

Met.O. 786

The Marine Observer

*A quarterly journal of Maritime
Meteorology*



Volume XXXVII No. 217

July 1967

PRICE 6s. 6d. NET

METEOROLOGICAL OFFICE

Surface Current Charts of Western N. Pacific

This is one of a series of five atlases giving a world-wide coverage of the ocean current circulation, now reprinted with minor amendments.

The atlas, numbered Met.O. 485 and entitled Quarterly Surface Current Charts of the Western North Pacific Ocean, covers the area north of the equator to 60°N and westward of longitude 160°W. Monthly chartlets of the China Seas are also included.

The quarterly charts comprise:

- (a) surface current roses;
- (b) surface current, predominant directions and average rates;
- (c) surface current vector means.

These charts have been compiled from observations of surface currents sent to the Meteorological Office by voluntary marine observers in British merchant ships (supplemented by observations extracted from certain foreign publications) and from observations made in H.M. ships forwarded by the Hydrographer of the Navy. The observations cover the period 1855 to 1939.

The atlas, which is available on free loan to U.K. voluntary observing ships from their Port Meteorological Officers, may be purchased from H.M. Stationery Office at 50s. net (by post 51s. 3d.).

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THE MARINE OBSERVER

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

VOL. XXXVII

No. 217

JULY 1967

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*Letters to the Editor, and books for review, should be sent to the Editor, "The Marine Observer,"
Meteorological Office, Eastern Road, Bracknell, Berkshire*

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

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Editorial

"There's glory for you!" said Humpty Dumpty.

"I don't know what you mean by 'glory'," Alice said.

Humpty Dumpty smiled contemptuously. "Of course you don't—till I tell you. I meant 'there's a nice knock-down argument for you!'"

"But 'glory' doesn't mean 'a nice knock-down argument'," Alice objected.

"When *I* use a word," Humpty Dumpty said in rather a scornful tone, "it means just what I choose it to mean—neither more nor less."

"The question is," said Alice, "whether you *can* make words mean so many different things."

"The question is," said Humpty Dumpty, "which is to be master—that's all."

Lewis Carroll, *Through the Looking Glass*.

The Concise Oxford Dictionary gives no fewer than seventeen definitions of the word 'glory', none of which would have satisfied Humpty Dumpty as long as he continued in the mood in which he interviewed Alice, though two of them, aureole and halo, might partially satisfy the meteorologist. But the student of Chapter II of the *Marine Observer's Handbook* (and we hope that all voluntary marine observers come within this category) will know that the word is applied to the coloured rings of light which an observer may see surrounding his own shadow when thrown upon fog by a low altitude sun, the whole phenomenon being known as the Brocken Spectre and quite common in Arctic regions.

The phrase 'different ships, different longsplices' is one which might well come ashore to be known as 'different users, different meanings' for there must be many words in common use which have different meanings in different professions.

One of the jobs which fall to the lot of the writer is to represent the 'user interest' on the editorial board which passes the meteorological, ocean current and ice texts which appear in each volume of the Admiralty *Pilots*. Though the *Pilots* themselves are actually Hydrographic Office publications, these particular texts are written and revised in the Meteorological Office, each necessarily by an expert in the individual field and, because the meteorologist, oceanographer or glaciologist may sometimes attach to a word a different meaning from that understood by a mariner, it has seemed prudent that a sailor shall be consulted before the texts actually appear in print. The word 'clear', for instance, to a meteorologist implies a sky with little or no cloud, whereas to a mariner it implies that the horizontal visibility is adequate for safe navigation. In the *Pilots*, therefore, this word is never used by itself but the meteorologist's 'clear day' is always termed a 'day with little cloud' and the sailor's 'clear day' becomes a 'day of good visibility'.

Similarly, were it not for the presence of a sailor on the board, undue prominence might be given to an item which interests the expert rather than the sailor and, conversely, material of interest to the sailor might be played down. Rainfall is a good example of this; the meteorologist is interested in the distribution and extent of rainfall because it is so very symptomatic of weather developments and, over the ocean, has a vital bearing on the interchange of energy between the air and sea, the basic cause of weather itself; that is why we are constantly asking officers to enter in the remarks column of their meteorological logbooks the time and duration of precipitation. But to the mariner, except in so far as it affects visibility, rain at sea has little more than nuisance value though in port it becomes important to him when it affects cargo work. Cloud cover, too, is important to the meteorologist wherever it occurs but the mariner will normally be interested in this only when he is clear of the land and depends on its sparseness for his ability to take sights.

This editorial board has also to bear in mind the possibility of a *Pilot* being translated into the language of a maritime country which does not produce its own *Pilots*; the same may be said of many other works: our *Meteorology for Mariners*, for instance, has been translated into Russian and is used as a meteorological textbook in their ships. For this reason, words used in our textbooks must be chosen

with care and the colloquial expression must be avoided, much though this may detract from the general readability of the book.

The Member of Parliament for Rochester and Chatham who, in addressing an international conference in Delhi last year, used the expression 'out of sight, out of mind' was no doubt surprised to have it come back to her on re-translation as 'invisible idiot'. Of meteorological interest, though perhaps somewhat apocryphal, is the schoolboy howler whereby the French expression 'il fait des éclairs', implying that lightning was present, became 'he is making cream buns'; no doubt the same schoolboy would have given a similar translation of 'il fait des éclaircies', the true implication of which is that the sky is clearing. The latter two examples provide an unanswerable argument in favour of the international figure code for, however meagre their knowledge of each other's tongue, a ww of 13, for instance, means the same to an Englishman as to a Frenchman: 'lightning visible, no thunder heard' to the former and 'éclairs visible, tonnerre non entendu' to the latter, translate how they may.

It is perhaps not out of place here to invite the attention of ships' officers once again to the chapters on phenomena (Chapters 8-12 inclusive) of the *Marine Observer's Handbook*, for many phenomena are all too frequently given the wrong label in meteorological logbooks. A meteor, for instance, a body which burns out in the atmosphere, is frequently described as a meteorite, an exactly similar body which actually falls into the sea or reaches the land as a solid object; either body is sometimes described as a shooting star and we have even read of a meteor being called a comet. There is some confusion also between an aurora and an aureole, two totally different phenomena despite the similarity of their names. Ambiguous descriptions also are very common; the comet with a tail 'about four feet long', the satellite 'about the size of an orange' are descriptions which have appeared in meteorological logbooks in the last few months. An observer's initial impression of the size of an object might be as described above but a moment's reflection would convince him that the only way of describing the length of an elongated object in the sky is by angular measurement and the only way of describing a satellite or meteor is by comparison with a nearby star or planet. Even the description of hailstones 'as large as oranges' can be ambiguous, for these fruits come in many different sizes; whenever an object can be handled, it should actually be measured. All such anomalies are edited before the observation finds its way into The Marine Observers' Log or is forwarded to the experts, but, as the editing must often be a matter of deletion only, much of the value of an observation is thereby lost.

In the January 1967 number of *The Marine Observer* an article appeared concerning changes in the meteorological codes which are to come into force at 0000 GMT on 1st January 1968 and the consequential re-designing of the meteorological logbook, now to be made more conspicuous by its bright yellow cover. These changes, it was explained, are largely to satisfy the needs of the computer which can deal with a virtually unlimited amount of data, to the ultimate improvement of the meteorological services which we are able, thanks to the observations of voluntary observing ships, to give to shipping. To feed and satisfy the computer the data needs to be precise and given in the order in which it is able to digest it.

Language computers, for the purpose of translation of words rather than working with figures, are already in use to a limited extent, and it may well be that the translation and re-translation at Delhi, referred to above, was the work of a computer, for it has no intelligence, no experience and can make no decisions. But it is reasonably certain that in the not very distant future these instruments will be universally accepted. Then the day will have come when a Frenchman may feed 'éclairs' into his computer, but whether we get 'cream buns' or 'lightning' at our end will depend only on how this word is fed to it. In its Brave New World there will, unhappily, be no room for Humpty Dumpty and his philosophy; perhaps we ought to start getting ready for it now.

L.B.P.

Report of Work for 1966

(MARINE BRANCH AND MARINE CLIMATOLOGY SECTION OF THE METEOROLOGICAL OFFICE: VOLUNTARY OBSERVING FLEET AND OCEAN WEATHER SHIPS)

1. Voluntary Observing Ships

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

- (a) 502 Selected Ships which are supplied with a full set of meteorological instruments on loan and which make observations in code form FM21.C every six hours and transmit them to the appropriate coastal radio station wherever their voyages take them.
- (b) 65 Supplementary Ships, including 9 trawlers, which make less detailed observations than Selected Ships and are supplied on loan with only a barometer, air thermometer and screen. They use abbreviated code form FM22.C for their messages.
- (c) 108 coasting ('Marid') vessels, and one lightship, which make sea-surface temperature observations in U.K. coastal waters and transmit them in a special code by w/T or R/T. When in the North Sea, the coasting ships include in their messages wind, weather and visibility observations.
- (d) 13 lightships which make observations of wind, waves, visibility, air and sea temperatures; 11 of these send coded reports by R/T, the other two record their observations for climatological purposes only. The *Dowsing*, *Galloper* and *Royal Sovereign* lightships report barometric pressure using the precision aneroid, and their reports are included in the BBC 5-minute weather bulletins for shipping. The *Galloper* also reports barometric tendency. The time limit imposed on BBC weather bulletins does not permit the inclusion of the barometric tendencies of the other two lightships.
- (e) 20 trawlers which make non-instrumental observations only and transmit them by w/T or R/T using the first four groups of FM21.C, to radio stations in the U.K., Canada, Iceland, Norway or U.S.S.R. depending on the area in which they are fishing. In addition to these, 9 trawlers now figure in the Supplementary Ships' List.
- (f) 50 Auxiliary Ships which make and transmit visual observations similar to those made by trawlers, with the addition of pressure and air temperature readings from the ships' own instruments (using the 'Shred' code). These ships do this work only when in areas where shipping is known to be sparse.

This total of 758 ships is about 17 per cent of the present world total of 4,500 voluntary observing ships of all nations. As the total number of British registered ships is only about 11 per cent of the world total of merchant ships our percentage of voluntary observing ships is well above the average. The British Voluntary Observing Fleet includes ships of over 100 shipping companies and Table 1 shows the variety of trade routes on which they are engaged. A study of the logbooks and other written records received from these ships shows that, as a general rule, they consistently send their observations by radio to some meteorological service or other throughout their voyages, except when there is no radio officer on watch. There is little doubt, therefore, that British voluntary observing ships play a major part in the provision of meteorological data from the oceans.

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

Australasia	105	South America	29
Far East	79	Pacific Coast of North America ..	12
Persian Gulf	32	Europe	53
South Africa	43	Falkland Islands and Antarctic ..	2
North Atlantic	92	World-wide 'tramping'	87
West Indies	38		

During the year 1,042 meteorological logbooks were received from Selected and Supplementary ships and 81 forms from Auxiliary ships. A scrutiny of these records shows that they continue, in general, to be of a high standard; the Marine Observers' Log is evidence of the great interest shown by observing officers in this work. As stated earlier, there are very few observations which are not transmitted by radio and it seems from a study of these records and from discussions with Port Meteorological Officers that the new WMO scheme, whereby the radio officer is given more freedom of action as to the radio station to which he transmits his message, is proving helpful. We get few complaints as to difficulties in clearing messages but radio officers are urged to give details, in the logbook, of any difficulties they do experience so that we can endeavour to remedy them. The neatness and care with which some of these logbooks are written up is quite remarkable; there is little doubt that in most cases the observations are made conscientiously.

As most merchant ships only carry one radio officer the synoptic hour often occurs during a period when there is no radio officer on watch to send the weather message. Nevertheless there is evidence that many ships, particularly on the North Atlantic run, are now sending four radio weather messages daily, observations made when the radio officer is off watch being retained for transmission during his next watch period, in accordance with the new WMO scheme.

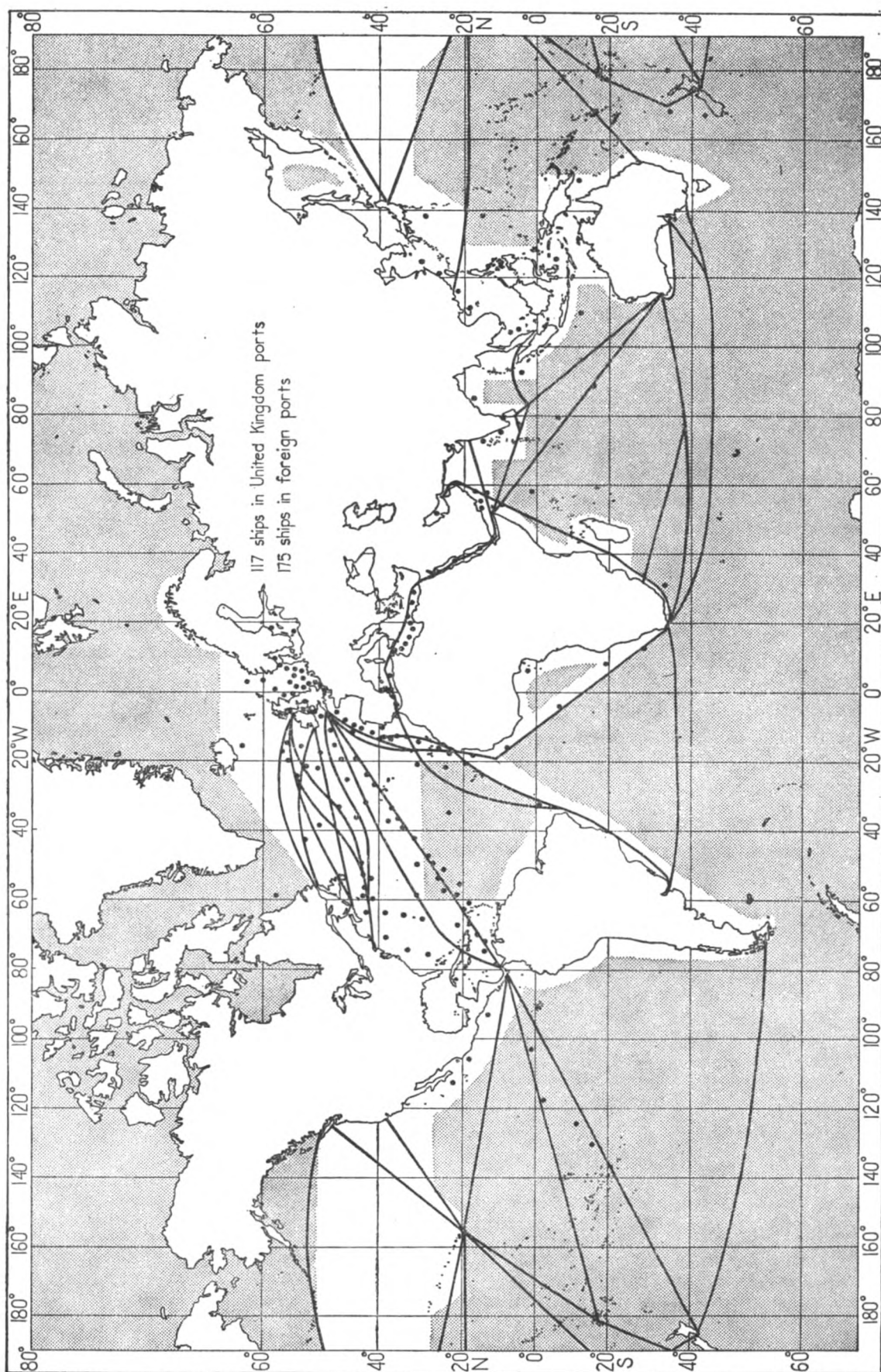
The following table gives the average daily number of radio weather messages received at the Meteorological Communications Centre at Bracknell during the year from merchant ships via GPO coastal stations.

Table 2. Daily average number of reports received direct from ships

(a) North Atlantic (east of 40°W and north of 35°N)	
U.K. Selected and Supplementary Ships	83
'Marid' ships (coasting vessels)	11
Foreign ships	11
Trawlers	7
Total	112
(b) North Sea (51°30'N to 61°N and 4°W to 7°30'E)	
U.K. Selected and Supplementary Ships	9
'Marid' ships (coasting vessels)	3
Trawlers	1
Total	13
(c) Light-vessels	46

During two typical days, one in June and one in December, the total number of reports from ships received in the Central Forecasting Office at Bracknell from various sources is shown in Table 3.

The success of this voluntary observing ship scheme is due largely to the efforts of our Port Meteorological Officers and Merchant Navy Agents who recruit the ships and maintain personal contact by quarterly visits. They have their difficulties because observing officers are so frequently on leave when the ship is in a home port—but every possible effort is made to make personal contact with the observing



The positions of British Selected and Supplementary Ships on 15th July 1966. The shaded areas are those in which shipping is sparse and in which Auxiliary Ships make reports.

Table 3. Total number of reports received at Bracknell by various sources from ships during two typical days in the year

	<i>JUNE</i>	<i>DECEMBER</i>
Direct reception from		
British ships in North Atlantic	108	101
Foreign ships in North Atlantic	11	78
British trawlers in North Sea	11	12
British merchant ships in North Sea	3	29
	<hr/> 133	<hr/> 220
Via other European countries		
Ships in North Atlantic	538	343
Ships in Mediterranean	74	144
Ships in North Sea	49	51
Ships off North Russia	27	14
Ships in Pacific	72	104
Ships in other waters	77	106
	<hr/> 837	<hr/> 762
Via North America		
Ships in North Atlantic	466	410
Ships in Pacific	298	396
Ships in other waters	39	118
	<hr/> 803	<hr/> 924

officers and radio officer who are sailing in the ship. The Port Meteorological Officers have, for many years, attended an annual conference at the Meteorological Office Headquarters for an exchange of views about various problems that arise in their work.

In addition to Cadets from navigation schools, Senior Officers attending the twice-yearly refresher courses at the Southampton School of Navigation now spend a day at Bracknell as part of their course. Despite our distance from a seaport, we do receive a fair number of visits from individual officers; such visits are always very welcome and there is much of interest that the mariner can see at this Office in Bracknell.

2. Ocean Weather Ships

In 1966 the British Ocean Weather Ships completed 19 years of North Atlantic service. All four 'Castle' frigates continue to give satisfactory service and to justify their choice for this exacting job. The total annual operating cost of each ship during 1966 worked out at about £3,000 less than in 1965; it is not often nowadays that one can report a lowering of costs!

Throughout the year these four ships have continued to operate in rotation with their French and Dutch colleagues at stations 'Alfa', 'India', 'Juliett' and 'Kilo' in the eastern Atlantic. When on station, hourly observations of surface weather and six-hourly upper-air observations have been made regularly—the upper observations attaining an average height of about 65,000 feet, although heights of over 80,000 feet have been attained, when using 1,000 gram balloons, on about 20 per cent of occasions. The scientific work carried out aboard these ships has included the recording of solar radiation, bathythermograph and deep soundings of temperature and salinity at a depth of about 2,000 fathoms, observations of surface ocean currents and sampling of surface sea water and rain water for the International Atomic Energy Survey and the collection of plankton. Deep echo-sounding apparatus has been transferred to the weather ships from H.M. survey ships withdrawn from service; this

will enable the weather ships to assist in the bathymetric survey of the eastern Atlantic.

For the third year in succession the British weather ships played a useful rôle in an international oceanographic programme lasting a whole month. During this period over 2,000 bathythermograph observations and 45 oceanographic deep soundings were taken aboard *Weather Adviser*.

Air/sea rescue being one of the weather ships' tasks, frequent exercises have been carried out by all four ships, including some night exercises; aircraft of R.A.F. Coastal Command participated in some of these and took the opportunity to drop mail and newspapers to the ships. The ocean weather ships continue to provide navigational aid and communication facilities for trans-Atlantic aircraft; at station 'Juliett', which is the busiest one, an average of about 40 aircraft a day were supplied with these aids.

An International Mission consisting of a financial expert and a shipping expert, appointed by the International Civil Aviation Organization to make a comparative cost analysis of the operation of the European Ocean Weather Ships, spent three days investigating the costs of the British weather ships during the year.

3. General

The non-meteorological observations extracted from ships' meteorological log-books, together with any available specimens, are forwarded for comment to the appropriate scientific authorities, to our mutual benefit.

4. Ice

The Marine Branch publishes monthly charts showing the distribution of sea-ice in the northern hemisphere, with interim charts every 10 days. Ice reports are received from many international sources by radio and, in addition to reports from ships, an increasing number is now received from airline pilots on polar routes.

Early in the year the work of our Ice Unit was extended to include a daily radio facsimile broadcast of the sea-ice situation over much of the northern hemisphere and the photographic information from the U.S. satellites Nimbus and Essa II has been an additional help in delineating the limits of the ice pack.

In November the day-to-day sea-ice work was transferred to the Central Forecasting Office, the Marine Branch retaining responsibility for the preparation of the monthly charts and for development work.

5. Surface Ocean Currents

Work has continued on programming for the computer the ocean current observations made aboard ocean weather ships, H.M. survey ships and ships of the Voluntary Observing Fleet. It is hoped that the revision of ocean current atlases will thus be expedited.

6. Inquiries

The marine inquiries dealt with during the year were mainly from solicitors, brokers and insurance companies in connection with impending lawsuits. Wind and wave data, both in home and foreign waters, were supplied to those planning off-shore drilling for oil and gas; similar details were sought by shipping companies and hovercraft operators.

Yachtsmen, travel agencies, research workers, journalists and those concerned with transport of goods by sea were interested in conditions in various sea areas.

A representative from the Marine Branch gave evidence at two civil actions and the Board of Trade were provided with full weather reports in connection with Formal Inquiries into the loss of ships at sea.

The International Load Line Conference, held in London, was supplied with information on the frequency of gales and storms.

7. Publications

The revision, editing and printing of various technical books and forms supplied to the Voluntary Observing Fleet, Ocean Weather Ships and Port Meteorological Officers and Agents continued throughout the year, as well as the preparation, editing and printing of *The Marine Observer*.

The corrected proofs of the 2nd edition of Met.O.593 *Meteorology for Mariners* were returned to the printer but the binding will delay publication until mid-1967.

Met.O.772 *Indian Ocean Currents*, Met.O.485 *Quarterly Surface Current Charts of the Western North Pacific and China Seas*, Met.O.518 *Monthly Meteorological Charts of the Eastern Pacific* and Met.O.575 *Monthly Meteorological Charts and Sea Surface Current Chart of Greenland and Barents Seas* were being reprinted to maintain stocks. Final copies of the new edition of Met.O.435 *Ocean Currents of the South Pacific* were awaited.

Preparations were made for the revision of Met.O.509 *Ships' Code and Decode Book*, the code cards, logbooks and related forms to incorporate the changes in the ships' codes which come into effect on 1st January 1968. Early printing is necessary to allow sufficient time for distribution to all ships well before that date.

8. Awards to Voluntary Observing Ships

Annual awards of books were made to the master and officers of 100 Selected/Supplementary ships, 4 coasting ships making sea temperature observations and 4 non-instrumental trawlers whose work reached the required standard; barographs were awarded to four shipmasters whose long and zealous record of voluntary observing was considered as deserving special recognition.

The books selected for awards were *Cassell's English Dictionary*, *Abyss* by C. P. Idyll and *The University Atlas*.

EXCELLENT AWARDS, 1966-1967

Once again, as in every July number of *The Marine Observer* since 1924, it is our pleasure to congratulate the captains, principal observing officers and radio officers of the hundred voluntary observing ships listed on pages 102 to 105 whose meteorological records, received at Bracknell during the year ended 31st March, have earned an Excellent Award. At the same time a word of commiseration is due to the much larger numbers of officers whose books have been assessed as Excellent but which still lack the 'something' which would bring them into the best hundred. Such officers may draw a little consolation from the fact that the notation EX has been placed against the record of their books on their personal cards.

The assessing of all ships' meteorological logbooks and the placing of them in an order of merit continues to be done by the Nautical Officer at Bracknell, supported by the advice of the Port Meteorological Officers who are in personal touch with the observers and who can thus often advise him as to the conditions under which the observations have been made. Comparison between the meteorological logbooks of such a variety of ships as is contained in the Voluntary Observing Fleet, from the two-mate short sea trader where the master or deck officer works the R/T, to the large passenger liner whose radio is manned 24 hours a day, is not easy, nor is it lightly undertaken. But the miscellany of ships which figure in the Excellent Award list every year tends to show that our system of marking is a fair one.

In the year ended 31st March 1967, the best books were received from the following nine ships:

1. *Santona* (Donaldson Line), Captain A. T. Johnston
2. *Echo* (Bristol S.N. Co. Ltd.), Captain J. L. Jenkins
- St. Giles* (T. Hamling & Co. Ltd.), Skipper J. W. Humphrey

EXCELLENT AWARDS (Year ended 31st March 1967)

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	OWNER/MANAGER
<i>Afric</i> ..	W. A. Murison ..	F. C. Watkins ..	M. J. Boyle ..	Shaw Savill Line
<i>Amoria</i> ..	D. Cooper ..	I. M. Brown ..	C. Grayson ..	Tanker Finance Ltd.
<i>Apollo</i> ..	G. V. Barnes ..	W. G. Sommerfield ..	R. Chamberlain*	Bristol S.N. Co. Ltd.
<i>Benarty</i> ..	C. Donnelly ..	J. B. W. Edgar ..	W. Paterson ..	Ben Line
<i>Bristol City</i> ..	F. R. Neil ..	W. A. Hursey ..	T. M. Jenkins, M.B.E.	Bristol City Line
<i>British Robin</i> ..	W. H. K. Hillman ..	J. Wallwork ..	P. Barrett ..	B.P. Tanker Co. Ltd.
<i>British Workman</i> ..	B. Sexton ..	C. E. Jones ..	S. W. Hogg ..	B.P. Tanker Co. Ltd.
<i>Camelia</i> ..	W. R. Hunter ..	W. Fallon ..	J. Sommerville ..	Stag Line Ltd.
<i>Cannanore</i> ..	M. Champneys ..	M. J. F. Moulin ..	N. S. Smethurst ..	P. & O. Lines Management Ltd.
<i>Cardiganshire</i> ..	S. E. Allerton ..	J. A. Matthews ..	I. F. Stocks ..	Glen Line
<i>Catford</i> ..	E. Clarke, M.B.E. ..	J. L. Halcrow ..	A. Corkhill ..	South Eastern Gas Board
<i>Ceramic</i> ..	N. S. Milne ..	R. D. Mallam ..	R. O'Shaughnessy ..	Shaw Savill Line
<i>Chindwara</i> ..	J. A. MacCowan ..	R. J. Cox ..	J. Hanley ..	British India S.N. Co. Ltd.
<i>City of Johannesburg</i> ..	L. R. Jones ..	P. W. Jackson ..	D. Scott ..	Ellerman Lines
<i>City of Pretoria</i> ..	C. B. Parks Bradbury ..	P. G. Pike ..	G. Burgen ..	Ellerman Lines
<i>City of Wellington</i> ..	H. Lewis ..	C. W. Rapley ..	B. Holmes ..	Ellerman Lines
<i>Clan Macindoe</i> ..	L. Pogson ..	J. L. C. Cotton ..	N. Birnie ..	Clan Line
<i>Cornwall</i> ..	G. W. McCathie ..	M. R. Doyland ..	M. A. Thompson ..	Federal S.N. Co.
<i>Dartwood</i> ..	J. Elliott ..	W. F. R. Whiting ..	M. Lebbon ..	Wm. France Fenwick & Co. Ltd.
<i>Delphic</i> ..	D. T. Moulden ..	B. Fraser ..	J. F. Twomey ..	Shaw Savill Line
<i>Denbighshire</i> ..	C. R. B. Goodman, M.B.E. ..	P. J. Duff ..	I. Gall ..	Glen Line
<i>Devon</i> ..	J. H. B. Weston ..	C. J. Francis ..	D. Macauley ..	Federal S.N. Co. Ltd.
<i>Devon City</i> ..	M. J. Higgins ..	J. J. Kalnins ..	S. G. Whitmore ..	Sir William Reardon Smith & Sons
<i>Discovery</i> ..	R. H. A. Davies ..	J. T. Walker ..	E. Aquis ..	National Institute of Oceanography
<i>Dukesgarth</i> ..	N. Richardson ..	I. G. Russell ..	B. D. McSweeney ..	W. Cory & Son Ltd.
<i>Echo</i> ..	J. L. Jenkins ..	M. R. G. Womer ..	H. H. Grant*	Bristol S.N. Co. Ltd.
<i>Esso Hampshire</i> ..	L. H. Grey ..	G. G. Cunningham ..	R. Tyrer ..	Esso Petroleum Co. Ltd.
<i>Explorer (F.R.S.)</i> ..	E. A. Bruce, O.B.E. ..	A. A. Baxter ..	J. Steven ..	Dept. of Agriculture & Fisheries for Scotland
<i>Floristan</i> ..	R. L. Cain ..	R. W. Lorains ..	B. W. Webster ..	Strick Line
<i>Galway</i> ..	P. D. Guerrier ..	A. G. Williams ..	J. McL. Cowe ..	Trinder Anderson & Co. Ltd.
<i>Glenartney</i> ..	R. G. Rippon ..	J. C. Whittaker ..	H. N. Kinley ..	Glen Line
<i>Glengarry</i> ..	R. J. Paterson ..	D. P. Wallace ..	B. R. Epps ..	Glen Line
<i>Glenmoor</i> ..	R. R. Jordan ..	G. W. Richardson ..	J. Walsh ..	Moor Line
<i>Glenogle</i> ..	W. J. Moore, D.S.C., R.D. ..	J. M. Irvine ..	C. W. Knibb ..	Glen Line

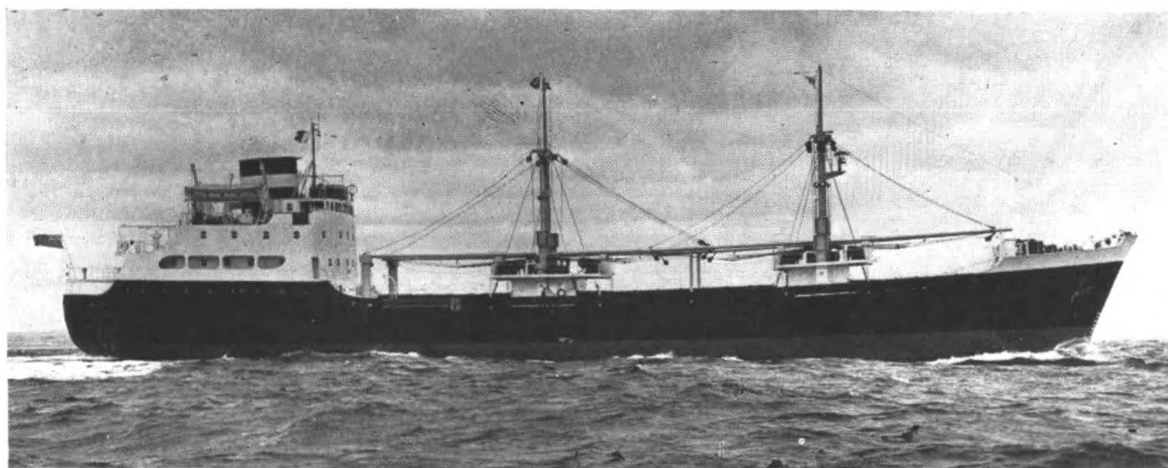
<i>Gloucester City</i>	..	E. Mace	..	G. D. Snowdon	..	H. D. Roderick	..	Bristol City Line
<i>Halifax City</i>	..	E. Irish	..	D. M. Watchorn	..	W. Beynon	..	Bristol City Line
<i>Hector</i>	..	S. S. Howie, M.B.E.	..	J. M. Wilson	..	W. Phillips	..	A. Holt & Co.
<i>Helenus</i>	..	L. R. H. Hill	..	B. Milkins	..	R. J. Hinchliffe	..	A. Holt & Co.
<i>Hinakura</i>	..	N. L. Warren	..	R. J. Ayers	..	W. F. Law	..	New Zealand Shipping Co. Ltd.
<i>Huntingdon</i>	..	W. F. T. Dan	..	H. J. Vercoe	..	S. L. Adams	..	Federal Line
<i>Illyric</i>	..	C. A. Borthwick	..	H. S. Monaghan	..	I. R. G. Channing	..	Shaw Savill Line
<i>Jamaica Producer</i>	..	G. A. Foulds	..	D. C. Hammond	..	K. R. Mugridge	..	Jamaica Banana Producers S.S. Co. Ltd.
<i>Jason</i>	..	H. S. Clarke, M.B.E., D.S.C.	..	H. W. Simmonds	..	A. F. Janacki	..	A. Holt & Co.
<i>King City</i>	..	T. W. D. John	..	K. Milburn	..	D. Worthy	..	Sir William Reardon Smith & Sons
<i>Laurentia</i>	..	A. L. Hunter	..	R. B. McLean	..	A. G. Hogg	..	Donaldson Line
<i>Lismoria</i>	..	J. L. Downie	..	G. C. Hamilton	..	W. A. Willox	..	Donaldson Line
<i>Logna</i>	..	R. B. Dickson	..	W. S. Banks	..	J. W. T. Low*	..	Chr. Salvesen & Co. Ltd.
<i>Mahanada</i>	..	A. P. Briggs	..	A. D. Marsh	..	F. R. Fallon	..	Brocklebank Line
<i>Manchester Commerce</i>	..	G. R. Thompson	..	D. J. Howard	..	D. Hodgson	..	Manchester Liners Ltd.
<i>Manchester Freighter</i>	..	J. Hogg	..	J. A. S. Mackay	..	R. E. Bennett	..	Cairn Line
<i>Melampus</i>	..	H. K. Martin	..	R. M. Telfer	..	A. W. Hay	..	A. Holt & Co.
<i>Mercury</i>	..	P. B. Henderson	..	J. E. Peck	..	D. Oakley	..	Cable & Wireless Ltd.
<i>Methane Princess</i>	..	J. Munday	..	J. C. Beaumont	..	P. G. Ring	..	Shell Tankers (U.K.) Ltd.
<i>Milo</i>	..	J. F. Tremlett	..	J. S. Earl	..	K. Kruitannis	..	Bristol S.N. Co. Ltd.
<i>Monarch</i>	..	O. R. Bates, O.B.E.	..	G. R. Plummer	..	A. Hindmarsh	..	H.M. Postmaster General
<i>Neleus</i>	..	D. K. Dunlop, R.D.	..	A. G. Rutherford	..	J. N. Nolan	..	A. Holt & Co.
<i>New York City</i>	..	F. W. Harris	..	C. O. Thomas	..	J. Moody	..	Bristol City Line
<i>Northern Star</i>	..	W. W. Newport	..	P. J. Marchbank	..	C. L. Carpenter	..	Shaw Savill Line
<i>Orsova</i>	..	S. Ayles, R.D.	..	B. Minter	..	H. R. Burch	..	P. & O. Lines Management Ltd.
<i>Otaki</i>	..	M. J. Heron	..	J. R. Jackson	..	A. McInnes	..	New Zealand Shipping Co. Ltd.
<i>Pacific Envoy</i>	..	A. H. Cooke	..	C. E. Nicholls	..	I. L. Whyte	..	Furness Lines
<i>Paparoa</i>	..	J. R. G. Hannah	..	R. T. Macnamara	..	E. R. C. Lamb	..	New Zealand Shipping Co. Ltd.
<i>Pegu</i>	..	F. Weller	..	D. M. Lucey	..	J. H. Brown	..	Henderson Line
<i>Pendennis Castle</i>	..	R. A. D. Cambridge, D.S.C., R.D.	..	M. R. Garton	..	P. P. Williams	..	Union Castle Line
<i>Perscus</i>	..	S. C. Llewellyn	..	H. P. Simmons	..	P. M. Dolphin	..	A. Holt & Co.
<i>Photinia</i>	..	R. J. Freeman	..	M. D. Staniforth	..	K. T. Jones	..	Stag Line Ltd.
<i>Piako</i>	..	D. E. Moran	..	J. M. McWilliam	..	S. J. Braithwaite	..	New Zealand Shipping Co. Ltd.
<i>Pipiriki</i>	..	P. Lay	..	A. Duncan	..	P. N. Heald	..	New Zealand Shipping Co. Ltd.
<i>Port Burnie</i>	..	I. H. North	..	M. H. Bennett	..	W. Hughes	..	Port Line
<i>Port Invercargill</i>	..	H. B. Conby	..	P. M. P. Muirhead	..	M. M. Garrett	..	Port Line
<i>Port Phillip</i>	..	P. E. Packwood	..	G. D. Wilson	..	R. E. Maskell	..	Port Line
<i>Port Victor</i>	..	R. A. Wight	..	G. K. C. Smith	..	T. J. Britt	..	Port Line
<i>Port Vindex</i>	..	A. J. Hawkins	..	C. W. G. Hunter	..	J. A. Foreman	..	Port Line
<i>Port Wellington</i>	..	R. Holmes	..	B. J. S. Tining	..	F. P. Cronin	..	Port Line
<i>Port Wyndham</i>	..	E. R. Jenkins	..	D. Parsons	..	J. Woods	..	Port Line
<i>Rakaia</i>	..	J. Cosker	..	W. J. N. Drummond	..	G. M. Summers	..	New Zealand Shipping Co. Ltd.

Excellent Awards (contd.)

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	OWNER/MANAGER
<i>Rangitane</i> ..	D. H. Chadwick ..	A. Marshall ..	L. C. Whittington ..	New Zealand Shipping Co. Ltd.
<i>Regent Eagle</i> ..	B. F. Rehse ..	M. J. Hazzard ..	R. Milner ..	Regent Petroleum Tankship Co. Ltd.
<i>Ripon</i> ..	J. Parsloe ..	G. Hopkin ..	I. McKenzie ..	Bolton S.S. Co. Ltd.
<i>Romanic</i> ..	C. L. Earl ..	D. W. Owen ..	G. Cassidy ..	Shaw Savill Line
<i>Ross Leonis</i> ..	R. Waller ..	M. Redfeam**	R. R. N. Laing ..	Charleson Smith Trawler Ltd.
<i>Ruahine</i> ..	R. G. Hollingdale ..	J. Gibbard ..	C. F. Lambe ..	New Zealand Shipping Co. Ltd.
<i>St. Finbarr</i> ..	T. Sawyer ..	—	D. Redshaw ..	T. Hamling & Co. Ltd.
<i>St. Giles</i> ..	J. W. Humphrey ..	J. R. Nelson**	K. C. Stone ..	T. Hamling & Co. Ltd.
<i>Santona</i> ..	A. T. Johnston ..	J. M. Bryan ..	I. Mck. Beattie ..	Donaldson Line
<i>Shropshire</i> ..	T. Cooper, D.S.C. ..	T. Hughes ..	S. Lakin ..	Bibby Line
<i>Sidonia</i> ..	A. J. F. Colquhoun, M.B.E. ..	J. M. Kane ..	R. Philp ..	Anchor Line
<i>Somerset</i> ..	I. Y. Batley ..	M. G. Smith ..	R. F. McManamon ..	Federal Line
<i>Southern Cross</i> ..	L. J. Hopkins ..	V. J. Williams ..	R. H. Day ..	Shaw Savill Line
<i>Suevic</i> ..	B. Hammond ..	W. T. Oliver ..	T. McMahon ..	Shaw Savill Line
<i>Suffolk</i> ..	H. J. D. Sladen ..	P. G. Wright ..	J. P. Whiteley ..	Federal S.N. Co. Ltd.
<i>Sugar Exporter</i> ..	S. Gorrell ..	M. S. W. Humphrey ..	J. R. Jackson ..	Sugar Line
<i>Sussex</i> ..	R. E. Baker ..	A. R. Savill ..	R. B. Redhead ..	Federal S.N. Co. Ltd.
<i>Tekoa</i> ..	F. C. Taylor ..	M. J. Rowland-Hill ..	R. G. Heath ..	New Zealand Shipping Co. Ltd.
<i>Tremeadow</i> ..	W. J. Perkins ..	I. Smith ..	J. R. Stokes ..	Hain-Nourse Ltd.
<i>Treneglos</i> ..	G. Joslin ..	T. Raddings ..	A. R. Watt ..	Hain-Nourse Ltd.
<i>Turakina</i> ..	R. B. Hoad ..	G. D. Goldsbrough ..	D. Lendrum ..	New Zealand Shipping Co. Ltd.
<i>Turkistan</i> ..	J. F. Ockleford ..	W. J. S. Burr ..	J. L. Porter ..	Strick Line
<i>Uganda</i> ..	J. D. Hamilton ..	K. W. V. Yeomans ..	D. Cross ..	British India S.N. Co. Ltd.
<i>Weybridge</i> ..	I. W. Jackson ..	R. E. Baker ..	S. Buckley ..	Watts, Watts & Co. Ltd.
'MARID' SHIPS†				
<i>Amsterdam</i> ..	H. W. Jennings ..	P. Parker ..	J. K. Bradbury ..	British Railways Board
<i>Hebrides</i> ..	J. C. Hodgson ..	G. Smith ..	J. MacKinnon ..	David MacBrayne Ltd.
<i>Leinster</i> ..	G. J. Barry ..	P. A. Tyndall ..	P. A. Hayes ..	Coast Lines
<i>Woodlark</i> ..	F. E. G. Renshaw ..	J. C. Moat ..	J. Hughes* ..	General Steam Navigation Co. Ltd.

* Deck Officer ** Relief Skipper † Vessels observing and transmitting sea temperatures only.

(Opposite page 104)

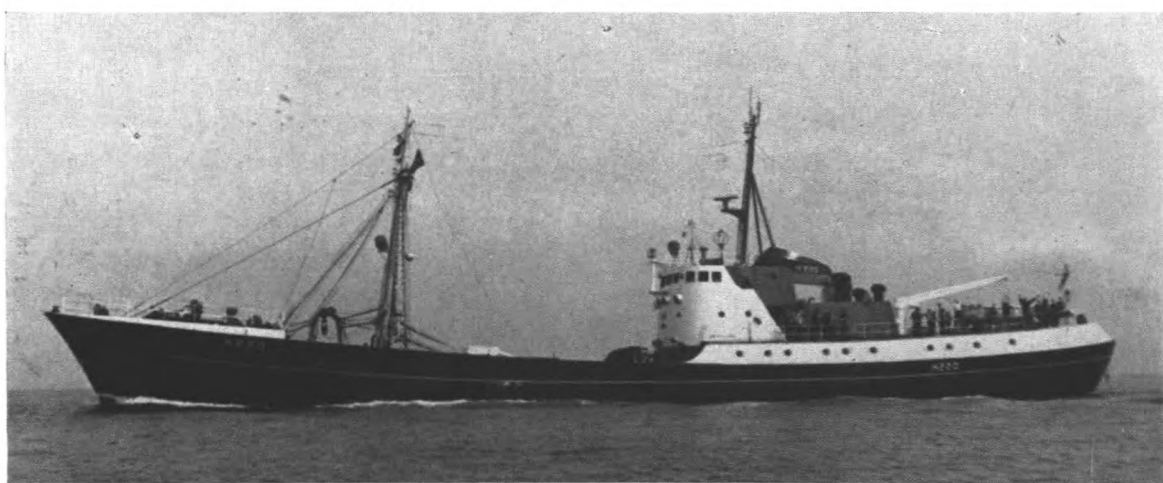


Santona (Donaldson Line), Captain A. T. Johnston.



Photograph by Skyfotos Ltd.

Echo (Bristol S.N. Co. Ltd.), Captain J. L. Jenkins.



St. Giles (T. Hamling & Co. Ltd.), Skipper J. W. Humphrey.

THE THREE SHIPS WHICH GAINED THE HIGHEST MARKINGS FOR THEIR METEOROLOGICAL LOGBOOKS DURING THE YEAR ENDED 31st MARCH 1967 (see page 101).

(Opposite page 105)



Section of photograph taken aboard the *Hanetia*, facing approximately SW, as the dark cloud containing volcanic dust gradually covered the sky (see page 116).



A facsimile recorder fitted in the chartroom of the *Sugar Carrier*, owned by the Sugar Line. The instrument shown in the top right-hand corner is a precision aneroid barometer (see page 122).

TRAWLERS

SKIPPER	WIRELESS OPERATOR	TRAWLER OWNERS
D. Cawood ..	E. D'Constantine	Newington Steam Fishing Co. Ltd.
J. O. Emmons ..	L. Bacon	Ross Trawlers Ltd.
C. Cross ..	—	Newington Steam Fishing Co. Ltd.
R. Taylor ..	—	Ross Trawlers Ltd.
—	C. Hodder	Hellyer Bros. Ltd.
—	B. E. K. Robinson	Newington Steam Fishing Co. Ltd.

3. *Gloucester City* (Bristol City Line), Captain E. Mace
Logna (Chr. Salvesen & Co. Ltd.), Captain R. B. Dickson
Manchester Freighter (Cairn Line), Captain J. Hogg
Port Burnie (Port Line), Captain I. H. North
Port Vindex (Port Line), Captain A. J. Hawkins
Ruahine (New Zealand Shipping Co. Ltd.), Captain R. G. Hollingdale

This is the thirteenth year in which we have published a 'short list' and we must congratulate the *Gloucester City* on making her third appearance whilst the *St. Giles*, *Port Vindex* and *Logna* are each appearing for the second time. The customary photographs of the three top ships appear opposite page 104.

The awards list also includes four 'Marid' ships (short sea traders taking and transmitting sea temperatures only) and four trawler skippers and trawler wireless operators sailing in trawlers which at present carry no instruments but make and transmit observations of wind and weather only, from far northern waters. The work of these ships is less spectacular than that of the main body of the Voluntary Observing Fleet but their observations are often made under conditions of acute discomfort and are always of paramount use in the preparation of weather forecasts for shipping and for coastal sea areas.

The recipients of the awards will, as in past years, be individually notified by letter and asked for an address to which they would like us to send it, but if any officer sees his name in the Excellent Award list in this journal before the official notification reaches him, we would be glad if he would write to us, claiming the award and giving us a forwarding address for it.

The most popular award still seems to be a world atlas and it is our normal practice to send one to any officer whose name appears in the list for the first time but if any such officer would prefer to have one of the alternatives, *Cassell's English Dictionary* or *Lodestone and Evening Star*, a book about exploration by sea from the voyages of the ancient Egyptians to the 20th Century, we will endeavour to meet his request if he would let us know.

L. B. P.



July, August, September

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

It sometimes happens that we are unable to offer an explanation for phenomena reported. In such cases we shall be very glad to hear from any reader who can put forward an authoritative or a possible explanation, which could be published in this journal. We should also be glad to hear from any reader who has witnessed a similar phenomenon in the past, but which has not previously been communicated to us.

HURRICANE 'FAITH' North Atlantic Ocean

m.v. *Shropshire*. Captain T. Cooper, D.S.C. Cristobal to Antwerp. Observer, Mr. T. Hughes, 3rd Officer.

23rd August–3rd September 1966. During our transit of the Panama Canal on the 23rd we received our first warning of Hurricane Faith. After leaving Cristobal warnings were received twice a day and the positions of Faith plotted on our daily weather map from the coded information issued by Washington. On the 25th at 1700 GMT, in position $13^{\circ} 42' N$, $73^{\circ} 45' W$, the vessel's course was altered for Sombrero, passing south of St. Croix Island in order to pass behind Faith. We had estimated that our original course and speed would have brought us almost head-on to the hurricane north of Mona Passage. The barograph was still recording a slow rise in pressure, with a good diurnal range. At 1530 on the 26th, in position $15^{\circ} 42' N$, $68^{\circ} 27' W$, the wind and swell started backing slowly and at 1600 the pressure began to fall. On the 27th the nearest approach of Faith was at 0400, our position being $17^{\circ} 05' N$, $65^{\circ} 50' W$, while that of the storm was 160 miles due north of us. The pressure began to rise again at 0800 and a couple of hours later the wind increased to force 5 from a southerly direction, the height of the swell also increasing. Faith was by this time 200 miles NW of us. At 1440 the vessel was off Sombrero and a course of 045° was set. Further positions of the hurricane were still plotted in case of re-curvature. On 3rd September we noted with interest how Faith had re-curved and was crossing the Atlantic as an extra-tropical storm. Our daily weather maps proved to be of inestimable value because, by watching the various highs and lows, the track of the hurricane was predicted quite accurately, so affording a safe passage home.

m.v. *Boniface*. Captain N. F. Sharp, Dublin to Barbados. Observers, the Master and Mr. M. J. Locke, 2nd Officer.

23rd–26th August 1966. A message was received from Washington Weather Bureau on the 23rd stating position and movement of tropical revolving storm Faith. The following are extracts from the messages received, with the approximate positions of the ship relative to the positions of Faith and also the distances from the storm. Throughout this period the ship's course was 231° , the average speed 15 kt and the swell was from the east.

GMT

1305: Wind NE, force 3. Bar. 1023 mb, steady. Air temp. 79°F . Slight sea and swell. Cloudy, fine and clear. Position of ship: $29^{\circ}48'\text{N}$, $36^{\circ}42'\text{W}$.
Faith's position: $15^{\circ}30'\text{N}$, $37^{\circ}30'\text{W}$ (830 miles from ship).
Course 270° , speed 15 kt. Wind 50 kt near centre.

24th

0051: Wind NE, force 3, Bar. 1024 mb, steady. Air temp. 79° . Slight sea, moderate swell. Cloudy, fine and clear.
Position of ship: $27^{\circ}42'\text{N}$, $39^{\circ}42'\text{W}$.
Faith's position: $15^{\circ}30'\text{N}$, $42^{\circ}30'\text{W}$ (760 miles from ship).
Course 270° , speed 17 kt. Wind 75 kt near centre.

1312: Wind NE, force 3. Bar. 1023 mb, steady. Air temp. 79° . Slight sea, moderate swell. Cloudy, fine and clear.
Position of ship: $25^{\circ}48'\text{N}$, $42^{\circ}06'\text{W}$.
Faith's position: $15^{\circ}30'\text{N}$, $46^{\circ}00'\text{W}$ (630 miles from ship).
Course 270° , speed 17 kt. Wind 80 kt near centre.

25th

0055: Wind NE, force 4. Bar. 1020 mb, steady. Air temp. 80° . Moderate sea and swell. Cloudy, fine and clear.
Position of ship: $24^{\circ}00'\text{N}$, $44^{\circ}36'\text{W}$.
Faith's position: $15^{\circ}24'\text{N}$, $50^{\circ}48'\text{W}$ (620 miles from ship).
Course 272° , speed 20 kt. Wind 80 kt near centre.

26th

0053: Wind E, force 5. Bar. 1019 mb, steady. Air temp. 83° . Rough sea, moderate swell. Cloudy, fine and clear.
Position of ship: $23^{\circ}06'\text{N}$, $46^{\circ}18'\text{W}$.
Faith's position: $17^{\circ}06'\text{N}$, $59^{\circ}48'\text{W}$ (850 miles from ship).
Course 270° , speed 18 kt. Wind 100 kt near centre.

1241: Wind E, force 4–5. Bar. 1019 mb, steady. Air temp. 83° . Rough sea, moderate swell. Cloudy, fine and clear.
Position of ship: $22^{\circ}42'\text{N}$, $47^{\circ}00'\text{W}$.
Faith's position: $18^{\circ}12'\text{N}$, $63^{\circ}12'\text{W}$.
Course 285° , speed 16 kt. Wind 85 kt near centre.

Note. Dr. Gordon Dunn, Director of the National Hurricane Center, Miami, Florida, comments:

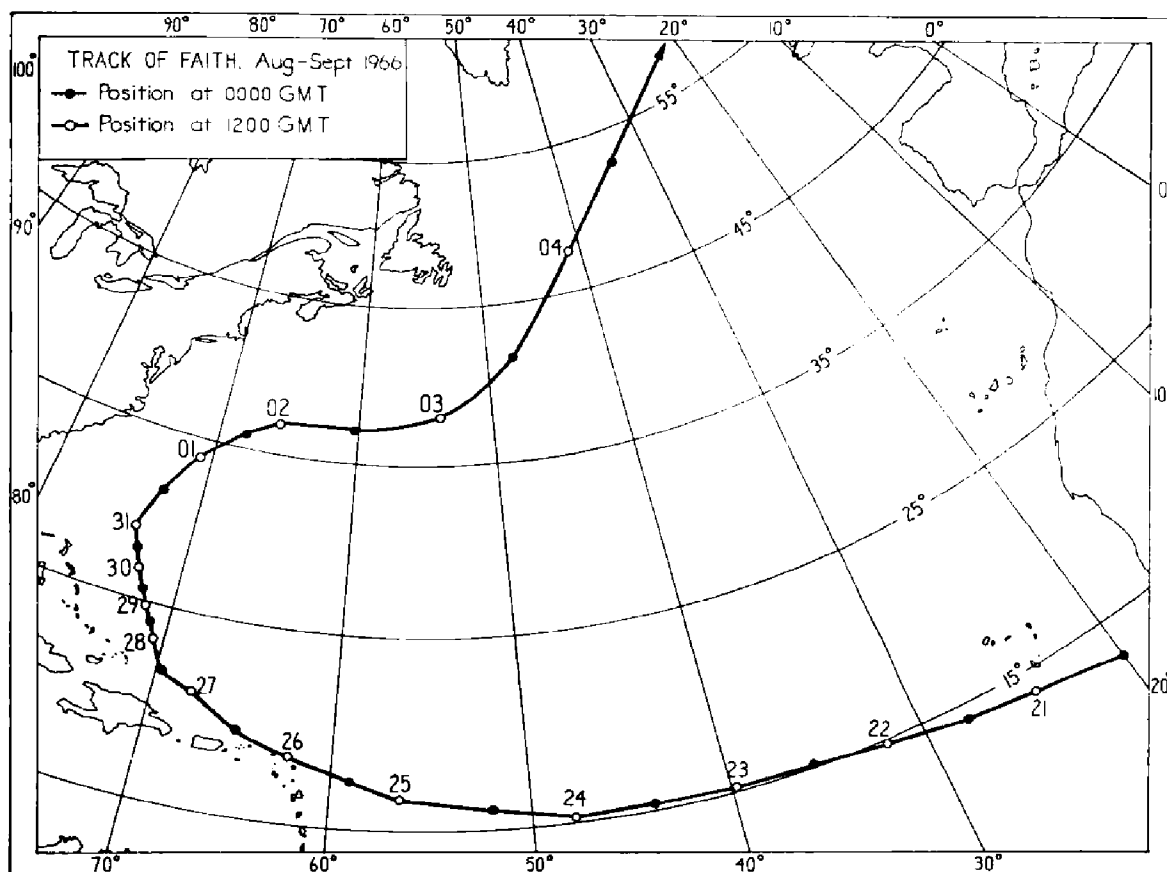
"The m.v. *Shropshire* reports received and plotted at the Center in Miami, 28th–31st August 1966, proved to be very accurate and most helpful to our forecasters. We would like to convey our appreciation to the Captain and Officers of the *Shropshire* and to thank them for their kind remarks about the accuracy of the forecasts on Hurricane Faith.

"Although the 24th/1800 GCT report from the m.v. *Boniface* was on the periphery of Hurricane Faith (about 25°N , 43°W) it was indeed accurate and helpful in our analysis.

"With each passing year more and more reconnaissance and satellite data are available around tropical cyclones. However, the data are not a substitute for accurate ship reports. The various data are complementary."

When forwarding the above comments Dr. G. P. Cressman, Director of the U.S. Weather Bureau, added:

"I would like to express our appreciation to the Officers of all United Kingdom ships which transmitted hurricane weather reports to our forecast centers during the 1966 season."



Note 2. We are also indebted to the U.S. Weather Bureau for the above chart and the following history of Hurricane Faith:

"Hurricane Faith began as a poorly-defined depression over the Ivory Coast of Africa on 18th August. Under satellite observation as it moved westward at about 18 kt, the storm developed slowly, reaching tropical storm intensity on the 22nd and hurricane strength on the following day near 15°N, 40°W, generating winds of 75 kt. Faith continued westward; its centre passed 25 miles north of St. Martin in the Leeward Is. on the 26th and reached a position north of the Dominican Republic the following day. The central pressure at this time was 983 mb. The storm then turned to a NNW'ly course, slowed to a forward speed of about 5 kt and intensified rapidly.

"For the next 3 days Faith held this course as winds increased to 105 kt and pressure fell to 963 mb. Late on the 31st Faith turned towards the NE. On 1st September the storm passed about 205 miles NW of Bermuda, generating maximum winds of 95 kt with gales extending out to 300 miles in the SE quadrant.

"Moving eastward, Faith continued to deepen. Pressure fell to 950 mb on the 3rd; later in the day the storm turned north-eastward again, with its forward speed increasing to near 40 kt by the 4th.

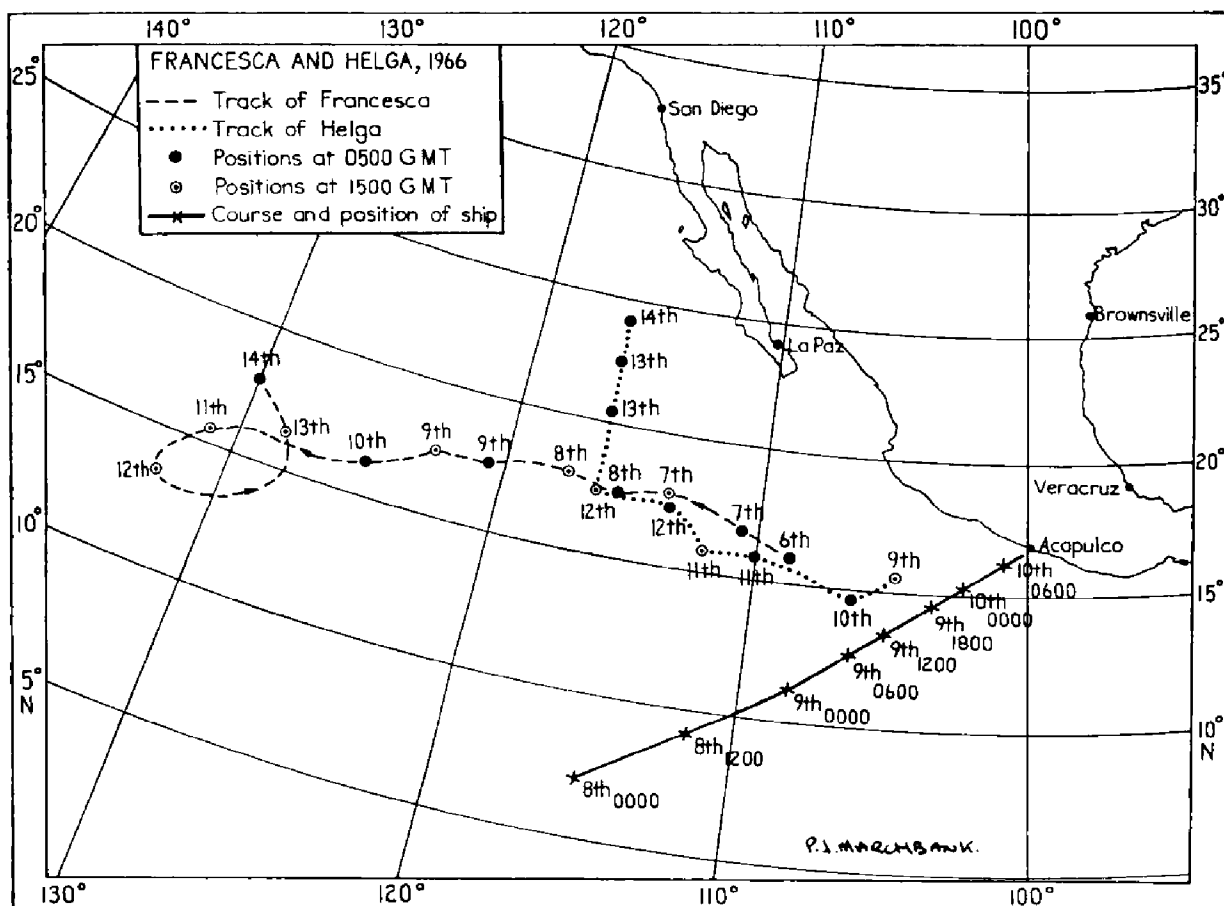
"On the 6th Faith (now extratropical) passed over the Faroe Is. and on the following day moved inland near Nordoyan, Norway. After passing over northern Europe the storm became a stationary low, 980 mb, over Franz Josef Land on 12th September."

HURRICANES 'FRANCESCA' AND 'HELGA'

Eastern Pacific Ocean

s.s. *Northern Star*. Captain W. W. Newport. Papeete to Acapulco. Observer, Mr. P. J. Marchbank, 3rd Officer.

The following observations were made while the vessel was in the vicinity of Hurricane Francesca and the tropical storm which would later develop into Hurricane Helga:



9th September 1966.

GMT

0000: Position of ship: $11^{\circ} 12' N$, $108^{\circ} 18' W$.

Wind wsw, force 4 increasing. Bar. falling. Cloud $\frac{4}{8} C_{L4}$ and $\frac{4}{8} C_{M6}$. Visibility over 15 miles. Air temp. $84^{\circ} F$.

Vessel commenced sending 3-hourly meteorological reports to the U.S. Weather Bureau, San Francisco in connection with Hurricane Francesca.

0300: Position of ship: $11^{\circ} 48' N$, $107^{\circ} 30' W$.

Wind increased to force 6. Bar steady. Continuous light rain began. Sea waves 8 ft.

0400: Weather deteriorating to moderate to heavy continuous rain. Visibility down to 4 miles. Swell constant from wnw, 10 ft.

0900: Wind veered wnw, force 6-7. Bar. fell 3.8 mb in $1\frac{1}{2}$ hours. Moderate rain. Visibility 8 miles. Air temp. 80° . Swell constant.

1500: Position of ship: $14^{\circ} 00' N$, $104^{\circ} 12' W$.

Wind unchanged. Bar. beginning to rise. Rain changed to showers. Swell increased to 14 ft.

1700: Wind decreased to force 2, direction variable. Bar. rising steadily. Heavy rain showers. Visibility improving.

1709: Received first report from U.S. Weather Bureau re tropical depression located near $15^{\circ} 30' N$, $104^{\circ} 48' W$.

1800: Position of ship: $14^{\circ} 24' N$, $103^{\circ} 36' W$.

Wind s'e, force 3. Air temp. 77° .

2100: Wind increased to force 5. Slight continuous rain. Air temp. 77° . Confused swell.

10th

0300: Position of ship: $15^{\circ} 36'N$, $101^{\circ} 30'W$.

Wind SSE, force 5. Barograph now shows normal diurnal range. Confused swell, 11 ft.

0553: Received report from U.S. Weather Bureau naming the depression 'Tropical Storm Helga'.

Note. Hurricane Francesca, spawned about 250 miles SW of Acapulco, Mexico on 5th September, deepened rapidly as it moved west-north-westward and, by the 6th, had reached hurricane intensity some 420 miles west of Acapulco. For the next 3 days Francesca moved slightly west of due north at a forward speed of about 8 kt and, early on the 9th, had degenerated to tropical storm intensity as maximum winds dropped to 80 kt. After continuing toward the WSW, the storm recurved in a loop pattern and finally dissipated on the 15th.

Note 2. Concerning Hurricane Helga, the Director of the U.S. Weather Bureau comments:

"The first indications of a tropical depression were those reported by the *Northern Star* at 3-hourly intervals between 0000 and 1200 GMT on 9th September. The *Northern Star* was headed north-east towards the Inter-tropical Convergence Zone and experienced showers, a 260° wind at 25 kt and steadily-falling pressure which reached 1006.6 mb by 1200 GMT. The depression moved towards the west at 12 kt and strengthened to tropical storm intensity by 1800 at $14^{\circ} 30'N$, $105^{\circ} 30'W$, with maximum winds of 40 kt. The storm then curved north-westward at 10 kt and the winds increased to 50 kt by 0600 on the 10th, to 55 kt by 1800 and to 75 kt, becoming a hurricane, at $19^{\circ} 30'N$, $116^{\circ} 12'W$ at 1800 GMT on the 12th.

"As a hurricane, the storm moved northward at 10 kt through the 13th, then weakened to a tropical storm with winds of 60 kt in $24^{\circ} 00'N$, $116^{\circ} 36'W$ at 0000 on the 14th. Decelerating and curving north-east, winds diminished to 55 kt by 1200 and to 50 kt by 1800 at $25^{\circ} 30'N$, $115^{\circ} 30'W$. It continued east-north-east at 10 kt with maximum winds of 50 kt until it reached the coast of Baja California near $26^{\circ} 36'N$, $113^{\circ} 00'W$ at 1200 GMT on 15th September.

"We are very grateful to the Captain of the *Northern Star* for the frequent and valuable reports which he forwarded to San Francisco on 9th and 10th September."

TYPHOON 'IDA'

Yokohama anchorage

m.v. *City of Wellington*. Captain H. Lewis. At anchor.

24th September 1966.

GMT

1100: Wind N'W, force 5. Air temp. $63^{\circ}F$. Sea 67° . Bar. 1007.5 mb. Heavily overcast with frequent rain showers. Moderate sea. Low swell.

1500: Wind NE, force 6-7. Air temp. 62° . Bar. 1000.3 mb. Heavily overcast with continuous rain. Poor visibility. Moderate sea and swell.

1700: Wind SSW, force 12+. Air temp. 78° . Bar. 992.2 mb. Continuous torrential rain and driving spray seriously affecting visibility. Phenomenal seas. Short steep swell. Conditions chaotic in very congested anchorage.

1900: Wind S, force 8. Air temp. 78° . Bar. 995.6 mb. Heavily overcast with frequent rain squalls. Rough sea.

2300: Wind S, force 5. Air temp. 79° . Bar. 1001.0 mb. Overcast and clear. Rough sea.

Note. Typhoon Ida developed from a tropical depression about 1,200 miles south-east of Tokyo on 22nd September and moved rapidly WNW. By the next day its centre was about 700 miles south of Tokyo, generating winds up to 70 kt, increasing to about 80 kt as it moved northwards. At 0000 GMT on the 24th Ida was centred at $26^{\circ} 30'N$, $138^{\circ} 00'E$, the central pressure being 967 mb. This had deepened to 960 mb by 1200 and, after curving slightly in its track, the storm reached Tokyo Bay late in the day, causing widespread damage and 197 deaths. Torrential rain set off huge landslides and the high winds created havoc with shipping. Damage to the mainland was estimated at more than \$300 million and a wind gust of 175 kt was recorded at the top of Mt. Fuji. After moving across Tokyo Bay the typhoon turned north-eastward into the Pacific and rapidly degenerated, all its fury being spent by the 25th.

EXCEPTIONAL VISIBILITY

Southern North Sea

m.v. *Echo*. Captain J. L. Jenkins. Rotterdam to Plymouth. Observers, the Master, 2nd and 3rd Officers.

28th July 1966. At 0005 BST exceptional visibility was experienced in the vicinity of the Noord Hinder L.V. At one time the loom of lights of the Galloper L.V., Outer Gabbard L.V., Dunkerque, Ostende, West Kapelle, Hook of Schouwen and the Goeree L.V. were observed. Shortly afterwards the loom of the South Foreland Light was seen. Visibility at this time was in excess of 40 miles. Air temp. 57°F, sea 61°, cloud 2/8 Cu. Wind NW'ly, force 3.

Position of ship: 51° 36'N, 2° 30'E.

Note. The extremely good visibility appears to have been due to the fact that the air, travelling as it did down the North Sea, was free from industrial contamination; it was also rather dry (as shown by the upper air sounding made at Hemsby at 0000 GMT) and there was a tendency for convection, as revealed by the presence of some cumulus cloud. Any local impurities in the air would have been carried away from the surface by the convection currents.

VIOLENT SANDSTORM

Aden

s.s. *Tabaristan*. Captain W. Mackenzie. At Aden. Observer, Mr. R. W. Sawyers, 3rd Officer.

2nd August 1966. At 1520 GMT, when the vessel was in Aden Inner Harbour, a heavy 'wall' of sand was seen approaching from NNW. Fifteen minutes later the sandstorm reached the vessel, the wind veering suddenly to NNW, force 9, and the visibility falling to about 100 yd. These conditions continued until 1930 when the wind moderated to force 7 and visibility began to improve slightly. By 2000 the wind had died away to force 2 and backed to wsw, visibility then being 4 miles. During the whole period of the storm the barometer showed a rise of 1–2 mb only and no advance warning was given by the trace. At the height of the storm a vessel was blown off one of the northern jetties and another one dragged both her anchors with an estimated four shackles of cable. All other port movements ceased.

Note. Reference to the synoptic weather chart for 1200 GMT, issued by the United Arab Republic, shows that an area of low pressure lay over Saudi Arabia with a large trough extending sw'wards towards Ethiopia. At noon Aden lay on the SE side of the trough which was moving gradually SE'wards. The sandstorm occurred as the trough line passed after 1500 GMT causing the onset of the NNW gale. At 1200 the wind at Aden had been ssw'ly force 6, with an air temperature of 93°F.

Gulf of Aden

m.v. *Cretic*. Captain V. H. Vizer. Suez to Aden. Observers, Mr. A. Thompson, Chief Officer, Mr. R. M. Gidden, 3rd Officer and Mr. R. Eastwood, 4th Officer.

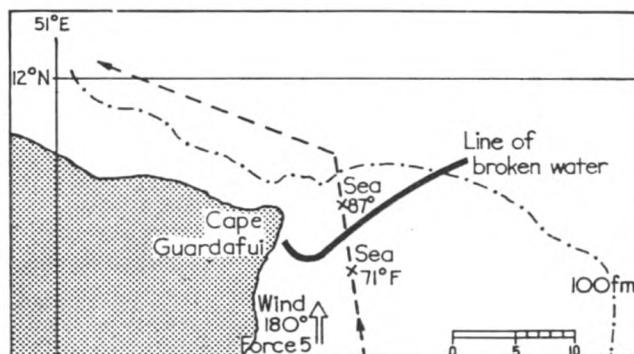
25th August 1966. At 1400 GMT when the vessel was 10 miles SE of Mount Dar Am Umer, the wind, which had been SE'E, force 3, shifted to NNE and increased to force 7; by 1425 it was NNE, force 9+. In the violent sandstorm which developed visibility was reduced to 1 mile. Pressure fell from 1000.8 mb at 1200 to 998.3 at 1440 and then began to return to its previous value. The wind decreased in strength after 1440 and visibility improved rapidly as the storm passed away. Between 1427 and 1432 the air temperature rose to 106°F having been 91.5 at 1200. The sea temperature, which had fallen to 88°, returned by 1700 to its previous value of 92°. During the storm the metal uprights on the bridge were bent, some broken in two, and awnings were torn away.

Position of ship at 1200: 12° 36'N, 43° 36'E.

BROKEN WATER: SEA TEMPERATURE CHANGE off Cape Guardafui

s.s. *Perseus*. Captain S. C. Llewellyn. Colombo to Aden.

26th August 1966. Between 0836 and 0854 GMT, when the vessel was rounding Cape Guardafui from the south, a line of broken water was observed extending some 15 miles ENE from a point 3 miles to the south of the Cape. To the south side



of the line the sea was green in colour, while on the north side it was blue. Three miles south of the broken water the sea temperature was 71.6°F, but it rose to 87.4° two miles to the north of the line and the vessel was set strongly to the east. Wind s'ly, force 5.

Position of ship: 11° 47'N, 51° 22'E.

m.v. *Middlesex*. Captain J. A. North. Fremantle to Aden. Observers, the Master and Mr. R. Longworth, 3rd Officer.

28th August 1966. At 0755 GMT a line of rough water was observed off Cape Guardafui. Evidence of this was first noted on the radar screen at 5 miles range. The PPI displayed a line of clutter extending due east from the Cape and recurving to the NE. Before the vessel steamed through the line of rough water the sea temp. was 72°F and the air temp. 80°.

At 0815 the vessel passed through the line of disturbance and the sea and air temp. rose sharply to 81° and 86° respectively.

The phenomena can perhaps be accounted for by the meeting of currents off the Cape. Before crossing the line of rough water the vessel had experienced the benefit of a 2 kt current, setting in a NNW'ly direction. After crossing the line of rough water the current was observed to be setting in an E'ly direction with rates varying from 1-2 kt.

Position of ship at 0600: 11° 24'N, 51° 36'E.

Note. Dr. J. C. Swallow of the National Institute of Oceanography, Wormley, Surrey, comments:

"This seems to be an excellent example of a phenomenon that has been observed before in this area, of the cold water (which upwells on the Somali coast south of Cape Guardafui) moving generally northwards and disappearing under the much warmer and more saline surface water of the Gulf of Aden. More observations of the positions of these current boundaries, and of the change in current across them, would be most welcome."

BIRDS

South Arabian Sea

m.v. *Melampus*. Captain H. K. Martin. Aden to Singapore. Observers, Mr. W. H. Percival, 3rd Officer and Mr. R. M. Telfer, 4th Officer.

26th July 1966, 0800 GMT. A flock of some 50 black tern-like birds, approximately the size of a small seagull, flew across the bows heading directly into the wind which was SW, force 6 at the time.

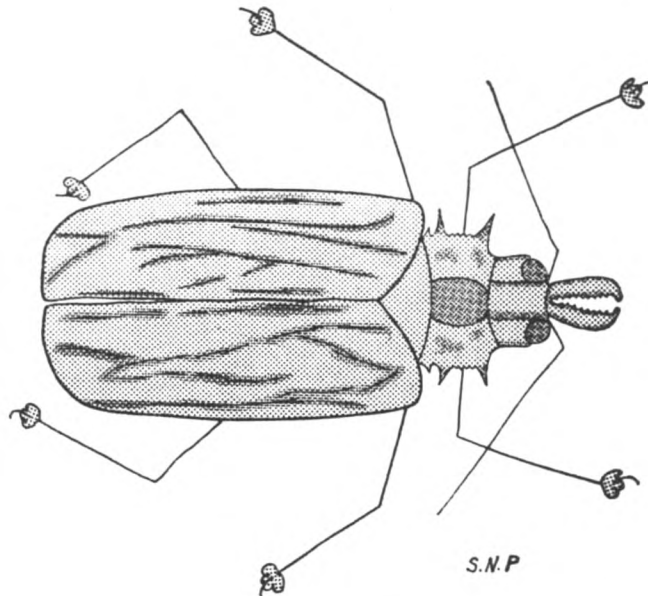
Position of ship: 11° 19'N, 63° 23'E.

LARGE BEETLE

Rio San Juan, Venezuela

s.s. *Esso Exeter*. Captain E. W. Thomas. At anchor. Observers, the Master and all Deck Officers.

28th September 1966. While at anchor in the Rio San Juan awaiting morning tide, a large beetle (shown half size in the accompanying sketch) was found on board and caught. It was $4\frac{1}{2}$ inches long and just over $1\frac{1}{2}$ inches at the widest part of the body. The creature would not eat anything and lived for only a day. The pilot said he had never seen anything of this kind before and we would be interested to know what it was. The specimen has been bottled and will be handed to the Port Meteorological Officer in Southampton.



Note. Mr. J. Balfour-Browne of the Department of Entomology at the Natural History Museum comments:

"The drawing is an excellent representation of the South American Long-horn Beetle known scientifically as *Macrodontia cervicornis* (Linnaeus) and whose popular name is 'Sawyer Beetle'.

"Like all Long-horns, the grubs bore into and feed on wood; they have been reported from coconut palm, 'Cotton tree' (*Ceiba*) and species of *Attalea* (for which I cannot find a common or vernacular name). They usually only attack dead or dying wood and so are not regarded as of much economic importance. The common name of 'Sawyer Beetle' is said to be derived from the curious habit, first reported in 1919, of the beetle claspng a growing twig up to one inch in diameter in its mandibles and gyrating round and round until the twig is severed.

"The larval galleries eaten out of the wood are relatively enormous, attaining to more than a metre in length and ten or more centimetres in diameter. In Brazil larvae of this beetle are eaten by the native tribes. The adults are of some commercial value as they are sought after by professional collectors. Distribution extends from Brazil through the Guianas to Venezuela and Ecuador and it also occurs in Trinidad. About five species in the genus are known from the northern parts of Brazil and the Guianas, all with the same habits.

"The specimen is in beautiful condition and will be added to our collection."

COLLISION WITH WHALE

South Pacific Ocean

c.s. *Mercury*. Captain G. Garret. Panama to Suva. Observer, Mr. J. E. Peck, 3rd Officer.

22nd August 1966. At 0412 LMT a sudden bump was felt and the vessel shuddered quite violently for about 5 sec before conditions returned to normal. Although

nothing was seen this was assumed to have been due to a collision with a whale, since at daybreak and during the following watch numerous whales were seen lying on the surface of the sea. The Master and several members of the crew were wakened by the impact.

The vessel is fitted with a Chernikeef log which protrudes about 14 inches below the keel and this was not damaged, nor apparently was any other part of the vessel. Course 251° . Speed 16 kt.

Position of ship: $0^{\circ} 19'S$, $101^{\circ} 29'W$.

LUMINESCENCE

West coast of Scotland

m.v. *Fidra*. Captain C. F. Irvine. Namsos (W. Norway) to Manchester. Observer, Mr. D. V. Ritchie, 1st Officer.

19th July 1966. At 0003 GMT, when the midnight observation was being made, traces of luminescence were noticed in the water as the rubber bucket used for taking the sea temperature was being emptied. The sea was flat calm but no trace of luminescence was seen in the wash at any time and subsequent experiments with the bucket were unsuccessful. Sea temp. $55.5^{\circ}F$.

Position of ship: 3 miles N'E of Ardnamurchan Point.

South Arabian Sea

m.v. *Trebartha*. Captain H. Gravell. Bordeaux to Singapore. Observers, Mr. J. Spall, Chief Officer, Mr. J. Davies, 2nd Officer and crew members.

13th August 1966. At 2045 GMT the vessel was approaching an area in which the water was apparently whitish in colour and, shortly afterwards, it entered this region of luminescence. The sea had the appearance of being illuminated from below by powerful lights of such brilliance that the eyes soon began to ache if constantly focused on the sea. The bow wave and the crests of the breaking waves were lost entirely in the powerful illumination, the general effect being that of a calm sea, although it was in fact really rough. There was a very clearly defined horizon line. The display continued for about $2\frac{1}{2}$ hours, normal conditions returning during the next $1\frac{1}{2}$ hours. Sea temp. $78^{\circ}F$ at 0000 GMT on the 14th. Wind SW'ly, force 7-8.

Position of ship: $10^{\circ} 47'N$, $58^{\circ} 25'E$.

S.W. Approaches

R.R.S. *Discovery*. Captain R. H. A. Davies. On survey. Observer, Mr. J. T. Walker, 2nd Officer.

21st September 1966. At 0230 GMT, while on seismic survey using a towed air gun, a single patch of luminescence was observed flashing every 12 sec with the firing of the gun. The flashes were a bright, pale green colour. While the vessel was passing through the patch, which was estimated to be about 250-300 ft in extent, four flashes were seen. Course was reversed, making allowance for the turning circle and the phenomena were again observed in detail. A flash was observed the third time some way off the beam when course was resumed. Shallow mist was present with a visibility of 3 miles. The waves were moving from 090° , period 8 sec and height 3 ft. Speed of vessel 3.8 kt.

Position of ship: $48^{\circ} 07'N$, $11^{\circ} 26'W$.

ABNORMAL REFRACTION

Hudson Strait

m.v. *Warkworth*. Captain K. B. Jewell. Middlesbrough to Churchill. Observers, the Master and Mr. I. Hiscock, 2nd Officer.

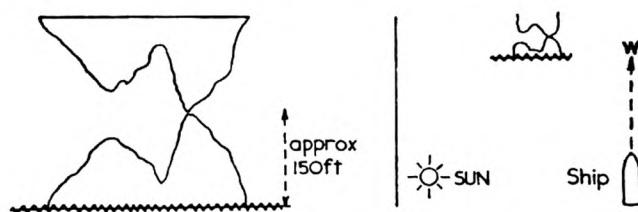
23rd July 1966, 1900 GMT. When entering the Hudson Strait many icebergs of



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

all shapes and sizes were seen. Visibility was very good, with some ice blink from a concentration of bergs and bergy bits. One double-headed berg, first seen at a distance of 18 miles, appeared to have a berg of similar shape inverted and above it, as shown in the sketch. This effect of abnormal refraction persisted until the berg was 4 miles away, when it gradually died out. None of the other bergs was similarly affected, though some were distorted at long ranges. The wind was light and variable and the sea calm. Air temp. 41°F , wet bulb 39.8° , sea temp. 38° but down to 32.5° within two miles of bergs. Cloud 6/8 of C_M7 .

Position of ship at 1800: $61^{\circ} 12' \text{N}$, $64^{\circ} 12' \text{W}$.



Note. The phenomenon described is sometimes known as a 'superior mirage' and is liable to occur, as in the present instance, when the sea surface is much colder than the air above it. A very similar observation, received from m.v. *Port Macquarie*, was published in the July 1966 issue of *The Marine Observer*.

off Yorkshire coast

m.v. *Catford*. Captain E. Clarke. London to Sunderland. Observer, Mr. R. Henson, 2nd Officer.

15th July 1966. At 1130 GMT, the whole coastline from Spurn Head to Flamborough Head was visible with the naked eye. The distance to the nearest coast was 22 miles, while Flamborough Head was 48 miles away. The Head disappeared at 30 miles and reappeared at 22 miles, after which it was continuously visible. Air temp. 64°F , sea 55° . Wind calm or light, SE'ly. Cloud 3/8 Cu and 8/8 thin As.

Position of ship at 1130: $53^{\circ} 30' \text{N}$, $0^{\circ} 43' \text{E}$.

Note. The sea was much colder than the air, a condition which allows distant objects beyond the horizon to become visible when they would not otherwise be seen. In such circumstances the rays of light from an object tend to follow the curvature of the earth instead of diverging from it, as is the case when the sea is warmer than the air.

LUNAR HALO

South China Sea

m.v. *Glenroy*. Captain I. R. Atkinson. Hong Kong to Singapore. Observer, Mr. H. M. Thompson, 3rd Officer.

3rd July 1966. At 1500 GMT a lunar halo was observed, having a radius of about 22° . An unusual feature was the fact that the upper and lower parts of the halo were very bright and sharp, while the sides were blurred and seemed to be double. The moon's altitude was 47° .

Position of ship: $4^{\circ} 47' \text{N}$, $106^{\circ} 38' \text{E}$.

DUST FALL

Celebes Sea

s.t.s. *Hanetia*. Captain B. S. Holroyd. Sukarnapura to Singapore.

12th August 1966. During the voyage across the Celebes Sea in a NW'W'ly direction, at approximately 1030 SMT, a distant explosion was heard similar to that caused by a heavy gun firing. About half an hour later a second explosion was heard, but in neither instance was a ship in sight and, though this may have no bearing on the matter, it is mentioned as adding yet another reason for some anxiety felt later.

At about noon a high, dark cloud, similar to that shown in Cloud Plate VIII, CL9, in the 1963 edition of the *Marine Observer's Handbook*, was noticed to the north of the vessel, covering the sky from the horizon to about 25° altitude over an arc of the horizon of about 60° in extent.

The cloud appeared very dark and threatening near the horizon, the colour shading gradually to a reddish-brown at the nearer, higher edges, the underside being hung with numerous grey-coloured mammae.

The wind, which had been SSE, force 4, during the early morning, decreasing to force 2 at 0800 and to light by noon, became N'ly, force 2, during the afternoon. The cloud increased in amount and moved SW'wards, the sunlight reflected from it giving a curious orange tint to the ship's superstructure which glowed as if in a brilliant sunset.

By 1500 about 6/8 of the sky was covered by the dark, advancing cloud which appeared also to be lowering and, by contrast, the remaining 2/8 seemed harshly brilliant, bathing the ship in an orange twilight glow against the now ominous blackness pervading to the north and east.

The ragged leading edge of the cloud rapidly obliterated the wedge of remaining daylight to the SW'ward and by 1540 the ship was in complete darkness, blacker even than night.

About this time, small pin-head-sized pellets of dust began to fall on the ship, increasing in intensity until by 1600 visibility must have been less than a mile, the surrounding atmosphere being a swirling mass of dust though there was very little breeze.

The pellets became larger, almost the size of a match-head, breaking up as they fell on the ship, and it became nearly impossible to see the foremast light through them, the powder layering thickly over everything, even vertical surfaces, and piling into drifts in corners due to the ship's motion.

After about one hour of this pitch blackness, the whole surrounding atmosphere gradually took on a red tinge and the ship's superstructure began to be faintly discernible, showing a uniform red colour reflected by the dust in the atmosphere.

This redness faded to a pallid orange colour, the change being so gradual as to be almost imperceptible; it was still impossible to see cloud overhead due to the continuous, silent, heavy fall of dust.

Nightfall overtook the gradual return of daylight and the ship's outline once more disappeared in the pitch blackness whilst the dust continued to fall.

At 2000, although the foremast light could be seen, it was estimated that visibility was still less than a mile. The breeze had dropped to only the lightest of airs and conditions remained thus until about 2300 when the first stars began to appear overhead and a light sw'ly breeze developed.

By 2400 visibility was estimated at 2-3 miles with the dust still falling, but thinly, and thereafter conditions quickly improved until, by 0100 on the 13th, visibility was estimated at over 10 miles and the sky was clear.

In daylight on the 13th the ship was seen to be covered to a depth of about $\frac{1}{2}$ inch with the fine, stone-coloured dust, deeper in places where it had drifted and, after photographs had been taken and samples collected, the work of hosing the ship clean began. When wet, the dust formed a stiff, heavy mass which could only be washed away under pressure and it took several days before the ship was really rid of the stuff.

Radar and radio transmission/reception were unaffected by the dust fall and a TTT message sent out to all ships in the vicinity at 1645 on the 12th and again at 1837, this time to Singapore, when the dust fall was seen to be persisting, was heard being repeated by Singapore on their schedule at 2030.

At 2127 on the 12th information requested of all ships in the Celebes Sea elicited no response, so at 2238 a TTT was sent to Manila who were also asked if they knew of any volcanic activity or similar dust falls; they replied that they had no reports of such.

Those members of the ship's company with personal radios were encouraged to listen to world and local news broadcasts for any information on similar occurrences, but nothing was heard until the morning of the 13th when one deckhand reported hearing from a Philippine station that there had been a dust fall in San Fernando during the previous night which had covered the town to a depth of 2 inches.

I was indeed relieved by the thought that a similar fall had occurred elsewhere and that there was no mention, on that or any other broadcasts or in answer to my TTT to Singapore, of radioactivity.

When the photographs, taken and developed on board, also produced bright, clear pictures I decided that our dust fall presented no danger to personnel and refrained from seeking advice on possible radioactive fall-out.

The vessel arrived at Singapore on the 16th August, berthed late afternoon and sailed again at 2213 the same day, so there was little time to present the dust samples for analysis.

On the voyage from Singapore to Bombay, no unusual signs of illness were reported amongst the ship's personnel.

At Bombay a sample of the dust was given to the Burmah-Shell Agent who kindly consented to have it analysed to the extent their equipment would allow and they later asked if the remainder might be sent to London for further analysis, to which I agreed.

Some powder still remains on board. It is an excellent, fine abrasive for removing stains from paintwork.

Position of ship at 1630 SMT on 12th August: $02^{\circ} 40'N$, $122^{\circ} 28'E$. (All times given in the report are ship's time, i.e. GMT + $8\frac{1}{2}$ hours).

Note 1. The following message from s.t.s. *Hanetia* was received by the Meteorological Office, R.A.F. Changi:

12th August: 0800 GMT. Position $02^{\circ} 40'N$, $122^{\circ} 28'E$. Sea calm. Wind N'yly airs. Threatening overcast spread slowly from NNE; first noticed 0330 until 0700 GMT. Sky completely overcast making day like night and started fall of fine, soft, stone-coloured power reducing visibility

to nil. Conditions prevailing at 0930 GMT: visibility $\frac{1}{2}$ mile; wind SW, force 2; atmosphere lightened to dull orange colour.

Note 2. *The Singapore Straits Times* of 22nd August 1966 carried the following report:

"Jakarta, Monday. Fifteen people died and more than 1,100 were injured when Mount Awu on Sangi Talaud Island erupted, belching boiling lava down on to nearby villages.

"A report from Manado at the northern tip of the Celebes today said some 21,000 islanders were made homeless when the volcano erupted on 12th August.

"Government first-aid teams are still working on the island which lies 100 miles north of Celebes.

"Reports said the sky over the capital of Tahuna was black with smoke and ash when Mount Awu brought terror to the islanders.

"Molten lava and huge rock rained down on 22 villages destroying houses, shops and plantations.—Reuter"

Note 3. The following report appeared in *The Times* (of London) dated 30th August 1966:

"Jakarta, 29th August. Twenty-eight people died, 60 school children were missing, feared dead, and 2,000 people were badly injured after Mount Awu, on the Indonesian island of Sangi Talaud, erupted.

"The volcano belched boiling lava down on to villages on 12th August and made homeless 40,000 people who now face famine, the official armed-forces newspaper said. The missing children were in a school which was covered in boiling mud, rocks and ash.—Reuter"

Note 4. Dr. Wiseman of the Mineralogy Department, British Museum, who examined a sample of the dust, comments:

"Brief investigation shows that this dust contains many isotropic volcanic shards as well as other minerals, suggestive of a basaltic or andesitic origin from one of the volcanoes in the eastern region of the Celebes Sea."

Note 5. A sample of the dust was submitted to the Atomic Energy Authority who confirmed that it contained no radioactive material.

Note 6. The island named as Sangi Talaud appears on some maps as Great Sangihe (or Sangi), the largest of the Sangi group of islands, at $03^{\circ} 45' \text{N}$, $125^{\circ} 30' \text{E}$ which is approximately 225 miles ENE of *Hanetia's* 0800 GMT position on 12th August.

AURORA

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

"The following visual observations of aurora reported by observers in British ships during July–September 1966 have been received at the Balfour Stewart Auroral Laboratory in the University of Edinburgh and are gratefully acknowledged. We note with appreciation four new names among the reporting ships—*Devon*, *Longstone*, *Regent Eagle* and *Nova Scotia*. Accompanying sketches and details of radio reception are also acknowledged with thanks.

"The two outstandingly active periods, geomagnetically, of the three months were at the end of August (30th–31st) and beginning of September (3rd–4th). Very high figures of geomagnetic activity were recorded for about 12 hours on this later occasion and ships at low latitudes in the western Atlantic (down to 41°N) recorded details of the auroral activity for the whole period of darkness. The entire range of forms was seen with the characteristic reddish colouring of large-scale aurorae. Coronal formation was seen as far south as latitude 42°N . Cloud covered many areas in the eastern Atlantic and over the British Isles so there is no information about the southern extent in this region.

"Reports of noctilucent clouds came from two Ocean Weather Ships each referring to approximately the same time (0030–0300) on the 26th July. Noctilucent clouds were more widely recognized during the 1966 season by land-based observers and a large number of reports was received. Theories on the origin and nature of these clouds are still being put forward and details of their behaviour and extent are very necessary to those working in this field."

DATE (1966)	SHIP	GEOGRAPHIC POSITION	λ	ϕ	I	TIME (GMT)	FORMS
13th May	<i>City of Winchester</i>	48°30'N 60°00'W	010	60	+74	0345-0500	HA
10th July	<i>Devon</i>	48°08'N 61°08'W	010	59	+74	0315-0500	N
27th	<i>Weather Monitor</i>	52°30'N 20°20'W	060	59	+60	0300	N
12th Aug.	<i>Weather Surveyor</i>	58°55'N 18°55'W	070	65	+72	0050-0300	N
14th	<i>Weather Surveyor</i>	59°05'N 19°40'W	070	65	+72	0115-0215	RA
19th	<i>Weather Surveyor</i>	58°50'N 18°10'W	070	65	+72	0150	N
23rd	<i>Weather Adviser</i>	59°02'N 18°56'W	070	65	+72	0215, 0400	N
26th	<i>Weather Adviser</i>	59°05'N 19°05'W	070	65	+72	0300	HA
31st	<i>Longstone</i>	54°36'N 46°48'W	030	65	+74	2300-0100	HB, RB, RR, P
1st Sept.	<i>Bamburgh Castle</i>	68°47'N 13°57'E	110	67	+77	2151-2154	N
2nd	<i>Bamburgh Castle</i>	68°47'N 13°57'E	110	67	+77	0035-0040	RR
4th	<i>Parthia</i>	42°00'N 65°00'W	010	53	+72	0001-0708	All forms
		45°12'N 57°36'W	010	57	+72	2355-0200	P
	<i>Regent Eagle</i>	41°12'N 69°13'W	360	53	+71	0030-0130	N, RR
						0315-0420	HA, RA
	<i>Nova Scotia</i>	45°00'N 60°36'W	010	56	+73	0100-0700	All forms
	<i>Weather Reporter</i>	52°23'N 20°14'W	060	59	+60	0130-0345	HA, N
	<i>Weather Adviser</i>	59°07'N 19°06'W	070	65	+72	0150, 0355	RR
7th	<i>Weather Adviser</i>	59°03'N 18°57'W	070	65	+72	0200	RA
		59°06'N 18°41'W	070	65	+72	2300, 2330	HA, RA
10th	<i>Weather Adviser</i>	58°55'N 19°06'W	070	65	+72	0350	SA, RR, P
		59°01'N 18°50'W	070	65	+72	2300, 2400	N
15th	<i>Weather Monitor</i>	59°00'N 20°00'W	070	65	+72	2400, 0100	RA, N
		59°00'N 19°10'W	070	65	+72	2100	N
19th	<i>Bamburgh Castle</i>	53°30'N 51°24'W	020	64	+74	0330-0600	RR, P, N
20th	<i>Warkworth</i>	58°36'N 36°06'W	050	67	+75	2245-2350	HB, RA, RB
21st	<i>Warkworth</i>	58°45'N 46°20'W	030	69	+74	2300-2306	HB
25th	<i>Manchester Regiment</i>	52°50'N 51°10'W	020	63	+74	0400-0600	HA, HB, RB, RR
27th	<i>Manchester Regiment</i>	55°40'N 33°25'W	050	64	+72	0400-0500	RB

KEY: λ = geomagnetic longitude; ϕ = geomagnetic latitude; I = inclination; HA = homogeneous arc; HB = homogeneous band; RA = rayed arc; RB = rayed band; R(R) = ray(s); P = patch; V = veil; N = unidentified auroral form.

TECHNOLOGY OF THE SEA AND SEA-BED

Exploitation of the resources of the sea and sea-bed was the theme of a conference organized by the United Kingdom Atomic Energy Authority, at the request of the Ministry of Technology, in April 1967. In calling this conference the Ministry had in mind that the sea is a largely untapped natural resource and that its exploitation could benefit the whole country in many ways; such a conference provided an occasion on which scientists and technologists from industry and government could exchange views.

The subjects covered included the technology of gaining food from the sea; underwater viewing, handling and communications; the winning of minerals from the sea-bed; movement and control of the sea-bed; sea rigs and platforms; information handling for oceanography and for meteorology over the oceans.

It was hoped that the proceedings of this conference would facilitate more detailed studies by the industries and government departments concerned to establish areas of development likely to yield possible returns.

Two of the papers read at this conference are of obvious interest to readers of *The Marine Observer*:

'Meteorological Observations over the Oceans' by Dr. G. D. Robinson, Deputy Director of Physical Research of the Meteorological Office and 'Monitoring the Ocean' by Mr. A. J. Lee, Deputy Director of the Fisheries Laboratory at Lowestoft. By kind permission of the United Kingdom Atomic Energy Authority, Dr. Robinson's paper is published in this number and Mr. Lee's will be included in the October number. The full proceedings of the conference will be available shortly for purchase through Her Majesty's Stationery Office.

Meteorological Observations over the Oceans

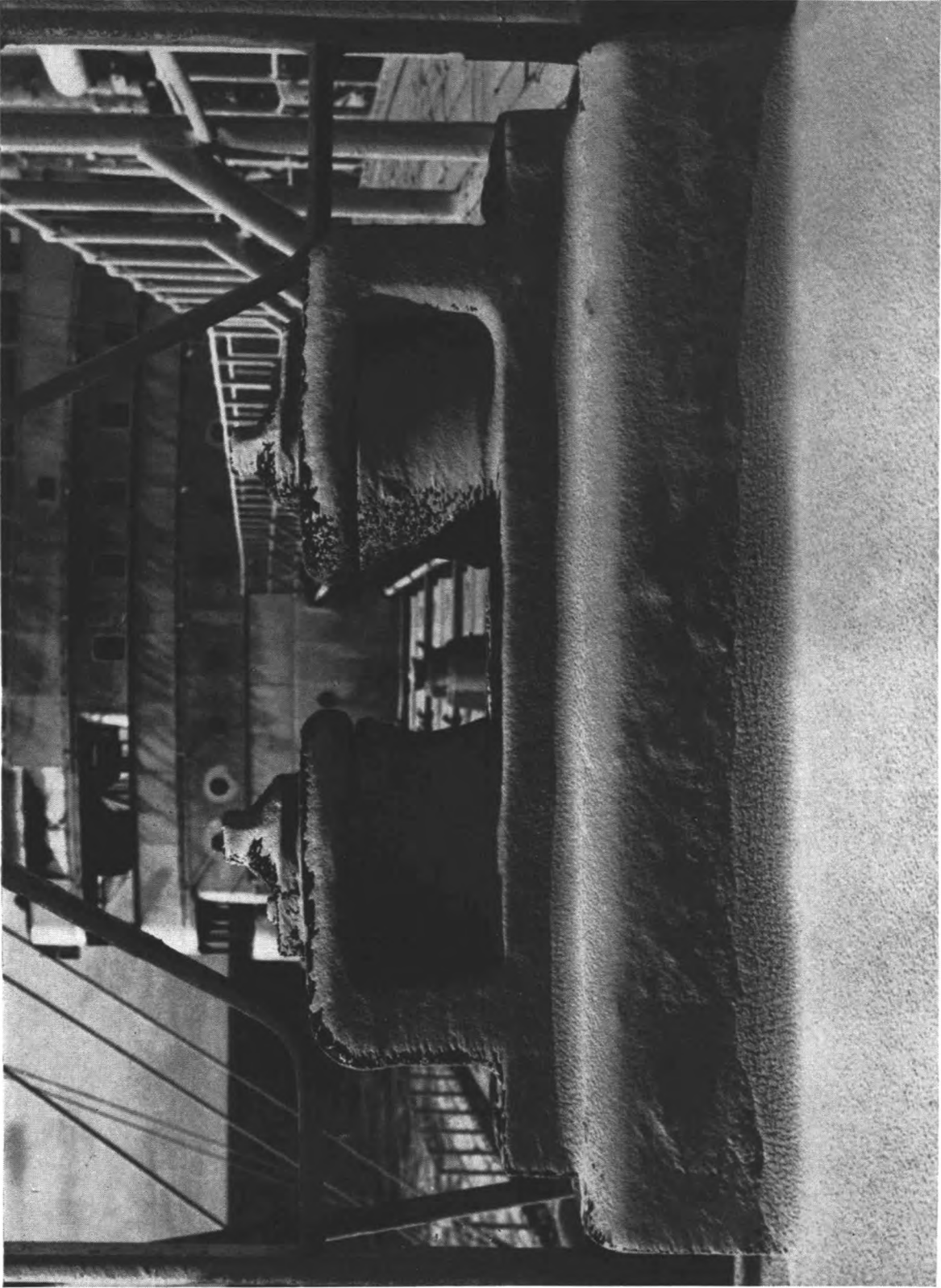
By G. D. ROBINSON, B.Sc., Ph.D.
(Deputy Director (Physical Research), Meteorological Office)

The weather is always with us, assisting or interfering with our activities and this is at least as noticeable over the oceans as over land. As we are probably at the start of a very considerable extension of meteorological measurement over the oceans which will require the application of new techniques I shall explain how and why this comes about and something of the methods which may be used.

In September 1961 the President of the U.S.A. addressed the General Assembly of the United Nations and declared *inter alia* “. . . We shall propose further co-operative efforts between all nations in weather prediction and eventually weather control . . .”. The proposal was made and, in December 1961, Resolution 1721 of the General Assembly of the U.N. resulted, one part of which called on Member States, the World Meteorological Organization (WMO), etc. to make early and comprehensive study of measures to advance the atmospheric sciences and to develop existing weather forecasting capabilities. In 1962 a further Resolution called on Member States of the U.N. to expand their activities in meteorological research and services, on the International Council of Scientific Unions (ICSU) to develop and expand programmes of atmospheric research, and on the U.N. agencies to provide technical and financial assistance to Member States, particularly for expansion of networks of observing stations. Discussions of these resolutions within WMO (a Specialized Agency of the U.N.) has resulted in the production of a detailed plan—known as World Weather Watch (WWW)—for the extension of meteorological observations in those areas where they are now insufficient or altogether lacking, and for efficient and timely dissemination of these observations throughout the world. The areas concerned are of course mainly oceanic, particularly in the tropical and Southern Hemisphere oceans. Within ICSU the deliberations have resulted in proposals, at present not firmly formulated, which have been christened the Global Atmospheric Research Project (GARP). For our present purpose it is sufficient to note that this project calls for an even more detailed observing programme than WWW, limited in the first instance to a period of one year, 1972 being the year suggested.

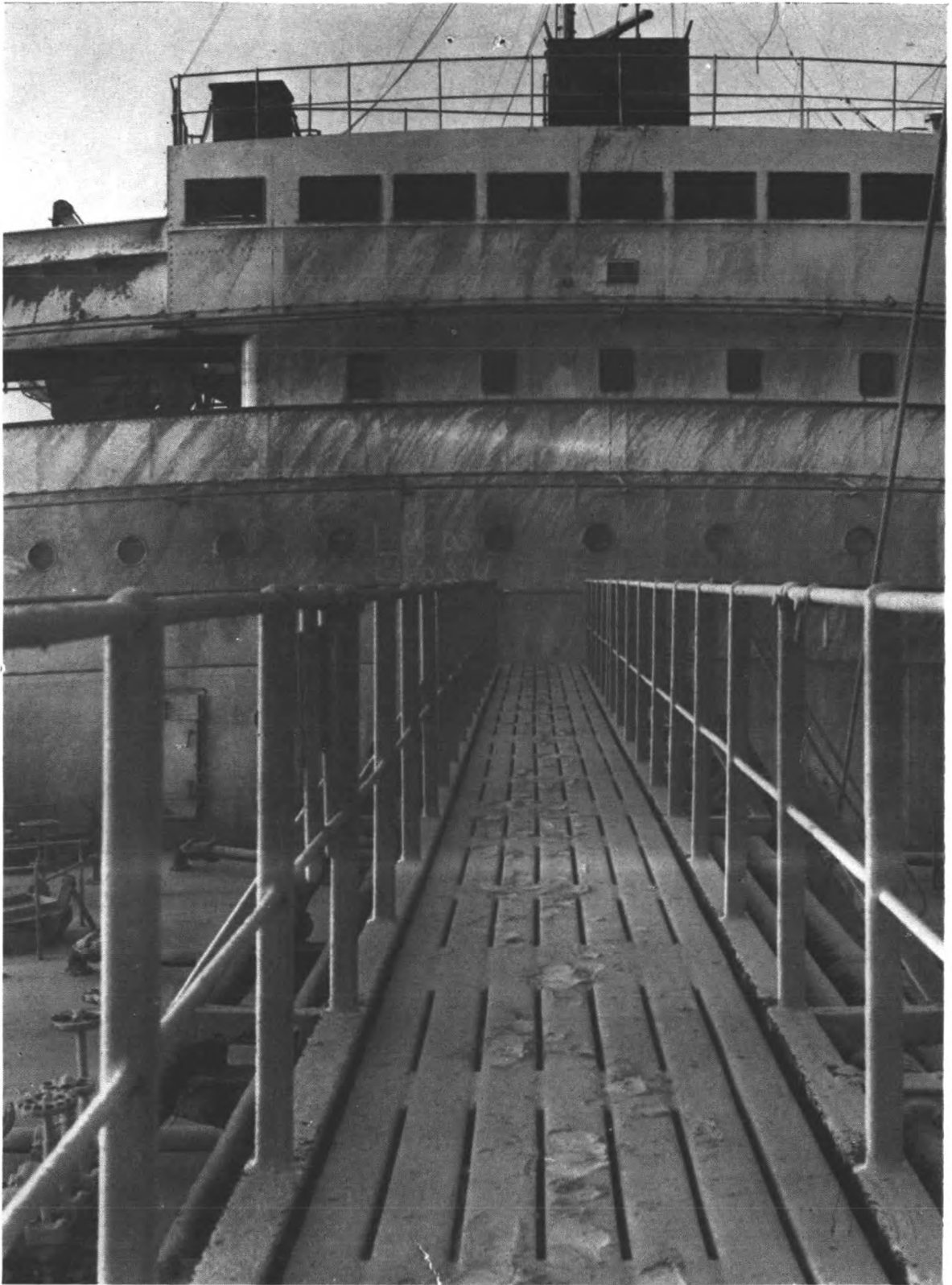
What is the reason for this active interest in meteorology? It is to be found in a revolution in meteorological practice which has occurred in the years since the Second World War, opening up possibilities of more precise and longer-term weather forecasting and in a realization of the economic benefits of such forecasts. The first stage in the production of a weather forecast is to analyse the initial situation by preparing charts showing the three-dimensional wind and temperature field—the height of a number of constant pressure surfaces is a favoured method. The second stage is to project these charts into the future to produce a picture of expected air motion, horizontal and vertical. The third is to decide what weather these air motions imply. The first two stages are now carried out, in routine practice, on an electronic computer by those meteorological services fortunate enough to possess a suitable one. The process involves forward integration by finite difference methods of the dynamical and mass and energy conservation equations of a simplified ‘model’ atmosphere of which the initial state is specified by observation. Experiments to reduce the third stage to a computation routine are in progress—in this country very promising ‘forecasts’ of rainfall amount have been made experimentally, using the Atlas computer at Harwell. Work of this nature, including a series of numerical experiments on physical-mathematical ‘models’ of the atmosphere of varying complexity and verisimilitude, has led many meteorologists to believe that in the temperate latitudes weather forecasts containing useful information for up to two weeks ahead will become possible, with increased accuracy for shorter forecast periods. To produce such forecasts observations will be required at several levels in the atmosphere at a world-wide network of stations with a spacing not greater than 1,000 km.

(Opposite page 120)



A heavy deposit of volcanic dust on the foredeck of the *Haneia* where it had accumulated in drifts owing to the ship's motion (see page 116).

(Opposite page 121)



Another view aboard the *Hanetia*, taken from the forward catwalk (see page 116).

The economic benefits to be gained from proper use of improved and extended weather forecasts have been examined and some very surprising figures have emerged. A U.S. Senate Committee estimated the annual cost saving of accurate 5-day forecasts in agricultural, water utilization and transport alone as \$5,600 million. An independent study, carried out for WMO, estimated a potential annual value to the world economy of \$17,000 million. One may feel sceptical about such figures but they have not yet been effectively challenged and there is a clear case for substantial spending in an attempt to reap such benefits. It is for this reason that Member States of the WMO seem likely to approve the World Weather Watch and face the cost, most of which will go to provide observations over the sea.

Information on weather over the sea comes at present from ships, aircraft and, in the form of cloud pictures, from weather satellites. There are about a dozen fixed stations, most of them in the North Atlantic, continuously manned by 'weather ships' which carry professional meteorological observers making upper air observations by radiosonde and radar and surface observations by conventional methods. This scheme was introduced to cover some operational requirements in connection with transport aircraft and, financially, it is a charge on civil aviation. It is the best, but by far the most expensive, method of getting meteorological information at sea. On grounds of expense it is most unlikely to be extended. Other ships' observations come, on a voluntary basis, from merchant shipping. They have not, until recently, included radio-soundings, but there is a move to have these made from some ships. With increasing automation and reduction of ships' complements it may become necessary to develop automatic meteorological observing equipment for use on commercial shipping. There are considerable areas of ocean not frequented by shipping; some new technique is required to obtain observations from these areas.

So far as observations in the free atmosphere are concerned, methods involving the use of artificial satellites have been studied and are in course of being proved by experimental trials. Winds will be measured by following the tracks of many free balloons set to float at constant pressure levels and automatically interrogated from the satellite. Temperatures will be obtained by measurement of the radiation emitted by the atmosphere in several regions of, for example, the 15μ CO_2 band or a microwave O_2 band, and inversion of the integral equation of radiative transfer. Cloud interferes with both these methods in their present stage of development; there is at present no solution in sight to the problem of observing the state of cloudy regions of the atmosphere over the unfrequented oceans.

It seems that for surface observations in remote areas we must rely on instrumental telemetering buoys. Very considerable effort has gone into the development of this equipment in the U.S.A. I do not think it would be claimed that the problems are satisfactorily solved but there has been progress. The difficulties divide into three areas: marine engineering—the construction of buoys, their power supplies and their deep water moorings, meteorological instrumentation and telecommunications. I am not qualified to discuss the first in any way, though it is perhaps the sector of most general interest to this conference. I think it is a fair summary of American experience so far that the bigger and more expensive the construction the more promising the performance. As a rough guide we may note that a buoy constructed (in small numbers) at a cost of about \$25,000 has survived a hurricane at its deep water mooring—though its meteorological instrumentation did not escape unscathed—and that it is considered worthwhile to experiment with structures in order of magnitude more costly.

Meteorological instrumentation would be expected to cause less difficulty than the engineering of the platform, but experience has not borne this out, I suspect because meteorologists have not been prepared to relax the standards of precision and accuracy which they expect from a first-class observatory or a weather ship. The basic requirements are probably pressure, sea-surface temperature, air temperature, wind speed, wind direction and humidity. I have listed them in order of difficulty of measurement. Most meteorologists would put pressure first in an order

of utility but I do not think there would be much agreement over the other placings. I do not have to explain the general unfriendliness of the air-sea interface as a subject of physical measurement, but mention two examples. I am told that in a strong gale it is not a simple matter to decide where the interface is, certainly within the scale set by the superstructure of a buoy or small vessel. To measure humidity with useful precision we have to keep a thermometer bulb or other surface dry, or free from salt, or both.

Difficulties with telecommunications arise from the distance from suitable shore stations coupled with the requirement for round the clock operation and limited available power. A system of meteorological buoys in the southern oceans would almost certainly be coupled with interrogation from a satellite.

I think I should conclude with some reference to the second part of the sentence which I quoted from President Kennedy's address to the U.N. General Assembly "... and eventually weather control". There has been a good deal of discussion of the possibility of weather and climate control, some of it opportunist and some ill-informed. There have been experiments in weather modification. There is no doubt that precipitation has been induced (by uneconomic methods) in individual clouds of certain types. Supercooled stratocumulus cloud has been dispersed locally by an expensive process. These are minor local effects. There is a controversy about the success of rain-making on a more extensive scale; many commercial ventures have clearly been unsuccessful and I know of no clear-cut demonstration of artificially increased precipitation on an economically useful scale, though it may have occurred. Of the mechanisms which have been proposed for large-scale climatic control one is of particular interest to a conference on the sea. This involves the suppression of evaporation from certain regions of the ocean, which could result in a major redistribution of energy sources in the atmosphere. Within the next few years it should be possible, by numerical experiment, to test the effect of such interference on the atmospheric circulation. Evaporation from small lakes has been reduced by monomolecular films of suitable substances such as hexadecanol. I was personally associated with a project which failed, in quite moderate winds, to establish and maintain such a film over a small reservoir at Kempton Park and I see little prospect of its being done over large areas of ocean in the trade-wind belts. But other means may be found.

SHIP-BORNE FACSIMILE

Pictorial radio transmissions, i.e. facsimile, now used by the meteorological services of many countries in all parts of the world, is the most expeditious method of obtaining the latest weather maps and the only practical way of ensuring that the map is precisely as drawn at the meteorological centre ashore.

The latest edition of the *Admiralty List of Radio Signals*, Vol. III includes, for the first time, a facsimile section which gives details of facsimile transmissions throughout the world likely to be of interest to mariners, e.g. surface analysis and prognosis maps, forecasts or observed ice formation, wave analysis and prognosis.

If properly used, a facsimile receiver is a valuable aid to a shipmaster in discharging his responsibility for the safe and timely arrival of his ship. As will be seen from the map (Fig. 1) showing the approximate sea areas not covered by facsimile transmissions, it is only in the less-frequented sea areas where they are not available.

In addition to the speed and accuracy of facsimile it is worth noting that intelligible weather maps can often be received by this means when other forms of reception are unreadable. The drawing of weather maps at sea by ships' officers from coded data contained in a radio analysis message takes up a lot of time and is therefore seldom done as a daily routine and, as it requires long experience to become proficient at this task, few ships' officers ever achieve the same proficiency as the professional meteorologist.

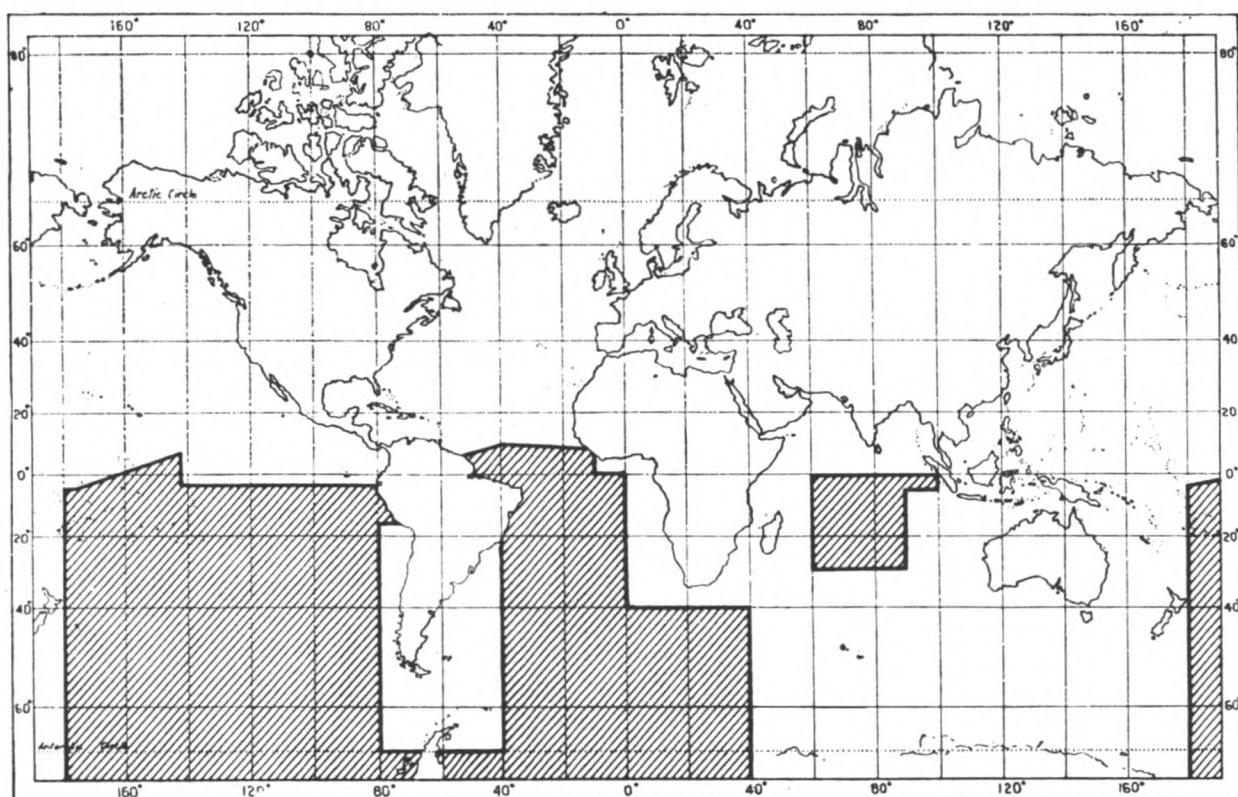


Fig. 1. Approximate sea areas not covered by facsimile transmissions.

With so much emphasis in recent years on automation aboard ship it is perhaps a little surprising that more use is not made of this equipment. It requires very little maintenance and no special skill to operate and its cost is comparatively moderate. Apart from its value as a means of receiving a weather map, facsimile is such a reliable and speedy method of communication that it has many possible uses aboard a merchant ship. Subject to the approval of the GPO and the issue of a licence for the use of a facsimile transmitter, it could be used as a direct method of communication between the ship and the Company's office ashore for such purposes as the transmission of cargo plans and manifests, the master's Portage Bill and other papers required for winding up the voyage.

Facsimile transmitters used for the transmission of weather charts are designed to conform to a specification authorized by the World Meteorological Organization.

The chart transmitter may be either a rotating drum or flat bed type. In both cases the chart to be transmitted is illuminated by a light source of constant intensity and passed before a light-sensitive device such as a photo-electric cell (PEC) and, through either a fixed or moving aperture (dependent upon the type of chart transmitter), the PEC is able to examine the illuminated area of the chart for varying light reflecting values. The light sensitive device translates the varying light values into corresponding variations of electric current. The scanning density is normally 96 lines to the inch which corresponds to an index of co-operation of 576. The normal helix speeds are 60, 90 and 120 r.p.m. An 18 × 22 inch chart is received in 18 minutes at 120 r.p.m., in 24 minutes at 90 r.p.m. or in 35 minutes at 60 r.p.m.

The high frequency radio link FAX receiver can be arranged to operate from either sub-carrier frequency modulation or frequency shift keyed transmissions employing 800 c/s shift. An f.m./a.m. conversion circuit is brought into use and the recorder operates directly from the output of a radio receiver.

Reception of f.s.k. transmissions requires, above all, a good quality H/F communications receiver of high grade stability and possessing simple control of the audio output to reproduce the frequencies corresponding to black and white. In practice

a centre frequency of 2550 c/s is commonly used, deviating ± 400 c/s in the case of reception in the H/F band and ± 150 c/s in the L/F band.

Secondly, a method is required to translate the frequency modulated output of the radio receiver back to the electrical relationship present at the output of the light sensitive device at the chart transmitter. Recording methods vary but, in general, are in two main groups: percussion recording in which a matrix of percussion-operated elements are used electro-mechanically to ink or otherwise mark the recording paper or, more commonly, by means of electro-sensitive paper whereby chemical elements with which the paper is impregnated or treated are activated by the passage of electrical current through the paper. In both cases the presence of a voltage (derived from or determined by the received picture signal) across the recording electrodes produces a mark on the recording paper; absence of markings on the original chart results in absence of voltage across the recording electrodes. As the chart is methodically broken down at the transmitter into a series of elemental areas the picture must be reformed at the recorder in a methodical sequence to present a facsimile of the original. To achieve this, perfect synchronization of transmitter and recorder is required and, if the original proportion and perspective is to be retained, compatibility of transmitting and receiving equipments is essential.

A typical FAX receiver is about 28 inches wide, 23 inches high and 12 inches deep, and weighs approximately 150 lb (*see* photograph opposite page 105). For convenience of tuning, the FAX and radio-communications receiver should be mounted close together, normally in the chartroom or radio office where they can be tuned by a navigating or radio officer. No special aerial is necessary.

On most facsimile surface weather maps, both prognosis and analysis, only isobars and the position of high and low pressure systems are shown. A few countries include wind arrows and movements of pressure systems. As will be seen in Fig. 2, the high and low pressure systems are identified by H or L respectively, fronts by C for cold, W for warm and O for occluded. The second letter in such cases is used as an identifier for the system, e.g. HI, LF, etc. The numbers inside the system or along the fronts are numerical identifiers which must be decoded by reference to the International Analysis Code (IAC Fleet), FM46.C. This code will be found on page 74 of the *Admiralty List of Radio Signals*, Vol. III, and also in the Meteorological Office publication *Ships' Code and Decode Book* (Met.O.509). Under the high pressure system HA, on the map referred to, are the numbers 85233. These numbers are decoded as follows:

- 8—indicator figure for pressure system
- 5—high pressure
- 2—little change in character of system
- 33—1033 mb at the centre of the pressure system

Similarly the numbers 66457 under frontal system CD in the same map would be decoded as:

- 66—indicator figures for a frontal system
- 4—a cold front
- 5—moderate, little or no change in the intensity of the front
- 7—waves at the frontal surface

On page 127 is a reproduction of an ice chart similar to the one transmitted daily from Bracknell. The meaning of the symbols used are shown on this chart. At present these symbols are not used internationally but a World Meteorological Organization working group concerned with the classification of ice and ice nomenclature has this need very much in mind and expects to provide a table of internationally-agreed ice symbols quite soon.

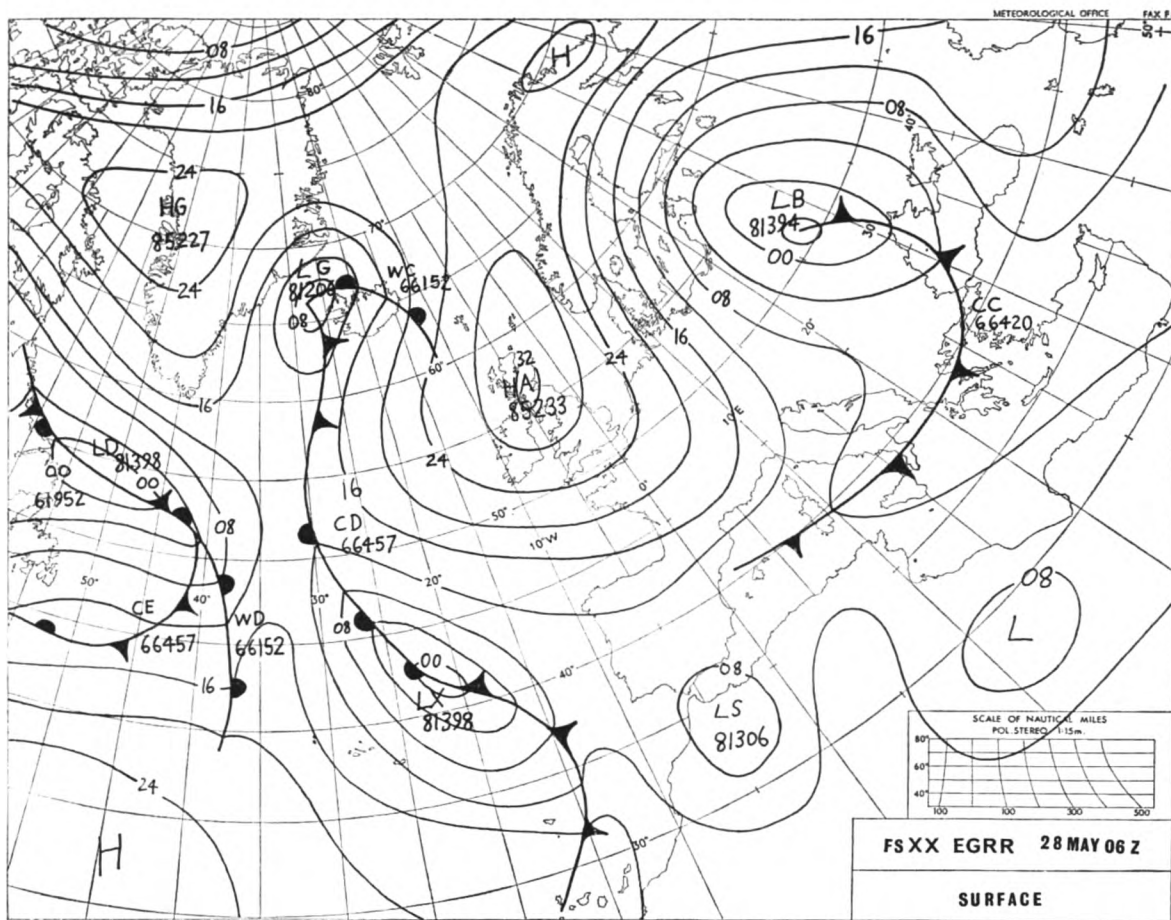


Fig. 2. A typical surface prognostic chart as broadcast by radio facsimile.

A facsimile sea-wave prognosis from Washington D.C., for 1200 GMT on 14th June 1966 for the North Atlantic, is reproduced below (Fig. 3). The information given is isopleths of wave height in feet. Arrows show the direction of waves.

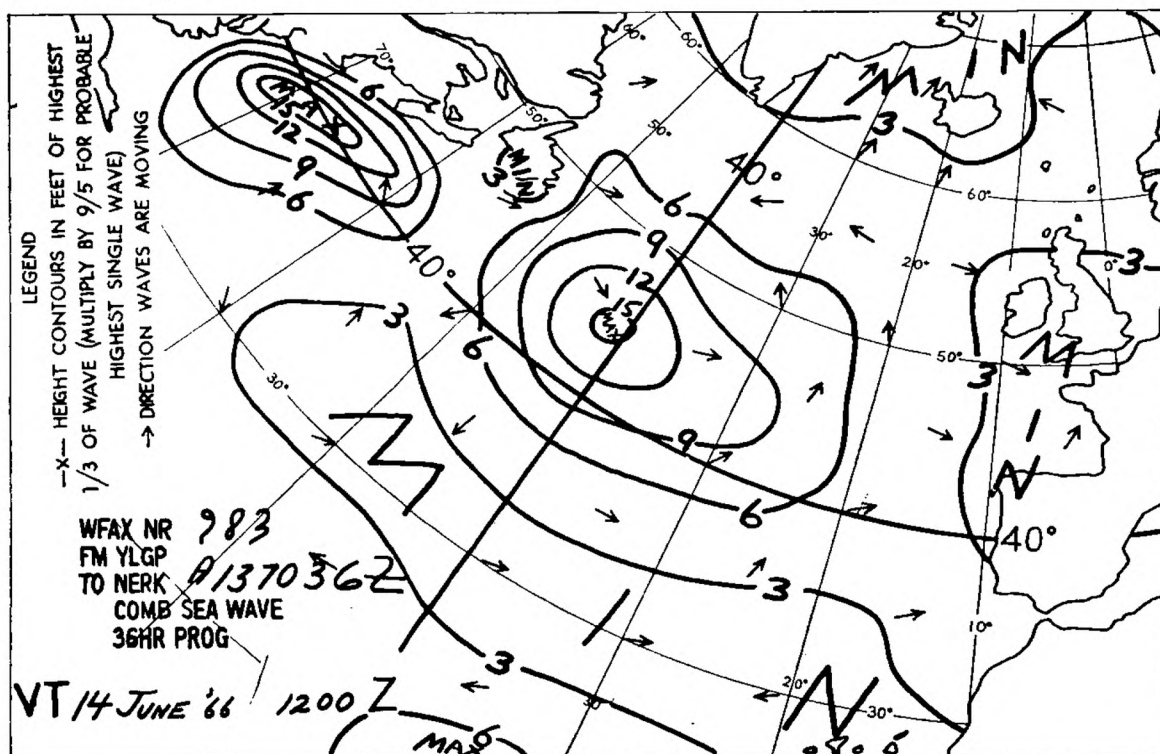


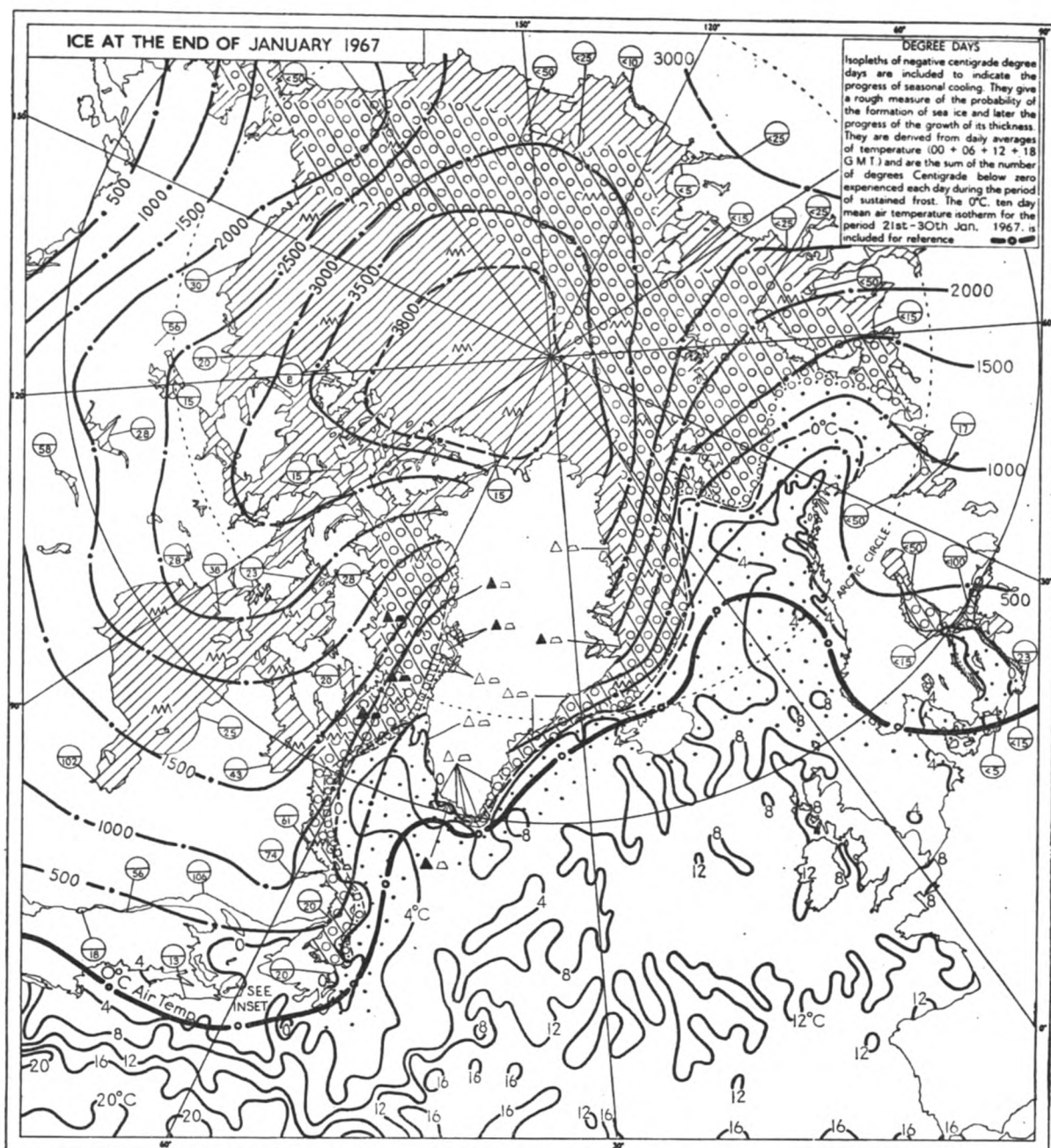
Fig. 3. A facsimile sea-wave prognostic chart broadcast from Washington, D.C.

The following selection of regular daily scheduled FAX transmissions of use to mariners in various parts of the world show the sort of information available.

STATION AND CALL SIGN	MAP AREA AND TRANSMISSION DETAILS	TIMES (GMT) OF TRANSMISSION
NORTH ATLANTIC		
Bracknell (GFE)	Surface analysis	0332, 0932, 1532, 1904, 2132
	Surface prognosis (24- and 72-hour)	0433, 1033, 1633, 2233
Halifax, N.S. (CFH) (Naval Broadcast)	Sea ice observations	1331
	Surface and upper air 500 mb prognosis	0000, 0600, 1200, 1800
	Oceanographic information	0100, 1300
	Ice information	0300, 1500
	Waves height analyses	0400, 1600
	Surface analysis	0500, 1100, 1700, 2300
SOUTH ATLANTIC		
Buenos Aires (LRB) (LRO)	Surface analysis	0145, 1545, 2120
	Surface prognosis (24-hour)	2020
NORTH PACIFIC		
San Francisco (NPG) (Naval Broadcast)	5-day extended forecast	0039 Mon., Wed. and Fri.
	Extended forecast	0052
	Sea wave and swell analysis	0226, 1439
	Sea wave and swell prognosis	0239, 1452
	Surface analysis	0326, 0926, 0939, 1526, 2126, 2152
Tokyo (JMB) (JMH)	Surface analysis for Northern Hemisphere	0323
	Surface analysis for North Pacific	0400, 1000, 1600, 1854, 2200
	Surface prognosis (24-hour)	0651 Mon. to Fri. except holidays
SOUTH PACIFIC		
Canberra (AXM)	Surface prognosis (24-hour)	0018, 1018
INDIAN OCEAN		
Nairobi (5YE)	Surface analysis	1325, 1825
New Delhi (VVD)	Surface analysis	0820, 2020
MEDITERRANEAN		
Rome (IMB)	Surface analysis	0440, 1040, 1640, 2240

A complete and up-to-date list of such stations, together with transmission details and the area they cover, will be found in *Admiralty List of Radio Signals*, Vol. III. Circumstances may arise that necessitate changes at short notice in contents, times and frequencies of radio facsimile broadcasts; such changes are promulgated by radio facsimile messages, by *Admiralty Notices to Mariners* and by other means.

A. D. W.



NOTES ON ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM JANUARY TO MARCH 1967

JANUARY

Pressure was unusually low over polar regions, especially towards the Siberia-Alaska sector with a resulting anomalous wind circulation affecting the ice cap. On the other hand, an unseasonal anticyclone just south of Iceland dominated the North Atlantic during the first part of the month, although this collapsed later and was replaced by an intense cyclonic system. With these departures from normal, northern Siberia and the adjacent seas were colder than usual but western Greenland and the Baffin Bay-Davis Strait area much warmer. The ice season in eastern Canada was still retarded although there were signs of 'catching up' by the end of the month.

Canadian Arctic Archipelago. Moderate north-easterlies blew during the second half of the month over eastern areas but, elsewhere, winds were mainly light southerly or variable. It was relatively warm in the west but in the east temperatures fluctuated about 4°C either side of normal. North of 75°N there were, perhaps, fewer breaks in the ice than usual.

Baffin Bay. South-easterly winds and resulting mild conditions— 6° to 9°C above average—gave way, for a time, to moderate north-easterlies with near or sub-normal values, but later in the month the south-easterlies were re-established and extremely high temperatures recorded—up to 14°C above the mean. Therefore it was not surprising that some areas, albeit small, of open water persisted along the Greenland coast.

Hudson Bay and Foxe Basin. Although there were over the eastern coasts of these waters brief spells of light to medium north-east winds the air flow was mainly from the north-west. Temperature over Foxe Basin fell from 5°C above to 5°C below but over Hudson Bay it remained very near normal, if on the low side. Both seas were bound by 10/10 fast-ice.

Hudson Strait. A moderately strong north-westerly airstream lowered the temperature, which had temporarily been a couple of degrees above normal, to three degrees below. Again this area was completely covered by 10/10 fast-ice.

Davis Strait. Over the western half strong north-north-westerly winds lowered the air temperature from 4°C above the seasonal mean to about 2°C below. Sea temperatures over those areas still ice-free persisted, however, a little higher than normal. Seawards of Cumberland Sound and Peninsula the ice extended out into the Strait about 60 miles more than usual but off Cape Chidley, in the south, the pack appeared to be 40 miles narrower than average. Further east and along the Greenland coast winds were mainly south-easterly and conditions unusually mild, air temperatures in places being up to 10°C higher than normal. The sea, too, was less cold than usual with the result that there was a marked deficiency in ice. Whereas it is common for fast-ice to form in the fjords at this season, this year there was none.

Labrador Sea. In spite of moderate or strong northerlies, air temperatures in the north remained normal or slightly high although further south they did fall to about 4°C below average. Sea temperatures on the whole were about 1°C above average. The width of the ice-pack in the north, as in the southern part of the Davis Strait, was about 40 to 50 miles narrower than usual but south of Hamilton Inlet the cover was about normal although, it is thought, the ice was relatively thin.

Great Bank. Light north-east winds backed to strong or even very strong north-westerlies and the relatively mild air was cooled down to about 2°C below average although in places, e.g. Belle Isle Strait, much more than this. Except for a small area to the north-east of Notre Dame Bay where it was 1°C cooler than usual, the sea retained much of its heat and water temperature was at least 1°C higher than normal. There was a very marked deficiency in ice and aerial reconnaissance on 28th showed the ice edge to be of the order of 150 miles nearer the shore than might be expected at the end of January, the only significant amount, in fact, being just east of Belle Isle itself.

Southern Newfoundland Sea. The light northerly and westerly winds lowered the air temperature from just above to a couple of degrees below normal but the sea remained quite warm, temperatures being about 2°C above average. There was, exceptionally for this time of year, no sea-ice.

Gulf of St. Lawrence. Under the influence of light northerly and moderate north-westerly winds the temperature fell from the high values of December to as much as 3°C below normal—the first sign that the backward season might yet catch up. However, the sea remained 2°C warmer than usual and ice amounts were low. Fast-ice and some pack formed round Prince Edward Island and in and off Chaleur Bay but the main channel through Cabot Strait remained completely ice-free. Altogether a January very light in ice for this seaway.

River St. Lawrence. Light west-north-westerlies gave way to east-north-easterlies as air temperatures fell from about 3°C above to 1°C below normal. There was a fair amount of close pack westward of 67° 30'W but ships were still moving.

Greenland Sea. Wind directions were variable; north of 75°N, for example, there were some unusual south-westerlies for part of the month. Temperatures oscillated violently and at one time, in the extreme north, were 10°C below normal. The first aerial reconnaissance report from Lufthansa Airlines (on 18th) near the north of Greenland confirmed the existence of a wider band of fast-ice than usual while the close pack extended some 60 miles beyond normal limits. In the area between 70°N and 75°N strong northerlies were replaced by light easterlies while air temperatures, slightly low at first, fell to about 9°C below average before partly recovering to 4°C below. There were a few ship reports and from these it appeared that the sea was on the cool side. Ice coverage was still excessive, early in the month by about 100 miles more than usual and extending as far out as Jan Mayen. Under the influence of the easterlies, however, the ice edge in this sector was driven in and by the end of the month reached only 60 miles beyond the normal limit. Between 65° and 70°N winds were much stronger, moderate north-westerlies being followed by extremely strong easterlies. The air remained, on the whole, on the relatively warm side although the sea, initially warmer than usual, cooled to below normal. There was a much wider expanse of pack to the north and north-west of Iceland but in the locality of Angmagssalik there was a deficit. During this period there was an incident when a British trawler, the *Northern Sceptre*, was partially disabled on 10th January when she hit ice off the north-west of Iceland. South of Denmark Strait, under the influence of a moderate to strong south-easterly flow, both air and sea remained relatively warm with the result that the ice pack along the Greenland coast was narrower than usual.

Spitsbergen and Barents Sea. Although there were some south-westerlies in the Novaya Zemlya area for a time the general wind flow was from the north-east, with a very big cooling effect, air temperatures in places being lowered to as much as 12° to 14°C below normal. Sea temperatures, too, were on the low side by about 2°C. Ice over much of these areas was greatly in excess of normal, an unusual 100 mile extension of the pack south of 75°N being moved some 200 miles westward towards Bear Island.

White Sea. Here ice conditions were quite normal with the air being generally some 4°C cooler than usual.

Baltic. It was generally cold in the Baltic, especially over the Gulf of Finland, any southerly winds bringing in air already cooled over European Russia. Ice tended to form rather quickly in the Gulf of Bothnia which was, by the end of the month, completely covered apart from narrow shore leads along the Finnish coast. The Gulf of Finland, too, was almost full of pack although some ports were kept open. There was some new ice along the Kalmar coast of Sweden and on the east coast of Gotland. The Gulf of Riga and many of the waters along the southern shores of the Baltic were also frozen over but the Kattegat and the Sound quite ice-free.

North Sea. With lowish temperatures at the beginning of the month there was a little new ice but this quickly disappeared later.

FEBRUARY

There was a marked change in the over-all weather picture, there being in the western hemisphere a rapid acceleration of the previously backward winter season. In the east, on the other hand, conditions were much milder than hitherto and in sharp contrast to those in February last year.

Canadian Arctic Archipelago. In spite of strong north-westerly winds persisting for most of the period the air temperatures tended to rise from about 8°C below normal in the early part of the month and finished some 3°C higher than usual. The ice pattern, however, remained unchanged.

Baffin Bay. Moderate north-north-easterly winds blew throughout the month but, surprisingly, temperatures were high by the end of the month, as in the Archipelago, although they had been on the low side during the first week or so. Ice, generally, was normal with perhaps a little more than usual in Smith Sound, with 10/10 cover.

Hudson Bay, Foxe Basin and Hudson Strait. Steady light to moderate north-westerly winds brought in very cold air and the temperature fell in many places to 12°C below normal—except in the extreme west of the Hudson Bay where there was a slight amelioration—and over all these areas there was much more fast-ice than usual.

Davis Strait. Strong winds, a point or two either side of northerly, lowered temperatures to well below normal. The sea, however, was probably still slightly warmer than average, at

least in the south where ice coverage was very much as usual, but further north there was a positive ice anomaly and the areas of open water along the Greenland coasts north of 65°N became frozen over. Nevertheless, it seems that ice was on the thin side, although in excess.

Labrador Sea and Great Bank. Winds were mainly from the north-west and strong, with some westerlies south of 50°N. Air temperatures were very low, by some 6 to 8°C, but since the sea was still warmer than usual any increases in the amount of ice failed to bring the total up to normal. In places the width of the pack was 50 miles narrower than is usual at the end of February.

South Newfoundland Sea. With off-shore winds bringing cold continental air over this area temperatures fell appreciably but the sea continued to be a little on the warm side. Relatively small amounts of new ice formed at the mouth of the Cabot Strait during the last half of the month but the covering was still less than usual.

Gulf of St. Lawrence. Wintry conditions, although delayed, set in firmly during February with consistent north-westerlies further depressing the air temperature to as much as 8°C below normal. Fairly rapid freezing occurred all over the Gulf, most of which was covered by close pack.

River St. Lawrence. Moderate north-north-westerly winds brought arctic air into eastern Canada and the season developed as a severe one, the amount of ice, especially in Lac St. Pierre, being the most for several years. Shipping, in spite of ice-breaker activity, was considerably delayed.

Greenland Sea. North of 70°N abnormally strong and steady north-easterlies kept temperatures well below average and, although such sea as remained open was probably a little warmer than usual, ice amounts were in excess and the extent of fast-ice along the Greenland shore was perhaps 50 miles wider than normal. South of 70°N the winds, although strong, were much more variable with a preponderance of southerlies in the extreme south. As might have been expected, air temperatures fluctuated either side of normal but the sea was generally much warmer than normal. Ice was, on the whole, less than average, one feature being the extreme irregularity of the ice edge. Some open pack drifted round Cape Farewell into the southern Davis Strait but only in small amounts.

Spitsbergen (Svalbard). In the extreme north of this area winds were mainly easterly and often strong. The air was several degrees cooler than usual but since the sea itself was relatively warm there was a deficiency of ice, especially to the immediate west of Spitsbergen.

Barents Sea. In the north the winds oscillated between south-east and north-west and air temperatures were consequently very variable but tended to rise slowly during the month, except for an area just south of Franz Josef Land where it was as much as 14°C colder than usual. Ice, in excess at the beginning, disintegrated somewhat along its southern edge which ran approximately along the 75th parallel. Further south the prevailing wind direction was from the south-west and temperatures were generally on the high side, the sea also being warm. This area was almost free of ice. At the beginning of the period some ice had intruded as far as 74°N but this melted, while the small quantity along the coasts to the east of the White Sea also tended to disappear.

White Sea. South-west or north-westerly winds, often strong, helped to raise the temperature and ice amounts were consequently low, the pack probably being on the thin side.

Baltic. The persistent southerly or south-westerly winds helped to keep air temperatures high, in many places 6°C above average and so, although the sea was perhaps a little cooler than usual, ice coverage was about normal as in the Gulf of Bothnia (where the pack was much thinner than usual), or less than normal as in the southern half of the sea. Many areas frozen in January were now clear. The western end of the Baltic was quite ice-free.

North Sea. There was no sign of ice even in the shallow inlets.

MARCH

Temperatures continued high in the east with the break-up in the Baltic and the White Sea about six weeks ahead of normal. A slow change took place in the west Atlantic as the cold anomaly, initially over eastern Canada, weakened and transferred to the Denmark Strait.

Canadian Arctic Archipelago. The weather here was mostly a little colder than average and winds were from the north-west. As is usual at this time of year the area was completely covered with ice.

Baffin Bay. Temperatures fell to 10°C below normal in the south-west although remaining warm in Smith Sound. During the month temperatures rose above average everywhere and a change of wind direction from north-east to south-west formed shore leads along the edge of the Baffin Island fast-ice. Breaks also occurred along the Greenland coast where there has been a very mild winter.

Table 1. Icebergs sighted by aircraft and merchant ships within latitudes 40°N–65°N and longitudes 40°W–65°W
(This does not include growlers or radar targets)

LIMITS OF LATITUDE AND LONGITUDE		DEGREES NORTH AND WEST												
		66	64	62	60	58	56	54	52	50	48	46	44	42
Number of bergs reported south of limit	DEC.	> 14	> 14	> 14	> 14	9	4	3	1	0	0	0	0	0
Number of bergs reported east of limit	DEC.	> 14	> 14	> 14	> 14	> 14	> 13	> 13	> 10	> 9	> 9	> 9	> 9	> 9
Extreme southern limit	DEC.	51° 39'N, 56° 22'W on 28.12.66												
Extreme eastern limit	DEC.	56° 57'N, 40° 30'W on 18.12.66												

LIMITS OF LATITUDE AND LONGITUDE		DEGREES NORTH AND WEST												
		66	64	62	60	58	56	54	52	50	48	46	44	42
Number of bergs reported south of limit	JAN.	10	8	2	2	2	2	0	0	0	0	0	0	0
	FEB.	> 372	> 372	> 372	> 371	368	306	189	141	39	0	0	0	0
	MARCH	205	205	205	205	205	205	205	205	139	5	1	0	0
	Total	> 587	> 585	> 579	> 578	575	513	394	346	178	5	1	0	0
Number of bergs reported east of limit	JAN.	10	10	10	10	10	10	9	4	1	1	1	0	0
	FEB.	> 372	> 372	> 372	> 339	> 263	> 189	> 58	> 39	> 9	> 1	> 1	> 1	0
	MARCH	205	205	205	205	205	205	203	141	27	9	0	0	0
	Total	> 587	> 587	> 587	> 554	> 478	> 404	> 270	> 184	> 37	> 11	> 2	> 1	0
Extreme southern limit	JAN. FEB. MARCH	55° 10'N, 55° 49'W on 3.1.67 48° 32'N, 48° 37'W on 28.2.67 45° 53'N, 47° 19'W on 21.3.67												
Extreme eastern limit	JAN. FEB. MARCH	55° 45'N, 44° 00'W on 16.1.67 59° 06'N, 42° 42'W on 5.2.67 47° 38'N, 47° 06'W on 20.3.67												

> ('greater than') has been inserted where there is some doubt as to the actual number of icebergs at some of the sightings, but the true value is probably greater than the value given.
Extreme limits during the 3-month period are underlined.

Hudson Bay, Foxe Basin and Hudson Strait. Temperatures began well below normal throughout, but mild air spread across from the south-west to bring temperatures up to normal in Foxe Basin and Hudson Strait, and above normal in Hudson Bay. There were no changes in ice cover apart from shore leads forming in the Hudson Strait.

Davis Strait. This area remained cold for the greater part of the month but, with a change of wind from mainly northerly to light westerly, temperatures were only a little below normal by the end of the month. There was a rapid increase of ice north of 62°N at first, giving much more ice than usual. The formation of shore leads along the Baffin Island coast indicated a continued south-eastward drift of the ice but, as this was now melting in saline Atlantic water, the increase of ice was halted.

Labrador Sea and Great Bank. For the first part of the month weather and ice conditions changed little from those of February. Later, over the Great Bank and southern Labrador Sea, winds became north-east and the whole area became less cold. Sea temperatures remained 1–2°C above normal. Numerous reports of icebergs were received, the most at this time of year since 1964.

South Newfoundland Sea. Initially winds were from the south-west and temperatures were low, causing an increase of ice in the Cabot Strait area until, by mid-month, there was more ice than normal. However, towards the end of the month, winds from the north-east and a rise in temperature to near normal reduced the ice to small amounts although patches drifted along the coast of Nova Scotia as far as Halifax.

Gulf St. Lawrence. Ice conditions slowly worsened under the influence of cold northerly winds but a change to less cold north-east winds opened a wide lead west of Newfoundland and the northern Cabot Strait became open again.

River St. Lawrence. The ice situation changed little as cold northerly winds persisted, with temperatures up to 10°C below normal. Late in the month a change to easterly winds and normal temperatures brought no improvement.

Table 2. Baltic Ice Summary: January–March 1967
No ice was reported at the following stations during the period: Aarhus, Copenhagen, Kristiansundfjord, Oslo.

STATION	JANUARY					FEBRUARY					MARCH																	
	LENGTH OF SEASON		ICE DAYS		NAVIGATION CONDITIONS	ACCUMULATED DEGREE DAYS	LENGTH OF SEASON		ICE DAYS		NAVIGATION CONDITIONS	ACCUMULATED DEGREE DAYS	LENGTH OF SEASON		ICE DAYS		NAVIGATION CONDITIONS	ACCUMULATED DEGREE DAYS										
	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H				
Leningrad	1	31	31	31	0	0	31	0	706	1	28	28	28	0	0	28	0	919	1	31	31	14	17	18	13	0	881	
Riga	7	31	22	14	4	14	4	0	400	1	26	26	23	2	0	23	0	470	1	27	10	0	10	1	0	0	381	
Pärnu	1	31	31	31	0	6	25	0	479	1	28	28	28	0	0	28	0	574	1	31	31	31	0	0	0	31	554	
Viborg	1	31	31	31	0	0	31	0	—	1	28	28	28	0	0	11	17	—	1	31	31	31	0	0	0	31	—	
Klaipėda	3	31	19	4	0	16	0	0	—	1	20	11	0	0	6	0	0	—	7	13	7	0	5	6	0	0	—	
Ventspils	7	31	24	1	0	7	0	0	—	1	20	19	3	7	18	0	0	—	0	0	0	0	0	0	0	0	—	
Tallin	13	31	16	0	9	12	3	0	—	1	28	28	1	27	0	27	0	—	1	20	30	12	8	0	20	0	—	
Helisinki	1	31	31	31	0	14	17	0	499	1	28	28	28	0	0	28	0	663	1	31	31	8	0	0	21	10	0	645
Mariehamn	23	31	9	7	0	9	0	0	245	1	28	28	12	15	24	0	0	314	1	14	14	0	0	0	12	0	0	275
W. Norrskar	6	31	22	0	7	10	6	0	—	1	28	28	0	28	0	1	27	—	1	31	31	31	0	0	0	12	19	—
Turku	9	31	23	23	0	18	5	0	429	1	28	28	28	0	0	28	0	551	1	21	21	5	5	8	2	0	0	531
Mantyluoto	9	31	23	10	1	11	9	0	—	1	28	28	28	0	0	28	0	—	1	27	27	2	0	25	2	0	0	694
Vaasa	1	31	31	31	0	0	31	0	532	1	28	28	28	0	0	1	27	697	1	31	31	31	0	0	12	19	0	—
Oulu	1	31	31	31	0	0	22	9	—	1	28	28	28	0	0	0	28	—	1	31	31	31	0	0	0	0	31	—
Roytaa	1	31	31	31	0	0	0	31	—	1	28	28	28	0	0	0	28	—	1	31	31	31	0	0	0	0	31	—
Luleå	1	31	31	31	0	0	25	6	749	1	28	28	28	0	0	0	28	—	1	31	31	31	0	0	0	0	31	—
Bredskar	1	31	31	9	0	23	4	0	—	1	28	28	28	0	0	0	28	—	1	31	31	31	0	0	0	0	31	—
Ånosund	1	31	27	9	0	22	5	0	—	1	28	28	28	0	0	20	8	944	1	31	31	31	0	0	0	3	28	—
Stockholm	12	31	20	7	0	20	0	0	200	1	28	28	28	0	5	23	0	—	1	27	27	20	7	15	5	0	0	143
Kalmar	8	31	15	6	1	13	0	0	111	1	28	28	20	2	26	2	0	233	1	1	1	1	0	1	0	0	0	94
Visby	0	0	0	0	0	0	0	0	105	0	0	0	0	0	0	0	0	108	0	0	0	0	0	0	0	0	0	—
Skellefteå	1	31	31	5	2	6	19	6	—	1	28	28	28	0	0	0	28	—	1	31	31	31	0	0	0	0	31	—
Göteborg	0	0	0	0	0	0	0	0	96	0	0	0	0	0	0	0	0	76	0	0	0	0	0	0	0	0	0	—
Kiel	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Tønning	9	13	5	0	5	4	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Husum	9	13	5	0	3	4	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Emden	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Lubeck	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Gluckstadt	9	10	2	0	0	1	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Bremerhaven	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Flensburg	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Stettin	9	12	2	0	0	0	0	0	27	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	0	—
Gdansk	25	31	2	0	1	0	0	0	86	1	14	2	0	1	0	0	0	47	0	0	0	0	0	0	0	0	0	—

CODE: A First day ice reported. C No. of days that ice was reported. E No. of days of pack-ice. G No. of days assistance required.
B Last day ice reported. D No. of days continuous land-fast ice. F No. of days dangerous to navigation, but assistance not required. H No. of days closed to navigation.
* These figures give a rough measure of first the probability of the formation of sea ice, and later the progress of the growth and of its thickness. They are derived from daily averages of temperature (00 + 06 + 12 + 18 GMT) and are the sum of the number of the degrees Celsius below zero experienced each day during the period of sustained frost.

Greenland Sea. North of Jan Mayen the strong north-north-east winds persisted, with mostly below-normal temperatures. Atlantic water made some inroads into the pack-ice in the north early in the month and later opened up the ice considerably, south of 75°N . The ice extended further east than usual but concentrations were smaller. From Jan Mayen southwards, including the Denmark Strait, temperatures were about 5°C below normal. Winds were very strong and a change of direction from north-east to northerly brought open pack-ice within 20 n. miles of the coast of north Iceland as far east as 15°W , creating a much larger ice area than normal. Winds south of 65°N were mostly north-east but north-west for a time in the extreme south. Ice continued to be less than normal and tended to drift southwards from Cape Farewell instead of into the Davis Strait. The sea remained warmer than usual.

Spitsbergen (Svalbard). Winds continued strong, mostly between south-east and north-east, and temperatures were low to begin with but rose to above average by the end of the month. Ice conditions were a little lighter than normal.

Barents Sea. Winds were mostly strong south-easterly in the north with temperatures below normal most of the month but rising above normal later. The pack-ice continued retreating northwards and there was much less ice than normal. In the south temperatures were up to $10\text{--}15^{\circ}\text{C}$ above normal and with strong south-south-west winds the ice to the east of Kanin Peninsula broke up and drifted away from the coast.

White Sea. There were rapid changes in the ice situation, the strong south-west winds and temperatures well above normal cleared much of the ice and, by the end of the month, there was mostly just very open pack-ice, apart from the coastal fast-ice.

Baltic. Winds continued to be south-westerly and temperatures were mostly above average. The ice continued to melt and the Baltic Sea became ice-free. There was open water through most of the Sea of Bothnia and ice in the Gulf of Finland continued to decrease.

North Sea. The area remained free of ice.

N. B. M. & G. P. D.

Note. The notes in this article are based on information plotted on ice charts similar to the map on page 127 but on a much larger scale ($39\text{ in} \times 27\text{ in}$). These charts are published at ten-day intervals and are available at the price of reproduction on application to the Director General, Meteorological Office (Met.O.1), Eastern Road, Bracknell, Berks. Alternatively, they may be seen at any Port Meteorological Office or Merchant Navy Agency. Up-to-date ice charts are broadcast daily by facsimile.

Book Reviews

Weather and Climate, by R. C. Sutcliffe, F.R.S. $8\frac{3}{4}\text{ in} \times 5\frac{3}{4}\text{ in}$, pp. 206, *illus.* Weidenfeld and Nicolson, 5 Winsley Street, London, W.1, 1966. Price: 36s.

This is a volume in the series *Advancement of Science*, the overall object of which, initiated with the advice of the British and American Associations for the Advancement of Science, is to inform the reader about new developments.

Professor Sutcliffe's book deals with the science of meteorology in all its varied aspects. To many, if not to most of the great unenlightened public there is only one side to meteorology—forecasting. Questions as to why we need a seven-storey building here in Bracknell merely to pump out a forecast, whilst not now so frequent as they were six years ago when we first set up business down here, are still by no means uncommon. Apart from the professional meteorologist, members of the corps of Voluntary Marine Observers can be numbered among the relatively few specialized people who fully realize that forecasting is only one side of a many-sided project, for they will know that although the dispatch of the radio weather message sees the end of their contribution to a weather forecast there is still the meteorological logbook to be completed, whether or not it is practicable to send a radio weather message, and sent in at the end of the voyage. Those shipmasters and officers who have visited us here will have followed the logbook through its various processes until it becomes a series of punched cards, one for every observation, to be used in future inquiries, investigations and the preparation of atlases and is itself put into the archives where it may stay for a century (for we still have most of the

logbooks which have come in since FitzRoy's day), or it may come out again tomorrow to settle some point such as a wind shift.

The author, then, sets out to show that forecasting is only one amongst many interests of the meteorologist; in his preface he writes "This is not a text book on meteorology, neither a general introduction nor a formal course, but it has a serious purpose and that is to explain to the general reader what it is that meteorologists are doing and trying to do." His book starts with an account of the constitution of the earth's atmosphere and the use of radio-sonde and weather satellites in its exploration and then proceeds through descriptions of clouds and radiation to a study of large-scale weather systems and forecasting. Other topics discussed include the wind systems of the world, long-range forecasting and the control of weather and climate and it concludes with a look into the future of weather science.

The very nature of his profession demands that a meteorologist must often have his head in the clouds but the reader must be grateful to Dr. Sutcliffe for, at the same time, keeping his own feet on the ground; concerning the vexed question of long-range forecasting, for instance, he writes "According to present scientific thinking there seems little prospect of ever breaking through this barrier so that no meteorologist of standing will encourage the public to expect weather forecasting even for two or three days ahead to be made consistently accurate with the detail to which they are now accustomed for one day ahead. Research holds the promise of many things, but not of everything, and long-range forecasts of weather changes day by day is not at present on the agenda." Or on the control of weather: "My own view, for what it is worth, is that the artificial alteration of weather and climate on the large scale is one of the least promising of objectives, not because it will prove entirely impossible but because what does become possible will not be sufficiently advantageous to be worthwhile. . . . Not looking too far beyond the horizon, it does seem likely that costs will remain decisive and that it will be more sensible to use artificial energy to keep ourselves warm or cool than to warm or cool the whole atmosphere, to pipe water where we need it rather than to control the rainfall, to travel to the sunshine rather than to bring the sunshine to where we live." Perhaps, though, he leaves the ground momentarily in his last chapter wherein he visualizes a close network of observations giving a complete picture of the weather, everywhere and at all times. For this meteorological Utopia he foresees radio-sonde balloon stations at a density of one for every 50,000 square miles over all land areas and all oceans where sufficiently populated islands are available, the wide expanses of the oceans being covered firstly by fixed ocean weather ships ("although these are particularly costly to maintain"), balloon observations from selected ships along the shipping lanes of the world, drop-sondes from high flying aircraft, balloons drifting with the winds for thousands of miles at predetermined heights and the picture filled in by observations of clouds from artificial earth satellites, by surface-manned and unmanned automatic stations and by radar networks and other auxiliary ways. And all this within the next 20 or so years!

But the book is an agreeable one, well illustrated by weather maps and cloud photographs. Dr. Sutcliffe's literary style is pleasant and he writes with authority, having been for many years Director of Research in the Meteorological Office and now breaking new ground as Professor and Head of a new department of meteorology in the University of Reading. Altogether, this is a useful book.

L. B. P.

Voyaging, by Captain James William Holmes. Edited by his daughter Nora Coughlan. 8½ in × 5½ in, pp. 207, *illus.*, Hutchinson & Co (Publishers) Ltd., 178-202 Great Portland Street, London W.1. Second impression 1966. Price 35s.

In the Model Room of the *Wellington*, Headquarters Ship of the Honourable Company of Master Mariners, is the wheel from Joseph Conrad's Command, the

Otago. On an adjacent bulkhead are two framed items: one a painting of the ship as the artist, Miss Norma Bull, found her as a stranded and disintegrating hulk on the banks of the Derwent River, Tasmania, and the other a letter to the artist from the late Dr. Masfield, Poet Laureate and Mariner, who commended her as "you who saw and painted her while there was still time, from pious care for something linked to genius".

Dr. Masfield's foreword to *Voyaging* is written in the same vein: gratitude that memories of the latter days of the sailing ship should be documented while there is still time.

The book is substantially the autobiography of Captain Holmes, compiled and edited from stories which he had told his daughter during his retirement and illustrated by his own paintings of the ships in which he sailed. He must have been a remarkable man and indeed he had a remarkable daughter. "I shared his love of ships", she writes in her preface, "with my feet on a ship's deck I instantly felt at home and, but for my sex, I should have been his sailor son. I understood that my 'timbers were laid' in the *Glenfinart* . . . I was cradled in the bunk of Willis's *Blackadder*. . . . I had my seventh birthday on board my father's barque *Leucadia*. In her I twice sailed round the world, so by rounding the Horn in a sailing ship I have the honour of being elected to that small and dwindling body, The International Association of Cape Horners . . . yet, before I depart on my Last Voyage, I must take up my pen in my eightieth year to fulfil my promise to Father that his rich memories should be recorded for posterity."

Though Mrs. Coughlan had written up all her father had told her of his half century at sea in sail and was able to show it to him before he died, forty years were to pass before she was able to tidy it all up for publication. The result is a truly admirable book.

Born in 1855 of a long line of seafaring ancestors, Captain Holmes went to sea at the age of fourteen in the barque *Talavera*, evidently a hard-run ship even for those days. But his experience in her failed to wash the salt from his blood and in 1870 we find him signing indentures with T. F. Gates of Shoreham and appointed to their barque *Blair Athol*, a Mediterranean and Black Sea trader. Command came to him in 1891 with the barque *Leucadia* belonging to Messrs. Alex. Nicol and Co. of Aberdeen; after her he commanded their *Cimba* for eleven years, from 1895 to 1906; she was naturally his favourite ship. His last command was the four-masted schooner *The Gardner Williams* which he left on final retirement in 1921.

In all, Captain Holmes served in twenty ships; he had a short and spasmodic taste of steam in the 1880's but came back to sail in 1891 with his first command. He painted every one of them, the paintings being reproduced in black and white in this book. This was a talent which he had developed as a small boy at Deal where his father and grandfather were Cinque Port Pilots. His life in each one of the ships is described, making not only a story of one man's life but also a story of the latter days of sail. Hard ships, hungry ships and happy ships; Holmes was in them all and, like most of his generation, he was acutely weather-conscious. Of his time in the *Cimba* he writes "My tenth voyage in the *Cimba* must have been my record for fine weather. From outside the Channel to Tasmania I had had the royals in for one hour. On my first and second voyages I went from Sydney to Dungeness without taking in main topgallant sails, and on the third voyage achieved the same feat from the Snares to the Western Isles. During all the years I was in command I was very fortunate in having good weather and good crews and it is a comforting reflection for a man who has spent fifty-four years of his life upon the world of waters to recall that he had never had a ship in trouble. Some of this immunity from disaster I must say has been due, under God, to an exceptional weather sense. I have found that the constant observation of the minute details of sky, sea, wind and barometer, which makes up life at sea, has developed an acute and instinctive anticipation of approaching conditions which has never failed me and which is perhaps the reason why I have never lost a suit of sails, although carrying them when other ships were

reefed down. I never reefed a topsail in the *Cimba*; but I always carried good gear and was able to anticipate emergencies."

This is a book which deserves to be read and cherished by even a steam-trained officer such as its reviewer for, as Masfield had it:

They mark our passage as a race of men,
Earth will not see such ships as those agen.

L. B. P.

Water in the Service of Man, by H. R. Vallentine. 7 in \times 4½ in, pp. 224, *illus.*, Penguin Books Ltd., Harmondsworth, Middlesex, 1967. Price: 6s.

The author, a graduate in civil engineering and one time Director of the Water Research Laboratory in the University of New South Wales, tells us in his preface that this book is intended to arouse the curiosity of the general reader in the behaviour, the use and abuse of a commonplace yet vital substance . . . "Since we cannot do without it but can do so much with it, enormous sums of money are devoted to its conservation, purification, distribution and disposal; and a great deal of research and investigation is undertaken to locate and evaluate it as a national resource."

This, then, is a book about water and how it has been harnessed for the use of man and how he, in spite of all his wisdom, in thus exploiting it, has insisted on wasting it and polluting it. Yearly, the author stresses, countless gallons of water run to waste; millions of people die from drinking polluted water and hundreds of millions of pounds worth of avoidable damage are caused by floods, soil erosion and drought.

The genesis of man's exploitation of his water resources probably lay with the late Stone Age people who differed from their hunting predecessors in that they produced their food by raising livestock and by farming. To them must be given the credit for the first irrigation systems: the diversion of water from natural streams on to their farms. From this beginning, the author brings us through history, Egyptian, Greek, Babylonian, Venetian, Roman and Arab, to modern times when man can justifiably be proud of such achievements as the Panama Canal, the St. Lawrence Seaway, the Snowy Mountains hydro-electric scheme and many others.

Having dealt with history in 30 pages of most fascinating reading, we go on to the various physical properties of water masses: Water at Rest, The Effects of Viscosity, Water in Motion, Flow in Pipes and in Rivers and Canals, Pumps and Turbines and Hydrology, the last named also containing much useful information concerning the distribution and conservation of rainfall. This section contains also a chapter on waves, from the oscillation due to the spoon-caused storm in a teacup to the giant flood waves that move down the world's great rivers.

One could have wished perhaps that the author had made more mention of the sea. He does, it is true, state that about 97 per cent of the world's water is sea-water and that it is generally agreed that practically all of the remaining 3 per cent of fresh water originated from the oceans through evaporation and precipitation. But here, surely, is a large body of water which has been the servant of man, though not infrequently his master, for thousands of years and its potentialities, particularly as a future source of food, are virtually unlimited. But this is largely a civil engineer's book about civil engineering triumphs and it is sadly true that man has little cause to be proud of his exploitation of the sea. Until comparatively recently he has made little effort to study its resources but has concentrated on casting nets for fish and on hunting its larger mammals to death as his remote ancestors hunted the primeval forests until they realized that they must farm the land if they were to live; the day may not be far distant when man will have to realize this about the sea also.

The book is adequately illustrated with explanatory line drawings in the text

and has also some very pleasing photographs, from the aqueducts of Rome to the Snowy Mountains scheme.

L. B. P.

Personalities

RETIREMENT.—CAPTAIN W. J. MOORE, D.S.C., R.D. retired recently from the sea, completing his last voyage in the *Glenogle*.

William Josselyn Moore first went to sea when he joined Messrs. Alfred Holt & Co. as a midshipman in 1923. From 1927 to 1932 he served with other companies and passed for Extra Master in 1930. In 1931 he served in submarines for his long R.N.R. training and in 1932 rejoined Alfred Holt & Co; from 1937 to 1939 he was their wharf Superintendent in Shanghai.

During the Second World War the whole of Captain Moore's service was spent in the Western Approaches on escort duty; his first command was H.M.S. *Bideford*, followed by H.M.S. *Whimbrel* and, later, H.M.S. *Ascension*; he was awarded the D.S.C. when Senior Officer of the 17th Escort Group. His last wartime appointment was Divisional Sea Transport Officer, Hong Kong. In 1946 he rejoined Alfred Holt & Co. and was appointed to his first command, the *Deucalion* in 1951; subsequently he commanded the *Telemachus*, *Adrastus*, *Diomed* and *Glenogle*.

As the Senior Officer in the Royal Naval Reserve, Captain Moore was appointed A.D.C. to Her Majesty the Queen for one year.

Captain Moore's association with the Meteorological Office started with his first logbook from the *Telemachus* in 1954; in 12 years he has sent in 27 logbooks of which 25 were classed as Excellent; he received Excellent Awards in 1954, 1960, 1961, 1962, 1963, 1964, 1965 and 1966.

We wish him health and happiness in his retirement.

J. C. M.

Fleet Lists

GREAT BRITAIN (Information dated 31.3.67)

The following is a list of British ships which have been equipped with instruments and which voluntarily co-operate 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 second column; an asterisk indicates a new recruitment who has not yet sent in a logbook.

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

The Port Meteorological Officers and Merchant Navy Agents 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 each July 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 a Port Meteorological Officer or Merchant Navy Agent, or to the Marine Superintendent of the Meteorological Office at Bracknell.

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

Selected Ships

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Accra</i>	10.3.66	F. St. H. Webber	L. Tunstall, R. Skinner, S. Bonner	M. F. Conroy	Elder Dempster Lines Ltd
<i>Achilles</i>	22.3.67	R. C. Risely	G. M. Poynter, M. J. Knight, D. D. McLaren	J. D. C. Wilford	Alfred Holt & Co.
<i>Adelaide Star</i>	25.1.67	C. R. Horton, D.S.C.	P. Suckling, A. Trayner, K. Finigan, G. Riches	R. Thorburn	Blue Star Line Ltd.
<i>Aden</i>	3.11.66	J. A. Lefevre	T. R. P. Humphreys	C. A. McQuillan	P. & O. Lines Management Ltd.
<i>Adventurer</i>	18.8.66	R. H. K. Ledger	J. Pearson, H. S. Bladen, P. Iveson	P. Goulden	T. & J. Harrison Ltd.
<i>Alghamistan</i>	31.3.67	W. J. Bie	J. P. Wood, J. Thwillier, J. W. McLean, L. Laidler	J. Dunn	Common Bros. Ltd.
<i>Africa</i>	30.3.67	W. A. Murison	F. C. Watkins, M. A. Culley, A. S. Monaghan	M. J. Doyle	Shaw Savill & Albion Co. Ltd.
<i>Albania</i>	6.2.67	T. H. Davies	C. C. Axford, P. Seymour, A. J. Wilson, J. B. Clenenson	T. Selman	Cunard S.S. Co. Ltd.
<i>Albany</i>	1.12.66	G. G. Chatterley	R. A. Farge, H. G. N. Lloyd, R. C. Little	J. O'Sullivan	Royal Mail Lines Ltd.
<i>Albistan</i>	1.9.66	P. W. Price, O.B.E.	V. L. Cox, J. Woodmass, P. Cleife, D. Coulson	J. Rush	F. C. Strick & Co. Ltd.
<i>Aldersgate</i>	29.12.66	P. L. Hopkins	I. Stoppard, R. Brindle, J. Davies, J. D. Robinson	R. McDonald	Silver Line Ltd.
<i>Alert</i>	9.1.67	J. P. Ruddock, O.B.E.	A. Dawson	H. O'Sullivan	H.M. Postmaster General
<i>Alinda</i>	31.1.66	L. J. P. Coutts	A. L. Preston, A. M. Wineberg, J. D. Lakeman	— Jones	Shell Tankers (U.K.) Ltd.
<i>Alva Bay</i>	1.2.66	L. L. Wellings	W. Kraemer	J. Ryan	Alva S.S. Co. Ltd.
<i>Amalric</i>	5.1.66	J. R. Richmond	J. C. Blake, I. S. M. Condie, J. R. A. Pepper	C. M. Jackson	Shaw Savill & Albion Co. Ltd.
<i>Amastira</i>	7.3.67	J. Campkin	R. L. Cheshire, D. Spargo, R. G. Stollery	E. Winslow	Shell Tankers (U.K.) Ltd.
<i>Amazon</i>	7.6.66	R. D. Jones	M. Odgers, R. Dabnett, M. Rasor	C. Grayson	Royal Mail Lines Ltd.
<i>Amoria</i>	16.11.66	D. Cooper	I. M. Brown, R. S. Francis, P. A. Cocker, J. V. Oliver	F. A. Dynn	Shell Tankers (U.K.) Ltd.
<i>Andania</i>	17.3.66	G. E. Thorton	N. T. Alford, J. O. Atkinson, R. G. P. Paine	J. Hands	Cunard S.S. Co. Ltd.
<i>Andes</i>	11.1.67	A. J. G. Barff	D. Griffiths, J. Riley, P. Barker, K. Avery	R. Brackenbridge	Royal Mail Lines Ltd.
<i>Apapa</i>	30.8.66	J. W. Hutchinson	D. P. Porter	D. Cameron	Elder Dempster Lines Ltd.
<i>Aragon</i>	13.2.67	J. Fox	S. Copeland	F. Kirk	Royal Mail Lines Ltd.
<i>Araluen</i>	10.8.66	H. G. Chafer	J. D. Inwood		Trinder Anderson & Co. Ltd.
<i>Aramaic</i>	27.1.67	R. E. Altham	D. Sweet, E. R. Snow, J. Dunley		Shaw Savill & Albion Co. Ltd.

<i>Argentina Star</i>	27.9.66	E. R. Pearce, O.B.E.	W. Oliver, A. Durham, M. Thompson, J. Lock	A. P. Benney	Blue Star Line Ltd.
<i>Argyllshire</i>	14.2.67	A. S. Palethorpe-May	G. H. Bail, A. Grant, L. Bartripp	A. MacCleod	Glan Line Steamers Ltd.
<i>Aranza</i>	24.8.66	G. A. Gibbons	J. W. Henderson, D. M. Shaw, P. Smith, I. Worrall	E. Harle	Royal Mail Lines Ltd.
<i>Arthur Albright</i>	13.3.67	S. Bristol	J. A. Jones, G. S. Lawson, P. Hunter	M. R. B. Simpson	James Fisher & Sons Ltd.
<i>Asprella</i>	7.12.66	J. J. Greener	E. Paterson, P. J. Melson, P. M. J. Scane	P. L. Wadhams	Shell Tankers (U.K.) Ltd.
<i>Asyanax</i>	5.12.66	D. L. Emery	J. Whittaker, — Gill, N. F. Smith	W. J. Walters	Alfred Holt & Co.
<i>Athelcrest</i>	16.1.67	T. Gorst	H. C. O'Doherty, D. W. Sharp, R. P. McDonnell	R. R. Bromham	Athel Line Ltd.
<i>Athelmere</i>	9.12.66	J. Crook	F. L. Pickering, P. V. Haswell, K. R. Farrow	P. Mahoney	Shaw Savill & Albion Co. Ltd.
<i>Athenic</i>	16.2.67	G. H. Heywood	J. B. Kendall	J. Noonan	Elder Dempster Lines Ltd.
<i>Aureol</i>	19.9.66	R. McWilliam	P. D. Thackstone, E. G. Marshall, W. Howarth	R. Williams	Blue Star Line Ltd.
<i>Australia Star</i>	7.11.66	D. M. McPhail	P. D. Thackstone, E. G. Marshall, W. Howarth	R. Sykes	Trinder Anderson & Co. Ltd.
<i>Author</i>	2.5.66	T. Hastings	C. D. Riley, R. Myles, A. Perry, C. D. Wilde	M. J. Camken	T. & J. Harrison Ltd.
<i>Baltson</i>	12.12.66	R. Sutcliffe	J. H. Laws, R. Ling, D. F. Gates, M. Lafferty	F. C. Strick & Co. Ltd.	F. C. Strick & Co. Ltd.
<i>Bamburgh Castle</i>	15.3.67	T. G. Goldie	G. Dickinson, R. E. Gattiss, J. Wallace	H. A. Sirett	W. A. Souer & Co. Ltd.
<i>Bankura</i>	22.11.66	J. Snelgrove	G. Woodland, H. K. H. Taylor, G. C. Ruaux, C. Love- ledge	J. D. Mosley	British India S.N. Co. Ltd.
<i>Baron MacIay</i>	25.11.66	I. MacKay	W. E. Creatorex, G. Linsay, C. Langlands	W. D. Thompson	H. Hogarth & Sons Ltd.
<i>Baron Penland</i>	8.3.67	T. B. McLeod	R. K. Durt, D. McNeill, D. J. Dickson	B. Boynes	H. Hogarth & Sons Ltd.
<i>Barrister</i>	10.11.65	J. W. Cubbin	D. Eastgate, C. Cobb, R. Wilson, T. G. Oxley	P. Curwell	T. & J. Harrison Ltd.
<i>Bassano</i>	28.4.66	B. Waldie	M. Atkinson, R. Ward, E. Metham, H. Blagdon	R. Cockett	Ellerman's Wilson Line Ltd.
<i>Beaverash</i>	19.1.67	J. Whaling	P. C. H. Adair, A. J. Bertles, R. T. King	J. B. Keenan	Canadian Pacific S.S. Ltd.
<i>Beaverbank</i>	16.12.65	D. J. R. Davies	I. G. Booker, K. G. Kelly, F. Hunter	A. Girvin	Bank Line Ltd.
<i>Beaverbalm</i>	2.9.66	J. D. S. Smythe	S. W. Spencer, I. F. Hill, D. Wilson, S. Lawrence	D. MacDonald	Canadian Pacific S.S. Ltd.
<i>Beaverbrook</i>	7.7.66	E. Aikman	W. A. McCall	J. W. Kenny	Canadian Pacific S.S. Ltd.
<i>Benarmin</i>	19.9.66	J. C. Harvey	N. M. Wight, D. E. Ross, D. S. Collins	W. Paterson	Ben Line Steamers Ltd.
<i>Benarty</i>	18.11.66	J. R. Morrison	R. S. Morrison, R. S. Moore, N. Matheson, P. B. Wright	D. J. O'Brien	Ben Line Steamers Ltd.
<i>Benatona</i>	3.8.66	A. McKenzie	M. Humby, E. P. Gibb	J. Thompson	Ben Line Steamers Ltd.
<i>Benclench</i>	29.12.66	W. C. S. Spencer	J. Kirk, J. M. Brierley, R. D. King, R. J. Loraine	I. E. Morton	Ben Line Steamers Ltd.
<i>Benedict</i>	16.2.67	E. Griffiths	A. G. Thomas, T. K. Melkie, A. K. Johnson	T. G. Hills	Ben Line Steamers Ltd.
<i>Benhope</i>	20.2.67	R. A. Lynn	I. M. Greig	J. McCool	Ben Line Steamers Ltd.
<i>Benlornmond</i>	2.1.67	D. S. Sinclair	A. Clisb, A. Lim Say Chin, I. Shepherd, A. A. Davidson	L. Porter	Ben Line Steamers Ltd.
<i>Benrinnies</i>	25.7.66	R. Griffiths	E. A. Masson, R. J. Carter	L. Sutton	Ben Line Steamers Ltd.
<i>Bharno</i>	19.5.66	W. J. Kinnaird	T. Tillman	A. P. Moss	Booker Line Ltd.
<i>Bishopgate</i>	25.1.67	I. G. Gibson	T. Wright, — Harrison	D. MacRae	Booker Line Ltd.
<i>Black Prince</i>	29.11.66	M. R. Duke	J. Barton, B. V. W. Roberts, M. Sangster	P. Hogan	Warwick Tankers Ltd.
<i>Bombala</i>	19.10.65	D. M. Gill	I. P. Butler, M. Plant, R. Alderman	O. O'Shaughnessy	Blue Star Line Ltd.
<i>Boniface</i>	1.3.67	J. Whayman, C.B.E., D.S.C., R.D.	M. J. Locke, P. Willmot, B. V. Peter, J. N. Davidson	J. B. Speiran	Medomsley S.S. Co. Ltd.
<i>Booker Vanguard</i>	20.12.66	S. Armitage	J. B. Fillingham, R. Williams, C. C. Morris	T. M. Jenkins, M.B.E.	Chapman & Willan Ltd.
<i>Booker Venture</i>	30.6.66	I. A. Carter	G. A. Topp, E. J. Jones, R. McKechnie, A. H. West	C. Hensley	Bristol City Line Ltd.
<i>Brandon Priory</i>	20.2.67	F. W. Richards	P. M. H. Carr, R. A. Whistler, A. Millie, E. G. Trotter	T. C. Eaves	B.P. Tanker Co. Ltd.
<i>Brasil Star</i>	16.3.67	L. Vernon, M.B.E.	I. A. Showky, C. D. Wheeler, N. Ianson	R. Williamson	B.P. Tanker Co. Ltd.
<i>Brecon Beacon</i>	2.12.66	T. Pearson	R. Hewitt, M. C. Smith, C. R. Nelson		
<i>Brighton</i>	5.12.66	W. A. Watson	— Hodson, G. H. Hurst, L. Chapman		
<i>Bristol City</i>	6.1.67	F. R. Neil	W. A. Hursey, D. James, D. Williams, B. Medcroft		
<i>British Ambassador</i>	23.2.67	E. W. Shingler	T. V. Watkins, J. Ward, R. L. Walker, I. D. Gent		
<i>British Bombardier</i>	29.12.66	J. E. V. T. Robinson	A. Nixon		
<i>British Freedom</i>	17.10.66	E. F. Henderson	L. Nichols		
		P. Marshall, H. Johansen			
<i>British Oak</i>	20.2.67	F. A. Frost	P. W. Hillier, K. A. Beton, J. S. Luker, R. A. Shearer	R. Archer	B.P. Tanker Co. Ltd.
<i>British Resource</i>	1.3.67	W. N. Bishop Laggett	P. W. Read	P. Williams	B.P. Tanker Co. Ltd.
<i>British Sailor</i>	3.3.67	N. Michaels	C. Kelly, T. Marrs, G. Waite		

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>British Splendour</i>	20.3.67	A. M. B. Ferguson	P. Stewart, J. Shields, C. Raywood, E. Livemore	M. Smith	B.P. Tanker Co. Ltd.
<i>British Trust</i>	18.11.66	J. P. M. Cliffe	R. McVeigh, D. W. Evans, R. M. Bertenshaw	C. J. A. Vount	B.P. Tanker Co. Ltd.
<i>Bulimba</i>	13.2.67	D. P. Barry	T. R. Young, E. K. Bushnell	D. P. Stoker	British India S.N. Co. Ltd.
<i>Calchas</i>	20.10.66	N. A. Joyce	P. Lloyd-Jones, M. B. Lynskey, W. P. Ruddock	M. Pritchard	Alfred Holt & Co.
<i>Calcedonia Star</i>	2.2.66	A. H. White	D. M. Ramsay, T. C. Black, R. Randle	C. Turner	Blue Star Line Ltd.
<i>California Star</i>	10.11.66	W. H. Askew	T. A. Grahamslaw, M. Dunn, T. Black, I. MacKillop	C. Turner	Blue Star Line Ltd.
<i>Calix Canbera</i>	20.2.67	B. James	J. Forrest-Holmes, D. S. Saunders, I. G. Moore, N. Paskins	W. Williamson	Overseas Tankship (U.K.) Ltd.
<i>Calix Edinburgh</i>	13.6.66	M. G. Oliver	A. M. G. King, J. L. Elliott, J. Rhydderch	F. Devlin	Overseas Tankship (U.K.) Ltd.
<i>Calix London</i>	18.11.66	A. Thomson	P. W. Foot, A. S. Hands, D. E. Kerrigan	L. Rowe	Overseas Tankship (U.K.) Ltd.
<i>Calix Saigon</i>	1.11.65	J. G. Smith	R. L. Lees, D. E. Kerrigan, P. A. Heckingbottom	G. R. McCarroll	Elder & Fyffes Ltd.
<i>Camilo</i>	29.12.66	A. Thomson	W. E. Roberts, C. A. Hare	J. Bell	Blue Star Line Ltd.
<i>Canadian Star</i>	15.2.67	A. H. White	L. Carr, M. Probert, J. Thomas	D. Footman	P. & O. Lines Management Ltd.
<i>Canopie</i>	8.3.67	R. N. Firth	M. S. Frost, G. T. Dickinson, M. J. Scanlan	K. Berman	Shaw Savill & Albion Co. Ltd.
<i>Canterbury Star</i>	23.3.65	M. Larrive	R. Ashton, C. Davis, R. Wooding	G. Arnup	Blue Star Line Ltd.
<i>Cape Franklin</i>	1.12.66	T. A. Ireland	E. Morrison, C. D. Churcher, D. Wale	R. Faulds	Lyle Shipping Co. Ltd.
<i>Cape Howe</i>	15.12.66	A. McLeod	P. M. Cooney, G. B. Kewley, G. Anderson, P. Richardson	A. H. Chambers	Lyle Shipping Co. Ltd.
<i>Cape Nelson</i>	30.8.66	A. C. Hunter	W. Andersen, J. Hetherington, M. Battersby	J. Chamberlin	Lyle Shipping Co. Ltd.
<i>Capetown Castle</i>	4.1.67	D. W. Sowden	R. W. Sumner, P. M. Baverstock, D. C. Griffith-Jones	J. R. Mathews	Union-Castle Mail S.S. Co. Ltd.
<i>Cardiff City</i>	4.5.66	I. Williams	J. A. Mathews, J. M. Wood, D. Torbett,	I. F. Stocks	Sir Wm. Reardon Smith & Sons Ltd.
<i>Cardiganshire</i>	20.12.66	S. E. Allerton	J. F. Clarkson		Glen Line Ltd.
<i>Carinthia</i>	9.1.67	H. L. De Legh	G. Roberts, J. R. D. Hall, P. J. Kendall, A. M. Watt	W. Long	Cunard S.S. Co. Ltd.
<i>Carmania</i>	20.10.66	J. E. Woolfenden, D.S.C.	R. K. Garrard, R. Langmuir, A. T. Willy, J. R. D. Hall	T. Maddrell	Cunard S.S. Co. Ltd.
<i>Caronia</i>	28.11.66	W. J. Law, R.D.	K. H. Stanley, J. T. West, G. Ferguson, R. C. Griffin	C. Pennington	Cunard S.S. Co. Ltd.
<i>Carrigan Head</i>	17.2.67	J. Greene	D. T. Alexander, P. Sherriff, G. Knight, H. O'Byrne	E. F. Dalton	G. Heyn & Sons Ltd.
<i>Caxton</i>	9.6.66	J. G. Wilson	W. D. Lorimer, B. Malowinski, E. Morrison, I. C. Rollo	W. P. M. Edmunds	Transatlantic Carriers Ltd.
<i>Ceramic</i>	9.1.67	N. S. Milne	P. Simmonds, G. Robins, T. J. Holmes, P. C. S. Vance	R. O'Shaughnessy	Shaw Savill & Albion Co. Ltd.
<i>Chakla</i>	23.1.67	H.N. Severs	G. B. Wright, D. Wood, A. J. Ketoyo	C. W. Cameron	British India S.N. Co. Ltd.
<i>Chantala</i>	11.1.67	F. Bell	I. G. F. Harwood, R. J. Hull, P. I. Hillman	C. Jones	British India S.N. Co. Ltd.
<i>Cheshire</i>	27.9.66	A. E. Young	M. Kingsmill, M. R. Nisbet, S. R. Dyer	J. E. Unsworth	Bibby Line Ltd.
<i>Chesiot</i>	8.9.66	G. Robison	J. F. Pykett, P. E. P. Liddell, I. W. James	P. M. Hodgson	Barnburgh Shipping Co. Ltd.
<i>Chindavara</i>	29.12.66	J. A. McCowan	R. J. Cox, M. J. Wray, P. D. Davies	J. Hanley	British India S.N. Co. Ltd.
<i>City of Birmingham</i>	18.1.66	G. E. Greenhow	P. F. Lisle-Taylor, T. Weatherly, T. Mallory, A. Westlake	D. Herdman	Ellerman Lines Ltd.
<i>City of Brisbane</i>	3.9.65	H. Swinney	J. A. R. Heaney, C. Baxter, G. J. Latcham	B. L. Baker	Ellerman Lines Ltd.
<i>City of Brooklyn</i>	3.10.66	L. H. King	J. M. Turner, M. J. Chambers, R. F. Mantle	D. T. Tremayne	Ellerman Lines Ltd.
<i>City of Canberra</i>	1.7.66	T. Rigg	P. D. Murphy, R. Bloss, J. Anderson	S. J. Duffy	Ellerman Lines Ltd.
<i>City of Chester</i>	9.1.67	J. S. Schofield	M. H. M. Taylor, R. Shearer, M. Kay	D. A. Foster	Ellerman Lines Ltd.
<i>City of Coventry</i>	14.12.66	R. H. Bellhouse	M. Wilkinson, J. Pether, R. J. Doe, D. G. Riddell	A. I. McNiel	Ellerman Lines Ltd.
<i>City of Glasgow</i>	9.1.67	R. K. Walker	R. G. S. Halawen, R. Lindsey, M. Allen	C. B. Smith	Ellerman Lines Ltd.
<i>City of Johannesburg</i>	10.11.66	L. R. Jones	P. M. Evans, B. J. Borland, A. J. C. Metcalfe	R. C. O'Bray	Ellerman Lines Ltd.
<i>City of Khartoum</i>	13.6.66	M. Graham	D. Conyers, K. M. Elededy, P. Goode, J. Peddie	R. Matheson	Ellerman Lines Ltd.
<i>City of Liverpool</i>	30.1.67	F. C. O'Neill, R.D.			Ellerman Lines Ltd.
<i>City of Manchester</i>	9.12.66	G. R. Jackson	M. G. Sewell, D. Cullen, T. D. Parkhouse	M. H. Crocker	Ellerman Lines Ltd.

City of Melbourne	8.2.67	T. H. Morgan	C. J. Langford, R. Owens, B. L. Green	S. Harper	Ellerman Lines Ltd.
City of New York	15.11.66	R. H. Broadbent	J. L. Parker, T. F. Goodanew, B. K. Keith, A. A. Ramsden	J. D. MacNamara	Ellerman Lines Ltd.
City of Oxford	20.12.66	F. C. O'Neill	W. D. Dick, R. G. Matson, A. G. Rover, E. W. Webster	H. J. Brady	Ellerman Lines Ltd.
City of Swansea	13.3.67	J. S. Grant	A. E. C. Struthers, N. M. Willott	R. Boyd	Ellerman Lines Ltd.
City of Wellington	6.12.66	H. Lewis	W. A. MacRitchie, B. C. Spaven, K. J. Lightbody	M. W. Ley	Ellerman Lines Ltd.
City of Winchester	13.2.67	H. Swinney	D. J. Baird, P. Kimber, D. C. Butcher	D. A. Holmes	Ellerman Lines Ltd.
Clan Macdonald	14.7.66	R. Shattock	R. E. Lamb, A. T. Campbell, M. Jackson	P. Darton	Clan Line Steamers Ltd.
Clan Macdonnell	16.1.67	M. N. Ure	D. J. Walker, H. Edwards, J. Howell	C. E. G. Pratt	Clan Line Steamers Ltd.
Clan Macgillivray	19.7.66	F. H. S. Petherbridge	R. Fullarton, J. W. Prior, R. Lyall	D. Withers	Clan Line Steamers Ltd.
Clan Macgowan	20.12.66	C. M. Powell, M.B.E.	C. A. Smith, P. L. Flatau, C. Thomson	G. L. MacIndoe	Clan Line Steamers Ltd.
Clan Macgregor	25.5.66	T. R. Halliday	M. Johns, P. MacNiven, C. MacIver	J. K. Paterson	Clan Line Steamers Ltd.
Clan Macivorath	25.1.67	A. Crawford	— Cook, P. Kent, D. Bark	N. Birnie	Clan Line Steamers Ltd.
Clan Macindoe	15.11.66	L. Pogson	J. L. G. Cotton, R. E. Todd, R. A. Slack	M. Hesketh	Clan Line Steamers Ltd.
Clan MacLaren	9.3.67	— Thorn	W. B. Rebello, D. F. Wray-Cook, D. J. Innes	N. Sherrin	Clan Line Steamers Ltd.
Clan MacLay	3.2.66	P. N. V. Rewell	R. B. Robertson, P. J. Le Caer, D. Finlayson	C. Bailey	Clan Line Steamers Ltd.
Clan Maclean	20.12.66	J. M. Lyckett	I. A. Carruthers, S. B. Fleming, C. Abbott	J. Blackwell	Clan Line Steamers Ltd.
Clan Macleod	30.3.67	T. H. Graham, M.B.E.	P. Atkinson, P. Ferguson, S. M. Grant, M. I. Kemp	M. MacDonald	Clan Line Steamers Ltd.
Clan Macnab	18.11.65	S. R. J. Woods, D.S.C.	I. W. Ferguson, S. M. Grant, M. I. Kemp	P. Hammond	Clan Line Steamers Ltd.
Clan Macnair	1.8.66	C. C. Atkinson	A. J. Stokes, O. T. Ross, F. J. Niehues	W. Gay	Clan Line Steamers Ltd.
Clan Macniven	28.3.67	W. J. Freestone, M.B.E.	R. S. Grant, A. R. MacIntyre, R. V. Hanks	E. G. McKay	Clan Line Steamers Ltd.
Clan Ramsay	24.10.66	A. I. R. Tyrrell	G. H. Ball, J. B. Woombie	J. S. Mathers	Clan Line Steamers Ltd.
Clan Sutherland	14.1.66	A. F. Banks	R. M. Black, R. MacLachlan, W. R. Clegg, G. Cowie	M. A. Thompson	Clan Line Steamers Ltd.
Colina	2.3.67	W. F. Joyce	F. C. Nicol, D. Harrower, G. Wilson	Donaldson Line Ltd.	Donaldson Line Ltd.
Corinaldo	2.9.66	R. Allan	V. H. Ridges, R. U. Primrose, G. Ewing, N. C. Cook	Shaw Savill & Albion Co. Ltd.	Shaw Savill & Albion Co. Ltd.
Corinthic	27.2.67	G. W. Grant	M. R. Doyland, G. K. Hawkes, J. M. Withington,	Federal S.N. Co. Ltd.	Federal S.N. Co. Ltd.
Cornwall	28.10.66	G. W. McCathie	C. S. Baugh	Pacific S.N. Co.	Pacific S.N. Co.
Colopaxi	3.11.66	J. H. Allenby	P. T. McGonigal, C. Rowntree, P. Barnby	Hain-Nourse Ltd.	Hain-Nourse Ltd.
Coltsold	30.9.66	J. M. Downard	C. A. Hatcher, L. E. Quigley, D. J. Daniels,	Bibby Bros. & Co. Ltd.	Bibby Bros. & Co. Ltd.
Coventry City	*	D. Hine	J. H. Armstrong	Shaw Savill & Albion Co. Ltd.	Shaw Savill & Albion Co. Ltd.
Cretic	20.12.66	V. H. Vizer	M. T. Donnellan, R. F. McLeod, R. Bell, N. Malpas	I. & J. Denholm (Management) Ltd.	I. & J. Denholm (Management) Ltd.
Criman	13.3.67	R. L. Edwards	R. M. Gidden, A. Thompson, W. Virtue, R. Eastwood	T. & J. Harrison Ltd.	T. & J. Harrison Ltd.
Crofter	26.7.65	H. G. Skelly	O. M. Owen, T. G. Oxley, C. Hebden	Sugar Line Ltd.	Sugar Line Ltd.
Crystal Bell	25.1.67	R. M. Pitts	P. C. S. Dove, D. Mustarde, G. Divitt	Sugar Line Ltd.	Sugar Line Ltd.
Crystal Crown	22.2.67	R. M. Pitts	C. H. Woodger, E. A. Duffield, W. Amies,	Sugar Line Ltd.	Sugar Line Ltd.
Crystal Cube	20.9.66	A. F. Lunn	D. Mawhinney	Sugar Line Ltd.	Sugar Line Ltd.
Crystal Diamond	7.3.67	F. Bowden	M. Armstrong, F. Bowden, C. S. D. Wright,	Sugar Line Ltd.	Sugar Line Ltd.
Crystal Gam	6.1.67	J. E. Leaver	C. N. L. Davies	Sugar Line Ltd.	Sugar Line Ltd.
Crystal Jewel	7.3.67	P. Sutcliffe	H. J. Henderson, I. Cleaver, G. P. Colebrook	Sugar Line Ltd.	Sugar Line Ltd.
Crystal Sapphire	19.9.66	G. Pirie	E. G. Winsor, O. N. Jorgensen, J. E. Sherwood,	Sugar Line Ltd.	Sugar Line Ltd.
Cumberland	20.2.67	C. P. Robinson	S. S. Keeble	Sugar Line Ltd.	Sugar Line Ltd.
Cymric	19.10.66	G. V. Conolly, D.S.C.	A. Rankin, D. Chant, L. J. Pipett, P. V. Martin	Federal S.N. Co. Ltd.	Federal S.N. Co. Ltd.
Daleman	29.12.66	A. Sutherland	E. A. Duffield, A. Hepburn, K. H. Makins,	Shaw Savill & Albion Co. Ltd.	Shaw Savill & Albion Co. Ltd.
Darro	30.6.66	I. Elliott	D. N. L. Thomson	T. & J. Harrison Ltd.	T. & J. Harrison Ltd.
Dartwood	15.3.67	B. H. Agnew	J. R. Collins, A. M. Doig, R. Slater	Royal Mail Lines Ltd.	Royal Mail Lines Ltd.
Delphic	22.2.67	W. R. Willis	M. J. Lacey, R. Newton, M. Gochin, R. Bishop,	Wm. France Fenwick & Co. Ltd.	Wm. France Fenwick & Co. Ltd.
Denbighshire	7.3.67	J. I. Jones, D.S.O.,	T. Smith	Shaw Savill & Albion Co. Ltd.	Shaw Savill & Albion Co. Ltd.
Devis	1.2.67	D.S.C., R.D.	N. Johnson, D. J. Allison, R. H. Jones, C. F. Browning	Glen Line Ltd.	Glen Line Ltd.
			J. Lambert, D. Potter, H. Messenger, R. J. Broulback	Lampport & Holt Line Ltd.	Lampport & Holt Line Ltd.
			W. F. R. Whiting, P. J. Dymond, W. Stephen, J. Potter		
			A. J. De La Haye, G. Calvert, P. F. Faulkner		
			C. M. Jackson, J. M. Stewart, D. K. Williams		
			C. B. Middleton		

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Devon</i> ..	21.12.66	J. H. B. Weston..	C. J. Francis, W. B. Anderson, D. Scott ..	D. Macaulay ..	Federal S.N. Co. Ltd.
<i>Devon City</i> ..	28.3.67	M. J. Higgins ..	J. J. Kalnins, W. Cross, K. Jones ..	S. G. W. Whitmore ..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Devonia</i> ..	22.3.67	R. Baker ..	P. R. White, J. W. A. Tanner, M. S. Wheeler ..	D. Easton ..	British India S.N. Co. Ltd.
<i>Diomed</i> ..	2.9.66	J. Chapman ..	M. R. Rutter, P. A. Read, R. I. Blackburn ..	E. O. Roberts ..	Alfred Holt & Co.
<i>Discovery</i> ..	17.1.67	R. H. A. Davies ..	J. T. Walker, G. L. Howe, P. N. Harrison ..	E. C. Agius ..	National Institute of Oceanography
<i>Donegal</i> ..	30.6.66	E. J. Ridout ..	H. Goulden, W. S. Genit, J. M. Peirce ..	J. H. Lamb ..	Trinder Anderson & Co. Ltd.
<i>Dorset</i> ..	17.1.67	C. A. Miller ..	B. J. Prince, A. Anson, B. Trevorrow, T. Hughes ..	M. McEwan ..	Federal S.N. Co. Ltd.
<i>Duhallo</i> ..	24.1.67	M. R. Ryan ..	I. Smith, J. V. Wallace, R. L. Mitchell ..	P. Precious ..	Hain-Nourse Ltd.
<i>Dubegarth</i> ..	17.10.66	N. Richardson, J. P. Waldoek ..	W. Ross, J. Banks, J. Truin ..	J. J. O'Neill ..	Wm. Cory & Son Ltd.
<i>Dunedin Star</i> ..	16.2.67	F. P. McGuckin ..	D. R. Grove, T. H. L. Jones, I. A. Wingate ..	T. G. Twisleton ..	Blue Star Line Ltd.
<i>Dunera</i> ..	27.2.67	E. C. Plowman ..	N. F. Hockings, W. Scott, C. Chandler, I. Dancer ..	J. F. Mennel ..	British India S.N. Co. Ltd.
<i>Eden</i> ..	10.11.66	F. M. Dickenson ..	P. R. Vignaux, J. L. Frain, P. J. Boucher ..	L. Lithgo ..	Royal Mail Lines Ltd.
<i>Edenmore</i> ..	25.11.66	A. L. Wiles ..	B. H. Mitchell, R. Rimmington, D. Cook, J. Sellar ..	F. Wilson ..	Furness Withy & Co. Ltd.
<i>Edinburgh Castle</i> ..	14.3.67	W. S. Byles, R.D. ..	J. Peel, N. Alabaster, P. R. Lawrence ..	H. Liggins ..	Union-Castle Mail S.S. Co. Ltd.
<i>Edward Wiltaw</i> ..	8.12.66	R. B. Riddle ..	T. M. Archer, K. Watt, K. Brammer, I. R. Bosworth ..	J. D. G. S. Gallagher ..	Cable & Wireless Ltd.
<i>Egton</i> ..	2.1.67	S. Jackson ..	W. Colquhoun, R. Ridsdale, M. Phillips ..	S. Lefabre ..	Roland & Marwood S.S. Co.
<i>Elmbank</i> ..	12.9.66	A. J. Kiff ..	D. C. Boyter, P. E. Morrant, A. R. McBride ..	R. J. Perrin ..	Bank Line Ltd.
<i>Elysia</i> ..	*	W. S. Thomson..	P. B. Bissett, A. Hutcheon, R. Logan ..	R. Prole ..	Anchor Line Ltd.
<i>Empire Star</i> ..	1.2.67	G. T. King ..	P. A. Heathcote, M. R. Smith ..	J. Connor, J. C. Horgan, T. Millett ..	Lampport & Holt Line Ltd.
<i>Empress of Canada</i> ..	27.9.66	F. W. S. Roberts ..	T. Parker, W. Watterson, P. Adair, A. Morris ..	P. McNab ..	Canadian Pacific S.S. Ltd.
<i>Empress of England</i>	31.3.66	R. Walgate ..	P. G. Hoiles, M. B. Foster, R. Henderson, P. Holtby ..	C. Richardson ..	Canadian Pacific S.S. Ltd.
<i>English Star</i> ..	26.1.67	G. Seave ..		R. W. J. Gregory ..	Blue Star Line Ltd.
<i>Ernest Holt</i> ..	18.11.66	E. A. Binnington ..			Ministry of Agriculture, Fisheries & Food
<i>Essequibo</i> ..	23.12.66	J. M. F. Anderson ..	M. Scanlan, P. R. Brown, M. H. Hobbs ..	K. E. Pritchard ..	Royal Mail Lines Ltd.
<i>Essex</i> ..	30.3.67	A. B. Stalker ..	M. K. Handfield, G. MacIver, J. Gill, P. Sawyer ..	S. Adams ..	Federal S.N. Co. Ltd.
<i>Esso Cambridge</i> ..	13.1.67	W. E. Duncan ..	G. C. Thomas ..	B. Martin ..	Esso Petroleum Co. Ltd.
<i>Esso Canterbury</i> ..	23.6.66	D. J. S. Davies ..	M. Stacey, B. Meyer, J. G. Bean, H. N. MacLellan ..	R. Smith ..	Esso Petroleum Co. Ltd.
<i>Esso Exeter</i> ..	16.11.66	E. W. Thomas ..	S. N. Pugsley, W. Whyte, T. Ramsey ..	C. W. Lomax ..	Esso Petroleum Co. Ltd.
<i>Esso Hampshire</i> ..	28.3.67	L. H. Grey ..	B. Pickaver, W. D. Templeman, L. Barry, A. W. Eadie ..	W. Hawkins ..	Esso Petroleum Co. Ltd.
<i>Esso Fembrokeshire</i> ..	21.3.67	R. E. Smith ..	D. Boothroyd, E. Baines, R. Gunthorpe ..	R. S. Kimberley ..	Esso Petroleum Co. Ltd.
<i>Esso Warrackshire</i> ..	16.11.66	T. E. Jemison ..		S. Pridaux ..	Esso Petroleum Co. Ltd.
<i>Esso York</i> ..	5.12.66	R. R. Phillips ..	M. G. King, B. Meyer, D. Flynn ..	J. Steven ..	Esso Petroleum Co. Ltd.
<i>Explorer (F.R.S.)</i> ..	8.3.67	E. A. Bruce, O.B.E.	J. McBride, J. Craig, W. Gatt ..		Dept. of Agriculture & Fisheries for Scotland
<i>Explorer (m.v.)</i> ..	20.2.67	H. P. Roberts ..	T. H. Henderson, K. Long, G. B. Stephens, H. R. Mason ..	L. A. G. Ricaud ..	T. & J. Harrison Ltd.
<i>Farristan</i> ..	2.6.66	R. B. Arthur ..	C. E. J. Simmonds, B. E. Feck, E. W. Wells, G. Keen ..	W. Williams ..	Frank C. Strick & Co. Ltd.
<i>Fidra</i> ..	22.12.66	G. A. Walteson ..	A. B. Gibson ..		Chr. Salvesen & Co. Ltd.
<i>Firbank</i> ..	23.6.66	W. Watson ..	R. A. Bazaire, A. K. Gillespie, E. Irvine ..	D. Wilson ..	Bank Line Ltd.
<i>Flintshire</i> ..	28.3.67	R. G. Rippon ..	J. A. Case, P. M. Whitworth, P. C. N. Ekebald ..	C. Branthwaite ..	Glen Line Ltd.
<i>Floristan</i> ..	7.11.66	R. L. Cain ..	R. W. Lorains, N. Wray, D. F. Gates ..	B. W. Webster ..	Frank Strick & Co. Ltd.
<i>Fourah Bay</i> ..	8.3.66	J. T. Alexander ..	I. Thain, R. Vincent, J. C. May, T. A. West ..	J. A. Marnell ..	Hunting & Son Ltd.
<i>Franconia</i> ..	22.9.66	P. A. Read, D.S.C.	C. Weaver, M. Baines, R. Stange ..	J. McDonald ..	Elder Dempster Lines Ltd.
<i>Gatcey</i> ..	13.3.67	P. D. Guerrier ..	M. M. MacLeod, J. N. Lewis, I. Phillip, J. M. Corlett ..	A. N. Donald ..	Cunard S.S. Co. Ltd.
			A. G. Williams, F. E. Spicer, J. F. Holder ..	G. D. MacNamara ..	Trinder Anderson & Co. Ltd.

Geestbay	16.1.67	O. Springett	E. R. McFarlane, A. MacNeil, G. Foster, B. Lee	W. Coombes	Geest Industries Ltd.
Geesthale	30.3.67	D. G. Powell	L. Heywood Jones, J. Milner, K. Waters, N. Cooper	S. Teare	Geest Industries Ltd.
Geesthaven	17.1.67	P. Groves	D. Whitehead, E. Walpole, A. MacNeal	J. Conway	Geest Industries Ltd.
Geestport	23.11.66	D. N. Boon	R. A. Cole, G. De F. Foster, A. N. Breach	L. G. Price	Geest Industries Ltd.
Georgina V. Everard	7.11.66	L. Andersen	A. MacIntyre	W. Arscott	F. T. Everard & Sons Ltd.
Glenalmond	19.1.67	R. G. Ouden	J. C. Wallace	N. W. Hare	W. J. Tatem Ltd.
Glenallach	16.1.67	G. I. Wright	P. A. Brown, D. C. Thompson, G. Berry	A. Moloney	Glen Line Ltd.
Glenarary	15.3.67	R. B. Tiplady	H. G. S. Davies, R. D. Jeffries, F. Morley	A. Brown	Glen Line Ltd.
Glenlyon	13.2.67	D. H. Stewart	T. A. Inglis, P. F. Robinson, R. Williams	W. W. Beebee	Glen Line Ltd.
Glenmor	22.2.67	R. C. L. Laxton	D. P. Wallace, R. M. Swabey, P. Wakely	B. R. Epps	Glen Line Ltd.
Glenmole	6.10.66	R. R. Jordan	I. H. Morris, J. Geddie, J. P. H. Fisher	P. T. K. Roberts	Glen Line Ltd.
Glenorchy	23.1.67	W. J. Moore, D.S.C., R.D.	G. W. Richardson, J. Burn, M. J. Martin, W. Watson	J. Walsh	Walter Runciman & Co. Ltd.
Glenpark	12.12.66	H. S. Taylor	M. J. Hindley, E. Genocchio, D. G. Marsh	C. Bent	Glen Line Ltd.
Gloucester City	25.7.66	H. W. MacDonald	L. Buchanan, D. Proudfoot, G. Morton, I. G. Robertson	M. R. Buist	Glen Line Ltd.
Gloucestershire	30.6.66	E. Mace	G. R. Chawner, N. Childs, A. Garner, C. O. Thomas	H. Roderick	Bristol City Line Ltd.
Gloxina	22.3.67	L. H. Sheldrake	H. Paulusz, D. I. Jones, K. McLeod, A. Set	R. A. Waller	Bibby Line Ltd.
Golfito	21.11.66	J. E. Shaw	W. Sutherland, E. Hutchinson, J. Forbes, G. L. Legg	J. B. McIntosh	Stag Line Ltd.
Good Hope Castle	16.3.67	E. Whitehouse	J. C. Twite, E. Jones, B. J. Duggan, R. A. Francis	C. Sutherland	Elder & Fyffes Ltd.
Gothic	22.3.67	—, L'Estrange	M. L. Gochin, A. Lavey, C. P. Stockings	B. McGovern	Union-Castle Mail S.S. Co. Ltd.
Gothland	17.1.67	H. O. V. Andersen	C. E. J. Dowswell, A. S. MacMillan, R. A. Hill,	D. Coughlan	Shaw Savill & Albion Co. Ltd.
Governor	30.3.67	G. A. Cain	T. B. Wyness	T. Parker	T. & J. Harrison Ltd.
Halifax City	7.12.66	J. R. Campbell	M. J. Bottomley, I. Barber, K. Leckie	W. Beynon	Bristol City Line Ltd.
Haparangi	23.1.67	W. J. T. Stevens	D. Williams	W. R. Hocking	New Zealand Shipping Co. Ltd.
Hauraki	17.3.67	I. S. Laidlaw	D. P. Farncombe, R. I. Duce, N. Millar, R. Young	A. F. Holmes	New Zealand Shipping Co. Ltd.
Hazelmoor	5.10.66	E. Howlett	P. T. Clegg, R. Picher, T. Weight, J. S. Thorpe	P. Dunne	Walter Runciman & Co. Ltd.
Hector	2.12.66	S. S. Howie, M.B.E.	J. C. Priest, R. Wind, T. A. Hall, D. Robinson	W. Phillips	Alfred Holt & Co.
Hector Heron	20.12.66	S. Hay	J. M. Wilson	J. Sandison	Hector Whaling Ltd.
Helena	21.3.67	A. C. Sparks	M. Donkin, J. Conacher, J. Berry	R. J. Hinchliffe	Alfred Holt & Co.
Helisoma	24.9.65	R. E. Annett	P. A. Clements, S. J. C. Findlay, P. S. H. Scott,	M. J. Davison	Shell Tankers (U.K.) Ltd.
Heminaetra	1.2.67	J. Forsyth	J. A. A. Adderley	J. S. McRostie	Shell Tankers (U.K.) Ltd.
Herefordshire	20.12.66	A. N. Williamson	T. M. Logan, I. Wragg, D. Pringle, G. J. Earle	J. S. Scorgie	Bibby Line Ltd.
Hertford	28.9.66	H. C. R. Dell	B. Morrey, Z. Pavlou, J. P. Briand	J. Bilton	Federal S.N. Co. Ltd.
Himalaya	3.6.66	W. N. Eade	A. J. Morris, D. Paulusz, A. L. Bath, A. F. Lightfoot	R. Plenderleith	P. & O. Management Ltd.
Hinakura	15.12.66	N. L. Warren	D. W. Syrett, J. B. Kiner, I. R. Hinchley	W. F. Law	New Zealand Shipping Co. Ltd.
Hinea	17.10.66	P. W. G. Chulman	R. J. Ayers, B. R. Baggett, C. J. Brownings, P. C. Hornett	W. A. Rance	Shell Tankers (U.K.) Ltd.
Hironiya	24.3.66	G. C. Turnbull	R. T. Wigg, A. M. Tennant, I. J. D. Scott, P. R. Clark	J. McAlister	Shell Tankers (U.K.) Ltd.
Hororata	1.9.66	D. E. Moran	T. Berry, D. J. Sloan, J. Bole	W. Kay	New Zealand Shipping Co. Ltd.
Humilaria	28.6.66	T. F. I. Alderman	M. H. Lawrence, P. Hornby, M. Austin	M. J. Sheldon	Shell Tankers (U.K.) Ltd.
Huntingdon	16.2.67	S. G. Robinson	C. B. Lukehurst, R. E. Fowler, P. B. Pamment	J. W. J. Hollands	Federal S.N. Co. Ltd.
Hurunui	12.9.66	J. Gunning	I. S. Roberts, D. R. Mountford, D. R. Lewis	M. J. Morrall	New Zealand Shipping Co. Ltd.
Iberic	30.6.66	C. A. Borthwick	K. St. C. Belfield, P. Grimes, J. A. Nelson	R. L. Baker	Shaw Savill & Albion Co. Ltd.
Illyric	23.11.66	E. C. Laidlaw	R. R. Minumack, A. W. Dew, G. P. Coleridge,	I. R. G. Channing	Shaw Savill & Albion Co. Ltd.
Imperial Star	22.3.67	J. E. Hodgson	C. J. Wood	R. Durston	Blue Star Line Ltd.
Indus	6.9.66	C. C. Brown, T. Newton,	A. S. Monaghan, M. C. Collins, R. A. Atkinson	E. B. Bridgman	Hain-Nourse Ltd.
Ingleton	19.10.66	K. Corcoran	R. C. Nicholls, J. Hall, P. Buffett	T. W. Reid	Chapman & Willan Ltd.
Inishouen Head	18.11.66	F. R. N. Best	C. Thompson	C. J. Irving	G. Heyn & Sons Ltd.
Inverbank	28.2.67	T. Walton	J. McCauley, R. Maxwell, J. McParland	C. R. Hill	Bank Line Ltd.
Inverewe	18.8.66	J. J. Rose	J. W. Gardiner, A. P. Watson, R. B. Booth	J. A. Heeray	J. & J. Denholm (Management) Ltd.
			A. I. Scott		

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Ionica</i> ..	22.2.67	B. B. Hinderwell	M. H. Murray, T. Falk, N. Cook, A. P. W. Peacock	W. Beverley ..	Shaw Savill & Albion Co. Ltd.
<i>Iron Age</i> ..	23.6.66	W. J. Bie	J. W. McLean, A. I. Buchanan, R. E. Tait	D. N. Austin ..	Common Bros. Ltd.
<i>Iron Barque</i> ..	20.1.67	J. C. Carr	C. W. Thomas, R. R. Fawcett, R. Wood	T. Murphy ..	Common Bros. Ltd.
<i>Iron Crown</i> ..	11.7.66	D. Martucci	M. F. Haley, W. Graham, J. R. Keedy, T. S. Thornton	J. D. H. Griffith	Common Bros. Ltd.
<i>Ivernia</i> ..	31.8.65	I. W. Killan	M. England, P. Lawley, P. Walton, M. Williamson	A. Turner ..	Cunard S.S. Co. Ltd.
<i>Ixion</i> ..	29.12.66	F. N. Curphey	J. P. A. Clarke, J. J. M. Terry	G. E. Clark ..	Alfred Holt & Co.
<i>Jamaica Planter</i>	6.12.66	M. C. Harper	B. Youles	D. James ..	Kaye Son & Co. Ltd.
<i>Jamaica Producer</i>	1.11.66	G. A. Foulds	D. C. Hammond, J. D. S. Marvao, J. J. Wilson, R. J. Banks	K. R. Muirbridge	Kaye Son & Co. Ltd.
<i>Jason</i> ..	1.2.67	H. S. Clarke, M.B.E., D.S.C.	H. W. Simmonds, S. Palmer, J. Maxwell, D. Ramage, J. Fort	A. F. Janacki ..	Alfred Holt & Co.
<i>John Biscoe</i> ..	2.6.66	T. Woodfield	P. R. Hay	A. Quinn ..	British Antarctic Survey
<i>Karaghistan</i>	1.2.67	H. D. Quick	J. Ridout, S. T. S. Household, J. W. Wightman, M. Saunders	J. Morrison, M. P. J. Davis	F. C. Strick & Co. Ltd.
<i>Kenuta</i> ..	14.9.65	D. I. Jones, D.S.C.	P. C. Barnby, J. S. Ross, G. Roe, I. Kelly	N. T. Roberts	Pacific S.N. Co. Ltd.
<i>Kenya</i> ..	7.12.66	I. K. Bowerman	L. H. Johnson, J. M. King, M. Lindsay, G. Taylor	J. Masterman	British India S.N. Co. Ltd.
<i>King Arthur</i>	23.11.65	R. Wise	T. R. Falc, E. E. Talbot, P. W. Brown	R. Charles	King Line Ltd.
<i>Kinnaird Castle</i>	8.9.65	I. G. Smith	S. F. Williams, J. Catterall, T. Bewley, D. S. Williams	M. Hesketh	Union-Castle Mail S.S. Co. Ltd.
<i>Kinrurnie Castle</i>	20.6.66	H. D. T. Lockyer	M. A. Wedgery, J. J. Wood-Mass, J. Frost, B. J. Toft	R. Willgress	Union-Castle Mail S.S. Co. Ltd.
<i>Kohistan</i> ..	27.2.67	W. H. D. Marker	R. A. Bazire, D. Stewart, D. W. Sleath, C. Turner	G. B. Randall..	Frank C. Strick & Co. Ltd.
<i>Laganbank</i> ..	28.3.67	T. D. Scott	A. H. Copeland	A. Hamill	Bank Line Ltd.
<i>Laksa</i> ..	20.8.65	J. W. Ross	R. M. S. Woodham, D. Moberley, M. R. Nisbet	C. Beyer	Chr. Salvesen & Co. Ltd.
<i>Lancashire</i>	27.4.66	F. J. Johns	M. C. Hurst, P. G. Radford, E. A. Tickner	G. Davies	Bibby Line Ltd.
<i>Leeds City</i> ..	16.11.66	J. D. Blake	D. J. Rooke, N. Luck, A. Lennay	B. Kelly	Sir Wm. Reardon Smith & Sons Ltd.
<i>Limerick</i> ..	2.6.66	J. W. Dunn	I. H. Fringle, D. A. B. Walker, W. F. Firman, C. M. Allen	S. Walker	Trinder Anderson & Co. Ltd.
<i>Lindisfarne</i>	29.7.66	T. R. E. Rowe	G. Turnbull	D. MacInnes	W. A. Souter & Co. Ltd.
<i>Linkmoor</i> ..	1.12.66	A. S. Jackson	J. E. Scholey, M. W. Salsbury, J. M. Jarratt, A. J. Kennedy	T. J. Britt	Walter Runciman & Co. Ltd.
<i>Livorno</i> ..	20.12.66	W. B. Avison	P. R. C. Gillard, E. ap H. T. Jones, J. Evans, D. K. U. Allin	C. Blane	Ellerman's Wilson Line Ltd.
<i>Loch Avon</i> ..	17.3.67	C. D. Ratcliff	B. Lewarn, M. Eden-Smith, P. Barnett, R. Breeze	F. Page	Royal Mail Lines Ltd.
<i>Loch Garth</i> ..	16.2.67	J. A. Phillips	T. S. Vanson, J. C. Jardine, A. E. Manger	I. Hobson	Royal Mail Lines Ltd.
<i>Loch Gowan</i>	22.8.66	G. C. W. Meldrum, M.B.E.	R. Newell, G. N. Coombe, W. Image	J. McMillan	Royal Mail Lines Ltd.
<i>Loch Loyal</i> ..	6.12.66	J. MacVean	P. S. Hardy, R. E. Gatiss, D. Newham, P. Liddell	J. Halpin	W. A. Souter & Co. Ltd.
<i>Longstone</i> ..	20.12.66	A. Bulley ..	D. J. Cottv, A. R. Anderson, A. Warren	N. Tremain	Houlder Bros. Co. Ltd.
<i>Mabel Warwick</i>	1.3.67	C. S. W. Gray	A. D. Marsh, M. R. Gadd, B. H. Bennion, A. C. Stallard	F. R. Fallon	T. & J. Brocklebank Ltd.
<i>Magdapor</i> ..	2.12.66	A. P. Briggs	D. Tracey, C. P. Margerson, N. K. James, J. Taylor	D. Butterworth	T. & J. Brocklebank Ltd.
<i>Mahamada</i> ..	31.8.66	G. B. Thomas	T. Williams, J. Watson, M. D. Agnew	A. J. Dunn	T. & J. Brocklebank Ltd.
<i>Mahout</i> ..	30.8.66	O. Pritchard	H. R. Owen, C. D. Symonds, P. G. Darton, M. W. Young	P. A. Byrne	T. & J. Brocklebank Ltd.
<i>Mahseer</i> ..	2.9.66	P. D. McKenzie	D. Geddes, W. MacMeikan, P. D. Cullen, F. N. Briggs	D. Hodgson	Manchester Liners Ltd.
<i>Makrana</i> ..	28.9.66	A. Starnet, D. G. Thomas	D. J. Howarth, J. A. McKay, T. B. Hancock, W. S. Worthington	F. M. Berry	Manchester Liners Ltd.
<i>Manchester City</i>	30.1.67	A. Cookson	J. D. Reynolds, D. Smith, D. R. Perry, J. Bell	G. Savage	Manchester Liners Ltd.
<i>Manchester Commerce</i>	18.1.67	J. M. Rushworth	R. Brown, A. S. Bashford, S. Worthington, D. J. Howarth		
<i>Manchester Exporter</i>	3.3.66	A. G. Rowlands..			
<i>Manchester Faith</i> ..	23.2.67				

Manchester Fame ..	28.2.67	J. Illingworth ..	R. Galloway, A. Milroy ..	E. Dickson ..	Manchester Liners Ltd.
Manchester Freighter ..	21.12.66	J. Hogg ..	G. A. S. MacKay, A. Quinn, K. D. Hunter ..	T. E. Bennett ..	Manchester Liners Ltd.
Manchester Mariner ..	31.3.67	A. Cookson ..	D. Pickles, J. Williamson, D. R. Perry, D. Morton ..	R. Berry ..	Manchester Liners Ltd.
Manchester Merchant ..	1.11.66	D. S. Millard ..	A. G. Quinn, D. Smith, W. R. Donaldson, J. Cryer ..	J. MacDonald ..	Manchester Liners Ltd.
Manchester Miller ..	28.3.66	E. W. Espley ..	F. Shepherd, D. W. Whitworth, R. Woods, J. Chapman ..	E. Heywood ..	Manchester Liners Ltd.
Manchester Port ..	•	G. R. Thomas ..	R. Galloway, K. W. Rourke, D. Perry ..	B. Bewley ..	Manchester Liners Ltd.
Manchester Progress ..	25.11.66	A. Cookson ..	C. J. Hunt, D. Deer, G. B. Hannaford, F. N. Briggs ..	— Berry ..	Manchester Liners Ltd.
Manchester Regiment ..	30.6.66	W. E. G. Oliver ..	J. H. Cryer, C. N. McLean, L. Clark, J. Williamson ..	K. Alexander ..	Manchester Liners Ltd.
Manchester Renown ..	27.1.67	J. E. Askew ..	R. J. Young ..	V. Dalton ..	Manchester Liners Ltd.
Manchester Shipper ..		N. W. Cockshoot, D. G. Thomas ..		K. Smith ..	Manchester Liners Ltd.
Manchester Spinner ..	22.2.67	J. E. Jones ..	A. W. Ellis, K. Rourke, R. J. C. Coyne ..	J. Reid ..	Manchester Liners Ltd.
Manchester Trader ..	18.7.66	J. R. Stephens ..	J. Barton, P. L. Goodwin, J. Gray, M. Bowen ..	D. R. Whitehead ..	Manchester Liners Ltd.
Marabank ..	22.11.66	G. W. Paterson ..	J. R. Hilton, A. G. Hall, A. A. Brown ..	M. Lawrie ..	Bank Line Ltd.
Marengo ..	27.7.66	C. Hansen ..	R. Priestley, M. W. Salsbury, A. Hodson ..	T. Hierney ..	Ellerman's Wilson Line Ltd.
Maron ..	10.11.66	A. R. Davidson ..	R. E. Savers ..	D. Gibson ..	A. Holt & Co.
Matina ..	3.10.66	N. W. Thomas ..	P. G. Pinkerton, A. Ditchfield ..	H. Burton ..	Elders & Fyffes Ltd.
Media ..	16.12.66	R. O. Venn ..	M. Lawley, A. J. Wilson, P. Walton, R. Hall ..	A. W. Holmes ..	Cunard S.S. Co. Ltd.
Melampus ..	6.2.67	H. K. Martin ..	P. Dawson, P. J. Hamilton, D. J. Metcalf, D. J. Tatham ..	E. O. Barnfather ..	Alfred Holt & Co.
Melbourne Star ..	2.1.67	G. Bowden ..	A. Goodman, A. E. Walker ..	J. Evans ..	Blue Star Line Ltd.
Mercury ..	2.12.66	P. B. Henderson ..	J. E. Peck, R. S. Merritt, B. Young ..	D. Oakley ..	Cable & Wireless Ltd.
Middlesex ..	1.11.66	J. A. North ..	R. Longworth, D. I. Jamison, A. Leachman, M. Perfect ..	K. Dougall ..	Federal Steam Nav. Co. Ltd.
Monarch ..	28.3.67	W. H. Stoodley ..	C. I. Willard, G. R. Plummer ..	A. Hindmarsh ..	H.M. Postmaster General
Montréal ..	8.9.66	D. K. Dunlop, R.D. ..	C. M. Lawton ..	J. Tyndall ..	Bristol Steam Nav. Co. Ltd.
Neleus ..	17.2.67	F. T. Knox ..	D. A. Chambers, J. L. Corrin, I. B. Thomson, J. L. Wilson ..	J. N. Nolan ..	Alfred Holt & Co.
Nestor ..	21.4.66	J. A. J. Downer, D.S.C. ..	J. Bindon, S. P. Khong, B. Hammond, R. Mason ..	A. K. Dickins ..	Alfred Holt & Co.
Nevasa ..	19.1.67	J. G. King ..	C. A. H. Blake ..	T. Sturgess ..	British India S.N. Co. Ltd.
Newcastle Star ..	21.9.66	J. T. Sheffield, M.B.E. R.D. ..	N. J. Munro, D. O. Tipping, A. Blackwood ..	E. I. Bell ..	Blue Star Line Ltd.
Newfoundland ..	23.2.67	F. W. Harris, R.D. ..	P. J. Hockaday, J. A. Ramsay, P. Hammond, D. Milliken ..	F. Murrant ..	Furness Withy & Co. Ltd.
New York City ..	6.1.67	G. Ferriday ..	J. Hebdon, D. Craddock, M. Delany ..	J. Moody ..	Bristol City Line Ltd.
New Zealand Star ..	10.11.66	L. H. Edmeads ..	P. W. Garlick, G. C. B. Claye, P. R. Ginzler, D. M. MacGillivray ..	T. Morrison ..	Blue Star Line Ltd.
Northern Star ..	19.1.67			P. J. O'Carroll ..	Shaw Savill & Albion Co. Ltd.
Northumberland ..	29.11.66	T. Rowland ..	D. Grimes, D. Fidgeon, C. Greenwood, M. Carrell ..	D. G. Cridland ..	Federal S.N. Co. Ltd.
Nottingham ..	16.2.67	J. D. Hellings ..	S. N. A. Wells, E. D. Jones, P. B. Low, A. Chisholm ..	R. A. Laycock ..	Shaw Savill & Albion Co. Ltd.
Nova Scotia ..	6.2.67	J. H. Williams ..	A. Tilmouth, J. Gray, B. Brocklesby, P. J. Hockaday ..	G. Burke ..	Furness Withy & Co. Ltd.
Nurmahal ..	•	J. Reilly ..	L. J. Jones, K. H. Stevens, G. B. Baxter ..	E. P. Rockett ..	Hain-Nourse Ltd.
Obust ..	14.10.66	A. G. Davies ..	J. M. MacLeod ..	D. Lancaster ..	Elder Dempster Lines Ltd.
Orcades ..	19.1.67	E. V. Harris ..	K. B. P. Robertson, R. Coldham, M. P. Carr, N. H. Lampe ..	G. Evans ..	P. & O. Lines Management Ltd.
Orcoma ..	•	A. Lang ..	A. W. Hepburn, J. McCombie, J. Smith ..	C. Needham ..	Furness Withy & Co. Ltd.
Orna ..	29.12.66	H. B. Chambers ..	N. F. Edwards, T. Cobbins, G. A. Thornton ..	E. A. Rodgers ..	British India S.N. Co. Ltd.
Oronay ..	8.2.67	E. Cowen ..	C. E. Burnell-Jones, L. S. Scorché, J. R. Wilson ..	I. French ..	P. & O. Lines Management Ltd.
Orsova ..	12.10.66	S. Ayles ..	B. Minter, A. P. Hodges, R. C. Ellison ..	H. R. Burch ..	P. & O. Lines Management Ltd.
Otaio ..	5.1.67	F. S. Angus ..	M. F. Keat, L. E. Howell, P. Milburn, P. Starkey ..	L. H. Sutton ..	New Zealand Shipping Co. Ltd.
Otake ..	7.3.66	M. J. Heron ..	J. R. Jackson, K. H. Lingard, P. J. R. Manson ..	A. McInnes ..	New Zealand Shipping Co. Ltd.
Otra ..	26.9.66	S. Sutherland ..	J. W. T. Low ..	J. M. Shand ..	Chr. Salvesen & Co. Ltd.
Pacific Envoy ..	17.6.66	A. H. Cooke ..	B. G. Witton, P. Norwood, J. G. Usher, C. R. Jenkins ..	J. Hurley ..	Furness Withy & Co. Ltd.
Pacific Northwest ..	5.12.66	J. L. Sims ..	R. P. Kelly, J. Kirby, B. Poore, M. Baker ..	J. Ernest ..	Furness Withy & Co. Ltd.
Pacific Reliance ..		C. G. Killick ..	A. N. Anderson, M. J. Kenyon, B. Reagan, E. M. G. Charlesworth ..		
Pacific Stronghold ..	18.11.66	G. Brown ..	D. J. Mossman, R. Brinkworth, D. Anderton, P. Howe ..	J. MacKay ..	Furness Withy & Co. Ltd.
Paparoa ..	29.12.66	J. R. G. Hannah ..	R. T. MacNamara, I. G. R. Griffith, J. H. Hutson, S. A. Mieszkowski ..	E. R. C. Lamb ..	New Zealand Shipping Co. Ltd.
Parthia ..	12.12.66	K. H. Nelson ..	C. J. Farnfield, B. C. Gouldthorpe ..	P. M. Madagan ..	Cunard Line Ltd.
Pegu ..	19.9.66	M. Sheridan ..	C. Wicks, L. Aye-Maung, J. McGeche ..	J. Brown ..	P. Henderson & Co.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Pendennis Castle</i>	16.3.67	R. A. D. Cambridge, D.S.C.	J. W. Paston, R. S. Hall, P. D. Woodhead, D. E. Mullins	T. A. Beck	Union-Castle Mail S.S. Co. Ltd.
<i>Pennyworth</i>	28.3.67	K. Scollay	J. A. Ratcliffe, M. G. Morrison, M. S. Winninayar,	P. T. Dolphin	R. S. Dalgleish Ltd.
<i>Perim</i>	10.11.66	C. R. Goodman, M.B.E.	J. McPherson		P. & O. Lines Management Ltd.
<i>Perseus</i>	20.3.67		A. T. Turner, A. H. Cope, K. R. Emmerson		Alfred Holt & Co.
<i>Persic</i>	23.12.66	A. T. McDougall		W. J. Peat	Shaw Savill & Albion Co. Ltd.
<i>Photinia</i>	17.3.67	R. J. Freeman	J. M. McWilliam, J. Sargent, D. E. Spencer		Stag Line Ltd.
<i>Piako</i>	30.1.67	D. E. Moran	A. Duncan, P. Simpson, G. W. Chatfield, N. Miller	G. M. Summers	New Zealand Shipping Co. Ltd.
<i>Pipiriki</i>	1.2.67	P. Lay	P. Howes, A. S. Adams, J. Davie	C. Elliott	New Zealand Shipping Co. Ltd.
<i>Pizarro</i>	30.1.67	R. K. C. Thomas	R. G. Burnet, J. Priestley, R. B. Lloyd, T. A. Kershaw	M. Alexander	Pacific S.N. Co. Ltd.
<i>Port Adelaide</i>	27.1.67	W. J. Williams		B. E. Bromley, M. G. Smithson	Port Line Ltd.
<i>Port Auckland</i>	3.10.66	A. S. McClouman	J. Williams, L. A. Taylor, D. J. Plume		Port Line Ltd.
<i>Port Brisbane</i>	22.12.66	J. S. Moate	C. Smith, M. Thwaite, B. Link	S. Lyons	Port Line Ltd.
<i>Port Burnie</i>	24.11.66	I. H. North	M. F. Bennett, J. P. B. Snape, D. A. Brown, E. L. G. Nightingale	W. Hughes	Port Line Ltd.
<i>Port Hobart</i>	14.10.66	J. S. Stannard	G. W. Hay, B. Money, D. S. Hellier	A. I. Thomson	Port Line Ltd.
<i>Port Invercargill</i>	18.7.66	H. B. Conby	P. M. P. Muirhead, R. S. Bolton	M. M. Garrett	Port Line Ltd.
<i>Port Launceston</i>	23.2.67	G. Carling	D. J. Morton, D. J. Arnold, R. D. Theobald	P. S. Henderson	Port Line Ltd.
<i>Port Lincoln</i>	13.7.66	A. M. Downes	D. D. Taylor, J. H. Pring, S. A. Frost	K. A. Jones	Port Line Ltd.
<i>Port Lyttelton</i>	5.12.66	V. A. Hunt	D. N. Ford, M. G. Jarrold, H. G. Coulter	D. R. Uglow	Port Line Ltd.
<i>Port Macquarie</i>	29.11.66	E. E. Chapman	R. Wallace, A. Richards, C. Lunn	M. Murphy	Port Line Ltd.
<i>Port Napier</i>	20.5.66	I. G. A. Dunn	J. W. Johnson, P. J. F. Bush, D. J. Fisher	T. P. Wilkinson	Port Line Ltd.
<i>Port Nelson</i>	13.3.67	R. H. Henshaw	R. H. Givan, P. L. B. Marriott, F. E. Beer	W. Cumming	Port Line Ltd.
<i>Port Nicholson</i>	27.7.66	F. J. Lavers	J. D. Farrar, J. A. Oscroft, H. J. Conybeare	P. E. Hornby	Port Line Ltd.
<i>Port Phillip</i>	25.11.66	P. E. Packwood	G. D. Wilson, R. L. Jones, R. W. Partridge	R. E. Maskell	Port Line Ltd.
<i>Port Pirie</i>	21.3.67	R. H. Finch	R. N. Cubin, B. R. Stephenson, A. J. Kennedy	A. M. Worthington	Port Line Ltd.
<i>Port Sydney</i>	8.11.66	L. W. Cady	D. S. Hughan, R. A. Mitchell, M. W. F. Phillips	L. V. O'Sullivan	Port Line Ltd.
<i>Port Townsend</i>	2.1.67	M. L. Coombs	J. M. Harger, T. J. Balfour, J. S. Howard	H. H. Lyon	Port Line Ltd.
<i>Port Victor</i>	7.7.66	R. A. Wight	G. K. C. Smith, J. E. B. Simpson, R. M. Grey	T. J. Britt	Port Line Ltd.
<i>Port Vindex</i>	6.2.67	A. J. Hawkins	C. G. W. Hunter, M. E. Hughes, R. A. Cunningham	J. A. Foreman	Port Line Ltd.
<i>Port Wellington</i>	1.2.67	R. Holmes	B. J. S. Tirling, J. Goldsmith, A. Pritchard	F. P. Cronin	Port Line Ltd.
<i>Potosi</i>	13.1.67	E. Gowland	M. H. Child, J. Hurley, W. Jenkins	F. Curran	Port Line Ltd.
<i>Priam</i>	•	W. T. D. MacMillan	J. W. Kemp, J. Batson, E. Webb, T. Norbury		Pacific S.N. Co. Ltd.
<i>Queen Mary</i>	•	J. Treasure Jones, R.D.			Alfred Holt & Co.
<i>Queensland Star</i>	30.3.67	R. White, D.S.C.	D. E. Norman, D. Wale, M. Mansfield, A. M. Nisbet	F. Huggett	Cunard S.S. Co. Ltd.
<i>Rakaia</i>	17.3.67	J. Cosker	G. F. Everitt, J. Thompson, R. Hoare, M. Eglon	M. Moore	Blue Star Line Ltd.
<i>Ramon de Larrinaga</i>	18.11.66	M. J. Ross	W. McR. Morrison, J. D. Savage, W. T. Stainer		New Zealand Shipping Co. Ltd.
<i>Ramore Head</i>	2.3.67	S. J. Stark	A. Marshall, A. J. Ward, A. J. Davies, G. K. Hawkes	W. J. Ward	Larrinaga S.S. Co. Ltd.
<i>Rangitane</i>	28.3.67	K. Barnett	M. W. Williams, M. J. Jackson, P. E. Keyes, M. J. Sutherland	L. C. Whittington	G. Heyn & Sons Ltd.
<i>Rangitoto</i>	25.11.66	H. N. Lawson		G. A. Parker	New Zealand Shipping Co. Ltd.
<i>Rapallo</i>	1.9.66	F. Metham	L. Gibson	A. Leary	Ellerman's Wilson Line Ltd.
<i>Raphael</i>	27.2.67	S. M. Williams	C. Bufton, A. Edmunds, M. J. Cawood, C. B. Middleton	A. J. Thomson	Lampport & Holt Line Ltd.
<i>Rathlin Head</i>	2.8.66	W. A. Haddock, O.B.E.	B. G. McShane, P. J. Sherriff, F. P. Gunning	W. Steele	G. Heyn & Sons Ltd.
<i>Redcar</i>	23.2.67	G. W. Brown	W. G. Ogle, A. S. Young, S. P. Coate	M. Thomas	Bolton Steam Shipping Co. Ltd.
<i>Regent Eagle</i>	30.11.66	B. F. Rehse	M. J. Hazzard, A. J. Cavey	R. Milner	Regent Petroleum Tankship Co. Ltd.
<i>Regent Falcon</i>	9.9.65	R. Armstrong	M. T. Hutton, F. J. Sread, R. Mitchell	J. Jenkins	Regent Petroleum Tankship Co. Ltd.
<i>Regent Pembroke</i>	3.10.66	R. Armstrong	D. Edwards, J. Wright, R. M. Hunt, P. J. L. Taylor	T. F. Kennedy	Regent Petroleum Tankship Co. Ltd.

Regent Royal	2.9.66	G. L. Mundy	L. G. Pilling	D. J. Cotter	Regent Petroleum Tankship Co. Ltd.
Registan	3.11.66	L. Saddon	C. E. J. Simmonds, J. Brown, J. Jackson	H. McGowan	F. C. Strick & Co. Ltd.
Rhodesia Castle	12.1.66	R. H. Pape	A. J. Blackburn	S. Harden	Union-Castle Mail S.S. Co. Ltd.
Rialto	11.8.66	J. F. O'Rourke	I. C. Gibson, D. Smee, H. Blanchon, D. Shorthouse	G. D. Lever	Ellerman's Wilson Line Ltd.
Richard de Larrinaga	8.8.66	L. G. Daniel	I. G. Walker, J. P. Cullen, R. I. Thomas	J. R. Cullen	Larrinaga S.S. Co. Ltd.
Richmond Castle	9.12.66	H. M. Walden	A. G. Dick, D. R. Youles, J. Hillbrow, P. Roy	D. K. George	Union-Castle Mail S.S. Co. Ltd.
Ripon	1.8.66	B. A. Lillivick	R. H. Jenkins, J. T. Brown, H. Thomas, W. J. Lovell	F. J. Devlin	Bolton Steam Shipping Co. Ltd.
Ronanby	2.3.67	C. Dixon	K. R. Brown, D. J. Bridger, N. Farrer	C. L. Keeble	Sir R. Ropner & Co. Ltd.
Romanic	2.1.67	C. L. Earl	D. W. Owen, R. C. Lescombe	G. Cassidy	Royal Mail Lines Ltd.
Roonagh	12.9.66	T. Sellers	T. B. Kernaghan, J. W. Auld, W. Dallas, M. Cavanagh	R. J. Shepherd	G. Heyn & Sons Ltd.
Rosemary Everard	4.7.66	W. G. Hunt	J. P. Skinner, W. J. Taylor	— Fearnhead	F. T. Everard & Sons Ltd.
Royal Arrow	13.3.67	G. B. Craig	J. C. Pittman, T. Young, A. R. M. White, D. Sinclair	C. F. Lambe	Union-Castle Mail S.S. Co. Ltd.
Ruahine	30.8.66	E. A. K. Brewer	J. C. McCarthy, J. R. E. Enston	P. Costelloe	Mobil Shipping Co. Ltd.
Ruswick	28.9.66	R. G. Hollingdale	J. Gibbard, R. A. Laycock, R. H. Wightman, B. O'Dea	A. G. Turner	New Zealand Shipping Co. Ltd.
Rushpool	23.9.66	E. Dunn	M. Nutbrown, A. J. Fairclough, B. Goodall	B. Flinders	Headlam & Son Ltd.
Ruthenic	22.12.66	I. Cameron	D. Pearce, M. Hairsine, R. Sanos, A. Webber	T. Keely	Sir R. Ropner & Co. Ltd.
Ruydael	1.2.67	J. Parsloe	W. Schouler, D. J. Fullwood, N. Holman	G. Gilminster	Royal Mail Lines Ltd.
S.A. Oranje	9.1.67	J. P. Smythe, D.S.C.	J. B. Merrett, W. Walker, D. Hawker, P. H. T. Broom	J. Eager	Bolton S.S. Co. Ltd.
S.A. Vaal	17.10.66	N. F. Lloyd, R.D.	R. G. E. Strick, A. MacDonald, J. Knights	B. D. MacSweeney	Union-Castle Mail S.S. Co. Ltd.
St. Margaret	29.11.66	W. F. Swann, R. J. Coyle	R. H. Lancaster, P. Lynch, J. Kosidowski	T. Murray	Union-Castle Mail S.S. Co. Ltd.
Salamanca	10.5.66	P. L. Whitaker	R. H. I. Gray, J. Bletsoe, D. Atchison	J. E. Blane	Houlder Bros. & Co. Ltd.
Salaverry	27.1.66	D. J. Houghton	P. D. Fogarty, D. Hughes, P. J. Creber, P. A. Chadwick	W. L. Stone	Furness Withy & Co. Ltd.
Sainas	10.2.66	E. I. Pepper	M. D. Egan, L. M. Hayler, T. J. D. Erskine	J. McMorran	Pacific S.N. Co. Ltd.
Saimela	17.8.66	A. F. Balkie	F. W. Wilson, A. Hamill	A. Holmes	Pacific S.N. Co. Ltd.
Samarita	2.5.66	R. T. Riley	G. M. Grainger, R. Hall, J. A. Colquhoun, M. S. England	C. Gamwell	Chr. Salvesen & Co. Ltd.
Santander	12.1.67	A. T. Johnston	D. A. Boffey, D. J. Bishop, T. R. Williams	I. McK. Beattie	Cunard S.S. Co. Ltd.
Sarmiento	27.4.66	E. Gowland	J. M. Bryan, P. Brough, W. Colquhoun, G. Cowie	W. Elliott	Donaldson Line Ltd.
Saxonia	22.2.67	R. O. Venn	R. I. Kriher, P. A. Chadwick, T. R. Williams	R. H. Latham	Pacific S.N. Co. Ltd.
Scottish Star	16.2.67	M. R. Bremberg	G. M. Grainger, J. M. Bubb, J. G. Parry, S. J. Dobell	L. Latham	Cunard S.S. Co. Ltd.
Scythia	8.9.65	D. C. Drummond	J. L. Peterson, P. Lawley, M. England	J. Hunter	Blue Star Line Ltd.
Serenia	6.12.66	K. I. Morris	A. L. MacLennan, E. G. Bee, J. McNeill	D. J. Kelly	Cunard S.S. Co. Ltd.
Shackleton	13.6.66	D. H. Turnbull	I. Benrimoj, D. Daniel, F. Barry	D. J. Duggan	Shell Tanker (U.K.) Ltd.
Shakhran	11.8.66	R. Hodgson	B. J. Bromby, S. T. Culshaw, M. J. Cole	D. J. Stoodley	Government of Falkland Islands
Shropshire	4.10.66	T. Cooper, D.S.C.	N. R. Peckham, J. Frost, D. Carden, C. Insh	N. Samuel	Frank C. Strick & Co. Ltd.
Sicilia	27.10.66	W. Yeaman	D. B. Bissett, D. Wilson, R. R. Watt, D. Lamont	S. Lakin	Bibby Line Ltd.
Sidonia	30.12.66	A. J. F. Colquhoun, O.B.E.	J. M. Kane, D. Lamont, R. Logan	N. MacLean	Anchor Line Ltd.
Silksworth	17.3.67	A. Hurst	M. K. Thet, G. Davies, A. Walker	R. Philp	Anchor Line Ltd.
Silvercrag	16.5.66	A. A. Walker	R. T. Harrison, B. Margerison, G. Hennell	J. J. Flanagan	R. S. Dalgliesh Ltd.
Silverstrand	19.1.67	R. W. Safe	K. Beavers	S. F. Casey	Silver Line Ltd.
Sir Gallahad	30.1.67	J. Swan	C. H. M. Colchester, M. W. L. Tozer, J. M. D. Edwards	D. E. Drage	Silver Line Ltd.
Sir Lancelot	1.3.67	A. Whittleton	F. J. Bearder	C. Tate	British India S.N. Co. Ltd.
Sir William Hardy	1.9.66	W. W. Gatenby	A. W. Stephen	N. S. Reeve	Torry Research Station
Sneaton	10.3.67	I. Y. Batley	G. Forward, A. D. Stuart	R. F. McManamon	Headlam & Son Ltd.
Somerset	14.3.67	D. T. Mouldley	M. G. Smith, W. Marshall, J. J. Bird	R. Day	Federal S.N. Co. Ltd.
Staffordshire	27.9.66	N. F. Fitch, M.B.E.	D. Hewitt, J. Dudley, A. Moore, R. Joughin	C. Beyer	Shaw Savill & Albion Co. Ltd.
Sturtic	20.12.66	B. Hammond	R. P. Hornby, C. Marton, R. Fletcher	T. McMahon	Bibby Line Ltd.
Suffolk	27.2.67	H. J. D. Sladen	W. T. Oliver, M. Godfrey, K. Fuge	J. P. Whiteley	Shaw Savill & Albion Co. Ltd.
Sugar Carrier	6.2.67	A. G. Rex	J. R. W. Hutchinson, A. Patterson, J. Hook, M. Parry	H. J. Myhill	New Zealand Shipping Co. Ltd.
Sugar Exporter	16.2.67	S. Gorrell	W. Brothers, G. S. D. Wright, D. Mustarde	E. Norton	Sugar Line Ltd.
Sugar Importer	18.11.66	J. Hunt	T. C. McDowell	A. H. Gray	Sugar Line Ltd.
Sugar Refiner	28.2.67	E. Moses	J. Brooks, W. Cowan, C. Middleton		Sugar Line Ltd.
			S. S. Keeble, C. E. Houghton, C. N. Davies,		
			O. T. Stephenson		

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Sunda	9.11.66	J. Clifford	J. J. Noakes, R. W. L. Pocock, D. Farrar ..	D. Kerslake	P. & O. Lines Management Ltd.
Sunk	9.1.67	H. Syversen	P. E. Peice, R. Knight, P. Lewis, R. Roberts	R. Hartland	John Kilgour & Co. Ltd.
Surrey	6.1.67	J. F. Milner	P. Storm, I. MacK, Murray, T. Gibson, P. J. Zealley	J. V. Diggle	Federal S.N. Co. Ltd.
Sussex	7.11.66	R. E. Baker	A. R. Savill, J. W. Spence, M. J. Mann, M. J. Charlesworth	R. B. Redhead	Federal S.N. Co. Ltd.
Sylvania	23.2.67	H. J. Chaloner, R.D.	G. Roberts, P. T. Bingley, I. Phillip, R. Langmuir	A. MacPherson	Cunard S.S. Co. Ltd.
Tabaristan	22.2.67	W. MacKenzie	A. C. McCulloch, W. I. E. Laslett, R. W. Madden, R. W. Sawyers	J. F. Bryson	F. C. Strick & Co. Ltd.
Tactician	8.8.66	H. G. Skelly	R. B. Chalk, B. Crook, P. Iverson ..	P. Lawton	T. & J. Harrison Ltd.
Tantallon Castle	18.8.66	K. Swift	W. Walsh, R. Will, P. Butler	H. Chesters	Union-Castle Mail S.S. Co. Ltd.
Tasmania Star	19.9.66	C. H. Watson	A. S. Green	M. Murray	Blue Star Line Ltd.
Tekoa	30.3.67	F. C. Taylor	M. J. Rowland-Hill, C. J. Roberts, D. R. Embery, M. B. Turner	R. G. Heath	New Zealand Shipping Co. Ltd.
Theseus	*	I. Webster	R. E. Sawers, D. Bell	R. Knight	Alfred Holt & Co.
Toronto City	*	J. J. Butterworth	D. M. Dye, E. T. Parr, J. R. Taylor	R. Ferry	Bibby Bros & Co. Ltd.
Torr Head	10.3.66	E. G. Davey	J. D. McRitchie, B. M. Connor, J. A. Niblock	M. J. Hannan	G. Heyn & Sons Ltd.
Tower Bridge	5.12.66	J. Kennar	R. F. Harrison, H. N. Lawson, C. Firth	M. M. W. O'Gorman	Silver Line Ltd.
Trebartha	25.11.66	H. Gravell	J. Davies, J. Spall, M. H. Warren	A. Hunter	Hain-Nourse Ltd.
Trecairna	2.8.66	A. V. Rowles	A. J. Ardley, F. J. Lovegrove, I. Perkin	B. G. Smith	Hain-Nourse Ltd.
Trecarrell	14.10.66	R. B. Oliver	J. H. Bache, C. J. Double, W. V. Venning	B. L. Baker	Hain-Nourse Ltd.
Trefusis	29.7.66	L. Annett	B. Smith, J. E. Johnson, J. W. Rhoadhouse	R. Keeley	Hain-Nourse Ltd.
Tremayne	30.12.66	W. J. Perkins	I. Smith, P. W. G. Wiggs, J. S. Clarke, D. W. Carsey	T. P. Furey	Hain-Nourse Ltd.
Tremeadow	13.10.66	D. A. Lacey	R. Lewis, M. Ball, J. Clarke	J. R. Stokes	Hain-Nourse Ltd.
Trenorah	28.2.67	G. Joslin	T. Raddings, R. C. Lister, F. Garfit	J. McSlaven	Hain-Nourse Ltd.
Trenoglas	2.1.67	J. E. Sellers	B. J. Shawe, B. Newlove, F. M. Marchant	A. R. Watt	Hain-Nourse Ltd.
Trevailan	28.10.66	L. J. Lennox	H. O'Mullan, B. Young, B. V. Purvis, J. A. Smeeton	R. Toogood	Hain-Nourse Ltd.
Trevaylor	28.11.66	J. R. Darby	A. J. Ardley, M. R. Cowton, B. D. Miller	A. E. Adams	Hain-Nourse Ltd.
Trevidden	27.2.67	R. B. Hood	G. D. Goldsbrough, R. A. Newnham, W. G. Lewis, R. J. G. Vincent	M. O'Neill	Hain-Nourse Ltd.
Turakina	13.3.67			D. Lendrum	F. C. Strick & Co. Ltd.
Turkistan	8.8.66	J. F. Ockleford	W. J. S. Burr, M. H. Wilson, C. J. Sabine	J. L. Porter	F. C. Strick & Co. Ltd.
V'elletia	13.2.67	P. A. Thompson	D. Leaford, M. G. Foster, T. M. Logan, P. C. Widd	A. U. Cochrane	Shell Tankers (U.K.) Ltd.
V'enassa	13.3.67	C. R. Kerr	B. W. Morrey, K. Bramley, J. A. Cumming	W. J. Beattie	Shell Tankers (U.K.) Ltd.
V'olvatella	31.10.66	W. Plenty	M. J. Dennis, G. A. Ramsden, D. Martin	A. J. Norman	Shell Tankers (U.K.) Ltd.
V'auvera	23.9.66	D. E. Aberdeen	A. G. Allerton, D. M. Cole, L. R. Dick	W. Tobin	Shaw Savill & Albion Co. Ltd.
V'antlu	12.1.67	J. W. G. Wilby	J. N. Bolton, J. Milward, D. R. Parkinson	Tang Yuen	China Navigation Co. Ltd.
Warborough	27.10.66	K. B. Jewell	D. Wharton, N. Storey, D. Simpson, I. Hiscock	D. Morrison	R. S. Dalglish Ltd.
Waronga	5.10.66	P. H. Bidmead	R. H. Small, M. B. Harvey, E. M. Deed, M. B. Smith	J. M. Brogden	British India S.N. Co. Ltd.
Welsh City	16.9.66	C. E. Exton	A. J. H. Crowther, A. D. Lightfoot, J. McCarthy	K. J. Lake	Sir Wm. Reardon Smith & Sons Ltd.
Welsh Herald	17.2.67	J. G. Tunncliffe	C. C. Davidson, W. Knight, E. Dix	J. Watson	Welsh Ore Carriers Ltd.
Westmorland	*	A. C. Davies	M. G. Bishop, I. Thomson, A. Dawkins, T. MacLaren	D. Byne	New Zealand Shipping Co. Ltd.
Weybridge	31.5.66	I. W. Jackson	R. E. Baker, J. C. Lewis, J. R. Timms	S. Buckley	Watts, Watts & Co. Ltd.
Willowpool	19.9.66	E. Seppel	B. Chapman, M. B. Bradley, P. McGovern	B. Jones	Sir R. Ropner & Co. Ltd.
Wimbledon	23.1.67	E. Pearce	N. Bowen, A. Cameron, P. W. Fletcher	P. Kinahan	Watts, Watts & Co. Ltd.
Windsor Castle	4.1.67	A. J. Hort	R. M. Durhie	R. A. Wilson	Union-Castle Mail S.S. Co. Ltd.
Woosung	3.12.64	F. Cunningham	A. L. Carter, G. A. Drewery, J. G. Baker	Lee Hon Lui	China Navigation Co. Ltd.
Yor-kshire	24.10.66	R. Weir	M. Kingsmill, E. H. Jones, M. T. Donnellah	R. D. Bateman	Bibby Line Ltd.
Zaphon	28.4.66	C. J. Hedges, M.B.E.	J. P. M. Cusson, F. Speak, W. A. Clarke, K. Heiser	M. J. Davison	Shell Tankers (U.K.) Ltd.

Supplementary Ships

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Aaro</i> ..	14.10.65	A. T. Jardine	P. Bishop	R. Price	Ellerman Wilson Line Ltd.
<i>Apollo</i> ..	5.12.66	G. V. Barnes	W. G. Sommerfield, R. Chamberlain, D. Makin, B. Cole	J. Galvin	Bristol S.N. Co. Ltd.
<i>Arctic Freebooter</i> ..	18.8.66	R. S. Bryant	M. R. Davenport, P. McKinney, A. Caboché	D. Taylor	Boyd Line Ltd.
<i>Baltic Importer</i> ..	20.10.66	W. Forbes	K. Camp, P. Wearing, W. Matthew	G. Kerr	Athel Line Ltd.
<i>Bendoran</i> ..	7.12.66	A. Sinclair	E. P. Anderson, D. Orrison, A. Howie	A. Arena	United Baltic Co. Ltd.
<i>Bennacdhui</i> ..	15.9.66	J. G. Adamson	T. Clark, R. C. Barnsfather	M. Smith	Ben Line Steamers Ltd.
<i>Benvorlich</i> ..	18.11.66	J. Main	W. C. Mackay, M. R. Baxendine	M. J. P. Reddin	Ben Line Steamers Ltd.
<i>Border Shepherd</i> ..	24.6.66	R. G. Bell	M. C. Walshaw	R. G. Hall	Common Bros Ltd.
<i>British Chivalry</i> ..	31.12.65	T. J. Taylor	T. J. Stringer, D. Tobin	I. P. Sherwood	B.P. Tanker Co. Ltd.
<i>British Destiny</i> ..	23.8.66	A. Lawson	R. F. Shaw, T. J. Stringer, D. Roberts, C. E. Hayward	T. V. Foulkes	B.P. Tanker Co. Ltd.
<i>British Energy</i> ..	22.3.67	L. G. Tanner	T. J. W. Hunter, R. Woodcock, D. J. Baker	P. S. Stewart	B.P. Tanker Co. Ltd.
<i>British Patrol</i> ..	25.11.66	D. Corp	I. Nicholson, H. Ramsey, N. Cadman	G. Bolton	Associated Humber Lines Ltd.
<i>British Reliance</i> ..	10.11.66	F. Lowther	S. M. Duncan, M. J. Buchanan, R. M. MacLeod, F. G. Hick	J. Sommersville	J. Robinson & Sons Ltd.
<i>British Robin</i> ..	19.1.67	A. D. Browne	J. R. Pilliner, A. D. Roberts, J. W. Crosbie	W. E. L. Gittins	Ellerman's Wilson Line Ltd.
<i>British Workman</i> ..	28.9.65	L. H. Hayward	A. D. D. MacRae, S. Robinson, S. Barber, R. A. Marsh	A. W. Dixon	South Eastern Gas Board
<i>Byland Abbey</i> ..	2.2.67	T. W. Westerdale	G. Calem, F. Cooper, A. Stockdale	B. Kingshott	Bristol S.N. Co. Ltd.
<i>Camellia</i> ..	7.4.65	W. R. Hunter	W. Fallon, J. Barker, J. Williams, D. Alder, W. G. Middleton	H. H. Grant	Royal Mail Lines Ltd.
<i>Cicero</i> ..	10.1.66	E. Tyler	R. W. Barrett, J. D. Edwards	H. W. Sinclair	Esso Petroleum Co. Ltd.
<i>Croydon</i> ..	24.1.66	H. G. N. D'Evelin	A. W. Dixon	M. E. Marcenik	Esso Petroleum Co. Ltd.
<i>Diado</i> ..	23.9.66	N. J. Llewellyn	M. J. Hogan	G. R. Smith	Hudson S.S. Co. Ltd.
<i>Ebro</i> ..	9.12.66	J. L. Perkins	R. D. Kelsall, T. Milner, M. Childs, P. Reseigh	W. M. Davies	J. Marr & Sons Ltd.
<i>Echo</i> ..	21.3.67	I. Warby	M. R. G. Warner, B. Welch, H. H. Grant	D. L. Verity	Ellerman's Wilson Line Ltd.
<i>Esso Lancashire</i> ..	27.2.67	K. MacKenzie	A. G. Greenwood, R. Hyam	G. W. Taylor	St. Andrews Steam Fishing Co. Ltd.
<i>Esso Westminster</i> ..	21.10.64	G. Waterson	W. M. Porritt, D. C. Wyatt	P. Y. Wright	Hellyer Bros Ltd.
<i>Glitra</i> ..	20.3.67	M. R. Uminski	G. Begg, G. Massie, K. M. MacRae	J. McCarrroll	T. & J. Brocklebank Ltd.
<i>Hudson Deep</i> ..	18.11.65	C. Townsend	G. T. Bell, A. Gordon, T. L. Harcus, J. H. Crane	J. K. Forster	T. & J. Brocklebank Ltd.
<i>Junella</i> ..	28.3.67	L. Fewster	W. M. Davies	P. G. Ring	Shell Tankers (U.K.) Ltd.
<i>Kirkella</i> ..	17.8.66	F. W. Wooler	D. W. Johnson	— Lucey	Shell Tankers (U.K.) Ltd.
<i>Kirkham Abbey</i> ..	30.3.67	P. E. Craven	D. L. Verity	A. E. Leeder	Bristol S.N. Co. Ltd.
<i>Logna</i> ..	25.3.66	R. B. Dickson	A. G. Agnew, J. W. T. Low	D. P. Punch	Mobil Shipping Co. Ltd.
<i>Lord Nelson</i> ..	30.6.66	N. E. Longthorp	H. G. Carter, E. S. Jackson, C. D. Croall	R. C. Millbank	Mobil Shipping Co. Ltd.
<i>Mangla</i> ..	18.3.66	J. P. Brand	J. McCarrroll		
<i>Marbella</i> ..	20.12.66	C. H. G. Drever	B. H. Bennian, P. Richardson, D. Moore		
<i>Mackelyia</i> ..	17.10.66	D. A. Keller	P. Dark, A. R. Wood, G. B. Drewery		
<i>Mawana</i> ..		J. P. Jackson	J. C. Beaumont, M. D. Coles, B. Cork, M. Laws, W. Thomas		
<i>Methane Princess</i> ..		J. Munday, J. Kell	G. M. Henderson, G. Wilson, W. Thomas, E. S. Slinger		
<i>Methane Progress</i> ..		W. W. Gibb	J. S. Earl, K. Kristanis		
<i>Milo</i> ..		J. F. Tremlett	D. Penny, D. Ashworthy, I. H. Purvis, J. A. Reedman		
<i>Mobil Acme</i> ..		J. H. E. George, J. Miller	G. A. Moffat, D. Scott-Hodge, H. K. Hodgson, F. P. Hall		
<i>Mobil Apex</i> ..		J. H. E. George	P. Callaghan, J. R. Enston, D. Wright, J. Stokoe		
<i>Mobil Endeavour</i> ..		J. L. James			

Supplementary Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Mobil Endurance</i> ..	20.12.66	G. K. Billett	J. R. Enston, D. J. Lindsay, R. G. Barker, J. D. Bell	W. Thomson ..	Mobil Shipping Co. Ltd.
<i>Mobil Enterprise</i> ..	1.2.66	J. Pawlowicz	J. L. Hussey, C. J. C. Harker, D. Penny ..	H. Fisher ..	Mobil Shipping Co. Ltd.
<i>Northella</i> ..	23.2.66	L. Fewster	W. M. Davies ..	W. M. Davies ..	J. Marr & Sons Ltd.
<i>Ross Illustrious</i> ..	4.4.67	R. Waller	R. R. N. Lang ..	R. R. N. Lang ..	Ross Trawlers Ltd.
<i>Ross Intrepid</i> ..	8.9.66	K. Neilson	J. Renfrew ..	J. Renfrew ..	Ross Trawlers Ltd.
<i>Ross Orion</i> ..	6.1.67	G. Whur ..	A. Ramsay ..	A. Ramsay ..	Ross Trawlers Ltd.
<i>St. Giles</i> ..	7.11.66	J. W. Humphrey	K. C. Stone ..	K. C. Stone ..	Thos. Hamling & Co.
<i>Sea Captain</i> ..	19.9.66	R. E. Huggins	A. A. Makhia, W. I. Morrison, —, Harvey, B. P. Kelly	P. J. F. Skelton	Vergocan S.S. Co. Ltd.
<i>Soutra</i> ..	29.12.65	R. Dickson	A. Hamill ..	..	Chr. Salvesen & Co. Ltd.
<i>Sireambank</i> ..	31.5.66	P. Smith ..	..	..	Bank Line Ltd.
<i>Sylvan Arrow</i> ..	..	J. McCormack	D. M. Garden, A. Stewart, K. Currie ..	J. S. Kickwood-Hackett	Mobil Shipping Co. Ltd.
<i>Tolsta</i> ..	13.3.67	J. B. Kerr	J. Kelly, W. C. Coull ..	W. Anderson ..	Chr. Salvesen & Co. Ltd.
<i>Truro</i> ..	11.1.67	A. Skelton	C. Waters ..	P. Kenneally ..	Ellerman's Wilson Line Ltd.
<i>Tudor Prince</i> ..	9.11.66	J. Gilzean	I. Davison, A. Collop, W. Lynn ..	T. J. Ahern ..	Prince Line Ltd.
<i>Volo</i> ..	2.3.67	H. Whitfield	T. Wren, J. Boswell, —, Straford, —, McCaughy	J. B. Anderson	Ellerman's Wilson Line Ltd.
<i>York</i> ..	17.2.65	J. Wm. Laverack	D. Peacham, B. Tong, B. D. Lee, R. Shaw ..	..	Associated Humber Lines Ltd.

Trawlers

The following is a list of trawler skippers and radio operators who voluntarily observe and report those elements of the weather which do not entail the use of any meteorological instruments (irrespective of the vessel in which they sail).

SKIPPER	RADIO OPERATOR	TRAWLER OWNER/MANAGER
B. A. Ashcroft ..	H. G. Pask ..	Hellyer Bros. Ltd.
W. Brettell ..	G. A. Osborne ..	Newington Steam Fishing Co. Ltd.
D. Cawood ..	E. D'Constantine ..	Newington Steam Fishing Co. Ltd.
M. Clark ..	C. Hodder ..	Hellyer Bros. Ltd.
P. Crane ..	J. D. Lester ..	Ross Trawlers Ltd.
C. Cross ..	G. A. Osborne ..	Newington Steam Fishing Co. Ltd.
A. Dewhurst ..	F. W. Burton ..	T. Hamling & Co. Ltd.
J. O. Emunons ..	L. Bacon ..	Hellyer Bros. Ltd.
W. Fry ..	M. W. Larsen ..	Northern Trawlers Ltd.
H. Hall ..	G. V. Lane ..	Ross Trawlers Ltd.
G. Peterson ..	L. Bacon ..	Hellyer Bros. Ltd.
T. Poakitt ..	B. Dhanjal ..	Hellyer Bros. Ltd.
J. W. Russell ..	B. C. Jones ..	T. Hamling & Co. Ltd.
P. Skipworth ..	R. T. Murphy ..	..
M. Spurgeon ..	G. V. Lane ..	Northern Trawlers Ltd.
R. Younger ..	..	..

‘Marid’ Ships

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

NAME OF VESSEL	CAPTAIN	OWNER/MANAGER
<i>Adriatic Coast</i>	R. E. Holt	Coast Lines Ltd.
<i>Amsterdam</i>	H. Jennings	British Railways Board
<i>Angularity</i>	D. O’Leary	F. T. Everard & Sons Ltd.
<i>Arctic Hunter</i>	P. Garner	Boyd Line Ltd.
<i>Arnhem</i>	R. C. Fergus	British Railways Board
<i>Avalon</i>	S. E. Dale	British Railways Board
<i>Bardic Ferry</i>	R. Hockings	Atlantic S.N. Co. Ltd.
<i>Brenda</i>	I. MacRae	Dept. of Agriculture & Fisheries for Scotland
<i>B.P. Manager</i>	F. M. Cain	Shell-Mex & B.P. Ltd.
<i>Caesarea</i>	V. Newton	British Railways Board
<i>Caledonian Coast</i>	C. Sudlow	Coast Lines Ltd.
<i>Cambria</i>	W. J. Roberts	British Railways Board
<i>Cardiffbrook</i>	J. K. Frost	Comber Longstaff & Co. Ltd.
* <i>Cerdic Ferry</i>	C. E. Tanner	Atlantic S.N. Co. Ltd.
<i>Cheshire Coast</i>	C. A. Hopkins	Coast Lines Ltd.
<i>Claymore</i>	N. Campbell	David MacBrayne Ltd.
<i>Clupea</i>	J. Jappy	Dept. of Agriculture & Fisheries for Scotland
<i>Corbrae</i>	H. Crossley	Wm. Cory & Sons Ltd.
<i>Darlington</i>	G. Shipley	Associated Humber Lines Ltd.
<i>Doric Ferry</i>	C. E. Tanner	Atlantic S.N. Co. Ltd.
<i>Dorset Coast</i>	R. H. Jones	British Railways Board
<i>Dryburgh</i>	J. Murray	G. Gibson & Co. Ltd.
<i>Duke of Argyll</i>	J. B. Williams	British Railways Board
<i>Duke of Lancaster</i>	W. N. Greenwood	British Railways Board
<i>Elk</i>	B. Picot, R.D.	British Railways Board
<i>Elswick Bay</i>	W. G. Dennison	Elwick Shipping Co.
<i>Ettrick</i>	G. Patience	G. Gibson & Co. Ltd.
* <i>Fernhurst</i>	D. Johnson	Stephenson Clarke Ltd.
<i>Ferryhill</i>	J. Innes	Aberdeen Coal & Shipping Co. Ltd.
<i>Fingal</i>	R. McEachern	Northern Lighthouse Board
* <i>Fulham X</i>	D. Battle	Stephenson Clarke Ltd.
<i>Gaelic Ferry</i>	J. W. Cowie	Atlantic S.N. Co. Ltd.
<i>Grebe</i>	C. Johnston	General S.N. Co. Ltd.
* <i>Hadrian Coast</i>	G. Jones	Coast Lines Ltd.
<i>Hamble</i>	H. Jack	Shell-Mex & B.P. Ltd.
<i>Harrogate</i>	R. J. Howell	British Railways Board
<i>Hebrides</i>	J. C. Hodgson	David MacBrayne Ltd.
* <i>Helmsdale</i>	A. F. Ross	Northern Trading Co. Ltd.
<i>Hero</i>	W. Kays	Bristol S.N. Co. Ltd.
* <i>Heron</i>	A. E. Guest	General S.N. Co. Ltd.
<i>Hesperus</i>	D. MacCorquadale	Northern Lighthouse Board
<i>Hibernia</i>	R. Roberts	British Railways Board
* <i>Hibernian Coast</i>	G. Mearns	Coast Lines Ltd.
* <i>Innisfallen</i>	P. C. McCullem	City of Cork Steam Packet Co.
<i>Ionic Ferry</i>	W. Close	Atlantic S.N. Co. Ltd.
<i>Irish Coast</i>	J. McKinnon	Coast Lines Ltd.
<i>Jersey Coast</i>	J. G. Casey	Coast Lines Ltd.
<i>Kelvin</i>	H. A. Matheson	Wm. Sloan & Co. Ltd.
* <i>Killingholme</i>	W. J. Mair	Shell-Mex & B.P. Ltd.
<i>Kingston Jacinth</i>	J. Russell	Kingston Steam Trawling Co. Ltd.
<i>Lairdscrest</i>	K. Dudgeon	Burns & Laird Line Ltd.
<i>Lairds Glen</i>	J. Napier	Burns & Laird Line Ltd.
* <i>Lairds Loch</i>	H. Davidson	Burns & Laird Line Ltd.
<i>Lancashire Coast</i>	P. A. Johnson	Belfast S.S. Co. Ltd.
* <i>Leinster</i>	G. Barry	Coast Lines Ltd.
<i>Loch Ard</i>	R. Campbell	David MacBrayne Ltd.
<i>Loch Carron</i>	A. Mathieson	David MacBrayne Ltd.
* <i>Loch Seaforth</i>	J. Smith	David MacBrayne Ltd.
<i>Lord Tedder</i>	J. Russell	Lord Line Ltd.
<i>Moose</i>	B. A. Caws	British Railways Board
<i>Mountstewart</i>	R. J. Jones	Coast Lines Ltd.
* <i>Munster</i>	M. Hollywood	Coast Lines Ltd.
<i>Mytongate</i>	F. Williams	Hull Gates Shipping Co.
<i>Netherlands Coast</i>	E. C. Fisher	Tyne-Tees Shipping Co. Ltd.
<i>Olivian Coast</i>	D. K. Wright	Tyne-Tees Shipping Co. Ltd.
<i>Oredian</i>	A. Kirkby	Ore Carriers Ltd.
<i>Oreosa</i>	N. A. C. Smith	Houlder Bros. Ltd.
<i>Oriole</i>	— Urquhart	General S.N. Co. Ltd.
<i>Orselina</i>	J. M. Jarvis	Continental Cargoes Ltd.
* <i>Pearl</i>	W. Campbell	Gem Line Ltd.
<i>Pharos</i>	C. Campbell	Northern Lighthouse Board
<i>Pointer</i>	R. Bruce	Burns & Laird Lines Ltd.
<i>Pole Star</i>	A. W. Walker	Northern Lighthouse Board
<i>St. Andrew</i>	H. H. Coney	British Railways Board
<i>St. Clair</i>	J. Johnston	North of Scotland Shipping Co.
<i>St. Magnus</i>	J. Harvie	North of Scotland Shipping Co.
<i>St. Patrick</i>	W. R. Waters	British Railways Board
<i>Sandringham Queen</i>	A. Flett	Comben Longstaff Ltd.
<i>Sarnia</i>	G. Cartwright	British Railways Board
* <i>Scotia</i>	A. M. Finlayson	Dept. of Agriculture & Fisheries for Scotland
* <i>Scottish Coast</i>	A. S. Nicholson	Coast Lines Ltd.
<i>Selby</i>	G. Hughes	British Railways Board

* These ships report wind and weather.

‘Marid’ Ships (contd.)

NAME OF VESSEL	CAPTAIN	OWNER/MANAGER
<i>Slieve Bawn</i>	J. R. Rowlands	British Railways Board
<i>Slieve Bearnagh</i> ..	R. B. Kitchen	British Railways Board
<i>Slieve Donard</i> ..	H. Hughes	British Railways Board
* <i>Southern Coast</i> ..	H. G. Kielit	Coast Lines Ltd.
* <i>Spray</i>	J. Andrews	Ellis & McHardy Ltd.
<i>Stella Antares</i> ..	J. Kearsey	Charleson Smith Trawlers, Ltd.
<i>Stormont</i>	P. A. Johnson	Belfast S.S. Co. Ltd.
* <i>Superiority</i>	H. V. Wadhams	F. T. Everard & Sons Ltd.
* <i>Talisker</i>	D. Lamont	Burns Laird Line Ltd.
<i>Tay</i>	D. MacDonald	Wm. Sloan & Co. Ltd.
* <i>Teano</i>	A. Gillis	Ellerman's Wilson Line Ltd.
<i>Torquay</i>	G. Proctor	J. A. Davidson Ltd.
<i>Treviscoe</i>	H. S. Shugar	Channel Shipping Ltd.
* <i>Warwickbrook</i> ..	D. J. Moyes	Comben Longstaff & Co. Ltd.
<i>Winchester</i>	B. Caws, D.S.C., R.D. ..	British Railways Board
* <i>Whitby Abbey</i> ..	J. Collier	Associated Humber Lines Ltd.
<i>Woodlark</i>	J. Townner	General S.N. Co. Ltd.
<i>Yarvic</i>	F. Williams	Anglian Shipping Co. Ltd.

* These ships report wind and weather.

Light-vessels

NAME OF VESSEL	MASTERS
<i>Bar</i>	N. S. Burns, A. Woodhall
<i>Dowsing</i>	B. H. Holmes, H. Frost
<i>East Goodwin</i>	M. Wild, H. J. G. Day
<i>Galloper</i>	E. Marsden, W. Burroughs
<i>Humber</i>	D. A. Bacon
<i>Longstone (Lt. Ho.)</i> ..	R. D. Ewens
<i>Newarp</i>	G. A. Harris, W. E. Fenn
<i>Royal Sovereign</i>	B. J. Key, G. Davies
<i>St. Gowan</i>	E. L. Jaeger, D. J. Harries
<i>Seven Stones</i>	J. W. James, S. R. Woolnough
<i>Shambles</i>	H. Price, E. D. P. Davies
<i>Shipwash</i>	S. Goose, J. Goldsmith
<i>Skulmartin</i>	D. Hawkins, S. E. Griffin
<i>Smith's Knoll</i>	F. Harrison, B. E. Cunham

Training Establishments

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

ESTABLISHMENT	CAPTAIN/SUPERINTENDENT
<i>Conway, H.M.S.</i>	E. Hewitt, R.D. Capt. R.N.R.
<i>Pangbourne Nautical College</i> ..	A. F. P. Lewis, C.B.E. Capt. R.N. (Retd.)
<i>Reardon Smith Nautical College</i> ..	J. N. Rose, R.D., Lt. Cdr. R.N.R. (Retd.)
<i>Warsash School of Navigation</i> ..	G. W. Wakeford, M.B.E.
<i>Worcester, H.M.S.</i>	L. W. L. Argles, O.B.E., D.S.O., R.N. (Retd.)

BRITISH COMMONWEALTH

The following lists give the names of Selected and Supplementary Ships, and the number of Auxiliary Ships where known (i.e., those which only report when in 'sparse areas'), which voluntarily co-operate with meteorological services of the British Commonwealth.
 Information for these lists is required by 20th April each year. Information for the January corrective lists is required by 20th October each year.

CANADA (Information dated 22.3.67)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Arcadia</i>	P. & O.-Orient Line
<i>A. T. Cameron</i>	Government of Canada
<i>Baffin</i>	Government of Canada
<i>Beaverfir</i>	Canadian Pacific Steamships
<i>Bluenose</i>	Canadian National Railways
<i>Brandal</i>	Government of Canada
<i>Bridgepool</i>	Sir R. Ropner & Co. Ltd.
<i>Camsell</i>	Government of Canada
<i>Canberra</i>	P. & O.-Orient Line
<i>C. D. Howe</i>	Government of Canada
<i>Chusan</i>	P. & O.-Orient Line
<i>Cygnus</i>	Government of Canada
<i>d'Iberville</i>	Government of Canada
<i>Droxford</i>	Ridson Beazley Ltd.
<i>Eduard Cornwallis</i>	Government of Canada
<i>G. B. Reed</i>	Government of Canada
<i>Hudson</i>	Government of Canada
<i>Imperial Acadia</i>	Imperial Oil Ltd.
<i>Imperial Quebec</i>	Imperial Oil Ltd.
<i>Imperial St. Lawrence</i>	Imperial Oil Ltd.
<i>Irving Glen</i>	Glenco Ltd., Nassau
<i>Irving Stream</i>	Irving Oil Co.
<i>John A. MacDonald</i>	Government of Canada
<i>John Cabot</i>	Government of Canada
<i>Kapuskasing</i>	Government of Canada
<i>Labrador</i>	Government of Canada
<i>Lakemba</i>	Pacific Shipowners Ltd., Singapore
<i>Letitia</i>	Donaldson Line
<i>Lynton</i>	Chapman & Willan Ltd.
<i>M. J. Boylen</i>	Kent Lines Ltd.
<i>Montcalm</i>	Government of Canada
<i>Narwhal</i>	Government of Canada
<i>N. B. McLean</i>	Government of Canada
<i>Northern Shell</i>	Shell Canada Ltd.
<i>Oriana</i>	P. & O.-Orient Line
<i>Porte Dauphine</i>	Government of Canada
<i>Queen of Prince Rupert</i>	British Columbia Ferry Authority
<i>Rally</i>	Government of Canada
<i>Rapid</i>	Government of Canada
<i>R. B. Angus</i>	Canadian Pacific (Bermuda) Ltd.
<i>Saldura</i>	Salvesen & Co. Ltd.
<i>Silvia</i>	Saguenay Shipping Ltd.
<i>Simon Fraser</i>	Government of Canada
<i>Sir Humphrey Gilbert</i>	Government of Canada
<i>Sir William Alexander</i>	Government of Canada
<i>Thor I</i>	A. S. Thor Dahl, Sandefjord, Norway
<i>Thorshope</i>	A. S. Thor Dahl, Sandefjord, Norway
<i>Thorsriver</i>	A. S. Thor Dahl, Sandefjord, Norway
<i>Thorsstream</i>	A. S. Thor Dahl, Sandefjord, Norway
<i>Wolfe</i>	Government of Canada
Supplementary Ships:	
<i>Arcadia</i>	Government of Canada
<i>Anna Bakke</i>	Knutsen Line, Norway
<i>Astrid Bakke</i>	Knutsen Line, Norway
<i>Bonneville</i>	A. F. Klaveness & Co., Oslo
<i>Bougainville</i>	A. F. Klaveness & Co., Oslo
<i>Bronxville</i>	A. F. Klaveness & Co., Oslo
<i>Emerillon</i>	Shell Canada Ltd.
<i>Gosforth</i>	Federal Commerce & Navigation Co. Ltd.
<i>Imperial Halifax</i>	Imperial Oil Ltd.
<i>Leif Eiriksson</i>	Government of Canada
<i>Libra</i>	Palomba & d'Amato, Torre del Greco
<i>Maxwell</i>	Government of Canada
<i>Polyrover</i>	E. Rasmussen, Kristiansand, Norway
<i>Princess of Acadia</i>	Canadian Pacific Steamships
<i>Sunnyville</i>	A. F. Klaveness & Co., Oslo
<i>Sunprincess</i>	Princess Shipping Co., Monrovia
<i>Thorscarrier</i>	A. S. Thor Dahl, Sandefjord, Norway
<i>William Carson</i>	Government of Canada

Auxiliary Ships:

Canada has 36 ocean-going Auxiliary Ships and 40 Auxiliary Ships operating on the Great Lakes.

INDIA (Information dated 20.3.67)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Andamans</i>	Shipping Corporation of India Ltd.
<i>Bahadur</i>	Asiatic S. N. Co. Ltd.
<i>Bharatmitra</i>	Bharat Line Ltd.
<i>Bharatratna</i>	Bharat Line Ltd.
<i>Dumra</i>	British India S.N. Co. Ltd.
<i>Dwarka</i>	British India S.N. Co. Ltd.
<i>Indian Exporter</i>	India S.S. Co. Ltd.
<i>Indian Merchant</i>	India S.S. Co. Ltd.
<i>Indian Pioneer</i>	India S.S. Co. Ltd.
<i>Indian Reliance</i>	India S.S. Co. Ltd.
<i>Indian Security</i>	India S.S. Co. Ltd.
<i>Indian Shipper</i>	India S.S. Co. Ltd.
<i>Indian Success</i>	India S.S. Co. Ltd.
<i>Indian Renown</i>	India S.S. Co. Ltd.
<i>Indian Trader</i>	India S.S. Co. Ltd.
<i>Islami</i>	Mogul Line Ltd.
<i>Jaladhan</i>	Scindia S.N. Co. Ltd.
<i>Jaladharna</i>	Scindia S.N. Co. Ltd.
<i>Jaladhanya</i>	Scindia S.N. Co. Ltd.
<i>Jaladhruv</i>	Scindia S.N. Co. Ltd.
<i>Jaladuhita</i>	Scindia S.N. Co. Ltd.
<i>Jalaganga</i>	Scindia S.N. Co. Ltd.
<i>Jalamudra</i>	Scindia S.N. Co. Ltd.
<i>Jalaprakash</i>	Scindia S.N. Co. Ltd.
<i>Jalaputra</i>	Scindia S.N. Co. Ltd.
<i>Jalavihar</i>	Scindia S.N. Co. Ltd.
<i>Jalazad</i>	Scindia S.N. Co. Ltd.
<i>Jaljawahar</i>	Scindia S.N. Co. Ltd.
<i>Kampala</i>	British India S.N. Co. Ltd.
<i>Karanja</i>	British India S.N. Co. Ltd.
<i>Mohemmedi</i>	Mogul Line Ltd.
<i>Mozaffari</i>	Mogul Line Ltd.
<i>Nicobar</i>	Shipping Corporation of India Ltd.
<i>Pradeep</i>	Dept. of Lighthouses and Lightships, Govt. of India
<i>Rajula</i>	British India S.N. Co. Ltd.
<i>Saudi</i>	Mogul Line Ltd.
<i>Sirdhana</i>	British India S.N. Co. Ltd.
<i>State of Assam</i>	Shipping Corporation of India Ltd.
<i>State of Bombay</i>	Shipping Corporation of India Ltd.
<i>State of Bihar</i>	Shipping Corporation of India Ltd.
<i>State of Gujrat</i>	Shipping Corporation of India Ltd.
<i>State of Kutch</i>	Shipping Corporation of India Ltd.
<i>State of Madras</i>	Shipping Corporation of India Ltd.
<i>State of Maharashtra</i>	Shipping Corporation of India Ltd.
<i>State of Orissa</i>	Shipping Corporation of India Ltd.
<i>State of Tr. Cochin</i>	Shipping Corporation of India Ltd.
<i>State of Uttar Pradesh</i>	Shipping Corporation of India Ltd.
<i>Vishva Prabha</i>	Shipping Corporation of India Ltd.
<i>Vishva Sudha</i>	Shipping Corporation of India Ltd.
Supplementary Ships:	
<i>Akash</i>	Apeejay Line Ltd.
<i>Ashok Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Bharatbhushan</i>	Bharat Line Ltd.
<i>Bharatkesari</i>	Bharat Line Ltd.
<i>Damodar Mondovi</i>	Damodar Bulk Carriers
<i>Desh Bandhu</i>	Shipping Corporation of India Ltd.
<i>Gandhi Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Gargi Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Indian Industry</i>	India S.S. Co. Ltd.
<i>Indian Resource</i>	India S.S. Co. Ltd.
<i>Indian Resolve</i>	India S.S. Co. Ltd.
<i>Indian Splendour</i>	India S.S. Co. Ltd.
<i>Indian Strength</i>	India S.S. Co. Ltd.
<i>Indian Tradition</i>	India S.S. Co. Ltd.
<i>Indian Triumph</i>	India S.S. Co. Ltd.
<i>Indian Trust</i>	India S.S. Co. Ltd.
<i>Jag Jiwan</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Kranti</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Ketu</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Kisan</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Laxmi</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Manek</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Mitra</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Rahat</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Ratna</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Shanti</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Vijay</i>	Great Eastern Shipping Co. Ltd.
<i>Jaladharti</i>	Scindia S.N. Co. Ltd.
<i>Jaladhir</i>	Scindia S.N. Co. Ltd.
<i>Jaladurga</i>	Scindia S.N. Co. Ltd.
<i>Jaladuta</i>	Scindia S.N. Co. Ltd.
<i>Jalagomati</i>	Scindia S.N. Co. Ltd.
<i>Jalagouri</i>	Scindia S.N. Co. Ltd.
<i>Jalagovind</i>	Scindia S.N. Co. Ltd.
<i>Jalagopal</i>	Scindia S.N. Co. Ltd.

INDIA (contd.)

NAME OF VESSEL	OWNER/MANAGER
<i>Jalakala</i>	Scindia S.N. Co. Ltd.
<i>Jalakanta</i>	Scindia S.N. Co. Ltd.
<i>Jalakendra</i>	Scindia S.N. Co. Ltd.
<i>Jalakirti</i>	Scindia S.N. Co. Ltd.
<i>Jalakrishna</i>	Scindia S.N. Co. Ltd.
<i>Jalamanjiri</i>	Scindia S.N. Co. Ltd.
<i>Jalamaya</i>	Scindia S.N. Co. Ltd.
<i>Jalamani</i>	Scindia S.N. Co. Ltd.
<i>Jalamayur</i>	Scindia S.N. Co. Ltd.
<i>Jalarajan</i>	Scindia S.N. Co. Ltd.
<i>Jalarajendra</i>	Scindia S.N. Co. Ltd.
<i>Jalavallabh</i>	Scindia S.N. Co. Ltd.
<i>Jalavijaya</i>	Scindia S.N. Co. Ltd.
<i>Jalapalaka</i>	Scindia S.N. Co. Ltd.
<i>Jalapankhi</i>	Scindia S.N. Co. Ltd.
<i>Jalavikram</i>	Scindia S.N. Co. Ltd.
<i>Jalaveera</i>	Scindia S.N. Co. Ltd.
<i>Jalavishnu</i>	Scindia S.N. Co. Ltd.
<i>Krishna Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Laxmi Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Maha Jag Tara</i>	South East Asia Shipping Co. Ltd.
<i>Maharajah</i>	South East Asia Shipping Co. Ltd.
<i>Ratna Usha</i>	Ratnakar Shipping Co. Ltd.
<i>Ratna Majushree</i>	Ratnakar Shipping Co. Ltd.
<i>Rama Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Rajah</i>	Asiatic S.N. Co. Ltd.
<i>Ranee</i>	Asiatic S.N. Co. Ltd.
<i>State of Andhra</i>	Shipping Corporation of India Ltd.
<i>State of Kerala</i>	Shipping Corporation of India Ltd.
<i>State of Madhya Pradesh</i>	Shipping Corporation of India Ltd.
<i>State of Punjab</i>	Shipping Corporation of India Ltd.
<i>State of Rajasthan</i>	Shipping Corporation of India Ltd.
<i>State of West Bengal</i>	Shipping Corporation of India Ltd.
<i>Sukh Jag Ganga</i>	Sukhsagar Shipping Co. Ltd.
<i>Vishva Jyoti</i>	Shipping Corporation of India Ltd.
<i>Vishva Kalyan</i>	Shipping Corporation of India Ltd.
<i>Vishva Kanti</i>	Shipping Corporation of India Ltd.
<i>Vishva Kirti</i>	Shipping Corporation of India Ltd.
<i>Vishva Mahima</i>	Shipping Corporation of India Ltd.
<i>Vishva Mangal</i>	Shipping Corporation of India Ltd.
<i>Vishva Maya</i>	Shipping Corporation of India Ltd.
<i>Vishva Nidhi</i>	Shipping Corporation of India Ltd.
<i>Vishva Pratap</i>	Shipping Corporation of India Ltd.
<i>Vishva Prem</i>	Shipping Corporation of India Ltd.
<i>Vishva Shanti</i>	Shipping Corporation of India Ltd.
<i>Vishva Usha</i>	Shipping Corporation of India Ltd.
<i>Vishva Vibhuti</i>	Shipping Corporation of India Ltd.
<i>Vishva Vir</i>	Shipping Corporation of India Ltd.

HONG KONG (Information dated 10.3.67)

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Anking ..	R. E. Brooks ..	G. M. Adams, H. J. Conybeare, Y. Y. Chan ..	U In San ..	China Navigation Co. Ltd.
Anshun ..	R. Kennett ..	J. R. C. Hamman, T. W. Allison, E. J. Potter, R. B. Cornelli ..	Li San Kau ..	China Navigation Co. Ltd.
Cardross ..	G. C. Sager ..	J. W. Johnston, Cheung Sing Yin, Yan Chun Yok ..	Tsang Chiu Leung ..	Manners Navigation Co. Ltd.
Cape St. Mary ..	Fu Chiu-wan ..	Chan Hok-mun, Kwok Yung-ang (Boatswain) ..	Wong Kam Tim ..	Agriculture & Fisheries Dept., H.K. Govt.
Changsha ..	J. F. O'Connor ..	W. F. Jeffrey, E. Lyons, W. M. Gregor, N. R. Howlett ..	Lum A. Gwan Ying ..	China Navigation Co. Ltd.
Chefoo ..	R. F. D. Pook ..	K. J. Barnett, R. J. Mullan, M. J. Butcher ..	Wai Pun Un ..	China Navigation Co. Ltd.
Chekiang ..	V. R. Woolfe ..	I. A. Derrick, D. M. Simpson, S. C. Lam ..	Edmund Ma ..	China Navigation Co. Ltd.
Chengtu ..	H. J. Stagg ..	D. H. Norcott, E. R. Gifford, J. P. G. Kelly ..	Leung Hon Kui ..	China Navigation Co. Ltd.
Chungking ..	M. R. M. Seale ..	D. C. Ramsey, D. R. Walker, J. D. Arbuthnot ..	Lo Kin Chek ..	China Navigation Co. Ltd.
Dana ..	I. Johnsen ..	R. Rasmussen, H. Bjordal, L. J. Naess ..	Lo Wing Kun ..	Karsten Larsen Co. (H.K.) Ltd.
Eastern Argosy ..	M. J. K. Crichton ..	G. F. Hammonds, M. K. Montgomery, M. S. Andrews ..	M. F. Stevens ..	Indo-China S.N. Co. Ltd.
Eastern Maid ..	K. Millar ..	J. Hawthorne, I. G. Tew, F. Fernandez ..	F. J. Bateman ..	Indo-China S.N. Co. Ltd.
Eastern Moon ..	T. C. W. Marr ..	R. G. Macdonald, I. J. H. Alexander, J. M. Joyce ..	E. A. Dunford ..	Indo-China S.N. Co. Ltd.
Eastern Muse ..	G. Kinley ..	P. M. Wheeler, D. M. Healey, R. W. Tipper ..	F. McGuckin ..	Indo-China S.N. Co. Ltd.
Eastern Queen ..	J. M. Marshall ..	D. Smith, B. L. Ballantyne, R. A. French ..	H. D. Bray ..	Indo-China S.N. Co. Ltd.
Eastern Ranger ..	P. J. Sullivan ..	G. G. Taylor, A. F. Spaul, A. M. Jones ..	R. G. Brennan ..	Indo-China S.N. Co. Ltd.
Eastern Rover ..	D. Wilson ..	N. A. H. Funston, T. D. Wood, A. Hollidge ..	J. F. Stewart ..	Indo-China S.N. Co. Ltd.
Eastern Saga ..	B. O. Jensen ..	P. R. Hammond, J. R. Denny, A. MacGilchrist ..	M. J. O'Brien ..	Indo-China S.N. Co. Ltd.
Eastern Star ..	W. E. Reeve ..	H. B. Skeritt, P. J. Cox, P. D. Thomas ..	W. D. O'Keefe ..	Indo-China S.N. Co. Ltd.
Eastern Trader ..	W. G. White ..	P. E. H. Pirou, A. R. Moses, D. J. Rayner ..	T. G. White ..	Indo-China S.N. Co. Ltd.
Foh Kim ..	D. R. Compteljohn ..	F. T. Dunn, K. Y. Hui, S. C. Ng ..	Robert Leong ..	Hong Kong Borneo Shipping Co. Ltd.
Francis Drake ..	P. Carlson ..	W. Millar, S. Dobson, A. Longmuir, T. Harrison ..	N. Giddy ..	Jardine Matheson & Co. Ltd.
George Anson ..	A. Dyason ..	D. Leslie, A. Wood, M. Hodgman, K. Campbell ..	D. Murphy ..	Jardine Matheson & Co. Ltd.
Hai Hing ..	O. Schubert ..	T. Monsen, A. Oyen, H. O. Isaksen ..	Chung Yeuk ..	Thoresen & Co. Ltd.
Hai Meng ..	T. Thorkildsen ..	O. Lauvli, Hanny Vossi, T. Sydnes ..	Chun Kam Tsun ..	Thoresen & Co. Ltd.
Hallborg ..	A. Sjoberg ..	K. Digernes, Leif O. Bang, A. Horsdal ..	Chan Siu Ming ..	Thoresen & Co. Ltd.
Halldis ..	J. Eide ..	J. R. Pedersen, Nils J. Isaksen, Hans Ove Fjelly ..	Yung Wing Ching ..	Thoresen & Co. Ltd.
Halldor ..	N. O. Wilhelmsen ..	N. Klok, R. Frydenlund, H. Aikio ..	Lau Kam Pui ..	Thoresen & Co. Ltd.
Helvard ..	Odd Andreassen ..	J. Eikeland, Arne Hansen, Rolf Rasmussen ..	Lai Kwong Yin ..	Thoresen & Co. Ltd.
Helios ..	O. J. Apold ..	J. Riverud, Odd Muren, T. Pedersen ..	Ip Yuk Fai ..	Thoresen & Co. Ltd.
Hermod ..	G. W. S. Ison ..	Arne Johnsen, J. Martensen, H. Haugen ..	M. L. Narasimhan ..	Thoresen & Co. Ltd.
Hero ..	D. N. Greenhalgh ..	Stein Olsen, J. E. Hermansen, B. Egeland ..	Tam Chung Mo ..	Thoresen & Co. Ltd.
Hang Sang ..	O. Oftedal ..	D. P. Gibbons, M. D. Pickard, C. F. Toomey ..	A. M. Bailey ..	Indo-China S.N. Co. Ltd.
Ho Sang ..	J. Ekrene ..	S. H. Gulbrandsen, H. Hansen, I. A. L. Johansen ..	J. Vidal ..	Indo-China S.N. Co. Ltd.
Hoi Kung ..	B. G. D. Ward ..	W. R. Smith, R. V. McKay, D. Nicolson, S. Jones ..	G. Johannessen ..	Karsten Larsen Co. (H.K.) Ltd.
Hui Wang ..	G. R. Hansen ..	O. Seyer-Hanson, M. H. Thyssen, A. M. Johansen ..	K. Haakensen ..	Karsten Larsen Co. (H.K.) Ltd.
Hunan ..	R. C. W. Gorman ..	D. W. Boys, W. J. B. Hibberdine, D. A. Roche, P. Gardener ..	Chin Fook On ..	China Navigation Co. Ltd.
Jacob Jeben ..	A. Harper ..	C. E. M. Graham, R. A. Drakes, R. L. Staker ..	Wong Hon-kwong ..	Jebesen & Co.
Kuala Lumpur ..	G. Cornforth ..	I. D. Goddard, J. W. Simpson, A. C. Davidson ..	Leung Man Hin ..	China Navigation Co. Ltd.
Kuangtung ..	I. R. Kidd ..	M. Bufton, P. A. C. Moss, D. G. Falkner ..	Chan Kong ..	China Navigation Co. Ltd.
Kwangsi ..	R. A. D. Neilson ..	F. Nissen, A. Berg, F. Poulsen ..	Hsu Kein Sin ..	China Navigation Co. Ltd.
Kwelin ..	J. H. Gomersall ..	C. G. Murray, B. C. R. Donnelly, W. F. Elton ..	Chan Law-bun ..	Jebesen & Co.
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Star Betelgeuse ..				

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<i>Tai Poo Loy</i> ..	K. J. Ko ..	Lee Chee Wan, Hui Shu-ching, Loo Yiu-ming ..	Chan Keng-chuen ..	Shun Cheong S.N. Co. Ltd.
<i>Tai Wah Shan</i> ..	E. L. Merrett ..	Yu Chi Tai, Won Chi-keung, Fu So ..	Choi Chung-shu ..	Shun Cheong S.N. Co. Ltd.
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<i>Wenchow</i> ..	I. M. Wigham ..	G. D. Watson-Jones, R. P. Dodkin ..	Omar Ismail ..	China Navigation Co. Ltd.
<i>Yochow</i> ..	M. H. A. Swift ..	C. J. N. Darch, J. R. Haines, R. F. D. Davies ..	Yue Shiu Ming ..	China Navigation Co. Ltd.
<i>Yunnan</i> ..	C. D. Nisbet ..	N. J. Alexander, J. M. Pemberton, R. B. Morris ..	Koo Lung Yu ..	China Navigation Co. Ltd.

SINGAPORE (Information dated 23.3.67)

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Bidor</i> ..	F. J. A. Scott ..	Sahak bin Yasin ..	S. Ferdandez ..	Straits S.S. & Co. Ltd.
<i>Cable Enterprise</i> ..	G. H. C. Reynolds, ..	J. S. Heathcote, D. E. Rickards, J. Paterson ..	P. Bennett ..	Guthrie Boustead Shipping Agencies Ltd.
<i>Hoi Houw</i> ..	O. Utseth ..	L. Overa, A. Staalesen ..	Pieter Joubert ..	Guthrie Boustead Shipping Agencies Ltd.
<i>Kah Poh</i> ..	S. J. Harvey ..	Wan Ahmad bin Dollah, Noor bin Lanang ..	Nik Ismail bin Nik Sar ..	Ho Chiang Shipping Co. Ltd.
<i>Katong</i> ..	G. C. Carter ..	Mohd. Hashim bin Mohd. ..	Yue Fook Wing ..	Straits S.S. & Co. Ltd.
<i>Keningau</i> ..	N. R. Murray ..	N. D. Miranda ..	P. V. Abraham ..	Straits S.S. & Co. Ltd.
<i>Kimanis</i> ..	W. G. Bradshaw ..	R. E. Dyason ..	S. R. Bharucha ..	Straits S.S. & Co. Ltd.
<i>Kinabalu</i> ..	I. M. McNaughton ..	Chan Eng Lock ..	Tan Yeow Kee ..	Straits S.S. & Co. Ltd.
<i>King Bay</i> ..	A. B. Durrant ..	I. D. Morrison, Toh Sa Wie ..	Wang Lang Kuan ..	Guan Guan Ltd.
<i>King Eagle</i> ..	Lam Tir Man ..	Ng Chuen Ming ..	Yap Yam Choh ..	Guan Guan Ltd.
<i>Kunak</i> ..	E. E. Fenwick ..	Chua Ngap Foo ..	K. A. Menon ..	Straits S.S. & Co. Ltd.
<i>Perak</i> ..	A. Lockwood ..	Jaffar bin Ahmad ..	A. M. Rebeiro ..	Straits S.S. & Co. Ltd.
<i>Pertis</i> ..	J. H. Martin ..	F. S. Tave ..	Ismail bin Manat ..	Straits S.S. & Co. Ltd.
<i>Sinabang</i> ..	W. F. Kaptijn ..	R. B. de Vries, F. Rotinsulu ..	C. Waasdorp ..	K. P. M. (Far East) Ltd.

NEW ZEALAND (Information dated 10.3.67)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>City of Auckland</i>	Ellerman & Bucknall S.S. Co. Ltd.
<i>Kaimiro</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kaitoa</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kaitoke</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kaituna</i>	Union S.S. Co. of New Zealand Ltd.
<i>Karamu</i>	Union S.S. Co. of New Zealand Ltd.
<i>Karepo</i>	Union S.S. Co. of New Zealand Ltd.
<i>Karetu</i>	Union S.S. Co. of New Zealand Ltd.
<i>Katea</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kawaroa</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kawatiri</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kawerau</i>	Union S.S. Co. of New Zealand Ltd.
<i>Knight Templar</i>	Crusader Shipping Co. Ltd.
<i>Komata</i>	Union S.S. Co. of New Zealand Ltd.
<i>Koraki</i>	Union S.S. Co. of New Zealand Ltd.
<i>Koraniui</i>	Union S.S. Co. of New Zealand Ltd.
<i>Koromiko</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kowhai</i>	Union S.S. Co. of New Zealand Ltd.
<i>Kurutai</i>	Union S.S. Co. of New Zealand Ltd.
<i>Matua</i>	Union S.S. Co. of New Zealand Ltd.
<i>Maurea</i>	Shell Oil New Zealand Ltd.
<i>Moana Roa</i>	New Zealand Government
<i>Ngahere</i>	Union S.S. Co. of New Zealand Ltd.
<i>Ngakuta</i>	Union S.S. Co. of New Zealand Ltd.
<i>Ngapara</i>	Union S.S. Co. of New Zealand Ltd.
<i>Ngatoro</i>	Union S.S. Co. of New Zealand Ltd.
<i>Saracen</i>	Crusader Shipping Co. Ltd.
<i>Tarawera</i>	Union S.S. Co. of New Zealand Ltd.
<i>Tofua</i>	Union S.S. Co. of New Zealand Ltd.
<i>Waikare</i>	Union S.S. Co. of New Zealand Ltd.
<i>Waimate</i>	Union S.S. Co. of New Zealand Ltd.
<i>Waimea</i>	Union S.S. Co. of New Zealand Ltd.
<i>Wainui</i>	Union S.S. Co. of New Zealand Ltd.
<i>Wairata</i>	Union S.S. Co. of New Zealand Ltd.
<i>Waitaki</i>	Union S.S. Co. of New Zealand Ltd.
Supplementary Ships:	
<i>Aramoana</i>	New Zealand Government Railways Department
<i>Aramui</i>	New Zealand Government Railways Department
<i>Holmburn</i>	Holm Shipping Co. Ltd.
<i>Maori</i>	Union S.S. Co. of New Zealand Ltd.
<i>Taranui</i>	South Pacific Shipping Co. Ltd. (Fiji)
<i>Wahine</i>	Union S.S. Co. of New Zealand Ltd.

Auxiliary Ships:
New Zealand also has a fleet of 10 Auxiliary Ships currently reporting.

PAKISTAN (Information dated 1.1.67)

NAME OF VESSEL	CALL SIGN
Selected Ships:	
<i>Abasin</i>	AQVO
<i>Al-Husaini</i>	AQAH
<i>Al-Sayyada</i>	AQAS
<i>Anwarbaksh</i>	AQAM
<i>Bagh-e-Karachi</i>	AQVM
<i>Fatehabad</i>	AQEM
<i>Kareem</i>	AQVE
<i>Mustali</i>	AQLY
<i>Ocean Endurance</i>	AQVA
<i>Safina-e-Hujjaj</i>	AQLW
<i>Safina-e-Nusrat</i>	AQLM
<i>Shams</i>	AQLN
Supplementary Ships:	
<i>Dacca City</i>	AQEO
<i>Iqbalbaksh</i>	AQLE
<i>Jahangirabad</i>	AQEN
<i>Karnaphuli</i>	AQVP
<i>Ocean Energy</i>	AQVB
<i>Safina-e-Arab</i>	AQVA
<i>Surma</i>	AQGL

Auxiliary Ships:
Pakistan has 14 Auxiliary Ships.

INDIAN EXCELLENT AWARDS

(From the Deputy Director-General of Observatories (Forecasting), India)

India Meteorological Department had 42 Selected and 74 Supplementary ships on the list of Voluntary Observing Fleet during the year ending 31st March 1966; 1,038 logs consisting of 13,103 meteorological observations were received in the Department from these ships during the year. The weather observations recorded and transmitted by these ships were of great value in the day-to-day forecasting work of the Department and, in particular, for issuing warnings to ships.

This Department wishes to convey its appreciation to all the officers concerned for their valuable co-operation.

Awards are offered in the form of books to the Captains, Observing Officers and Radio Officers of the ships whose meteorological work has been adjudged to be 'excellent' and the following ships have been selected for such Excellent Awards for the year 1965-66:

NAME OF VESSEL	OWNER
<i>State of Bombay</i>	Shipping Corporation of India Ltd.
<i>State of Madras</i>	Shipping Corporation of India Ltd.
<i>Desh Bandhu</i>	Shipping Corporation of India Ltd.
<i>Rajula</i>	British India Steam Navigation Co. Ltd.
<i>Jalakrishna</i>	Scindia Steam Navigation Co. Ltd.
<i>Jaladharti</i>	Scindia Steam Navigation Co. Ltd.
<i>Jaladhanya</i>	Scindia Steam Navigation Co. Ltd.
<i>Saudit</i>	Mogul Lines Ltd.
<i>APJ Akash</i>	Apeejay Lines Ltd.

In addition to the ships mentioned above, the following have been awarded a Certificate of Merit for commendable work done during the same year:

<i>Jalaganga</i>	<i>Sirdhana</i>	<i>Andamans</i>
<i>Jalamudra</i>	<i>State of Maharashtra</i>	<i>Ram Jayanti</i>
<i>Jalavihar</i>	<i>State of Bihar</i>	<i>Mozaffari</i>
<i>Jaladhan</i>	<i>State of Travancore-Cochin</i>	<i>Bahadur</i>
<i>Jalaveera</i>	<i>Maha Jag Tara</i>	<i>Jag Manek</i>
<i>Karanja</i>	<i>Vishva Prabha</i>	<i>Rajah</i>
<i>Kampala</i>	<i>Vishva Jyoti</i>	<i>Jag Mitra</i>
<i>Dwarka</i>	<i>Vishva Maya</i>	

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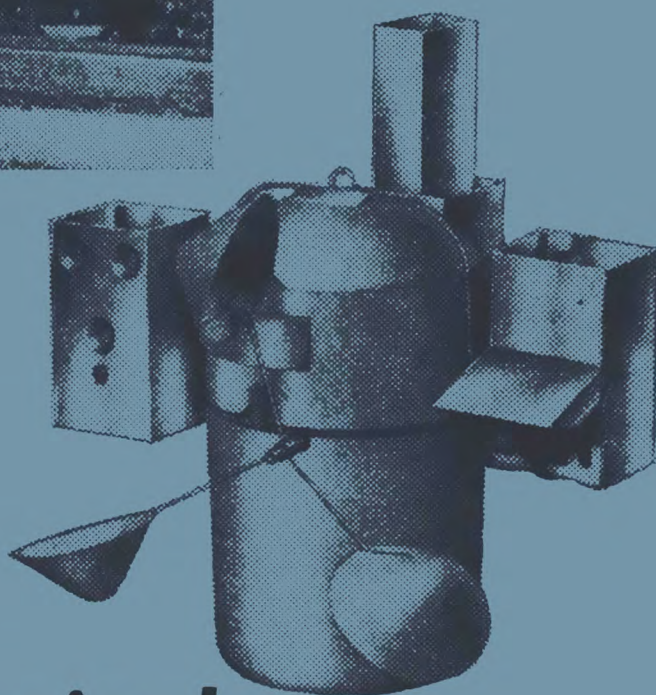
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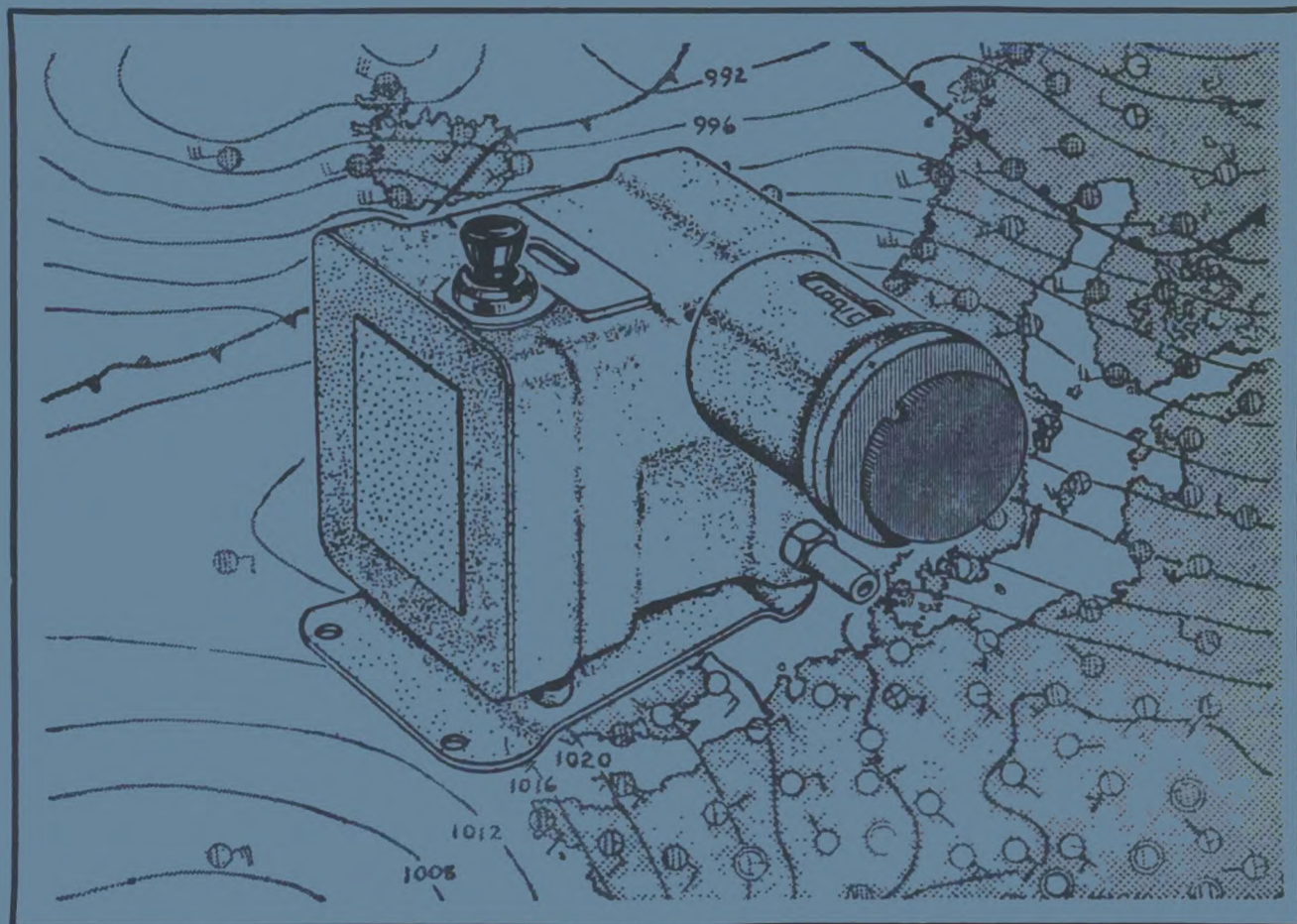
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