.B.E.

In 1921, being appointed Marine Superintendent in the London office of the Union Castle Line, Sir Benjamin temporarily gave up the sea, but after two years ashore he returned to sea, at his own request, a life he much preferred. From then until his retirement in 1932 he commanded many of the Company's mailships, his last ship being the *Windsor Castle*.

While he was at sea Sir Benjamin was a keen meteorological observer; 25 log-books were sent in from ships in which he served. On his retirement from the sea Sir Benjamin was appointed Merchant Navy Agent at Southampton, and he carried out this duty for the Meteorological Office very effectively until 1949, when he finally retired at the age of 78. The captains and officers of many of the ships regularly using this port will no doubt remember his pleasant and genial manner.

He wrote a few articles for this journal, such as "The Radio Direction Finder", published in 1934, and "The Denny-Brown Ship Stabilizer" in 1936.

He had many other interests in the port of Southampton, being an active member of the Southampton Master Mariners' Club the "Cachalots", which he joined soon after its formation, serving as "boatsteerer" to the club from 1936 until 1947. When he relinquished this office he was presented with a framed illuminated scroll by the members and also elected an honorary life member of the club.

Sir Benjamin also served for many years as Vice-Chairman of the Southampton Committee, Missions to Seamen; also Chairman of the Sub-Commissioners of Pilotage, Southampton and Isle of Wight district, which post he relinquished at the age of 80 on the advice of his doctor.

A memorial service was held at Highfield Church, Southampton, which Sir Benjamin had attended for 46 years, and was attended by the Mayor of Southampton and representatives of all the main shipping companies and organisations connected with the sea, and by the writer of these notes, representing the Meteorological Office.

J. R. R.

RETIREMENT.—CAPTAIN F. D. STRUSS, O.B.E., D.S.C., Commodore of the fleet of Manchester Liners, Ltd., recently retired after 46 years in that service, 37 of which were in command. He served with distinction in both world wars, being awarded the D.S.C. in recognition of the action when, in command of the *Manchester Trader*, he engaged in a six-hour running fight with a submarine in the Mediterranean before his ship was sunk by gunfire. He received his O.B.E. for his services in the Second World War, during which he was in the *Manchester Merchant* when she was torpedoed and sunk.

To crown his last year in the Canadian trade he arrived in the *Manchester Spinner* at Montreal on 30th March, being the first ship of the 1954 season up the St. Lawrence, thus winning the gold-mounted stick presented annually.

Captain Struss has been a voluntary observer for the Meteorological Office since 1929, and many of the logs returned by him have been classed "Excellent".

We wish him health and happiness in his retirement.

M. C.

RETIREMENT.—CAPTAIN I. E. G. GOLDSWORTHY, R.D., R.N.R., Commodore of the Orient Line, retired from that Company's service in August, 1954, after 45 years at sea.

Ivan Ernest Goodman Goldsworthy was born in 1894 and went to sea in 1909 to serve his apprenticeship in sail. During the First World War he served as an R.N.R. officer, mainly in vessels of the Grand Fleet minesweeping flotilla. In 1920 he joined the Royal Mail Steam Packet Company, and transferred to the Orient Line in 1921. At the outbreak of the Second World War Captain Goldsworthy was Staff Commander of the *Oronsay*. This ship came under heavy air attack at St. Nazaire while embarking troops. Although damaged in five attacks the *Oronsay* made her escape. For his part in this action Captain Goldsworthy was mentioned in despatches. As a Commander R.N.R. he then served with the Royal Navy as a Commodore of Coastal Convoys. He was promoted from Commander to Captain, R.N.R., in 1942.

Since the war he has commanded several of the Orient Line ships, most of them selected ships of the voluntary observing fleet. Captain Goldsworthy's first association with the Meteorological Office was in 1922.

We wish him good health and happiness in his retirement.

C. H. W.

SEA WATER SAMPLES

In the past few years many ships' meteorological logbooks have contained interesting reports on discoloured water, and in some cases a sample has been obtained and sent in to us. These samples have been examined by biologists at the Marine Biological Association Laboratory, Plymouth, or latterly at the National Institute of Oceanography.

The National Institute of Oceanography hopes that ships will continue when possible to send them samples because:

- (a) Although it is known that discolorations are most frequent in coastwise waters of main upwelling regions, and offshore near major current boundaries, the seasonal shiftings of these hydrodynamically defined effects are themselves insufficiently known, so that records of discoloured water sometimes gives useful evidence concerning them.
- (b) The discoloured water is usually due to dense local swarming—"bloom-ing"—of microscopic plants or animals. Some of these are harmful to other forms of marine life or even indirectly to man. Others are quite harmless, but may occur in the same sea areas. Thus it is still a matter of some importance to know the species, and these can only be determined from preserved samples.

It is thought that masters of observing ships sufficiently interested to log these occurrences might be willing to collect samples also. With this in mind Port Meteorological Officers are being provided with small sets of sample bottles with preservative and instructions for use. These may be obtained on application.

NOTICE TO MARINE OBSERVERS

All observing officers in voluntary observing ships are reminded of the changes in International Meteorological Codes which come into force on the 1st January, 1955, and which were referred to in the October number. Preliminary roneed notices were issued to all ships last August. The detailed amendment to the *Marine Observer's Guide* was unavoidably delayed in printing, but will be issued before the end of 1954. An *Admiralty Notice to Mariners* on the subject was issued on 4th December, 1954.

The Marine Observer, January, 1955

Fleet Lists
GREAT BRITAIN

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 returns received. The date of receipt of the last return received is given in the third column.

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

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

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

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

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

Selected Ships

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Accra</i>	GJSW	3.8.54	W. Munt	J. F. Murphy, R. Munro	J. Stuart	Elder Dempster Lines, Ltd.
<i>Afghanistan</i>	GNYB	24.6.54	R. Connacher	N. H. Crawford, F. E. Bowley, F. M. Price	E. M. Petrie	F. C. Strick & Co., Ltd.
<i>Ajana</i>	GKVB	14.8.54	F. W. Mould	H. A. McGill, T. Hastings, H. E. Keeble	L. Kidd	Trinder Anderson & Co.
<i>Ajax</i>	GJXM	6.8.54	S. C. Llewellyn	J. K. Marshall, A. R. Worthington, J. B. Swindells	A. E. Holman	A. Holt & Co.
<i>Albistan</i>	MABT	19.8.54	E. E. Dunn	E. C. Cross, M. Fleming	J. Peel	F. C. Strick & Co., Ltd.
<i>Alcantara</i>	GLQR	27.5.54	H. H. Treweek	G. More, P. Hawley, R. E. Fairly	R. Hammond	Royal Mail Lines, Ltd.
<i>Alsatia</i>	MABL	20.4.54	J. Chapman, R.D., R.N.R.	R. W. Barten, H. P. Williams, A. P. Hunt	—, McKinnon	Cunard Steamship Co., Ltd.
<i>Amakura</i>	MCPN	19.6.53	A. Jones	D. Andrew, C. St. John-Keyton, J. H. Donaldson	E. Ash	Booker Bros. McConnell & Co., Ltd.
<i>Andes</i>	GQCV	24.6.54	H. D. Hooper, O.B.E.	R. B. Dales, D. Stratton, P. J. Foster, B. C. Gothard	W. Smith	Royal Mail Lines, Ltd.
<i>Andria</i>	GDWM	5.8.54	A. G. Cuthill	B. O'Brien, P. A. A. James, J. Cosnett, M. J. Meyers, J. Weston	J. B. Allan	Cunard Steamship Co., Ltd.
<i>Apapa</i>	MACE	9.3.54	A. G. Baptiste	D. J. Brown, A. Hopper	G. I. Gilling	Elder Dempster Lines, Ltd.
<i>Arabia</i>	GLKF	20.7.54	W. B. Tanner, R.D., R.N.R.	Q. Paul, O. Lynch, R. J. F. Nightingale	T. D. Sandham	Cunard Steamship Co., Ltd.
<i>Arabistan</i>	GCKK	10.7.54	J. E. Cooke	R. Ellingham, D. Calvert, J. Edmondson	J. C. Crowley	F. C. Strick & Co., Ltd.
<i>Araby</i>	GMZL	1.12.54	A. J. C. Barff, R.D., R.N.R.	J. A. Le Breccart, R. Foulkes, M. Larrive	M. Duff	Royal Mail Lines, Ltd.
<i>Araaka</i>	GDVN	25.3.54	J. A. Carter	J. L. Anczykowsky, T. W. Jones, R. Hammond	J. Fraser	Booker Bros. McConnell & Co., Ltd.
<i>Arawa</i>	GSMN	18.10.54	L. J. Hopkins	B. Creese, S. Carr, O. Thomas	P. W. Booth	Shaw, Savill & Albion Co., Ltd.
<i>Argentina Star</i>	GTKF	19.7.54	E. R. Pearce, O.B.E.	J. Bottwood, J. Haigh, E. Gill	J. Hulme	Blue Star Line, Ltd.
<i>Ariguani</i>	GMBL	13.10.54	R. W. Lundy, O.B.E., R.D.	J. L. Taylor, J. Nicholson, B. Griffiths	W. J. Read	Elders & Fyffes, Ltd.
<i>Arundel Castle</i>	GCZL	26.7.54	D. D. MacKenzie	W. R. Warner, P. J. Stead	E. Pitt, D.S.C.	Union Castle Mail S.S. Co., Ltd.
<i>Ascania</i>	GKNJ	2.10.54	E. A. Divers, O.B.E., R.D.	J. K. Finlay, J. S. Roe, L. W. Crump	H. M. Milligan	Cunard Steamship Co., Ltd.
<i>Ashburton</i>	GNJN	26.3.54	C. Farry	G. Griffiths, J. P. McKink, R. Smellie	A. E. Marten	Trinder Anderson & Co.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
Asia ..	GLJV	17.8.54	F. E. Patchett	R. Smith, O. H. Hawells, P. J. Davies, P. Jackson, C. R. Bishop, A. B. Knight ..	J. S. Marshall ..	Cunard Steamship Co., Ltd.
Assyria ..	GKX	24.6.54	I. G. Bradley, R.D., R.N.R.	G. H. Griffiths, J. Davies, W. B. Leubert ..	B. A. Long ..	Cunard Steamship Co., Ltd.
Asturias ..	GLQS	26.8.54	W. H. Grimshaw, O.B.E. ..	A. C. Aesson, J. D. Salt, G. C. Kendrick, A. J. Heather, J. Wilson ..	R. Farrell ..	Royal Mail Lines, Ltd.
Athelfoam ..	GMFN	21.8.54	A. W. Pegg	H. R. Meudell, J. H. Fraser, A. B. Hunter ..	D. Robinson ..	Athel Line, Ltd.
Athenic ..	GBLS	28.9.54	L. E. Edmeads	A. J. Smyth, J. D. Williams ..	H. S. Knight ..	Shaw, Savill & Albion Co., Ltd.
Athone Castle ..	GYTK	27.10.54	C. C. Page	G. Wood, J. Ferrett, P. J. O. Sheridan ..	J. Summers ..	Union Castle Mail S.S. Co., Ltd.
Aureol ..	GMGJ	27.8.54	J. J. Smith	D. Donaldson, D. I. Flynn ..	F. W. J. Broomfield ..	Elder Dempster Lines, Ltd.
Auricula ..	GMPV	27.8.54	G. E. Hunt	D. C. Howard, T. B. Kelly, F. R. Christian, R. M. Watt ..	G. H. S. Jordan ..	Messrs. Shell Tankers, Ltd.
Australia Star ..	GYCS	18.9.54	R. White, D.S.C.	G. C. Williamson, J. C. Harris, F. Agnew ..	L. Cooper ..	Blue Star Line, Ltd.
Austratind ..	GJKF	4.8.54	R. Willcocks	D. L. King, H. R. Coates, R. Jeans ..	T. Ogbourne ..	Trinder Anderson & Co.
Avistone ..	GBSV	22.10.54	A. A. Roche	L. Agar, T. Davies, M. Martin ..	L. R. Bradley ..	Purvis Shipping Co., Ltd.
Avondene ..	MAWG	11.10.54	F. Moorcraft	E. B. Fitzpatrick, W. Lewis, A. Booth ..	I. T. Moody ..	Dene Shipping Co., Ltd.
Avonmoor ..	GFGL	15.4.54	F. F. Gilbert	K. B. Jewell, G. Sharpe, K. Arthur ..	K. J. O'Connor ..	Walter Runciman & Co., Ltd.
Balanatia ..	GBNM	13.5.54	I. A. Phillips	C. H. Burdell, J. J. Rutler, D. H. McCree ..	W. Maudsley ..	Royal Mail Lines, Ltd.
Balaena ..	GLDG	13.5.54	P. Uirik	R. Christoffersen, — Benitzen, A. Andersen ..	J. Dahl ..	Hector Whaling, Ltd.
Baron Elphinstone ..	GCCD	9.9.54	A. Campbell	L. T. McElliott, R. S. Beat, W. L. Davies ..	R. I. Podmore ..	H. Hogarth & Sons
Baron Fairlie ..	GLCY	23.9.54	T. R. Reid	A. E. Stainthorpe, J. Gordon, J. A. Roberts ..	I. L. Manderson ..	H. Hogarth & Sons
Baron MacLay ..	GKXW	20.10.54	D. MacGregor	J. E. Oliver, C. P. Roy, R. W. Gunn ..	W. A. Trainor ..	H. Hogarth & Sons
Baron Renfrew ..	GYDR	3.8.54	P. Dunsire	G. D. Johnston, R. Potter, J. Somerville ..	M. Barry ..	H. Hogarth & Sons
Bassano ..	GNXK	24.6.54	B. Waldie	M. Robinson, C. R. Tutty, G. Lawson ..	A. Leary ..	Ellerman's Wilson Line, Ltd.
Beaverburn ..	MAGB	20.4.54	J. Soame	W. P. Embleton, G. Parry, W. Holmes, R. M. Stewart ..	G. Adamson ..	Canadian Pacific S.S., Ltd.
Beaverford ..	MOJG	29.5.54	W. R. Thorburn	M. J. Mayes, M. R. Organ, P. J. Roberts ..	H. Littlecott ..	Canadian Pacific S.S., Ltd.
Beavergleng ..	GBCP	17.9.54	C. L. de H. Bell, D.S.C., R.D., R.N.R.	R. N. Walker, M. Scott, G. Parry ..	W. H. Pettit ..	Canadian Pacific S.S., Ltd.
Beaverlake ..	GBCQ	5.2.54	N. W. Duck, D.S.C., R.D., R.N.R.	C. Hutchinson, G. Palmer, J. Whaling, M. Scott ..	A. E. S. Thompson ..	Canadian Pacific S.S., Ltd.
Beaverlodge ..	MAGJ	4.5.54	W. J. P. Roberts	H. West, J. Richardson, J. Brooks ..	E. R. Le Gear ..	Canadian Pacific S.S., Ltd.
Bellerophon ..	GGCM	24.9.54	A. R. McDavid	J. Solley, G. Fisher, J. H. Waterson ..	J. C. Wilson ..	A. Holt & Co., Ltd.
Benarty ..	GZZZ	25.3.54	T. Sutherland	J. Main, W. Kinnaird, T. Fyfe ..	W. G. Money ..	W. Thomson & Co.
Bennetis ..	MAGG	15.9.54	R. L. Chalmers	T. McDougall, G. S. Cairns, J. B. Forrest ..	F. G. Hayes ..	W. Thomson & Co.
Bervannoch ..	GCDZ	17.5.54	R. C. Allan	A. Syme, A. Ellington, D. Cochran ..	E. Carruthers ..	W. Thomson & Co.
Bentoyvis ..	MYPW	4.8.54	J. L. Arkley	W. C. S. Spencer, E. Ricknell, D. Anderson ..	A. Watt ..	W. Thomson & Co.
Biscoe ..	GDCW	18.3.54	D. J. McKinnon	D. M. Hannah, B. Mullan, G. Baler ..	D. Wilkes ..	Hector Whaling, Ltd.
Brasil Star ..	GTLF	2.7.54	G. E. Barnard	M. J. Slessor, B. Abbott, C. D. Leatham ..	J. McConnell ..	Blue Star Line, Ltd.
Bravo ..	GLDZ	27.5.54	I. A. Etches	A. J. Collard, R. Lomax, F. M. Martin ..	J. Hudson ..	Ellerman's Wilson Line, Ltd.
Brisbane Star ..	GZCI	29.7.54	S. Foulkes	P. J. Harris, M. Hawes, D. Van der Merwe ..	M. Sheahan ..	Blue Star Line, Ltd.
Bristol City ..	GUAY	26.5.54	F. Harris	N. A. Childs, W. H. Stoodley, F. Gilmore ..	A. V. Chappel ..	Charles Hill & Sons
Britannic ..	GDXF	29.6.54	P. A. Morris	P. A. Brush, R. G. M. Hunt, K. T. Jones ..	J. Kidson ..	Cunard Steamship Co., Ltd.
British Consul ..	GCXT	4.3.54	G. MacKillican	A. C. Williams, J. G. Thompson, A. C. Brown ..	T. MacPherson ..	British Tanker Co., Ltd.
British Endeavour ..	GFCN	10.5.54	E. L. Michinson	G. R. Grey, R. E. Chalkin, W. Disson ..	R. Jacobs ..	British Tanker Co., Ltd.
British General ..	GCDJ	30.8.54	R. Shea	J. L. Gillan, A. Hendrey, G. E. Graham ..	H. H. Houston ..	British Tanker Co., Ltd.
British Marguis ..	GWVL	24.6.54	E. P. Williams	G. M. Dunn, D. MacKinnon, M. J. Goulding ..	R. T. Rowse ..	British Tanker Co., Ltd.

<i>British Patience</i>	GUFG	1-9.54	N. Leybourne, D.S.C.	A. Longden, L. Ashburn, B. J. Granfield	W. H. Ball	British Tanker Co., Ltd.
<i>British Piper</i>	GDNN	12.7.54	J. Mason	P. R. Newton, R. Bell, H. J. Shields	J. Sheen	British Tanker Co., Ltd.
<i>British Resource</i>	GFCD	4.10.54	B. M. Naylor	L. G. Buckenham, A. L. Wheaton, D. C. Dalton	P. Wrang	British Tanker Co., Ltd.
<i>British Sailor</i>	GSBQ	20.9.54	E. J. Cole	J. E. Surman, G. J. Harrison, P. Frier	P. Kendrick	British Tanker Co., Ltd.
<i>British Splendour</i>	GCJT	8.8.54	J. A. Gilchrist	A. Philips, H. Roach, T. S. Gwyer	C. O'Neil	British Tanker Co., Ltd.
<i>British Swardfish</i>	GCOV	11.5.54	J. R. Anderson	W. MacKenzie, C. A. Jones, G. B. Sanders	R. F. Pilkington	British Tanker Co., Ltd.
<i>British Union</i>	GCLZ	3.11.53	C. C. Dingle	G. S. Varney, J. L. Holt, J. M. Jones	R. O. Jones	Royal Mail Lines, Ltd.
<i>Brittany</i>	GMZS	25.6.54	D. J. Jones	Graham, —, Nicholas, —, McLaughlin	P. O'Leary	Walter Runciman & Co., Ltd.
<i>Brockleymoor</i>	GDWP					Mark Whitwell & Sons, Ltd.
<i>Busen Rollo</i>	GKDV	30.8.54	S. K. Williams	A. R. Oliver, H. Sanders, K. Sinclair	W. Anderson	Cairns, Noble & Co.
<i>Carnarvon</i>	GPJN	20.5.54	G. H. Percy	A. R. Fairley, J. Sutherland, T. Walker	W. Devine	Cairns, Noble & Co.
<i>Carrndhu</i>	GPBB	6.7.54	J. W. Scott	D. Aitchison, J. Hogg, J. Barton	W. Greaves	Cairns, Noble & Co.
<i>Carnesk</i>	GMKR	7.7.54	G. R. Norvell	L. Edwards, G. Pattison, D. Lamb	E. Johnston	Cairns, Noble & Co.
<i>Carrngowan</i>	GNZZ	7.9.54	J. G. Foster	K. Murray, J. E. Potter, J. Lobban	D. M. Hughes	A. Holt & Co.
<i>Calchas</i>	GMSS		D. R. Jones	R. Naylor, K. George, J. Main, J. Chapman		
<i>Caledonia</i>	GCKR	16.8.54	D. Barclay	D. Lamont, J. George, D. F. Storey, W. Stavelly	D. W. Field	Anchor Line, Ltd.
<i>Cambridge</i>	MMBF		P. P. O. Harrison	L. T. Fancett, P. W. Bower, R. F. D.		Federal Steam Navigation Co., Ltd.
<i>Canton</i>	GDDT	18.7.54	J. C. W. Last, O.B.E.	P. Pook, S. W. Lambrick	J. Murphy	P. & O. Steam Navigation Co.
<i>Cape Clear</i>	GCKN	9.3.54	P. St. C. Willett	A. K. Ewing, A. J. Arrowsmith, D. Johnstone, F. Ewell	D. Harley	Lyle Shipping Co., Ltd.
<i>Cape Grafton</i>	MAIF	19.7.54	D. M. Taylor	J. S. Taylor, D. Cameron, G. Barker	A. P. Brooke	West African Fisheries Research Institute
<i>Cape St. Mary</i>		17.12.51	J. A. Robson	A. C. Hunter, E. M. Rebone, C. C. Paterson		Union Castle Mail S.S. Co., Ltd.
<i>Capetown Castle</i>	GKGM	1.7.54	J. Trayner	M. Rich, D. M. Bailey, B. Webb	W. Williams	Donaldson Bros. & Black, Ltd.
<i>Captain Cook</i>	GLBX	15.10.54	A. Bankier	A. Maclean, N. Dalziel, I. McLaudie, C. Porteous	L. W. Hooper	Union Castle Mail S.S. Co., Ltd.
<i>Carnarvon Castle</i>	GJSL	18.9.54	W. S. Byles, R.D., R.N.R.	M. Logan, J. G. Kemp-Luck, M. Curd	H. G. Liggins	Cunard Steamship Co., Ltd.
<i>Caronia</i>	GYKS	24.6.54	C. S. Williams	D. Lee, L. Easton, A. M. Christie, J. King	W. A. Sturgeon	P. & O. Steam Navigation Co.
<i>Carthage</i>	GRNX	26.7.54	K. A. H. Cummins	J. W. Slee, G. W. John, P. Aspinall	G. Dunn	Runciman (London), Ltd.
<i>Caslon</i>	MCJR	22.2.54	K. Blacklock	R. C. Scroggins, T. R. Robinson, R. R. Rawlings	W. McHugh	Elders & Fyffes, Ltd.
<i>Cavina</i>	GKJV	24.6.54	T. H. Bull	R. Daley, W. Thompson, E. R. Williams	W. P. Edmunds	Runciman (London), Ltd.
<i>Caxton</i>	GCDX	17.9.54	W. J. Coull	R. M. Davies, W. M. Hendry, G. C. Elvidge	M. Palmer	Shaw, Savill & Albion Co., Ltd.
<i>Ceramic</i>	GFLM	19.5.54	F. A. Smith	H. Riding, B. Agnew, R. Frisby, I. McIntosh	B. Braithwaite	British India Steam Nav. Co., Ltd.
<i>Chantala</i>	GQMR	14.8.54	L. W. Smith	W. M. Coutts, —, Stubbington	C. Beyer	Bibby Bros. & Co.
<i>Chepman</i>	GFVR	17.9.53	G. Blacklock	J. S. Glen, J. W. Peck, E. Peers	G. J. Edge	British India Steam Nav. Co., Ltd.
<i>Cheshire</i>	GLXV	7.9.54	N. F. Fitch	J. J. Mullins, B. Pennington, P. Northway	C. Pennington	Anchor Line, Ltd.
<i>Chindwara</i>	GFRT	10.7.54	B. A. Rogers, D.S.C., R.D., R.N.R.	H. B. Chambers, A. S. Boiles, T. I. Robertson, W. Woodburn	K. McGuire	Ellerman Lines, Ltd.
<i>Cilicia</i>	GDGL	10.9.54	J. L. Gibson, O.B.E.	D. McLeod, G. Hendry, H. M. McFarlane	J. Sheridan	Ellerman Lines, Ltd.
<i>Cingalese Prince</i>	GFRC	20.10.54	B. R. Simons	A. Farrar-Hare, P. Norwood, A. McMath	A. Hill	Ellerman Lines, Ltd.
<i>City of Barcelona</i>	GTKR	24.6.54	A. N. Fry	P. G. Pope, A. M. Oxbery, D. B. Williams	J. T. James	Ellerman Lines, Ltd.
<i>City of Birmingham</i>	GZLR	26.5.54	W. S. Doidge	E. S. Page, J. W. E. Caffyn, P. Leatham	J. O'Donoghue	Ellerman Lines, Ltd.
<i>City of Brisbane</i>	GGLM	24.6.54	E. G. Chapman	D. J. Shiel, J. Grinnell, B. Morris		
<i>City of Cape Town</i>	GBBQ	20.4.54	J. Blewett	R. Stenhouse, P. Redhead, A. Willa		
<i>City of Carlisle</i>	GBJK	11.9.54	J. McKay	A. Lambie, A. MacMillan, R. Williamson		

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
City of Chester	MAHN	17.9.54	W. A. Hannah	W. Locker, D. Jamieson, C. Granyer	D. G. Hallam	Ellerman Lines, Ltd.
City of Delhi	GLBW	6.10.54	W. S. Lowe	K. Graham, W. Courts, A. Ledger	F. Culin	Ellerman Lines, Ltd.
City of Derby	GFWC	24.6.54	F. W. Woods	C. F. Fawcett, D. S. MacLean	J. Oliver	Ellerman Lines, Ltd.
City of Dreppe	GSVQ	26.7.54	G. J. Law	J. A. Gibson, A. B. Rowman, I. B. Taylor	S. G. Denning	Ellerman Lines, Ltd.
City of Durham	GBJM	29.6.54	T. G. Mathias	A. G. Hine, D. Wardlow, R. White	P. B. Healy	Ellerman Lines, Ltd.
City of Edinburgh	GNGC	24.6.54	J. W. Wotherspoon, M.B.E.	J. F. Turvill, T. Innes, J. F. Leigh	P. H. Smyth	Ellerman Lines, Ltd.
City of Evansville	GJNF	1.9.54	T. L. Vaughan	M. J. Thomas, J. B. Hutcheon	W. Trainor	Ellerman Lines, Ltd.
City of Johannesburg	GBKW	4.8.54	R. J. Rickets	R. P. M. Cook, D. Lawrie, M. J. B. Rogers	M. Sheehan	Ellerman Lines, Ltd.
City of Khartoum	GBZC	8.8.54	E. M. Jenkins	G. H. Salter, J. Sapp, J. D. L. Kenny	J. D. Carroll	Ellerman Lines, Ltd.
City of Khios	GKVB	13.5.54	J. Wharry	D. Brown, D. N. MacDonald, A. B. Carson		Ellerman Lines, Ltd.
City of Lichfield	GCXL	20.7.54	G. R. Jackson	I. Butcher, D. Quinn, A. A. Smith	J. A. Dunlop	Ellerman Lines, Ltd.
City of Lille	GSLN	12.5.54	H. Mackie	F. W. More, D. Wright, G. H. Watkins	E. M. Grover	Ellerman Lines, Ltd.
City of Lyons	GMCN	26.6.54	J. R. Pulford	J. Kinley, W. M. McGregor, J. M. Long-staff	A. T. Murray	Ellerman Lines, Ltd.
City of New York	GLYQ	1.7.54	A. M. Westlake	W. F. P. Connell, A. Burnett, —, Morill	J. Jones	Ellerman Lines, Ltd.
City of Paris	GFQM	22.3.54	T. H. S. Speakman	J. B. Somerville, R. Binnie, —, Robson,	C. Cowen	Hall Line, Ltd.
City of Pretoria	GBLN	24.6.54	A. G. Freeman	J. A. Buchanan, F. B. Cocking, J. A. Parsons, T. R. Hughes	A. Gandon	Ellerman Lines, Ltd.
City of Swansea	GBZT	23.1.54	F. J. H. T. Vizer	J. A. McInyre, —, Waddleton, —, Murfin, —, Lewis	K. G. Arthur	Ellerman & Bucknall S.S. Co., Ltd.
City of Sydney	GSEFM	9.9.54	G. F. Sumpton	R. K. Heyward, L. G. Powell, T. Lovell	R. G. Bell	Ellerman Lines, Ltd.
Clan Brodie	GKPD	26.7.54	B. Vernon-Browne	A. B. Forster, C. Morrow, A. Crawford,	W. G. Richards	Ellerman Lines, Ltd.
Clan Buchanan	GKNM	27.7.54	H. T. Booth	A. G. Cruickshank	V. S. Slevin	Cayzer Irvine & Co., Ltd.
Clan Campbell	GDZK	26.7.54	H. C. Simpson, O.B.E.	R. Shattock, E. C. Harvey, J. A. Riach	J. Brown	Cayzer Irvine & Co., Ltd.
Clan Chattan	GFEX	6.5.54	J. McCrone	G. A. Dubery, R. G. C. Gibson, R. H. Field	R. F. Cole, O.B.E.	Cayzer Irvine & Co., Ltd.
Clan Chisholm	GFBY	4.3.54	V. W. Green	J. J. Grigor, N. Wallace, J. A. Bint, P. G. Warren	N. G. MacLean	Cayzer Irvine & Co., Ltd.
Clan Davidson	MAWU	7.9.54	T. A. Watkinson	J. Wilkie, —, Taylor, A. Lightly	H. G. P. Macnamara	Cayzer Irvine & Co., Ltd.
Clan Forbes	GPGB	8.8.54	I. C. Scott	B. W. Hollman, P. Philip, W. O. M. Cathro	G. D. Ainslie	Cayzer Irvine & Co., Ltd.
Clan Macaulay	GZCS	15.10.54	F. H. S. Petherbridge	G. W. Wilson, T. M. Graham, S. M. Grant	J. M. Humphreys	Cayzer Irvine & Co., Ltd.
Clan MacDonald	GCPG	24.9.54	A. J. Hogg	K. Kerr, J. Baxter, J. S. A. Rendell,	C. Hegarty	Cayzer Irvine & Co., Ltd.
Clan MacDougall	GFBO	10.7.54	P. MacMillan	E. A. Cameron, G. S. Gann, R. Gray,	G. Martyn	Cayzer Irvine & Co., Ltd.
Clan MacKinnon	GKLY	18.8.54	J. P. Dunphy	E. L. Bealey, T. Hunter, A. M. Ewing	C. E. C. Crew	Cayzer Irvine & Co., Ltd.
Clan MacLaren	GSSC	4.5.54	A. G. MacPherson	D. W. Thomas, J. Currie, E. Harvey,	G. Norton	Cayzer Irvine & Co., Ltd.
Clan MacLean	GSWX	7.9.54	H. Whitehead	E. J. E. Owen, C. Lea-Swain, T. J. Strange	R. Moore	Cayzer Irvine & Co., Ltd.
Clan Macrae	MAHP	14.7.54	W. Woodruffe	S. K. Young, F. R. Usher, C. P. Marshall	W. G. Peddie	Cayzer Irvine & Co., Ltd.
Clan MacTavish	GUBB	26.5.54	E. Gough, O.B.E.	H. S. Cotterall, J. S. Beavan, J. E. Jackson	N. Cuthbert	Cayzer Irvine & Co., Ltd.
Clan Shaw	BGYW	24.5.54	F. J. E. Houghton	J. Allison, I. M. Shearer, R. A. Fletcher,	W. Ellmers	Cayzer Irvine & Co., Ltd.
				F. R. Usher	G. H. Hudd	Cayzer Irvine & Co., Ltd.
				C. J. Abbot, J. G. Smith, T. J. Edmonds,		
				G. B. Waigate		

<i>Clan Sutherland</i>	GFWZ	23. 12. 53	F. H. Turdon	W. T. Maltman, J. T. Messinger, D. B. MacMurray, L. S. Jones, M. C. MacCabe, D. Townshend	W. Gay	..	Cayzer Irvine & Co., Ltd.
<i>Clan Urquhart</i>	GFBK	1. 7. 54	T. W. Inman, O.B.E.	A. A. Elston, L. S. Jones, M. C. MacCabe, D. Townshend	R. Morris	..	Cayzer Irvine & Co., Ltd.
<i>Clearpool</i>	MAHQ	7. 7. 54	J. H. Atkinson	L. Anderson, E. Dunn, R. M. Cook	D. W. James	..	Sir R. Ropner & Co., Ltd.
<i>Clydebank</i>	GKLM	7. 9. 54	F. Hale	A. J. Kiff, F. D. Parsons, D. W. D. Pitt	T. B. Ellis	..	Andrew Weir & Co., Ltd.
<i>Condesa</i>	MAHU	8. 10. 54	F. W. Kent	M. Gilmour, J. Jacques, H. Swindells	J. Bishop	..	Furness-Houlder Argentine Lines, Ltd.
<i>Consuelo</i>	GOGQ	26. 7. 54	G. Goodman	P. L. Willingham, D. T. C. Martin, J. H. Ledger	V. R. Ferrand	..	Ellerman's Wilson Line, Ltd.
<i>Corfu</i>	GRNW	8. 8. 54	E. F. Ferraby	D. A. Hansing, P. A. Wiseman, J. B. Latham, J. Christian	F. J. Arthurs	..	P. & O. Steam Navigation Co.
<i>Corinaldo</i>	GMKP		R. McNie	C. Sheppard, A. Campbell, —, Mac-Donald	A. R. Cox	..	Donaldson Bros. & Black, Ltd.
<i>Corinthic</i>	GZYL	24. 6. 54	A. C. Jones	Denley, P. Miller, G. H. Lewis	L. Waterhouse	..	Shaw, Savill & Albion Co., Ltd.
<i>Corrales</i>	GSJL	22. 9. 54	J. E. Purvess	T. N. J. Davies, B. Hodges, F. Cubbon	S. Ribee	..	Elders & Fyffes, Ltd.
<i>Corrientes</i>	GFPT	19. 8. 54	E. C. Laidlaw	Nowlan, G. Waddell, —, Maidment	J. Scannel	..	Donaldson Bros & Black, Ltd.
<i>Cotopaxi</i>	GQNX		J. D. Richards	W. A. Johnston, G. McC. Hunter, J. E. Evans	—, Bowles	..	Pacific Steam Navigation Co.
<i>Craftsman</i>	GPZT	29. 5. 54	T. B. Littlechild	G. B. Thompson, F. R. Robinson, J. Maddison	D. Baty	..	T. & J. Harrison, Ltd.
<i>Crofter</i>	MNGX	11. 10. 54	S. Diamond	F. H. Curry, H. Sutcliffe, D. Smith	A. Dunscombe	..	T. & J. Harrison, Ltd.
<i>Cumberland</i>	GPY	10. 5. 54	A. E. Williams	J. Crewsdon, S. Sparrow, J. Weston, G. Lowery	G. R. Ross	..	Federal Steam Navigation Co., Ltd.
<i>Cuzco</i>	GKPF	29. 4. 54	G. H. Rice	P. Barry, G. Patterson, A. Jestico	V. Dalton	..	Pacific Steam Navigation Co.
<i>Daleby</i>	MFV	24. 6. 54	F. D. Lloyd	R. A. Vans, C. Dixon, P. Robinson	M. R. Carney	..	Ropner Shipping Co., Ltd.
<i>Dallas City</i>	GCLS	25. 9. 54	D. W. Butcher	P. Whitecross, J. Driscoll, A. Corbet	B. S. Thomson	..	Sir William Reardon Smith & Sons, Ltd.
<i>Darro</i>	MAID	30. 9. 54	T. Powell	E. Long, C. Colwinston-Thomas, R. W. Sutton	F. M. O'Dea	..	Royal Mail Lines, Ltd.
<i>Debrett</i>	GRPR	29. 6. 54	C. E. Legg	W. L. Murphy, D. H. Liewelyn, J. E. Lenham	J. Powell	..	Lampport & Holt Line, Ltd.
<i>Deerpool</i>	GKDY	7. 9. 54	S. Richards	O. Ashcroft, J. R. Breckell, R. E. Gattiss	A. Owen	..	Sir R. Ropner & Co., Ltd.
<i>Delphic</i>	MBLQ	23. 10. 54	C. L. Carroll, D.S.C., R.D., R.N.R.	D. Rogers, G. S. Kaye, R. O. Guille	A. Morris	..	Shaw, Savill & Albion Co., Ltd.
<i>Deseado</i>	MAIH	26. 7. 54	R. C. S. Woolley, R.D., R.N.R.	C. D. Robinson, H. Thornbury, M. Thompson	P. Murray	..	Royal Mail Lines, Ltd.
<i>Devis</i>	GFKT	26. 2. 52	W. Gillespie	L. Smith, W. A. Ansdell, G. Tunnicliffe	B. Thompson	..	Lampport & Holt Line, Ltd.
<i>Devon</i>	GDRF	15. 8. 54	R. G. Hollingdale	L. Fancett, E. Cooper, T. Partridge	E. Caley	..	Federal Steam Navigation Co., Ltd.
<i>Devonshire</i>	G'ITV	7. 10. 54	H. Kerbyson	G. F. Risley, J. R. Longrigg, A. Mac-Pherson	A. Jones	..	Bibby Bros & Co.
<i>Ditwara</i>	GYQV	23. 9. 54	M. C. Williams	T. W. Barnett, E. C. Plovman, D. G. Watson, I. K. Bowerman	S. J. Taylor, M.B.E.	..	British India Steam Nav. Co., Ltd.
<i>Discovery II</i>	GWVM	4. 10. 54	H. O. L'Estrange	C. W. P. Sumner, R. M. Frederick, J. Norrington	—, Miller	..	National Institute of Oceanography.
<i>Dominion Monarch</i>	GRGG	22. 10. 54	B. Forbes-Moffatt	G. H. Perry, K. Lindop, K. Murry-Brown, K. Brown, R. Marchmont	F. V. Harford	..	Shaw, Savill & Albion Co., Ltd.
<i>Dorset</i>	GZFQ	26. 10. 54	K. Barnett	M. Blake, B. Foster, E. Hubbard	J. Tomlinson	..	Federal Steam Navigation Co., Ltd.
<i>Drina</i>	MAIL	24. 6. 54	F. J. Swallow	G. B. Copland, R. B. Hill, R. J. Brockbank	D. C. H. Franklin	..	Royal Mail Lines, Ltd.
<i>Dryden</i>	GQGT	1. 7. 54	W. J. M. Ankers	J. R. Chatterton, K. J. McGuire, R. P. Willis	K. N. T. Jones	..	Lampport & Holt Line, Ltd.
<i>Duke of Athens</i>	GMYS	19. 8. 54	T. Walton	K. Tucker, T. Owen, D. Montague	E. Dennis	..	Trent Maritime Co., Ltd.
<i>Dunedin Star</i>	GKKT	6. 5. 54	J. D. W. Davies	J. Greenwood, J. B. Kirkham, J. Hurton	R. Read	..	Blue Star Line, Ltd.
<i>Dunera</i>	GBBR	29. 6. 54	A. A. Kay	C. R. S. Monk, F. Hills, J. A. Stanton, T. M. Hall	T. F. Holden	..	British India Steam Nav. Co., Ltd.
<i>Dunkery Beacon</i>	GUFS	22. 5. 53	A. C. E. Green	—, Richardson, G. Atkinson	G. Delahoy	..	Phs. Van Ommeren (London), Ltd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Durango</i> ..	MAIM	30.9.54	H. A. Wright	B. E. Becker, D. B. Cairns, C. B. Chamberlain	H. Davies	Royal Mail Lines, Ltd.
<i>Durban Castle</i> ..	GPGP	8.10.54	J. A. Sowden	J. Perrett, R. Foster, D. Kerr	D. Droyer	Union Castle Mail S.S. Co., Ltd.
<i>Durenida</i> ..	GPSL	23.9.54	W. J. Machon	P. J. Clarke, R. Palmer, D. M. D. Rae	Blackford	British India Steam Nav. Co., Ltd.
<i>Durham</i> ..	GWWK	27.9.54	J. D. Bennett	J. Stringfellow, J. Hannah, D. Brockbank	T. M. Jones	Federal Steam Navigation Co., Ltd.
<i>Edenfield</i> ..	GFJF	19.5.54	J. Parks	J. Horsburgh, G. Milbank, J. Chinnery	M. Wilson	Hunting & Sons, Ltd.
<i>Edinburgh Castle</i> ..	GOHN	18.8.54	H. A. Deller	R. Watt, J. Bradford, I. Dilly	J. Hodgson	Union Castle Mail S.S. Co., Ltd.
<i>Egidia</i> ..	GJZD	23.8.54	D. Morrison, O.B.E.	R. Kane	N. Foil	Anchor Line, Ltd.
<i>Elyzia</i> ..	GJZK	8.10.54	A. I. F. Colquhoun	R. P. Jones, A. Campbell, M. C. Bell	A. R. Prole	Anchor Line, Ltd.
<i>Empire Clyde</i> ..	GDXS	23.9.54	A. C. Johnston	J. A. Scrimgeour, W. Thomson, W. Hallam, G. Murdock, J. McCutcheon	D. Thompson	Anchor Line, Ltd.
<i>Empire Fowey</i> ..	GMPW	17.2.54	W. T. C. Lethbridge	M. N. Elrington, J. F. Bannister, R. A. Garne, J. Vale	P. Moloney	P. & O. Steam Navigation Co.
<i>Empire Halladale</i> ..	GPVQ	4.10.54	R. Blake	J. C. Moffat, J. S. Watson, H. Cameron, W. Cameron	D. Robson	Anchor Line, Ltd.
<i>Empire Ken</i> ..	GKZI	31.8.54	C. E. Mason	D. Dunbar, E. Black, K. Harper, J. Wisden	E. Winslow	Royal Mail Lines, Ltd.
<i>Empire Ornell</i> ..	GRCB	8.10.54	C. K. Blake, O.B.E., R.D., R.N.R.	T. J. McCarthy, J. Charlesworth, D. R. Carroll	A. C. Shippam	Orient Steam Navigation Co., Ltd.
<i>Empire Star</i> ..	GCDP	24.9.54	D. J. Stratta	E. A. Davies, G. C. Jones, G. J. Austin	W. G. Fitzgerald	Blue Star Line, Ltd.
<i>Empress of Australia</i> ..	GQMQ	20.10.54	J. P. Dobson, D.S.C., R.D., R.N.R.	R. T. Stoneley, H. West, A. Ashton	I. Butterworth	Canadian Pacific S.S., Ltd.
<i>Empress of France</i> ..	GNTV	12.8.54	S. W. Keay, O.B.E.	— West, M. Tenger, E. Brewer, R. Elliot	E. Murphy	Canadian Pacific S.S., Ltd.
<i>Empress of Scotland</i> ..	GMLV	6.11.54	C. E. Duggan, R.D., A.D.C., R.N.R.	G. Douglas, — Orgon, E. Brewer	W. Campbell	Canadian Pacific S.S., Ltd.
<i>English Star</i> ..	MFSS	26.10.54	L. Vernon, M.B.E.	J. Law, D. Newlin, E. S. Neave	H. B. Smith	Blue Star Line, Ltd.
<i>Ertion</i> ..	GNLF	24.6.54	R. F. Hellings	D. Brodie, J. Blake, P. Johnson	E. Ingham	Birt, Potter & Hughes
<i>Esperance Bay</i> ..	GSMP	14.8.54	H. C. Smith	M. D. Johnstone, D. G. Ede, M. L. Ingle, M. Thornton	H. H. Lyons	Shaw, Savill & Albion Co., Ltd.
<i>Essequibo</i> ..	GKPK	4.9.54	T. W. F. Bolland	R. H. Atkinson, J. Park, J. G. Street, D. Knights, P. T. Shephard	P. Snaith	Royal Mail Lines, Ltd.
<i>Essex Trader</i> ..	GMMML	..	L. W. Fulcher	S. H. Sparrow, H. Harkens, D. Swyer	J. Skitrow	Federal Steam Nav. Co., Ltd.
<i>Eso Canterbury</i> ..	GCMS	26.10.54	R. E. Bennett	E. Whistley, E. E. Atkinson, D. Milburn	G. C. Waterfield	Trader Navigation Co., Ltd.
<i>Eso Glasgow</i> ..	GWZF	..	O. H. Shephard	P. Mattocks, G. Arthur, J. Barnes	A. Mills	Eso Transportation Co., Ltd.
<i>Eso Manchester</i> ..	GTXC	2.10.54	A. Conner	R. Hutt, T. Jamison, J. F. Godden	L. Barnett	Eso Transportation Co., Ltd.
<i>Eso Plymouth</i> ..	GWCD	6.8.54	J. L. Harris	I. Campbell, H. Moore, J. Wright	B. Thomas	Eso Transportation Co., Ltd.
<i>Etebank</i> ..	GYRX	20.10.54	H. Brice	A. M. Brown, W. B. Ferguson, G. R. Eunsen	M. J. Power	Eso Transportation Co., Ltd.
<i>Eucadia</i> ..	GDMK	14.7.54	R. I. Warr	H. K. Stevens, J. B. Bain, G. D. Scott	Le A. Bundock	Andrew Weir & Co., Ltd.
<i>Eumaeus</i> ..	GJZL	22.10.54	W. MacVicar, M.B.E.	D. Barclay, J. C. Robertson, R. B. Douglas	I. Paterson	Anchor Line, Ltd.
<i>Explorer</i> ..	MRWT	12.8.54	H. Large	L. Henshall, D. MacCaffery	J. Birchall	A. Holt & Co.
<i>Factor</i> ..	GVIX	29.8.54	W. S. Eustace	J. Heald, E. J. Maxwell, G. McGuinness	A. Clarkson	T. & J. Harrison, Ltd.
<i>Fanad Head</i> ..	GFZV	4.5.54	E. B. Stephens	R. Bell, R. H. Douglas, G. W. Barton	B. W. Evans	T. & J. Harrison, Ltd.
<i>Flamenco</i> ..	GNQQ	24.6.54	W. J. Leinster	R. A. Maxwell, W. R. Nelson, T. McDowell	E. Gill	G. Heyn & Sons, Ltd.
<i>Francotta</i> ..	GCBV	5.8.54	P. L. Hockey	C. Pringle, F. J. Leicester, G. McIntyre	P. E. Grenway	Pacific Steam Navigation Co.
	GBRO	7.7.54	D. N. MacLean, D.S.C., R.D., R.N.R.	J. B. Clemenson, F. E. Pollitt, H. L. Ascroft	A. H. Farman	Cunard Steamship Co., Ltd.

<i>Fremantle Star</i>	..	MQFT	26.7.54	C. R. Horton, D.S.C.	C. G. Smeaton, T. E. Harris, S. C. Buchanan	R. Gell	Blue Star Line, Ltd.
<i>Fresno City</i>	..	GBYD	12.4.54	D. L. Beynon	J. S. Randall, H. Ward, M. Scarffe	A. Ferguson	Sir William Reardon Smith & Sons, Ltd.
<i>Garvell Park</i>	..	GKSV	20.5.54	T. MacDonald	S. Hay, E. Eceloo, A. Blair	J. McI. Robertson	Denholm Line Steamers, Ltd.
<i>Geelong Star</i>	..	GNWF	24.5.54	E. L. Jermyon	J. S. Grawe, J. B. Owen, K. L. Morris	J. Brawn	Blue Star Line, Ltd.
<i>Geologist</i>	..	GJMR	16.9.54	A. E. Jackson	R. H. Williams, D. Mayer, J. Bean	P. J. Weston	T. & J. Harrison, Ltd.
<i>Georgic</i>	..	GRLJ	16.9.54	J. W. Caunce	D. Calvert, J. King, J. Williams, H. Huntley, J. L. Easton	G. Hill	Cunard Steamship Co., Ltd.
<i>Glenartney</i>	..	GBLG	25.6.54	H. Readshaw	R. R. Taylor, W. E. Davies, C. H. Hamilton, A. T. Hill	J. Knott	Glen Line, Ltd.
<i>Glenbank</i>	..	GKLC	7.7.54	J. B. Mitchell	B. P. Forde, J. O'Connor, J. Lichy	P. McGowan	Andrew Weir & Co., Ltd.
<i>Glenorchy</i>	..	GBLL	4.10.54	R. A. Hanney	J. G. R. Taylor, J. C. Ray	D. Royle	Glen Line, Ltd.
<i>Gloucester</i>	..	MANK	19.5.54	J. E. Bury	D. C. Blackman, B. S. Smith, N. I. Collett, N. Niblock	R. Oliver	Federal Steam Nav. Co., Ltd.
<i>Golfito</i>	..	GBYL	5.8.54	J. H. Bull	D. J. Ely, H. G. Cresswell, J. Gannicliffe, R. Leech	F. Griffiths	Elders & Fyffes, Ltd.
<i>Gothic</i>	..	MAUQ	..	K. G. Fisher, G.M.	— Dalby, H. O. V. Anderson, M.V.O., J. B. Cousins, W. R. Morison	C. M. Roberts	Shaw, Savill & Albion Co., Ltd.
<i>Graig</i>	..	MFDS	20.5.53	S. Glynn-Woods	G. McNish, D. Owen, D. C. Meardon	E. Taylor	Idwal Williams & Co., Ltd.
<i>Graford</i>	..	MQGC	24.6.54	E. J. C. Moryan	R. Rawlinson, N. D. E. Perry, H. J. Garrett	R. Small	Goulandris Bros., Ltd.
<i>Great City</i>	..	GBYS	20.9.54	T. S. Dixon	D. C. Griffiths-Jones, J. Vaughan, P. Law	D. J. Barnes	Sir William Reardon Smith & Sons, Ltd.
<i>Haparangi</i>	..	GJYX	30.9.54	D. B. Brittain	B. Gulson, F. Taylor, J. Cosh, J. Fordham	E. Graham	New Zealand Shipping Co., Ltd.
<i>Harbalycus</i>	..	GYNB	27.3.54	J. Wharton, D.S.C., M.B.E.	B. O'Sullivan, J. G. Neilson, L. W. Hagreen	N. Cockayne	J. & C. Harrison, Ltd.
<i>Hartington</i>	..	GFCZ	3.8.54	J. F. Champion	J. B. Steele, G. C. Lewis, L. Hagreen	J. Conway	J. & C. Harrison, Ltd.
<i>Hauraki</i>	..	GJLV	24.6.54	H. C. Dell	A. J. Rawson, L. A. Bowen-West, D. L. Turner, A. Rollinson	C. Robinson	New Zealand Shipping Co., Ltd.
<i>Helicina</i>	..	GKBC	4.10.54	W. C. Loughlin	A. Alexander, R. C. Adams, D. S. Evans	S. D. Cox	Anglo-Saxon Petroleum Co., Ltd.
<i>Herdsmen</i>	..	GPZX	9.3.54	W. A. Sawle	H. C. Arden, G. Penston, R. H. Jones	T. O'Looney	T. & J. Harrison, Ltd.
<i>Hertford</i>	..	GKNW	15.7.54	E. A. Burton	J. C. Waller, J. Laidlaw, D. Moran, P. R. B. Manson	T. M. Ready	Federal Steam Nav. Co., Ltd.
<i>Highland Brigade</i>	..	GJKN	2.9.54	J. Smith, R.D., R.N.R.	J. T. Jones, H. G. N. Lloyd, — Rowley, C. W. Harris	T. Desboro	Royal Mail Lines, Ltd.
<i>Highland Chieftain</i>	..	GCTY	7.7.54	P. M. Burrell	C. Cowley, A. Whittle, J. Escolme, M. G. Rogers	W. Rollason	Royal Mail Lines, Ltd.
<i>Highland Monarch</i>	..	GMZF	29.8.54	D. R. Miller	J. Evans, W. B. Baxter, E. D. Long, M. S. Jones	R. Dunk	Royal Mail Lines, Ltd.
<i>Highland Princess</i>	..	GFMN	15.2.54	S. J. G. Hill	J. P. Crawford, P. Campbell, A. R. Evans, R. Greenal, G. Dalton	F. Goodall	Royal Mail Lines, Ltd.
<i>Hilary</i>	..	GQVM	11.7.53	J. H. Stoker	R. T. King, G. Calvert, D. J. Taylor, T. W. McMullan	A. Newcombe	Booth S.S. Co., Ltd.
<i>Hildebrand</i>	..	GKTK	15.10.54	J. Whayman, D.S.C., R.D., R.N.R.	G. Davies, J. Gladwin, G. W. Walker	D. Douglas	Booth S.S. Co., Ltd.
<i>Himalaya</i>	..	MCDY	19.8.54	D. G. H. O. Bailie	G. B. Thom, P. R. L. Bishop, N. D. Smith, J. G. Clark	J. F. Clerk	P. & O. Steam Navigation Co.
<i>Hinakura</i>	..	GDVS	15.9.54	N. L. Warren	G. W. Lane, T. Wadie, A. S. Cripps, N. W. Carrell	G. Miller	New Zealand Shipping Co., Ltd.
<i>Honorata</i>	..	MANZ	11.5.54	H. R. N. Smith	J. B. Camping, B. C. Whybrow, N. J. Charlesworth	T. Green	New Zealand Shipping Co., Ltd.
<i>Huntingdon</i>	..	GFCT	30.6.54	P. S. Calcutt	C. Pennington, J. M. James, O. P. Harrington, B. J. Stephens	A. G. Wallace	Federal Steam Nav. Co., Ltd.
<i>Hurumi</i>	..	GJZF	15.5.54	F. Pover	A. Britain, R. Loveridge, A. C. Thorpe	A. H. Sandilands	New Zealand Shipping Co., Ltd.
<i>Hycania</i>	..	MADE	22.3.54	A. V. Jones	W. J. Knox, J. Wilson	D. James	Baltic Trading Co., Ltd.

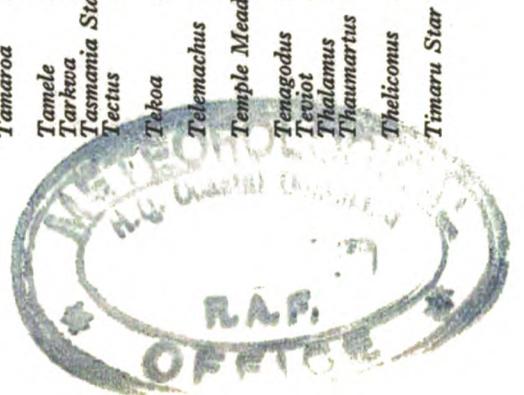
NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Imperial Star</i>	GIAC	26.7.54	G. C. Gouldie	C. P. Davey, F. E. Thomas, G. Crisford	O. R. Whitehead	Blue Star Line, Ltd.
<i>Inishowen Head</i>	MAOC	25.6.54	H. N. Clarke	S. Thompson, A. Fee, W. Cooper	A. E. Adams	G. Heyn & Sons, Ltd.
<i>Interpreter</i>	GPZY	22.5.53	T. Winstanley	R. Simmons, B. W. Jones, R. F. Hart	D. Howden	T. & J. Harrison, Ltd.
<i>Inverbank</i>	GKML	23.7.53	R. A. Lorraines	D. Bennett, P. N. Etherington, J. Aldiss	G. Murphy	Andrew Weir & Co., Ltd.
<i>Jamaica Producer</i>	VPLM	7.10.54	G. E. M. Jenkins	D. B. Bird, C. Irvine, W. Henderson, G. Millward	H. W. Tubbs	Kaye Son & Co., Ltd.
<i>Jersey City</i>	GIGA	5.8.54	R. Dodds	S. Gallagher, A. Bailey, C. Davidson	L. Butcher	Sir William Reardon Smith & Sons, Ltd.
<i>Jessmore</i>	MAOF	14.7.54	G. Cook	D. MacDonald, P. Roberts, J. P. Barber	P. Wade	Furness Withy & Co., Ltd.
<i>John Biscoe</i>	VPNE	29.6.54	W. Johnston	F. W. Brown, H. Prece, N. Brown	P. King	Government of the Falkland Islands.
<i>John Holt</i>	GNEF	29.6.54	W. R. Atkinson	R. I. Griffiths, A. D. Farrell, J. S. Butler	J. H. Sheary	Guinea Gulf Line, Ltd.
<i>Kaikoura</i>	GZPZ	8.7.54	N. Frazer	C. T. Marchant, J. Hunter, P. J. MacPherson	L. Laval	Trinder Anderson & Co.
<i>Kaipaki</i>	GQGI	1.1.54	T. Wilson	B. Diggle, G. Gunn, J. Bryon	P. Seaward	Trinder Anderson & Co.
<i>Kaituna</i>	QGGG	1.9.54	J. Wood	J. F. Munden, I. Cameron, J. Eames	P. M. Wilson	Trinder Anderson & Co.
<i>Kentworth Castle</i>	MQLP	30.1.54	A. C. M. Black, O.B.E.	P. M. Boulton, G. Hatcher, E. Bennet, J. Curcliffe	J. S. Godfrey	Union Castle Mail S.S. Co., Ltd.
<i>Kent</i>	GPDC	26.7.54	P. P. O. Harrison	B. Whelan, K. W. Mayhew, J. B. Camping, G. F. Fuller	T. G. Terrell	Federal Steam Nav. Co., Ltd.
<i>Kenuta</i>	GCBW	21.10.53	T. J. Naylor	W. Jones, J. E. Turner, A. B. Powell	J. Murray	Pacific Steam Navigation Co.
<i>King Robert</i>	MAON	24.6.54	G. Craze	G. Boyle, J. B. Daniel	R. V. Pemberton	King Line, Ltd.
<i>King William</i>	GNOV	27.7.54	J. C. Davies	F. Moro, G. Ross, D. Parr	W. Stirling	King Line, Ltd.
<i>Kohistan</i>	GSFZ	24.6.54	A. N. Henderson	W. G. Parry, G. Grindrod, D. M. Foster, K. E. Grodzicki	B. West	F. C. Strick & Co., Ltd.
<i>Koyan</i>	GKST	15.9.54	W. I. McIntosh	G. H. Robertson, R. S. Brown	P. H. Reynolds	Henderson & Co.
<i>Lalonde</i>	GNFL	3.6.54	L. Ankers	K. Horner, J. T. Lowe, B. A. Early	J. Tomay	Lampport & Holt Line, Ltd.
<i>Lanarkshire</i>	GCTC	29.5.54	R. Lindsley	A. B. Hayden, R. J. Bewo, B. King, G. Spiller	H. Mann	Turnbull Martin & Co., Ltd.
<i>Lancashire</i>	GLZC	3.9.54	A. M. Williamson	I. H. Birch, A. R. Moore, P. R. Byrne	C. S. Talbot	Bibby Bros. & Co.
<i>Langton Grange</i>	MAOT	18.2.54	J. R. Faulkner	M. H. L. Jenkins, P. Healy, M. Dickenson	J. Brosman	Houlder Bros. & Co., Ltd.
<i>Lassell</i>	GFND	8.10.54	J. King	D. G. Boothroyd, A. Corlett, F. Adams	J. Kennedy	Lampport & Holt Line, Ltd.
<i>Latia</i>	GLCF	17.8.54	A. Price	A. B. Calvert, J. Sydenham, V. Graham, J. D. Westley, G. T. Evans	J. D. Eastwood	Anglo-Saxon Petroleum Co., Ltd.
<i>Laurentia</i>	GNDY	13.7.54	T. S. Graham	T. Scott, J. McCully, W. Joyce	D. Murray	Donaldson Bros. & Black, Ltd.
<i>Leverbank</i>	GLPZ	30.5.52	A. T. Stansfield	F. G. Howard, A. Dawkins, J. Scobbie	J. Simpson	Andrew Weir & Co., Ltd.
<i>Linguist</i>	GQBC	9.9.54	W. Weatherall	J. O. Dickenson, C. S. Boam, J. A. Ashcroft	R. W. Robertson	T. & J. Harrison, Ltd.
<i>Livorno</i>	GPWF	4.7.53	A. Hinchcliffe	R. A. Jones, D. G. Rouse	M. MacMahon	Ellerman's Wilson Line, Ltd.
<i>Lloydcrest</i>	MAOY	22.8.53	L. Borwell	A. Burrell, J. Beckensale, G. Bridges	J. Rowe	Crest Shipping Co., Ltd.
<i>Loch Avon</i>	GMZI	16.8.54	H. Sang	J. A. Race, —, Dickenson, P. Brown, J. Connell	R. Littlejohn	Royal Mail Lines, Ltd.
<i>Loch Garth</i>	GMZY	26.8.54	J. W. Stevens, R.D., R.N.R.	J. L. Perkins, W. J. D. Smith, R. Nottage, N. C. Kerr	J. Greenhalgh	Royal Mail Lines, Ltd.
<i>Loch Ryan</i>	MAOZ	24.3.54	H. V. Todd, R.D., R.N.R.	R. L. Collins, J. Cox, L. W. Green, A. Fairburn	L. Francis	Royal Mail Lines, Ltd.
<i>London Pride</i>	GKTI	7.9.54	J. H. Cooper	J. Moran, G. Douglas, D. Rattray	J. P. Desgan	London Overseas Freighters, Ltd.
<i>Lotorium</i>	GBLP	29.8.54	A. Thompson	G. A. Wareing, A. Scott, G. J. Thomas	G. O. Winship	Anglo-Saxon Petroleum Co., Ltd.
<i>Marcharda</i>	GKKF	3.8.54	T. C. Eddy	W. E. Kirkbride, I. A. MacLaren, R. C. Main	G. Stone	T. & J. Brocklebank, Ltd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>New Australia</i>	GZKD	26.8.54	K. D. G. Fisher	D. G. Model, C. R. Downes, P. Murchison, W. Siddall	H. Matthews	Shaw, Savill & Albion Co., Ltd.
<i>New York City</i>	MATR	13.10.54	F. R. Neil	R. W. Whitman, M. Reynolds, E. Mace	T. Jenkins, M.B.E.	Charles Hill & Sons, Ltd.
<i>New Zealand Star</i>	GYOR	14.9.54	E. N. Rhodes	S. Tompsett, P. Mitchell, P. Hynt	E. Ewart	Blue Star Line, Ltd.
<i>Newfoundland</i>	GNMC	6.10.54	C. H. Kenyon	P. Warne, R. I. Heys, K. Swinburne	T. Cahill	Furness Withy & Co., Ltd.
<i>Nordic</i>	GDJC	24.5.54	E. G. Jones	A. Uden, W. P. Crone, B. H. Whyfe, H. Gates	D. Gough	Prince Line, Ltd.
<i>Nottingham</i>	GCNC	13.8.54	E. H. White	L. Bridges, R. H. Burton, P. Fletcher, C. Jones	L. Sutton	Federal Steam Nav. Co., Ltd.
<i>Nova Scotia</i>	GNNK	20.4.54	I. E. Wilson, O.B.E.	J. H. Williams, A. C. Wales, A. R. Smith	W. J. Brock	Furness Withy & Co., Ltd.
<i>Novelist</i>	GMLG	3.6.54	R. H. Longster	F. C. Meakin, C. Carew	R. Sparks	T. & J. Harrison, Ltd.
<i>Obust</i>	GMLQ		R. W. Phillip	D. A. Norris, —, McKean, D. Burgess, R. Drury	J. W. Barlow	Elder Dempster Lines, Ltd.
<i>Oilfield</i>	GNMN		C. O. T. Polkinghorne	D. G. Bissett, O. A. P. Johnson, J. McPhee	P. Shine	Hunting & Sons, Ltd.
<i>Orari</i>	GJKX	19.11.53	J. R. M. Romsey	A. Stoke, M. Blake, C. S. Single, P. Holloway	W. H. Jones	New Zealand Shipping Co., Ltd.
<i>Orcades</i>	MABA	17.8.54	N. W. Smith	J. W. Jackson, E. H. Pickles, B. H. Pickering	F. Miller	Orient Steam Nav. Co., Ltd.
<i>Orion</i>	GYKL	24.6.54	I. E. G. Goldsworthy, R.D., R.N.R.	R. Mattingley, T. R. Williams, W. B. McGuffin	F. Harrop	Orient Steam Nav. Co., Ltd.
<i>Oronsay</i>	GCNB	20.4.54	S. S. Bernard, O.B.E.	B. Clerke, R. D. Cookman, P. Leighton	R. Oakley	Orient Steam Nav. Co., Ltd.
<i>Oronies</i>	GBXM	8.10.53	J. D. Birch, D.S.C., R.D., R.N.R.	D. Gaffney, H. G. Ward, G. K. Harrison	A. Quinton	Orient Steam Nav. Co., Ltd.
<i>Orsova</i>	GNDL		N. A. Whinfield	K. E. Howard, M. Champneys, B. D. Campbell, G. Woods	P. Parish	Orient Steam Nav. Co., Ltd.
<i>Otaki</i>	GPBV	12.4.54	A. Hocken	W. A. French, A. Faulkner, E. Leech	R. Heath	Orient Steam Nav. Co., Ltd.
<i>Otranto</i>	GFKV	24.5.54	A. E. Coles, R.D., R.N.R.	J. W. Spiers, C. A. Howard	I. R. M. Thomas	Orient Steam Nav. Co., Ltd.
<i>Pacific Fortune</i>	GBFM	30.7.54	H. A. Shaw	A. Adams, M. J. Brown, G. D. Kay	D. Powell	Furness Withy & Co., Ltd.
<i>Pacific Northwest</i>	GQCP	26.7.54	F. H. Perry	D. Fuller, N. Land, D. M. Lloyd	J. Jennings	Furness Withy & Co., Ltd.
<i>Pacific Reliance</i>	GMJK	25.9.54	P. F. Owens	V. C. Jackson, A. H. Lipden, D. Hopkinson	F. O'Shea	Furness Withy & Co., Ltd.
<i>Pacific Unity</i>	GUAN	15.10.54	E. A. Kemp	A. W. B. Chalmers, A. Hodges, P. R. Farthing	R. Haskayne	Furness Withy & Co., Ltd.
<i>Pacure</i>	GCNX	17.8.54	W. J. Young	R. J. Williams, D. Morriss, G. K. Evans	R. D. Cole	Royal Mail Lines, Ltd.
<i>Pampas</i>	GCDL	3.12.53	H. Davies	H. D. Lawson, M. Keen, N. Wheatley	M. Hookway	New Zealand Shipping Co., Ltd.
<i>Papanui</i>	GDIW	1.7.54	D. A. G. Dickens	J. R. Gair, C. Keay, W. Nisbet	V. W. Bennet	New Zealand Shipping Co., Ltd.
<i>Paparoa</i>	GBCZ	19.8.54	J. Guylar	G. McCathie, J. Reid, R. A. Wilson	P. Goulden	Royal Mail Lines, Ltd.
<i>Paraguay</i>	MAQS	7.7.54	W. S. Thomas	D. P. Byrne, C. H. Whightman, R. E. Forrester	I. MacDonald	Blue Star Line, Ltd.
<i>Paraguay Star</i>	GTNC	25.6.54	D. R. MacFarlane, D.S.O., O.B.E.	I. W. Hay, B. Gibb, M. Moore	V. Burdin	Royal Mail Lines, Ltd.
<i>Pardo</i>	GMNZ	25.6.54	W. Williams	R. J. Bland, S. Gibson, J. T. Duff	J. E. Neane	Royal Mail Lines, Ltd.
<i>Parima</i>	GCLO	29.7.54	G. S. Grant, R.D., R.N.R.	J. E. Flood, M. Wardle, C. Cowley	C. Jameson	P. & O. Steam Navigation Co.
<i>Paringa</i>	MMBD	26.6.54	E. J. Kerridge	P. W. G. Everett, M. R. Prowse, C. I. H. Greaves, J. R. K. Rees	A. O'Sullivan	Cunard Steamship Co., Ltd.
<i>Parthia</i>	GSWQ	18.9.54	J. O. Armstrong, D.S.C., R.D., R.N.R.	W. G. Smith, P. J. Lawley, G. E. Edwards	— Cahill	P. & O. Steam Navigation Co.
<i>Perim</i>	GCGB	11.5.54	L. Porter	P. Beeley, C. B. Thompson, M. Haggas, M. W. Thomas		

<i>Pentshire</i>	..	GYWK	7.7.54	T. N. Soane	..	M. N. Ure, R. A. G. Simmons, J. Pritchard, S. R. Davidson	..	J. Pattie	..	Turnbull Martin & Co., Ltd.
<i>Philomel</i>	..	GYPV	18.9.54	M. M. Selmer	..	G. Walton, A. Frier, G. May	..	H. Humphries	..	General Steam Nav. Co., Ltd.
<i>Philosopher</i>	..	MAQV	30.7.54	F. C. Heaton	..	R. Smith, R. A. Patmore	..	G. Keenham	..	T. & J. Harrison
<i>Pilcomayo</i>	..	GBZX	1.6.54	G. A. C. Thacker	..	R. J. Tuner, P. C. Davies, J. Arnott	..	R. Briggs	..	Royal Mail Lines, Ltd.
<i>Pipiriki</i>	..	GDRQ	20.4.54	K. Barnett, R.D., R.N.R.	..	G. Hudson, A. Britain, W. Sewell	..	A. MacInnes	..	New Zealand Shipping Co., Ltd.
<i>Planter</i>	..	GZSS	29.10.53	H. T. Wells	..	R. M. Harrison, W. Johnson, G. Garvin	..	J. Johnson	..	Chr. Salvesen & Co.
<i>Port Adelaide</i>	..	MGGG	1.6.54	C. R. Townshend	..	C. P. C. Gordon, D. E. Bowden, J. L. Hope	..	P. Keilly	..	Port Line, Ltd.
<i>Port Auckland</i>	..	GWRB	20.4.54	J. G. Lewis, O.B.E.	..	E. E. Chapman, W. V. Lusted, J. E. Toghill	..	J. Skinner	..	Port Line, Ltd.
<i>Port Brisbane</i>	..	GWRC	16.9.54	F. W. Bailey, M.B.E.	..	K. W. Jayne, A. D. Braithwaite, G. Ballinger	..	D. Don	..	Port Line, Ltd.
<i>Port Hardy</i>	..	GDFG	1.6.54	P. H. Potter	..	I. F. Beckett, D. Ogilvie	..	A. G. Johnson	..	Port Line, Ltd.
<i>Port Hobart</i>	..	GKGC	18.10.54	P. S. Ball	..	D. J. Evans, A. M. Downes, D. Haddon-Cave	..	P. Byrnes	..	Port Line, Ltd.
<i>Port Jackson</i>	..	GZKR	24.6.54	G. G. Langford	..	B. Skrimshire, M. S. Box, D. Church, J. Dolton	..	G. Sharman	..	Port Line, Ltd.
<i>Port Lincoln</i>	..	GFZK	26.7.54	A. C. Hodson	..	P. R. Jones, C. Milne, E. Newstead, W. Ardley	..	A. Kenny	..	Port Line, Ltd.
<i>Port Macquarie</i>	..	MAQY	25.6.54	L. J. Skales	..	C. Armstrong, K. Nichol, B. C. Crabb	..	T. Hargrave	..	Port Line, Ltd.
<i>Port Napier</i>	..	GPKD	25.6.54	C. R. Townshend	..	G. L. Danton, A. D. Jones, J. Read, P. Beatty	..	B. McGovern	..	Port Line, Ltd.
<i>Port Phillip</i>	..	MAQZ	11.9.54	L. Copeland	..	M. Caldwell, W. P. Russell	..	W. Sharkey	..	Port Line, Ltd.
<i>Port Pirie</i>	..	GLVQ	11.10.54	P. H. Pedrick	..	D. A. W. Burgess, R. V. McKee, G. R. Cooke	..	D. C. Thomson	..	Port Line, Ltd.
<i>Port Townsville</i>	..	MGCY	26.7.54	E. W. R. Young	..	R. C. W. Marr, J. R. King, P. P. Hatchley	..	T. McNeil	..	Port Line, Ltd.
<i>Port Victor</i>	..	MSWK	24.6.54	E. T. N. Lawrey	..	W. Duthie, E. Stewart, P. J. Hannan	..	R. Crompton	..	Port Line, Ltd.
<i>Port Vindex</i>	..	MAUW	26.6.54	E. E. Ronwell	..	A. J. Starkey, J. C. Naylor, J. O'Dowd	..	J. B. French	..	Port Line, Ltd.
<i>Port Wellington</i>	..	GJNI	22.10.54	T. L. Kidwell	..	E. E. Chapman, G. G. Mooney, D. I. Pull	..	J. C. Coutts	..	Port Line, Ltd.
<i>Port Wyndham</i>	..	GYCW	30.6.54	G. Hodson	..	B. Dunlop-Jones, P. Williams, J. Lester, R. Johnstone	..	E. Saul	..	Blue Star Line, Ltd.
<i>Portland Star</i>	..	GZSY	26.7.54	A. W. Mitchell	..	J. Jermyn, W. Neill, W. Ferriday	..	R. Bailey	..	Royal Mail Lines, Ltd.
<i>Potaro</i>	..	GNIJ	22.10.54	W. Tennent	..	J. P. L. Thornhill, R. Kistler, R. Clarke	..	J. Barrie	..	Hector Whaling, Ltd.
<i>Powell</i>	..	GKJL	24.6.54	D. Cornwell	..	A. C. Wehner, C. G. Stiff, S. Christie, G. E. Baker	..	J. Gilbert	..	Union Castle Mail S.S. Co., Ltd.
<i>Pretoria Castle</i>	..	GOAE	7.7.54	G. H. Mayhew	..	G. Stockley, M. Llewellyn, J. Hopkinson	..	R. Greenhough	..	Dr. B. M. Cwilong
<i>Princess Waitangi</i>	..	OJNS	19.10.54	Dr. B. M. Cwilong	..	D. Mulville, J. Gizowski	..	A. Wilkinson	..	T. & J. Harrison, Ltd.
<i>Prospector</i>	..	GIMS	16.11.53	F. V. Dunn	..	E. Sherlock, G. L. Beecroft, D. Hanchock	..	P. Broome	..	Stephens, Sutton, Ltd.
<i>Radley</i>	..	GZZG	6.5.54	H. W. White, O.B.E.	..	E. Howlett, H. Blair, J. Gibbons	..	F. Murrant	..	New Zealand Shipping Co., Ltd.
<i>Rahaia</i>	..	GFGW	15.6.53	C. P. Robinson	..	D. J. Newman, J. Cosker, P. J. Sedgwick	..	C. Lambe	..	G. Heyn & Sons, Ltd.
<i>Ramore Head</i>	..	MAXX	11.8.54	R. A. Ferguson	..	D. Craig, J. Greig, E. C. Rea	..	J. Grant	..	New Zealand Shipping Co., Ltd.
<i>Rangitane</i>	..	GDBV	11.8.54	H. N. Lawson, R.D., R.N.R.	..	D. Burdett, P. Fletcher, G. J. Clarke, P. Egan	..	J. D. Charter	..	New Zealand Shipping Co., Ltd.
<i>Rangitata</i>	..	GSZN	26.4.54	G. Kinnell, O.B.E.	..	J. Masson, F. Green, P. Bower	..	G. A. Parker	..	G. Heyn & Sons, Ltd.
<i>Rangitiki</i>	..	GSXW	22.10.54	A. E. Lettington, O.B.E., D.F.C.	..	A. Mash, I. Excell, G. Caulfield, M. Field	..	E. Heywood	..	Regent Petroleum Tankship Co. Ltd.
<i>Rangitoto</i>	..	GLMV	16.7.54	C. R. Picher, O.B.E.	..	A. Finch, B. Anstey	..	R. W. Jones	..	Regent Petroleum Tankship Co. Ltd.
<i>Rathim Head</i>	..	GRDB	16.3.54	M. Kennedy	..	R. J. Crawford, C. E. Pringle, S. Dunwoody	..	J. A. Jackson	..	Regent Petroleum Tankship Co. Ltd.
<i>Regent Hawk</i>	..	GMND	6.10.54	R. Armstrong	..	G. Sinclair, Z. Wojewodzki, C. A. Brennan	..	J. Butler	..	Pacific Steam Navigation Co.
<i>Regent Royal</i>	..	GRPN	11.9.54	G. H. Hobson	..	W. Walker, R. H. Swift, A. G. Brown	
<i>Reina Del Pacifico</i>	..	GMPS	20.10.54	J. Whitehouse	..	A. MacLean, P. B. Potts, R. T. Bruce, C. Taylor	

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Retriever</i>	MRWY		J. Grant	W. T. Goodall, G. H. C. Reynolds, K. Matheson, J. K. Cook	J. Grant	Cable & Wireless, Ltd.
<i>Reynolds</i>	GQNC	3.11.53	J. Burns	G. Leith, J. C. Pratt, C. Dale	M. H. Mann	Bolton Steam Shipping Co., Ltd.
<i>Rhodesia Star</i>	GUAX	4.5.54	F. L. Hambridge	D. N. Murray, W. Robertson, T. Thornton		Blue Star Line, Ltd.
<i>Rialto</i>	GBLV	7.9.54	H. Greenhill	A. M. England, A. D. Robinson, D. Bedford		
<i>Richmond Castle</i>	GCSP	20.8.54	J. D. B. Fisher	W. Howson, P. Pollard, C. E. Bragg	C. V. Child	Ellerman's Wilson Line, Ltd.
<i>Ripplingham Grange</i>	GIGP	10.9.54	R. Owen	G. Spong, P. Hector, J. Elson	W. Burnett	Union Castle Mail S.S. Co., Ltd.
<i>Rochester Castle</i>	GZQF	24.2.54	D. W. Sowden, R.D., R.N.R.	P. M. Pollard, J. Martocks, D. A. Bird	M. Goodall	Houlder Bros. & Co., Ltd.
<i>Roonagh Head</i>	GNTN	25.3.54	E. W. Black, O.B.E.	T. McI. Hamell, A. F. Jones, F. Best	A. P. Smith	Union Castle Mail S.S. Co., Ltd.
<i>Roslin Castle</i>	GYJZ	19.10.54	A. E. Payne	E. A. C. Paul, N. Upham, R. J. Parkin	B. J. Lewis	G. Heyn & Sons, Ltd.
<i>Roswallan Castle</i>	GDFT	8.10.54	I. P. Alpin	K. Williams, D. Jones, J. Taylor	L. Hunt	Union Castle Mail S.S. Co., Ltd.
<i>Roxburgh Castle</i>	GBGS	22.9.54	W. C. J. Swift	A. D. Mildren, J. Panceo, J. M. Archbold	M. C. Anderson	Union Castle Mail S.S. Co., Ltd.
<i>Royal Star</i>	MARJ	15.3.54	A. H. Dare	M. G. Tonkin, D. Mallinger	J. H. Welsh	Union Castle Mail S.S. Co., Ltd.
<i>Ruafine</i>	GKSY	11.10.54	B. Evans	J. B. Evans, D. Gaskell, F. Green, D. Thomas	J. Stewart	Blue Star Line, Ltd.
<i>Runic</i>	GGCS	20.8.54	C. W. Sendall	J. Wyles, I. V. Cansdale, R. E. Greenhaugh	J. Heath	New Zealand Shipping Co., Ltd.
<i>Sacramento</i>	GKCN	14.8.54	J. Robinson, M.B.E.	G. Reed, E. R. Baker, G. Potter	A. McMurray	Shaw, Savill & Albion Co., Ltd.
<i>Salacia</i>	GZRN	6.5.54	A. L. Hunter	D. G. Hall, I. McFarlane, N. Larsen	H. L. Hall	Ellerman's Wilson Line, Ltd.
<i>Salamanca</i>	GLSG	22.12.53	P. L. Hockey	E. J. Pepper, G. R. Dewsnap, R. B. Bryant	M. Mann	Donaldson Bros. & Black, Ltd.
<i>Salaverry</i>	GBLQ	26.10.54	E. C. Hicks	D. I. Jones, W. Washington, D. C. Steele	B. E. Bewley	Pacific Steam Navigation Co.
<i>Satinas</i>	GLIK	22.1.54	D. W. Hutchinson	G. B. Swan, R. K. Thomas, P. Whittaker	A. T. Shawcross	Pacific Steam Navigation Co.
<i>Satween</i>	GFFN	28.9.54	M. M. Ramsay	A. H. S. Gray, G. Armstrong, R. Larsen	H. Roderick	Pacific Steam Navigation Co.
<i>Samanco</i>	MARQ	7.9.54	T. H. G. McGill	H. McNaught	J. H. Brown	P. Henderson & Co.
<i>Samarita</i>	GJCF	5.8.54	W. T. Fitzgerald, R.D., R.N.R.	M. E. Jones, G. E. Turner, E. Gowland	M. D. Pilgrim	Pacific Steam Navigation Co.
<i>San Adolfo</i>	GYKK	15.9.54	A. Walker	J. A. Bursilope, P. Miller	E. Bishop	Cunard Steamship Co., Ltd.
<i>San Cirito</i>	GZMR	24.6.54	E. J. Osbourne	I. D. Bate, W. Richardson, M. J. Weston	C. Maguire	Eagle Oil & Shipping Co., Ltd.
<i>San Felix</i>	GFJZ	7.7.54	G. R. Pearson	L. J. Courts, P. W. Hodges, S. D. Mayl	D. Neeson	Eagle Oil & Shipping Co., Ltd.
<i>San Velino</i>	GCNY	16.11.53	L. Moys	G. J. Hughes, T. J. Magee, P. Kirton	W. C. Townsend	Eagle Oil & Shipping Co., Ltd.
<i>San Veronica</i>	MASQ	7.7.54	C. Summers	K. Bramley, G. C. Turnbull, R. Davies	P. Seanlan	Eagle Oil & Shipping Co., Ltd.
<i>San Vulfrano</i>	MASR	25.3.54	H. W. Fortnam	I. F. Boon, F. D. Smith, D. J. Powell	G. J. Gearon	Eagle Oil & Shipping Co., Ltd.
<i>Sansu</i>	GQON	26.7.54	J. A. Cleator	R. L. Black, G. Gardner, B. Morton	M. N. Hynes	Elder Dempster Lines, Ltd.
<i>Santander</i>	GBNR	22.12.53	P. Ray	D. Houghton, W. J. Campbell, A. Lang	N. Fenton	Pacific Steam Navigation Co.
<i>Sarmiento</i>	MARW	18.3.54	A. G. Litherland	I. Eardley, F. Nuttall, W. Jenkins	J. Whitfield	Pacific Steam Navigation Co.
<i>Saxon Star</i>	MARX	26.7.54	R. J. C. McDonald	D. A. Thomas, E. Dyer, A. W. Kinghorne	K. Lancaster	Pacific Steam Navigation Co.
<i>Saxonia</i>	GSJS		A. MacKeller, R.D., R.N.R.	G. Buckley, D. Davis, R. O. Jones	D. Allonby	Blue Star Line, Ltd.
<i>Scottish Eagle</i>	MIMVX		R. R. Baxter	C. K. Rawnsley, G. G. Greenfield, J. A. Brown	F. Faman	Cunard Steamship Co., Ltd.
<i>Scythia</i>	GDYP	15.10.54	J. D. Armstrong, D.S.C., R.D., R.N.R.	A. L. Gosset, D. J. Swinnerton, E. D. Hall	D. Witteridge	Scottish Tankers, Ltd.
<i>Seattle Star</i>	MMNW	24.6.54	A. Penrice	J. Rymes, D. Leicester, D. E. Sayle	W. Brown	Cunard Steamship Co., Ltd.
<i>Selector</i>	MARZ	10.3.54	R. L. Williams	P. Doran, A. Ashdown, J. Keating	Saul	Blue Star Line, Ltd.
<i>Settler</i>	GTTX	24.5.54	R. F. Phillips	R. J. Turnbull, R. B. Wilson, I. Mitchell	C. O'Callaghan	T. & J. Harrison, Ltd.
<i>Shielbank</i>	GDPZ	28.9.53	D. A. Reid	G. A. D. Govan, D. Campbell, S. F. Bowditch	J. J. Blake	T. & J. Harrison, Ltd.
<i>Silveroak</i>	GCQR	9.8.54	J. H. Leask	N. H. F. Smith, M. J. Perry, V. D. Gardner	W. H. Edgington	Andrew Weir & Co., Ltd.
					E. Connolly	Silver Line, Ltd.

Sneaton	6.10.54	W. Armstrong	E. Wilson, G. Wilson, W. R. Atkinson, W. J. Derby	B. Doyle	Headlam & Son
Socotra	26.3.54	L. H. Howard, R.D., R.N.R.	Hayward, G. C. J. Morris, R.N.R., D. M. Reynolds	R. Mathew	P. & O. Steam Navigation Co.
Somerset	2.4.54	W. J. T. Stevens	R. Holdsworth, D. Swynes, D. Fonthum	T. Mason	Federal Steam Nav. Co., Ltd.
South Africa Star	17.8.54	R. M. T. Jones	T. V. Anderson, F. P. McGuckin, E. J. T. Boone	A. Sibbald	Blue Star Line, Ltd.
Southern Atlantic	7.7.53	J. O. Bowie	J. Sinclair, D. Watt, D. Frejzendorf	P. Curson	Chr. Salvesen & Co.
Southern Garden	5.5.53	W. J. Swanson	S. McGillivray, W. Scott, A. Smith	J. Christie	Chr. Salvesen & Co.
Southern Harvester	5.5.54	T. Strandskog	A. Anderson, K. Snekkestad, H. Solberg	G. Campbell	Chr. Salvesen & Co.
Southern Opal	24.6.54	A. F. Baikie	J. Thomson, S. Sutherland, H. Solberg	T. Johnson	Chr. Salvesen & Co.
Southern Venturer	29.4.54	H. Myhre	F. Johansen, A. Hakness, O. Vikkländer	J. MacMorron	Chr. Salvesen & Co.
Specialist	25.6.54	D. Wolstenholme	W. Tinkler, W. E. Hinde, B. Riddiough	F. Hickey	T. & J. Harrison, Ltd.
Stirling Castle	18.10.54	F. R. Pope, R.D., R.N.R.	R. J. Marchmont, H. Burgess, Long	W. Brown	Union Castle Mail S.S. Co., Ltd.
Stirlingshire	23.9.54	E. W. Jenkin	C. W. Gowans, G. Pow, C. D. de F. Hedges	A. Ross	Turnbull Martin & Co., Ltd.
Strathaird	4.10.54	H. A. Mallett	K. W. Farr, M. Hobbs, C. J. Latham, R. A. Peters, N. Purser	H. A. M. Jardine	P. & O. Steam Navigation Co.
Stratheden	26.2.54	R. G. Freeman	A. Barrett, D. E. Aikman, G. Harris, D. E. Hewitt	A. Horne	P. & O. Steam Navigation Co.
Strathmore	8.8.54	A. G. Jenkins	A. H. W. Dallas, J. M. S. Beaumont, P. Fox, T. C. Tilden-Smith, W. H. Bickford	J. P. Carey	P. & O. Steam Navigation Co.
Strathnaver	25.10.54	J. M. Peter	D. C. Guthrie, J. Crichton, A. P. Petrie, J. Woollen	W. Freeman	P. & O. Steam Navigation Co.
Struan	29.5.54	M. Palson	W. Ross, E. Smith, G. Clarke	W. Moyes	Chr. Salvesen & Co.
Sunrover	12.8.54	J. Givan	T. Horne, D. Boyter, Paterson	W. Docherty	Clunies Shipping Co., Ltd.
Suffolk	17.7.54	H. Horwood	P. Holloway, R. Hood, R. Brown, P. Robertson	W. H. Jones	Federal Steam Nav. Co., Ltd.
Sussex	4.8.54	F. Loughheed	J. Werry, D. Crabtree, J. Newsham	D. James	Federal Steam Nav. Co., Ltd.
Sydney Star	3.6.54	G. L. Evans	R. M. Burns, R. Crookall, R. S. Hopper, D.S.C., P. Gilkes	W. A. Wade	Blue Star Line, Ltd.
Tabristan	13.4.54	W. J. Ellis	E. S. Hewitt, G. L. Andrews, R. Goudie	H. J. Roberts	Frank C. Strick & Co., Ltd.
Tagetus	12.7.54	T. W. Green	G. Hails, W. Miller, J. Pratt, E. H. Phillips, A. F. Morrison	P. Brennan	Anglo-Saxon Petroleum Co., Ltd.
Tamaroa	19.10.54	T. H. Davies	R. J. McVittie, I. P. N. Cameron, L. Howells, W. J. Lyman	D. MacRae	Shaw, Savill & Albion Co., Ltd.
Tanele	7.7.54	H. Flowerdew, O.B.E.	Bager, R. Munro, Ball	A. Allen	Elder Dempster Lines, Ltd.
Tarkwa	24.6.54	J. D. Simpson, O.B.E.	J. Sanderson, I. Phillips, W. E. Christie	D. T. De Witt	Elder Dempster Lines, Ltd.
Tasmania Star	24.5.54	T. F. McDonald, O.B.E.	D. Brady, I. Haldane, R. Bayley	C. V. James	Blue Star Line, Ltd.
Tectus	12.8.54	N. Clarke	S. H. Beer, J. C. Chambers, W. Snowdon, E. K. Donnelly, J. Ayre	D. Cameron	Anglo-Saxon Petroleum Co., Ltd.
Tikoa	24.6.54	H. Sladen	A. Dorkins, F. Field, T. Rowland, P. Deslands	R. Liston	New Zealand Shipping Co., Ltd.
Telemachus	18.8.54	N. A. Rae, M.B.E., R.D., R.N.R.	N. H. F. Weldham, J. H. Lockwood, J. Jones	J. C. Noble	A. Holt & Co.
Temple Mead	20.8.54	R. W. Chislett	D. J. P. Wheate, A. Brookwell, A. W. Jones, G. W. Brown	J. Gleisner	Lambert Bros., Ltd.
Tenagodus	25.8.54	R. F. Garrod	I. Bodger, F. Gristwood, J. Diston	E. Hutchinson	Anglo-Saxon Petroleum Co., Ltd.
Teviot	11.12.53	G. B. Medlycott	T. Milner, A. E. Crebbin, A. M. Brook	G. Tulbot	Royal Mail Lines, Ltd.
Thalamus	23.3.54	R. Chandler, M.B.E.	E. W. Hughes, M. Fraser, P. J. Cornish	E. Makin	Anglo-Saxon Petroleum Co., Ltd.
Thaumartus		F. W. Barnes	R. W. Denmark, R. F. Weller, J. D. Westley	N. W. Jones	Anglo-Saxon Petroleum Co., Ltd.
Thelicomus	17.8.54	D. Mellon	S. F. Darrock, W. I. Simpson, I. Nixon, J. C. Young	A. W. Duke	Anglo-Saxon Petroleum Co., Ltd.
Timaru Star	8.7.54	H. W. McNeil	E. Dyer, M. Johnson, J. Maidment	A. Sloan	Blue Star Line, Ltd.



NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Tinto</i> ..	GBYT	31.3.53	S. H. Bennett, M.B.E.	R. M. Lawson, C. Main, J. E. Scholay	G. S. Dunn ..	Ellerman's Wilson Line, Ltd.
<i>Tongariro</i>	GLFZ	24.6.54	I. C. Davidson	P. Cresswell, A. Mason, J. Baxter, J. Hale	P. Dickson ..	New Zealand Shipping Co., Ltd.
<i>Torr Head</i>	GZPW	29.6.54	S. J. Stark ..	E. McIntosh, E. L. Seaton, R. Hunt ..	I. McKinnon	G. Heyn & Sons, Ltd.
<i>Tregenna</i>	GBPM	18.5.54	W. F. Denyer	A. T. Youden, J. M. Downard, P. J. S. Bishop	T. Wright ..	Hain S.S. Co., Ltd.
<i>Treleavan</i>	GBPQ	12.7.54	J. Cornish ..	A. Downs, S. H. Ray, H. A. Manby ..	G. M. Leighton	Hain S.S. Co., Ltd.
<i>Trelyon</i>	GBPP	17.9.54	W. T. Evans	L. Edwards, W. Carmichael, D. Phillips	C. Coldroy ..	Hain S.S. Co., Ltd.
<i>Trevaylor</i>	GCKG	22.12.53	L. I. White	V. Wise, J. Healy, D. Cullum ..	M. Kenny ..	Hain S.S. Co., Ltd.
<i>Tribesman</i>	MATG	12.8.54	F. G. Bolton	D. Laud, E. Spencer-Payne, J. Cayzer ..	W. H. Major	T. & J. Harrison, Ltd.
<i>Tribulus</i>	GBNZ	20.10.54	W. P. Baker	F. L. Steele, D. Bloom, P. Moore ..	M. J. Quan ..	Anglo-Saxon Petroleum Co., Ltd.
	GFJS	6.8.54	G. Robson ..	B. E. Batterick, R. W. Lumdsen, E. N. Taylor, E. L. Petherbridge	D. B. Strang	Shell Tanker, Ltd.
<i>Trochiscus</i>	GFKB	24.9.54	J. R. Petrie	J. Mayo, E. Roberts, F. Walton ..	T. O'Shea ..	Royal Mail Lines, Ltd.
<i>Tweed</i>	GBRP	7.9.54	R. J. Finch	R. J. Howlett, R. Box, G. S. Bonnar	W. MacKenzie	Watts, Watts & Co., Ltd.
<i>Twickenham</i>	GNDC	12.8.54	J. A. Tully ..	S. E. Hooper, A. Pharaony, J. Collister ..	S. Hewett ..	Bullard, King & Co., Ltd.
<i>Umtali</i>	GYWB	12.7.54	F. E. J. O'Hea	J. H. Burcher, W. Gibson, J. G. Jenn, D. L'Estrange	S. Merchant	Bullard, King & Co., Ltd.
<i>Umtata</i>	GDQF	7.9.54	D. L. Weston	G. S. Wood, I. Szablowski, H. G. Swanson	T. A. M. Morris	Cunard Steamship Co., Ltd.
<i>Umzinto</i>	GIFO	18.9.54	R. Harber ..	J. G. Campbell, J. Lyon, J. Aldous ..	D. C. White	Ellerman & Wilson Line, Ltd.
<i>Varditia</i>	GCFW	8.10.54	H. J. Chaloner, R.D., R.N.R.	R. M. Attwater, J. Clarke, D. Neck	J. Houghney	Shaw, Savill & Albion Co., Ltd.
<i>Velletta</i>	MGGD	9.9.54	S. Algar	J. A. Forbes, J. D. Soudry, G. G. Kiddle	J. R. Hinds	Shaw, Savill & Albion Co., Ltd.
<i>Vestra</i>	MNNB	18.6.53	D. S. Archibald	K. B. Singer, D. C. White, H. C. Cuner	K. F. Lax ..	Watts, Watts & Co., Ltd.
<i>Volo</i> ..	GPCI	18.12.53	J. Maynard	G. Paton, R. Massam, W. Walker	B. Holyoake ..	Watts, Watts & Co., Ltd.
<i>Wanawana</i>	GWXQ	5.8.54	J. L. Stobbs, R.D., R.N.R.	R. E. Ryding, C. Borthwick, A. S. G. L'Estrange	R. B. Shaw	Union Castle Mail S.S. Co., Ltd.
<i>Wairangi</i>	MATX	26.7.54	V. Vizer ..	I. S. McEwan, M. J. England, E. Snaith, A. M. McDougall	D. Carr ..	Watts, Watts & Co., Ltd.
<i>Waivera</i>	GBJB	11.8.54	R. A. Barnes	D. S. Knight, G. Maine, C. Perry	D. Alcock	Bibby Bros. & Co.
<i>Waivis Bay</i>	GKKB	4.8.53	R. E. Kenton	W. K. West, F. Davidson, I. MacLachlan	W. Allen	P. Henderson & Co.
<i>Wanstead</i>	GFLS	8.4.54	I. W. Jackson	M. F. Diggins, F. MacDonald, F. Martin	J. Downie ..	Shaw, Savill & Albion Co., Ltd.
<i>Warkworth</i>	MALF	7.5.54	N. Thompson, M.B.E.	E. D. Rowland, R. Atkinson, R. E. Keys	H. Wilson ..	Sir R. Ropner & Co., Ltd.
<i>Wendover</i>	GFML	17.5.54	W. Donald ..	E. J. Vincent, R. T. Mudd, M. Court ..	K. F. Lax ..	Watts, Watts & Co., Ltd.
<i>Winchester Castle</i>	GTPZ	15.10.54	G. W. B. Lloyd	F. J. Harding, — Turner, M. J. Bower ..	B. Shaki ..	Watts, Watts & Co., Ltd.
<i>Windsor</i>	GPOG	27.8.54	D. V. Cameron	A. Priestley, E. Pearce, I. Mirchison	R. B. Shaw	Watts, Watts & Co., Ltd.
<i>Woodford</i>	GFMM	19.5.54	H. A. Cox ..	J. Whyte, D. Bewick, J. Cormack	J. Ireland ..	Watts, Watts & Co., Ltd.
<i>Worcestershire</i>	GFZM	13.8.54	F. C. Brooks	J. Pennington, R. M. Bessant, J. F. Code	D. Carr ..	Watts, Watts & Co., Ltd.
<i>Yoma</i>	GLPN	30.6.54	S. Thomson	S. B. Hamilton, T. A. Hood, D. P. Postlethwaite	D. Alcock	Bibby Bros. & Co.

Supplementary Ships

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Alert</i> ..	GCBM	5.9.54	R. H. J. Wallis	R. M. Tuckwell, D. Curror, J. P. Ruddock	A. Prest	H.M. Postmaster General
<i>Ariel</i> ..	GMDY	29.4.54	C. M. G. Evans, M.B.E.	E. J. Evans, D. C. Chisholm, A. C. H. Childs	R. Cunningham	H.M. Postmaster General
<i>Ballerby</i> ..	MQJF	28.5.54	J. R. Copping	E. H. Williams, W. Gordon, H. Forrest	H. S. Speight	Ropner Shipping Co., Ltd.
<i>Blairclona</i> ..	GLLG	11.5.54	J. McVean	J. E. Halliday, P. McAlister, L. M. Henderson	E. Yard	Geo. Nisbet & Co.
<i>Cape Breton</i> ..	GLXG	2.2.53	J. Smith	— Miller, W. R. Pilling, A. D. Chappell	V. Dalton	C. T. Bowring & Co., Ltd.
<i>Cape Howe</i> ..	GQYP	9.5.53	C. M. Mortimer	T. R. Baker, W. J. Clarke, M. Symon	J. McDonald	Lyle Shipping Co., Ltd.
<i>Circassia</i> ..	GZMD	3.8.54	J. McC. Brown	J. Ballantyne, R. Sinclair, J. Kane		Anchor Line, Ltd.
<i>Cian Alpine</i> ..	GIFP	22.3.54	J. W. Charles-Aukland	O. T. Rose, N. P. R. Turner, R. W. L. Kenyon	C. J. Ritchie	Cayzer Irvine & Co. Ltd.
<i>Clan Lamont</i> ..	GTTD	5.8.54	J. E. Townrow	J. S. Cummings, L. Pitts, R. W. Bathgate	D. Munroe	Cayzer Irvine & Co., Ltd.
<i>Clan MacBrayne</i> ..	MAQA	9.4.53	C. A. Thomas	J. MacNiven, D. M. Geddes, D. Grant		Cayzer Irvine & Co., Ltd.
<i>Coptic</i> ..	GSND	14.9.54	A. E. Smith, R.D., R.N.R.	C. A. Brodie, D. Campbelljohn, D. H. Clarke, A. Pugh	H. M. Busson	Shaw, Savill & Albion Co., Ltd.
<i>Dartmoor</i> ..	CFQT	12.10.54	F. Bradfield	R. W. Webb, A. Coaster, R. Jenkins	W. Beverly	Walter Runciman & Co., Ltd.
<i>Devon City</i> ..	MBKL	15.10.54	S. Leebetter	J. Groves, R. L. Hunter, D. Thomas, A. Prasser	L. Mills	Sir William Rardon Smith & Sons, Ltd.
<i>Eastern City</i> ..	GBRB	4.8.54	G. Harvey	A. H. Davis, W. G. Jones, T. C. Rooney	D. W. Aycliffe	Sir William Rardon Smith & Sons, Ltd.
<i>Edward Wilshaw</i> ..	MBMP	6.8.54	H. Milne	R. Riddle, J. Reilly, J. Orr	G. O. Brean	Cable & Wireless, Ltd.
<i>Empire Trooper</i> ..	GLXJ	6.8.54	R. H. A. Bond, O.B.E.	W. K. Fullager, F. G. Hill, C. F. Robinson	J. Reardon	British India Steam Nav. Co., Ltd.
<i>Fry Hill</i> ..	MAKS		J. Campbell	J. Naisbitt, G. Morgan, C. Dalziel	D. J. Breaves	Counties Ship Management Co., Ltd.
<i>Harpalion</i> ..	GFFX	11.5.54	H. Small	G. Freeman-Pannett, A. H. Webber, J. Duhig	J. Nisbet	J. & C. Harrison & Co., Ltd.
<i>Hestone</i> ..	GUGJ	17.9.54	J. DeGaris	P. M. Googer, D. Shapherd, W. Lindsay	N. Burnitt	Houston Line (London), Ltd.
<i>Horsa</i> ..	MPFJ		D. Dickson	J. Turner, A. Wallace	J. Turner	Currie Line, Ltd.
<i>Hudson Deep</i> ..	MPCR	31.8.54	J. Gibbons, D.S.C.	K. McKenzie, J. Cunningham, R. Baron	D. Colley	Hudson S.S. Co., Ltd.
<i>Hudson Firth</i> ..	GDKM	14.5.54	E. W. Pvbush	M. R. Uminski, W. Wilson	E. J. Standley	Hudson S.S. Co., Ltd.
<i>Iceland</i> ..	GFFT	1.8.54	J. Hawk-Shaw	A. Smith, — Piper, I. Archibald, D. Foster	P. McGowan	Currie Line, Ltd.
<i>Kirriemoor</i> ..	GYIW	26.6.54	W. A. Watson	F. T. Chapman, T. Byrne, E. Maddison	M. Williams	W. Runciman & Co., Ltd.
<i>Leicestershire</i> ..	GDBL	16.8.54	T. J. A. Thomson	A. C. Murray, L. Conway, J. A. Robinson	J. E. Unsworth	British India Steam Nav. Co., Ltd.
<i>Letchworth</i> ..	MAOV	9.7.54	J. E. S. Newby	B. Cahill, W. Phillips, S. Hardy	J. Archibald	R. S. Dalgleish, Ltd.
<i>Linga</i> ..	GLCK	18.10.54	C. J. Hedges	A. Paterson, A. Boniwell, B. R. Alderton	F. Abrahams	Anglo-Saxon Petroleum Co., Ltd.
<i>Lingula</i> ..	GKDT	25.9.54	H. C. L. Phillips	J. R. Addams, M. P. Canning, C. B. Leggett	D. Townshend	Anglo-Saxon Petroleum Co., Ltd.
<i>Loch Gowan</i> ..	MMJT		E. N. Giller, M.B.E.	D. Walker, M. Boyd, B. Thorne, R. Phillips	P. Hennerly	Royal Mail Lines, Ltd.
<i>Marie Louise Mackay</i> ..	GDNP	23.3.54	T. N. Heap	W. D. Harper, L. P. Denny, L. R. Cook, Cook, M. Poyser	E. Mathiss	Commercial Cable Co.
<i>Markab</i> ..	GCVT	11.1.54	C. Christenzen	F. Wilkins, H. Kurch, N. Velliadis	L. Bundock	Phocean Ship Agency, Ltd.
<i>Marna</i> ..	MLPK	25.8.54	L. M. Smith	R. Sutherland, J. Carnie, W. Morrison	L. M. Smith	Chr. Salvesen & Co.
<i>Meta</i> ..	MPWB		A. D. McNab	N. Frazer, J. Henderson		Glen & Co., Ltd.

Supplementary Ships—Contd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGERS
<i>Mirror</i>	GDFL	5.8.54	T. A. Vickers, R.N.R.	I. G. Dryburgh, A. J. de C. Harrison	J. Poulten	Cable & Wireless Ltd.
<i>Mulberry Hill</i>	MAKQ	12.7.54	A. C. Gillanders	M. Simons, J. D. Hawkins A. Mitchell, S. G. Sanderson, R. Wilkinson	P. T. Higgins	Counities Ship Management Co., Ltd.
<i>Nicania</i>	GIGJ	20.8.54	S. A. Greenaway	A. M. Riddell, M. P. Shilito, C. B. Oxley	M. Jones	Anglo-Saxon Petroleum Co., Ltd.
<i>Northia</i>	GDOK	24.6.54	C. McKellar-Young	F. Ruddle, J. G. Wilson, T. Hetherington	T. Dunsire	Anglo-Saxon Petroleum Co., Ltd.
<i>Port Ferry</i>	GSTP	4.3.54	L. Cadey	N. Fraser, P. Grant, T. Woodfield	R. A. Bennett	Port Line, Ltd.
<i>Queen Maud</i>	MAJM	15.4.54	J. Adam	J. Davis, D. Finlayson, F. Tinsley	T. O'Shea	Thos. Dunlop & Sons, Ltd.
<i>Ramsay</i>	GPSW	11.10.54	J. B. Burns	J. R. Smith, B. A. Lillivick, D. W. Parry	J. R. Ward	Bolton Steam Shipping Co., Ltd.
<i>Rembrandt</i>	GPED	22.9.54	E. E. Roberts	J. Parsloe, J. S. Jackson, C. H. Phillips	J. R. Ward	Bolton Steam Shipping Co., Ltd.
<i>Rockwood</i>	GFSN		A. Dover	— Broadwith, J. S. Thompson, F. Turnbull, G. W. Bourne	J. Moss	Wm. France, Fenwick & Co., Ltd.
<i>Royal Emblem</i>	GDSC	8.7.54	W. S. Dunn	R. D. Davidson, R. Storm, A. P. Culling	L. Loosemore	Hall Bros.
<i>Runa</i>	GFSW	8.7.54	T. Henry, O.B.E.	W. Taylor, L. Loose, J. Greenland, J. Scott	L. Loosemore	Hall Bros.
<i>Silvio</i>	GSVC	2.7.54	S. F. Williams, M.B.E.	N. Hebden, N. Cook, J. Pickering	A. Corliss	Glen & Co., Ltd.
<i>Table Bay</i>	MFTV	9.9.54	H. Gentles	J. G. Paul, C. N. Carruth	H. Moore	Ellerman's Wilson Line, Ltd.
<i>Terantia</i>	GIGS	26.8.54	R. H. Harris	C. Royle, T. L. Langlands	G. Roberts	Lyle Shipping Co., Ltd.
<i>Thelma</i>	MBKK	23.9.54	T. A. W. Fairweather	J. A. G. McColl, D. MacDonald, J. D. McIntosh	W. Gibb, A.M.I.W.T.	Anchor Line, Ltd.
<i>Trelisick</i>	GBPR	21.8.54	D. I. Spencer	L. A. Antorzeuicz, L. T. Annett, B. Martin	K. Hicks	Glen & Co., Ltd.
<i>Trevelyan</i>	MATE	4.10.54	H. Gravell	A. J. W. Imback, D. L. Lacey, D. Saddler	G. Llewelyn	Hain S.S. Co., Ltd.
<i>Trevince</i>	MATH	20.9.54	R. B. Oliver	A. Seymour, F. Boyd, E. Sprunks, B. Cram	T. Dunne	Hain S.S. Co., Ltd.
<i>Trevoilas</i>	MATL	26.7.54	I. M. Prince	M. Kennet, L. Watson, J. O. Spence	J. Murphy	Hain S.S. Co., Ltd.
<i>Tronda</i>	MMLX	15.10.51	R. J. Sinclair	R. Angus, K. Clow	A. T. Battye	Hain S.S. Co., Ltd.
<i>Truro</i>	G/TQ	5.8.54	W. White	A. Cameron, A. Gillis, R. Stevenson	J. Nicoll	Chr. Salvesen & Co.
<i>Warwick Castle</i>	GRRJ	17.5.52	L. H. Farrow	G. Beaumont, T. Schmidt, J. Spencer	R. C. Cullen	Ellerman's Wilson Line, Ltd.
<i>Woodland</i>	MTCT		R. Bopthwick	G. R. Dyke, G. W. Crutchshank, J. Morgan	W. Davitt	Union Castle Mail S.S. Co., Ltd.
						Currie Line, Ltd.

Marid Ships

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

NAME OF VESSEL	CALL SIGN	CAPTAIN	OWNERS/MANAGERS
<i>Actuality</i>	GPPF	D. O'Leary	F. T. Everard & Sons, Ltd.
<i>Amsterdam</i>	MFBP	C. R. Baxter, D.S.C.	British Transport Commission
<i>Angelo</i>	GQFY	S. N. Stokes	Ellerman's Wilson Line, Ltd.
<i>Ariosto</i>	GKPW	W. C. Gill	Ellerman's Wilson Line, Ltd.
<i>Atlantic Coast</i>	GWSY	J. O. Rowlands	Coast Lines, Ltd.
<i>Barra Head</i>	MPQZ	W. Flett	A. F. Henry & MacGregor, Ltd.
<i>Beaulu</i>	MLZK	J. McGugan	W. Sloan & Co.
<i>Belravoch</i>	MKGV	T. Wallace	London & Edinburgh Shipping Co., Ltd.
<i>Belvina</i>	MLZF	W. Fisher	London & Edinburgh Shipping Co., Ltd.
<i>British Coast</i>	GWQX	R. E. Holt	Coast Lines, Ltd.
<i>British Scout</i>	GJKD	T. S. Rawlingson	British Tanker Co., Ltd.
<i>Brora</i>	MLVY	M. MacIver	William Sloan & Co.
<i>Caledonian Coast</i>	GKXF	J. Webber, M.B.E.	Coast Lines, Ltd.
<i>Cambria</i>	GBKT	N. Lloyd-Williams	British Transport Commission
<i>Cato</i>	GUAK	L. Jenkins	Bristol Steam Nav. Co., Ltd.
<i>Clupea</i>	GOAJ	J. Jappy	Fishery Board for Scotland
<i>Corfen</i>	GDJX	F. S. Granger	Wm. Cory & Son Ltd.
<i>Corfleet</i>	GWTD	A. G. Waller	Wm. Cory & Son, Ltd.
<i>Cormain</i>	MAHT	J. T. Collin	Wm. Cory & Son, Ltd.
<i>Cormead</i>	GDBX	T. Slack	Wm. Cory & Son, Ltd.
<i>Cormist</i>	GDVT	R. J. Barrow	Wm. Cory & Son, Ltd.
<i>Cormoat</i>	GLKV	R. B. Armstrong	Wm. Cory & Son, Ltd.
<i>Cormull</i>	MAHS	E. R. W. Allen	Wm. Cory & Son, Ltd.
<i>Corncrake</i>	MJKL	W. S. Dunlop	Moss Hutchison Line, Ltd.
<i>Crane</i>	MMCS	B. Cooney	Moss Hutchison Line, Ltd.
<i>Drake</i>	MMYC	J. Main	General Steam Nav. Co., Ltd.
<i>Duke of Argyll</i>	GNVX	W. N. Greenwood	British Transport Commission
<i>Duke of Lancaster</i>	GCPQ	J. B. Williams	British Transport Commission
<i>Duke of Rothesay</i>	GNVL	H. Thompson	British Transport Commission
<i>Eildon</i>	MLZL	J. Little	G. Gibson & Co., Ltd.
<i>Empire Cedric</i>	GRSC	W. H. Laws, R.D., R.N.R.	Atlantic Steam Nav. Co., Ltd.
<i>Empire Doric</i>	MAVQ	W. Close	Atlantic Steam Nav. Co., Ltd.
<i>Empire Gaelic</i>	MAVR	H. T. Green	Atlantic Steam Nav. Co., Ltd.
<i>Explorer</i>	MRCZ	G. B. McLaren	Scottish Home Department
<i>Falcon</i>	MXXL	S. W. Develin	General Steam Nav. Co., Ltd.
<i>Golden Dawn</i>	MLZV	A. Adamson, M.B.E., R.D., R.N.R.	A. Adamson, M.B.E.
<i>Great Western</i>	GWRD	D. O. Griffiths	British Transport Commission
<i>Grebe</i>	MAEY	W. S. Lockhart	General Steam Nav. Co., Ltd.
<i>Greyfriars</i>	MLQN	D. Hunt	E. R. Newbiggin, Ltd.
<i>Guernsey Coast</i>	MANS	H. Keilit	British Channel Islands Shipping Co., Ltd.
<i>Harrogate</i>	MNDB	J. M. Walters	Wilson's & N.E. Railway Shipping Co., Ltd.
<i>Hibernia</i>	MBMT	R. A. H. Lord, D.S.C.	British Transport Commission
<i>Hibernian Coast</i>	GKXC	G. Mearns	Coast Lines, Ltd.
<i>Horsa</i>	MPFJ	D. Dickson	Currie Line, Ltd.
<i>Isle of Guernsey</i>	GQYJ	F. Breudlay	British Transport Commission
<i>Isle of Jersey</i>	GRBQ	C. E. Abbey	British Transport Commission
<i>Isle of Sark</i>	GTSR	G. Pierce	British Transport Commission
<i>Jura</i>	MARU	L. J. Blanche	Admiral Shipping Co., Ltd.
<i>Kinnaird Head</i>	GCSQ	G. Henderson	A. F. Henry & MacGregor, Ltd.
<i>London Merchant</i>	MBRZ	C. A. Piper	London Scottish Lines, Ltd.
<i>Maidstone</i>	MNOV	E. H. Ashton	British Transport Commission
<i>Marine Craft Unit</i> (R.A.F.) No. 1102		Flt.-Lt. D. A. Koster	Royal Air Force
<i>Melrose</i>	MCFD	J. Murray	Geo. Gibson & Co., Ltd.
<i>Melrose Abbey</i>	GSYW	J. Blackburn	Hull & Netherlands S.S. Co., Ltd.
<i>Meta</i>	MPWB	A. D. McNab	Clydesdale Shipowners Co., Ltd.
<i>Milo</i>	GQDP	H. E. Lawson	Bristol Steam Nav. Co., Ltd.
<i>Minna</i>	GKPS	T. Mather	Fishery Board for Scotland
<i>Moray Coast</i>	MKDL	J. Richardson	Coast Lines, Ltd.
<i>Narva</i>	GQFP	R. J. McNinch	Glen & Co. (Scottish Nav. Co., Ltd.)
<i>Ocean Coast</i>	GYMP	G. H. Clarke	Coast Lines, Ltd.
<i>Pluto</i>	GUAB	G. V. Barnes	Bristol Steam Nav. Co., Ltd.
<i>Peregrine</i>	GIGM	W. Lockhart	General Steam Nav. Co., Ltd.
<i>Princess Maud</i>	GWRT	E. A. Horspool	British Transport Commission
<i>Rattray Head</i>	GCBR	J. Graham	A. F. Henry & MacGregor, Ltd.
<i>Ringdove</i>	GRKK	E. C. Painter, D.S.C.	General Steam Nav. Co., Ltd.
<i>Rora Head</i>	MKVB	A. F. Ramsay	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>Runa</i>	GFSW	T. Henry, O.B.E.	Clydesdale Shipowners Co., Ltd.
<i>St. Clair</i>	MMFX	T. Gifford	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>St. Clement</i>	GRGM	W. J. Ramsay	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>St. Helier</i>	GLBT	W. Baker	British Transport Commission
<i>St. Julien</i>	GLBV	L. J. Richardson	British Transport Commission
<i>St. Magnus</i>	GFYK	W. McKay	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>St. Ninian</i>	GJBB	A. M. Dundas	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
<i>Selby</i>	MLFT	A. C. Allen	Wilson's & N.E. Railway Shipping Co., Ltd.
<i>Slieve Bawn</i>	MQQC	W. J. Roberts	British Transport Commission
<i>Slieve Bearnagh</i>	MLNL	C. R. Gill	British Transport Commission
<i>Slieve Bloom</i>	MQDD	A. Robertson	British Transport Commission

Marid Ships—contd.

NAME OF VESSEL	CALL SIGN	CAPTAIN	OWNERS/MANAGERS
<i>Sieve League</i>	MQCM	E. E. Bradshaw	British Transport Commission
<i>Sieve More</i>	MQBM	R. Roberts	British Transport Commission
<i>Southern Coast</i>	MASD	G. Goldman	Coast Lines, Ltd.
<i>Suffolk Coast</i>	MMVC	T. Taylor	Tyne Tees Shipping Co., Ltd.
<i>Teal</i>	GBXC	C. C. Reynolds	General Steam Nav. Co., Ltd.
<i>Thelma</i>	MBKK	F. Fairweather	Clydesdale Shipowners Co., Ltd.
<i>Vanellus</i>	GDVW	J. E. Green	British & Continental S.S. Co., Ltd.
<i>Vienna</i>	GTBR	A. Pearson Sutton	Ministry of Transport
<i>Yarmouth Trader</i>	GUAP	R. A. Goodings	Great Yarmouth Shipping Co., Ltd.

Trawlers and North Sea Traders

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

NAME OF SHIP	CALL SIGN	MASTER	OWNERS/MANAGERS
Trawlers:			
<i>Ernest Holt</i>	GFXD	H. J. Aldiss	Ministry of Agriculture and Fisheries
<i>St. Alciun</i>	MGCW	J. Dobson	T. Hamling & Co., Ltd.
<i>St. Amant</i>	GFVD	A. Munger	T. Hamling & Co., Ltd.
<i>St. Britwin</i>	MFJX	J. H. Miller	T. Hamling & Co., Ltd.
North Sea traders:			
<i>Carlo</i>	GOKL		Ellerman's Wilson Line, Ltd.
<i>Netherlands Coast</i>	MLK		Tyne-Tees Shipping Co., Ltd.

Lightvessels

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

NAME OF VESSEL	MASTERS
<i>Bar</i>	E. E. Abbott, N. S. Burns
<i>Dowsing</i>	J. R. Audley, S. R. Smith
<i>East Goodwin</i>	L. W. Ling, N. J. Hawkes, W. H. Price
<i>Galloper</i>	S. J. Vincent
<i>Humber</i>	F. I. Butcher, L. A. Brett
<i>Newarp</i>	T. J. Sales, W. J. Rogers, R. J. Middleton
<i>Royal Sovereign</i>	L. Dawson, S. Sharman
<i>St. Gowan</i>	H. G. T. Morgan
<i>Seven Stones</i>	J. H. Cooper, J. Appleby
<i>Shambles</i>	W. C. Moulard, C. H. Duff
<i>Shipwash</i>	G. W. Broom, C. G. Isaac
<i>Skulmartin</i>	D. Hawkins
<i>Smith's Knoll</i>	W. J. Hall, J. W. R. Reeve, B. Hadden

Training Establishments

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

ESTABLISHMENT	CAPTAIN/SUPERINTENDENT	LAST RETURN RECEIVED
<i>Conway</i> , H.M.S.	E. Hewitt, R.D., Capt., R.N.R.	3-8-54
<i>Pangbourne</i> Nautical College	H. C. Skinner, O.B.E., Cdr., R.N.	3-8-54
<i>Warsash</i> , School of Navigation	G. W. Wakeford, Capt.	5-8-54
<i>Worcester</i> , H.M.S.	G. C. Steele, V.C., Capt., R.N.R.	26-7-54

AUSTRALIA

Voluntary Observing Ships

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

NAME OF VESSEL	OWNERS
Selected Ships:	
<i>Asphalion</i>	Alfred Holt & Co.
<i>Bulolo</i>	Burns Philp & Co., Ltd.
<i>Canara</i>	British India Steam Navigation Co.
<i>Charon</i>	Alfred Holt & Co.
<i>Chupra</i>	British India Steam Navigation Co.
<i>Duntroon</i>	Melbourne Steamship Co., Ltd.
<i>Gorgon</i>	Alfred Holt & Co.
<i>Idomeneus</i>	Alfred Holt & Co.
<i>Koolinda</i>	Western Australian State Steamships
<i>Koomilya</i>	McIlwraith McEacheron, Ltd.
<i>Koorawatha</i>	McIlwraith McEacheron, Ltd.
<i>Kooringa</i>	McIlwraith McEacheron, Ltd.
<i>Lowana</i>	Melbourne Steamship Co., Ltd.
<i>Malaita</i>	Burns Philp & Co., Ltd.
<i>Malekula</i>	Burns Philp & Co., Ltd.
<i>Nellore</i>	Eastern and Australian Steamship Co., Ltd.
<i>Orestes</i>	Alfred Holt & Co.
<i>Triadic</i>	British Phosphate Commission
<i>Trienza</i>	British Phosphate Commission
<i>Triona</i>	British Phosphate Commission
<i>Wanganella</i>	Huddart Parker & Co., Ltd.
<i>Westralia</i>	Huddart Parker & Co., Ltd.
Supplementary Ship:	
<i>Kabbarli</i>	Western Australian State Steamships

CANADA

Voluntary Observing Ships

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

NAME OF VESSEL	CALL SIGN	OWNERS
Atlantic list:		
<i>Beaverbrae</i>	VCPO	Canadian Pacific Steamships, Ltd.
<i>Canadian Challenger</i>	VGSK	Canadian National Steamship Co., Ltd.
<i>Canadian Conqueror</i>	VCPV	Canadian National Steamship Co., Ltd.
<i>Canadian Constructor</i>	VGBY	Canadian National Steamship Co., Ltd.
<i>Canadian Cruiser</i>	VGPZ	Canadian National Steamship Co., Ltd.
<i>Canadian Highlander</i>	VCPP	Canadian National Steamship Co., Ltd.
<i>Cyrus Field</i>	GKQC	Western Union Cable Depot
<i>Esso Knoxville</i>	HPTK	Imperial Oil Shipping Co.
<i>Fort Avalon</i>	MBMC	Furness Withy & Co.
<i>Fort Hamilton</i>	GCSS	Furness Withy & Co.
<i>Imperial Alberta</i>	VGSF	Imperial Oil Shipping Co., Ltd.
<i>Imperial Charlottetown</i>	VDWC	Imperial Oil Shipping Co., Ltd.
<i>Imperial Edmonton</i>	VGSJ	Imperial Oil Shipping Co., Ltd.
<i>Imperial Fredericton</i>	VDWB	Imperial Oil Shipping Co., Ltd.
<i>Imperial Toronto</i>	VGSZ	Imperial Oil Shipping Co., Ltd.
<i>Lake Kootenay</i>	VDZY	Western Canada S.S. Co.
<i>Lakonia</i>	GCDB	Balfour Guthrie, Ltd.
<i>Lord Kelvin</i>	GDMN	Western Union Cable Depot
<i>Maplecove</i>	GNLX	Canadian Pacific S.S. Co.
<i>Mapledell</i>	GBBS	Canadian Pacific S.S. Co.
<i>Mont Alta</i>	VGVC	Buries, Marks, Ltd.
<i>Ottawa Valley</i>	GKQY	Trinder, Anderson & Co., Ltd.
<i>Paloma Hills</i>	VGGX	Shell Canadian Tankers, Ltd.
<i>Pinnacles</i>	VGGZ	Shell Canadian Tankers, Ltd.
<i>Rincon Hills</i>	VGGY	Shell Canadian Tankers, Ltd.
<i>Rupertisland</i>	VDXX	Hudson's Bay Co.
<i>Sunjarv</i>	VGVQ	Saguenay Terminals, Ltd.
<i>Sunwhit</i>	VCKZ	Saguenay Terminals, Ltd.

CANADA—Voluntary Observing Ships (continued)

NAME OF VESSEL	CALL SIGN	OWNERS
Pacific list:		
<i>Angusdale</i>	VGGQ	Lunham & Moore Shipping, Ltd.
<i>Fort Hearne</i>	VCGX	Hudson's Bay Co.
<i>Lakemba</i>	VPKV	B.C. Ship Chartering Co.
<i>Lake Minnewanka</i>	VCNC	Western Canada S.S. Co.
<i>Mossel Bay</i>	GKCB	Western Canada S.S. Co.
<i>Waihemo</i>	ZMJO	Canadian Australasian Line
<i>Waikawa</i>	ZMHU	Canadian Australasian Line
<i>Wairuna</i>	ZMMQ	Canadian Australasian Line
<i>Waitomo</i>	ZMKO	Canadian Australasian Line
Lightships:		
<i>Lurcher</i>		Minister of Transport
<i>Sambro</i>		Minister of Transport

BERMUDA

Voluntary Observing Ships

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

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

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	OWNERS
Selected Ships:	
<i>Kauri</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Karitane</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kairanawa</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kaitoke</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kawaroa</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kawatiri</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Komata</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kopua</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Koromiko</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kowhai</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kurou</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kurutai</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Matua</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Maui Pomare</i>	New Zealand Government
<i>Manowai</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Tofua</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Waimate</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Waimea</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Waipori</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Wairata</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Wairimu</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Waitemata</i>	Union Steam Ship Company of New Zealand, Ltd.
Supplementary Ships:	
<i>Kaiapoi</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kairanga</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kaitangata</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Kaitawa</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Katui</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Konui</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Korowai</i>	Union Steam Ship Company of New Zealand, Ltd.
<i>Piri</i>	Imperial Chemical Industries, Ltd.
<i>Port Waikato</i>	Holm & Company, Ltd.
<i>Vasu</i>	Tasman Steam Ship Company of New Zealand, Ltd.
<i>Viti</i>	Tasman Steam Ship Company of New Zealand, Ltd.
<i>Waiana</i>	Union Steam Ship Company of New Zealand, Ltd.

INDIA

Voluntary Observing Ships

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

NAME OF VESSEL	CALL SIGN	OWNERS
Selected Ships:		
<i>Alavi</i>	VWBL	The Mogul Line, Ltd.
<i>Bahadur</i>	MAVH	Asiatic Steam Navigation Co., Ltd.
<i>Dara</i>	GDTT	British India Steam Navigation Co., Ltd.
<i>Daressa</i>	GFSM	British India Steam Navigation Co., Ltd.
<i>Dumra</i>	GMLA	British India Steam Navigation Co., Ltd.
<i>Dwarka</i>	GCKS	British India Steam Navigation Co., Ltd.
<i>Havildar</i>	GLVK	Asiatic Steam Navigation Co., Ltd.
<i>Indian Exporter</i>	VWVW	India Steamship Co., Ltd.
<i>Indian Merchant</i>	VWVR	India Steamship Co., Ltd.
<i>Indian Pioneer</i>	VWVS	India Steamship Co., Ltd.
<i>Indian Trader</i>	VWVT	India Steamship Co., Ltd.
<i>Islami</i>	VWJC	The Mogul Line, Ltd.
<i>State of Bombay</i>	VWWP	Scindia Steam Navigation Co., Ltd.
<i>Jal-duta</i>	VWDJ	Scindia Steam Navigation Co., Ltd.
<i>Jalaganga</i>	VWJG	Scindia Steam Navigation Co., Ltd.
<i>Jalajawahar</i>	VWWN	Scindia Steam Navigation Co., Ltd.
<i>Jalaketu</i>	VWWC	Scindia Steam Navigation Co., Ltd.
<i>Jalakrishna</i>	VWJM	Scindia Steam Navigation Co., Ltd.
<i>Jalakirti</i>	VWWD	Scindia Steam Navigation Co., Ltd.
<i>Jalamanjari</i>	VWWY	Scindia Steam Navigation Co., Ltd.
<i>Jalamani</i>	VWJK	Scindia Steam Navigation Co., Ltd.
<i>Jalaprakash</i>	VWYD	Scindia Steam Navigation Co., Ltd.
<i>Jalayamuna</i>	VWJI	Scindia Steam Navigation Co., Ltd.
<i>Jehangir</i>	VWBJ	The Mogul Line, Ltd.
<i>Kampala</i>	GCKX	British India Steam Navigation Co., Ltd.
<i>Karanja</i>	MACS	British India Steam Navigation Co., Ltd.
<i>Mahadevi</i>	GCRN	Asiatic Steam Navigation Co., Ltd.
<i>Maharaja</i>	GNBY	Asiatic Steam Navigation Co., Ltd.
<i>Mozaffari</i>	MACV	The Mogul Line, Ltd.
<i>Nadir</i>	GCDV	Asiatic Steam Navigation Co., Ltd.
<i>Nurani</i>	MAPS	Asiatic Steam Navigation Co., Ltd.
<i>Rajula</i>	GMSN	British India Steam Navigation Co., Ltd.
<i>Santhia</i>	GFSN	British India Steam Navigation Co., Ltd.
<i>Shahjehan</i>	GPUX	Asiatic Steam Navigation Co., Ltd.
<i>State of Saurashtra (Bombay)</i>	VWXY	Scindia Steam Navigation Co., Ltd.
<i>Subadar</i>	MADK	Asiatic Steam Navigation Co., Ltd.
<i>Umaria</i>	GMNS	British India Steam Navigation Co., Ltd.
<i>Warla</i>	GZFC	British India Steam Navigation Co., Ltd.
Supplementary Ships:		
<i>Amra</i>	GNNX	British India Steam Navigation Co., Ltd.
<i>Badarpur</i>	MAUS	Burmah Oil Co., Ltd.
<i>Bharatjal</i>	VWXC	Bharat Line, Ltd.
<i>Bharatmata</i>	VWXF	Bharat Line, Ltd.
<i>Bharatmitra</i>	VWYX	Bharat Line, Ltd.
<i>Bharatraya</i>	VWXL	Bharat Line, Ltd.
<i>Bharatrani</i>	VWXM	Bharat Line, Ltd.
<i>Bharatveer</i>	VWZY	Bharat Line, Ltd.
<i>Bharatvijaya</i>	VWZK	Bharat Line, Ltd.
<i>Indian Commerce</i>	VWZW	India Steamship Co., Ltd.
<i>Indian Importer</i>	VWYT	India Steamship Co., Ltd.
<i>Itaura</i>	GMWW	British India Steam Navigation Co., Ltd.
<i>Jaladurga</i>	VWDX	Scindia Steam Navigation Co., Ltd.
<i>Jalagopal</i>	VWGB	Scindia Steam Navigation Co., Ltd.
<i>Jalakendra</i>	VWWR	Scindia Steam Navigation Co., Ltd.
<i>Jalamayur</i>	VWWX	Scindia Steam Navigation Co., Ltd.
<i>Jalamohan</i>	GOFZ	Scindia Steam Navigation Co., Ltd.
<i>Jalapadma</i>	VWYN	Scindia Steam Navigation Co., Ltd.
<i>Jalarajendra</i>	GFPF	Scindia Steam Navigation Co., Ltd.
<i>Jalaratna</i>	VWDS	Scindia Steam Navigation Co., Ltd.
<i>Malika</i>	GCSK	Asiatic Steam Navigation Co., Ltd.
<i>Risaldar</i>	GLVL	Asiatic Steam Navigation Co., Ltd.
<i>Rizwani</i>	VWBF	The Mogul Line, Ltd.
<i>Sofala</i>	GDDP	British India Steam Navigation Co., Ltd.
<i>State of Andhra</i>	VWBD	Scindia Steam Navigation Co., Ltd.

HONG KONG Voluntary Observing Ships

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

NAME OF SHIP	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	SHIPPING COMPANY OR OPERATOR
<i>Anking</i>	J. McKinlay	A. W. K. Prosser, L. W. Rothwell, G. W. Bryant	R. A. Wilson	China Navigation Co., Ltd.
<i>Anshan</i>	A. Naismith	A. V. Harrison, J. A. McDonald, D. Green	Li San Kau	China Navigation Co., Ltd.
<i>Belinda</i>	A. H. Bathurst	A. Moyses, Wu Chuen King, Wong Chai On	Ip Kee Tseung	Shun Cheong Steam Navigation Co., Ltd.
<i>Castle Peak</i>	A. L. Waites	J. S. Clarke, Yuan King Lau, M. A. Henry	Kwok Shek Hee	Molters Ltd.
<i>Changsha</i>	F. N. Booth	G. Baxter, I. F. Robertson, J. W. G. Wilby	Pang Ting Yee	China Navigation Co., Ltd.
<i>Choy Sang</i>	D. G. R. Kinnear	G. J. Eastwood, M. J. Pope, M. Tonner	J. D. Clifton	Indo-China Steam Navigation Co., Ltd.
<i>Chun Sang</i>	L. C. Cox	M. J. K. Crichton, C. M. Gibbs, J. G. McArdle	D. J. O'Moore	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Glory</i>	H. J. Cairns	P. G. Harkness, J. Taylor, I. D. Patterson	A. C. Martin	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Queen</i>	S. Schofield	E. M. Norman, G. H. Thompson, J. Parish, C. A. Bradley	R. O. Smith	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Saga</i>	E. J. Thomson	G. Parish, J. P. B. Stormont, J. W. Nugent, C. J. Farren	H. C. Urquhart	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Star</i>	H. G. Goddard	C. Thomson, P. K. Phoenix, J. Hardisty, J. B. Bowman	A. Smith	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Trader</i>	A. C. Tai	H. C. Chen, C. H. Huang, C. Y. Lee	C. Y. Lee	Great Southern Steamship Co., Ltd.
<i>Elebeth</i>	E. L. M. Merrett	G. Sacellary, O. Y. Wellington	K. Y. Pun	Shun Cheong Steam Navigation Co., Ltd.
<i>E Sang</i>	N. H. King	P. K. Leary, J. R. Simpson, G. C. Taylor	P. M. Matley	Indo-China Steam Navigation Co., Ltd.
<i>Fengfeng</i>	J. W. Evans	J. R. Keddie, H. Nightingale, P. Bulatoff	Leung Man Hin	China Navigation Co., Ltd.
<i>Fengtien</i>	G. P. Cope	L. L. Watson, T. A. C. Taylor, L. J. Wang	Leung Kan	China Navigation Co., Ltd.
<i>Foochow</i>	W. E. Avcock	D. L. Wilson, D. S. M. Tosh, G. F. Chan	Chin Fook On	China Navigation Co., Ltd.
<i>Fort Charlotte</i>	R. G. Edmonds	R. J. Secombe, A. Johnson, W. Sey	G. H. Parker	Royal Fleet Auxiliary
<i>Fukien</i>	J. Storey	J. R. Brett, J. M. Parker, J. C. Mark	Yeung Wai Ki	China Navigation Co., Ltd.
<i>Funing</i>	H. Pilling	J. F. O'Connor, E. Clent, J. K. Chan	D. Fong Yang	China Navigation Co., Ltd.
<i>Hai Hing</i>	T. Thorkildsen	E. T. Sorensen, Clas Asserson, Alf. Gronvik	Tam Wing Kin	China Siam Line
<i>Hai Lee</i>	O. Apold	B. K. Pedersen, John Leren, Helge Johansen	Wuie lu Chang	China Siam Line
<i>Hai Meng</i>	T. Stange-Olsen	B. Thodesen, Leif Andas, A. Overland	Chan Kam Tsun	China Siam Line
<i>Hang Sang</i>	J. H. Thomas	C. M. Wilson, H. Worton, K. C. Yeung	Chan Kwok Chuen	Indo-China Steam Navigation Co., Ltd.
<i>Han Yang</i>	J. F. Follert	A. Bartley, A. H. McAuley, C. L. Tse	Cheung Shau Wai	China Navigation Co., Ltd.
<i>Heinrich Jessen</i>	J. P. Johansen	J. Holst, W. Kronenbitter, G. J. Andersen	Wong Ka Tong	China Navigation Co., Ltd.
<i>Helios</i>	Nils Soelberg	G. Sundholm, Ivar Krogstad, O. Johannessen	Ip Yuk Fai	China Siam Line
<i>Hermelin</i>	Leif Eide	J. Begewald, R. Skarpeness, O. Andreasen	Lai Kwong Yin	China Siam Line
<i>Hermid</i>	J. Eide	K. Kristoffersen, A. Sjoberg, H. Wold	So Yuet Hang	China Siam Line
<i>Hew Sang</i>	W. I. Bartlett	R. W. E. Little, W. G. White, A. Nelson	Ho Hung Ki	Indo-China Steam Navigation Co., Ltd.
<i>Hin Sang</i>	G. W. F. Edwards	L. I. Ovsiannikoff, J. H. Gould, T. Y. Yuen	Ma Ping Leung	Indo-China Steam Navigation Co., Ltd.
<i>Hoi Hoiw</i>	A. Fjeldheim	O. Utseth, A. Vespestad, R. Ronning	H. H. Fastingsen	Karsten Larsen & Co. (Hong Kong), Ltd.
<i>Hoi Wong</i>	M. Bierkenes	O. Ofteidal, R. Okland, T. Thomassen	A. J. Takvam	Karsten Larsen & Co. (Hong Kong), Ltd.
<i>Hunan</i>	R. E. Selwyn-Jones	W. J. Coburn, E. R. Jones, K. Y. Lee	Lam Bun	China Navigation Co., Ltd.
<i>Hupei</i>	W. E. Hargrave	F. T. Quinn, J. E. Lyon, P. Y. Lam	Yu Pak Pui	China Navigation Co., Ltd.
<i>Yacob Yebesen</i>	G. R. Hansen	A. Lassen, T. Decker, Fung Choa Hung	E. Belard	China Navigation Co., Ltd.
<i>Lok Sang</i>	T. C. W. Marr	J. M. Marshall, V. W. Pinnington, R. Bromfield	J. Carlan	Indo-China Steam Navigation Co., Ltd.
<i>Mui Hock</i>	H. Benneche	O. A. Antonsen, Henry Hansen, E. Johansen	Leung Che Yung	Chin Seng Hong Shipping Co., Ltd.
<i>Pakhoi</i>	G. T. M. Ramsay	W. Davidson, G. Gilroy, W. Lee	Tsang Kau	China Navigation Co., Ltd.
<i>Poyang</i>	N. McMillan	C. N. Stewart, M. Clent, I. F. Lee	Tong Sik Iu	China Navigation Co., Ltd.
<i>Produce</i>	L. Hetland	J. Samuelsen, L. Fagerland, A. Sondervik	S. C. Ong	Karsten Larsen & Co. (Hong Kong), Ltd.

<i>San Jorge</i>	..	E. D. Holmes	..	R. Le Juge De Segrais, G. H. Rich, J. A. Cabral	..	P. S. Beryar	..	John Manners & Co., Ltd.
<i>Shansi</i>	..	E. Bruce	..	R. G. W. Gorman, S. W. Owen, S. H. Damp	..	E. G. Inwood	..	China Navigation Co., Ltd.
<i>Shengking</i>	..	E. H. Histed	..	W. Pollock, S. M. Readers, K. C. Lo	..	Wai Pun Un	..	China Navigation Co., Ltd.
<i>Shillong</i>	..	G. A. Wild	..	T. Whinyates, A. R. Turner, A. E. Merrick, A. F. Gorton	..	J. F. Meaney	..	Mackinnon, Mackenzie & Co. (Hong Kong), Ltd.
<i>Sinkiang</i>	..	F. Hindle	..	P. Flory, R. N. Frappell, M. B. Fowkes	..	R. A. Castro	..	China Navigation Co., Ltd.
<i>Sirdhana</i>	..	W. Brawn	..	A. J. Woodcock, V. P. Harvey, R. M. Giles	..	D. C. Mathison	..	Mackinnon, Mackenzie & Co (Hong Kong), Ltd.
<i>Soochow</i>	..	J. Taylor	..	J. Hunter, D. A. Hutchinson, R. E. Easley	..	Li In San	..	China Navigation Co., Ltd.
<i>Star Alcyone</i>	..	G. V. A. Almstrom	..	R. G. Grasman, F. J. A. Hartmann, C. I. Blomqvist	..	P. E. G. Wengelin	..	Everett Steamship Corporation
<i>Star Betelgeuse</i>	..	C. H. Jungbark	..	W. F. Ringstrom, G. R. B. Forsberg, T. G. Strandlund	..	P. G. Nilsson	..	Everett Steamship Corporation
<i>Szechuen</i>	..	W. J. Bunney	..	C. Stark, A. Atkin, F. Coulson	..	Choi Pong Cheung	..	Shun Cheong Steam Navigation Co., Ltd.
<i>Tai Chung Shan</i>	..	C. L. V. Dury	..	W. J. Windrim, Li Yat Sang, Chan Mow Tung	..	Chan So	..	Australia Oriental Line
<i>Tai Ping</i>	..	N. L. Hall	..	R. A. Smith, A. G. Hunt, C. C. Springall	..	Leung Cheuk Shing	..	China Navigation Co., Ltd.
<i>Tai Yuan</i>	..	Y. N. Campbell	..	A. Harper, L. P. James, R. E. Brooks	..	L. J. S. Cohn	..	Indo-China Steam Navigation Co., Ltd.
<i>Tak Sang</i>	..	M. I. Groundwater	..	G. Kinley, E. E. Ewbank, K. Y. Feng	..	S. A. Erlansson	..	Everett Steamship Corporation
<i>Thai</i>	..	E. V. Lieberath	..	P. A. Perswald, K. A. Albertson, B. H. Johansen	..	A. G. Lum	..	Indo-China Steam Navigation Co., Ltd.
<i>Wing Sang</i>	..	J. F. G. Fotheringham	..	P. J. Sullivan, P. C. Whittle, Ko Ken Jen	..	P. J. Behan	..	Indo-China Steam Navigation Co., Ltd.
<i>Wo Sang</i>	..	W. E. Reeve	..	J. Adair, P. G. Bush, A. W. Lloyd-Taylor	..	Yue Shiu Ming	..	China Navigation Co., Ltd.
<i>Yachow</i>	..	A. J. Keddie	..	Liu Shih Hsin, M. J. Clark, R. A. Burton	..	Lo Kin Chek	..	China Navigation Co., Ltd.
<i>Yunnan</i>	..	F. Kelly	..	K. A. Page, F. Cunningham, C. F. Yang	

SOUTH AFRICA

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

NAME OF SHIP	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS
<i>Abraham Larsen</i>	E. Christophersen	H. G. Amor, L. D. Moon	J. Klosser	Union Whaling Co., Durban
<i>Africana II</i>	R. L. V. Shannon, O.B.E.	M. Williams, G. P. Brand, R. J. Shipp		Division of Fisheries, Cape Town
<i>Aloe</i>	S. S. Edwards	A. A. Ruckbite		South African Railways Ships, Cape Town
<i>F. T. Bates</i>	R. W. Watson	I. S. McKean, G. R. Davies, D. W. R. Reeve	D. Wittridge	South African Railways & Harbours
<i>Benin</i>	T. E. M. Jenkins	D. Powell, A. D. Forster, A. Bluett, P. Jackson	A. Briggs	Elder Dempster Lines
<i>Constantia</i>	A. C. Thomas	S. J. Hurst, P. Carrington, S. H. Damp	J. Flutman	South African Marine Corporation, Cape Town
<i>Dalia</i>	E. N. Stewart	E. Ladbrooke, R. G. Addinall, I. Mackintosh		South African Railways Ships, Johannesburg
<i>Gilia</i>	J. Lundberg, M.B.E.	M. A. Hoffman	P. Soper	Irving & Johnson, Ltd., Cape Town
<i>Kaapland</i>	P. F. M. Buchholtz	P. J. Le Marchand, G. B. Perkins		South Africa Lines, Cape Town
<i>Mashona Coast</i>	L. Coltham	A. Pearson, F. D. Liggat, C. Etherington	G. Adey	Thesen's Steamship Co., Cape Town
<i>Matabele Coast</i>	E. Hale	P. Sharp, W. Storm, R. Underwood	H. A. Pypers	Thesen's Steamship Co., Cape Town
<i>Morgenster</i>	D. W. Thorpe	G. P. Stevens		South African Marine Corporation, Cape Town
<i>Noordewal</i>	D. C. Wallwork	J. Van der Veer	S. P. Garnett	Van Riebeeck Lines, Cape Town
<i>Ovambo Coast</i>	P. Bolmm	H. Poulton, D. H. Harris, K. Macnish	L. Stanley	Thesen's Steamship Co., Cape Town
<i>Tristania</i>	O. Mohr			Tristan Development Co., Cape Town
<i>Verzelegen</i>	F. Honeyman			South African Marine Corporation, Cape Town
South African Nautical College	G. V. Legassick, D.S.C., R.D., Capt. R.N.R.	The Senior Cadets		
Naval Gymnasium, Saldanha Bay	Lt.-Cdr. P. Selk	The Senior Trainees		

MALAYA
Voluntary Observing Ships

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

NAME OF VESSEL	CALL SIGN	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS
<i>Bentong</i>	ZBNF	P. H. Philips	D. Ferrier	P. N. Nair	Straits Steamship Co., Ltd.
<i>Islander</i>	VSPS	E. C. Gray	J. E. Hall	K. A. Taylor	Boustead Co., Ltd.
<i>Katon</i>	ZBNR	G. Heaton	A. D. Watterson	K. A. Menon	Straits Steamship Co., Ltd.
<i>Kimanis</i>	VSND	R. P. Atkinson	R. G. Ogden, B. F. Rehse	F. M. Fernandez, R. Nemesius	Straits Steamship Co., Ltd.
<i>Larut</i>	VPKO	T. Hooper	N. G. Leslie	P. Rozario	Straits Steamship Co., Ltd.
<i>Matang</i>	VSPB	J. M. Harkness	J. C. Officer	J. Sinclair	Straits Steamship Co., Ltd.
<i>Stanley Angwin</i>	GNXG	C. C. R. Evans	N. H. Smith, K. Matheson, E. Bloomfield	D. Mahony	Cable & Wireless, Ltd.

Meteorology for Aviators

By R. C. SUTCLIFFE, Ph.D.



THIS volume aims to present in a compact form the aspects of meteorology important in aviation. The pilot of average keenness who wishes to make himself sufficiently a master of the subject for success and efficiency in his profession will find Dr. Sutcliffe's book very useful, as it covers the necessary field with the proper perspective. It is of particular interest to those who have neither the time nor always the inclination to study the whole literature of meteorological science, and who may not have the basic scientific training necessary to follow the presentation in the more technical publications.

With Charts

Price 10s.

By post 10s. 6d.

Obtainable from

HER MAJESTY'S STATIONERY OFFICE

at the addresses on title page
or through any bookseller

Marine Observer's Handbook

7th Edition, 1950

(reprinted 1952)

A standard reference work for the ship's officer since it was first published; this new and improved edition was written primarily to assist officers in British Commonwealth vessels, who carry out voluntary observations at sea for Meteorological Services, to do the work in the most efficient and uniform way. It provides a comprehensive and valuable source of information for those who are interested in meteorology, but who have little or no specialized knowledge.

ILLUSTRATED

Price 10s. 6d. By post 10s. 11d.

FROM

HER MAJESTY'S STATIONERY OFFICE

AT THE ADDRESSES ON TITLE PAGE

OR THROUGH ANY BOOKSELLER