M.O. 736

The Marine Observer

A quarterly journal of Maritime Meteorology

Volume XXXIII No. 200

April 1963

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M.O. 736

THE MARINE OBSERVER

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

VOL. XXXIII **No. 200** **APRIL 1963**

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Editorial

Thirty-nine years ago, in January 1924, *The Marine Observer*, then intended to be a monthly publication, made its first appearance. As such, it continued until January 1933 after which it became a quarterly. Publication was discontinued for the period of the Second World War, and today we are proud to lay before the Corps of Voluntary Marine Observers the two-hundredth number.

In all its life, the format of *The Marine Observer* has changed very little, though the series 'Wireless and Weather as an aid to Navigation', which had a place in each of the first twelve numbers, would seem very elementary today when radio is so much part and parcel of meteorological observing at sea.

But the first number contained, as this number contains, selected extracts from the meteorological logbooks of voluntary observing ships and it is interesting to note that the first photograph published, that of the 'table-cloth' on Table Mountain, was sent in by a Mr. C. H. Williams, a 2nd officer in the Union Castle line who was later, for some twenty years, the Port Meteorological Officer in London and will doubtless be remembered by very many present-day observers.

Of interest also is the fact that the Fleet List in the January 1924 number contains no fewer than forty-nine ships' names which are repeated in today's Fleet List. But, with two exceptions, these are newer ships to whom a name has been handed down. The exceptions are the veteran cable ships *Mirror* and *Norseman*, both, at the age of forty, still doing useful work for us.

A glance at the Excellent Award list of 1924 is also worth while for it records the names of three young officers who, as senior masters, are still observing for us. One of them, Captain C. R. Townshend of the Port Line, indeed appeared also in last year's Excellent Award list. To have thirty-eight years connecting ones first award with ones latest must at present be a record, possibly to be broken later, as all three masters have, we hope, several years of active observing ahead of them.

The content of the Marine Observers' Log section has changed but little and the first year's published extracts from ships' meteorological logbooks contained observations of anti-solar rays, aurora, clouds, currents, discoloured water, earthquakes, fog, haloes, humidity, ice, lightning, meteors, mistral, monsoon, phosphorescence, rollers, shamal, squall, sunset effects, temperature changes, tropical storms, visibility, and waterspouts, just as might be recorded in the log today. A recorded narrative from this source has often opened up a new line of progress or research, as for instance in the discovery of a more economical route Westbound across the Pacific Ocean, reported by the *Port Caroline* when the Panama Canal had been open a bare nine years and published in the January 1925 issue; or the hitherto almost unknown mating habits of the flying fish reported by the *Clan Macfadyen* in the July 1954 number; or the reproductive system of the deep sea shark reported by the *Kent* in the April 1956 number, this being the first such information that had ever been received by the Natural History Museum. There can be little doubt either, that the various radar reports from observing ships have materially aided research into the potentialities of this instrument in various circumstances.

The similarity of pattern between today's log and that of thirty-nine years ago can but emphasise the unchanging nature of the sea and seamen. Some thousands of years ago the Psalmist wrote "They that go down to the sea in ships, that do business in great waters, these see the works of the Lord and his wonders in the deep" and the daily scrutiny of ships' meteorological logbooks, one of which recently had been inscribed with those words, is an apt reminder to us who came ashore, of this age-old truth.

The observer on the bridge of a ship today watching the birth of a tropic dawn must surely still experience what Conrad describes as "the charm of its inscrutable mystery, the immensity of its promise, the supreme witchery of its possible favour".

For empty day, as yet untarnished by history, is all around him, in all the three hundred and sixty degrees of his vision there is not one impertinent interruption and he himself is on nobody's horizon. It must surely have been like this on the first day, and perhaps the imaginative officer, going into the chartroom at this moment to sign the night order book open upon the table, might not be misunderstood if his mind's eye sees therein the Master's order, "Let there be light".

The conquest of Everest and the Trans-Antarctic journey may have led many to wonder if there were any more fields to conquer on earth, or would hereafter outer space be the only outlet for the adventurous pioneer. The advent of the astronaut and the meteorological satellite may perhaps have caused an occasional voluntary observer at sea to wonder if these things heralded the end of his usefulness as such.

Not so—for Earth has one other frontier with which she still challenges man, the frontier of the sea. It is strange to reflect that, from the time of the great sixteenth-century navigators who mastered the art of finding their way around and across it, almost to the present day, man has made so little effort to study what lies beneath it, except to cast nets for fish or to hide his death-carrying warships there.

This last frontier guards the vital secrets of the interchange of energy between sea and air, secrets which must be resolved if the scientists are ever to get to the basic cause of weather. It is permanently manned by ships of the voluntary Observing Fleet, who can play a great part in providing the clues.

Those in the Indian Ocean this year and next are participants in an International Expedition, man's first serious, though belated, attempt to cross this frontier on the grand scale, to probe the secrets of the new world which lies beyond it. One result of this might be to assist in finding a solution to the world's increasing food problem; perhaps also one may dare to hope that such an international effort, made over a long period by seamen and scientists of countries so often at variance with each other in the councils of the world may play a part in teaching man how to live and work at peace with his neighbours.

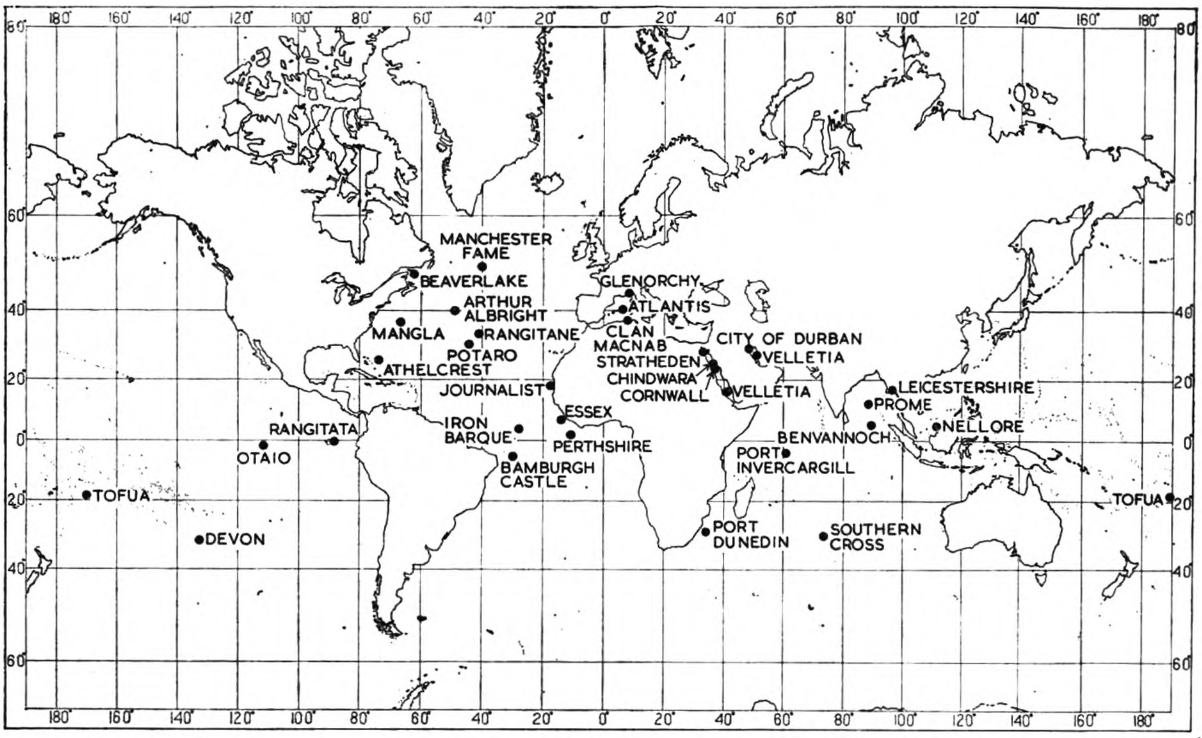
In the meantime the humble air and sea temperatures and the noting of time and duration of precipitation, or its absence, have now an especially important place in the observations of ships in this ocean, though not to the detriment of wind, pressure, waves and weather. These are the items which will enable the meteorologist to play his part in this, perhaps the last great earthbound project. Observations and specimens of discoloured water will be the voluntary marine observer's contribution to the vital project of farming the sea, instead of merely hunting in it.

For this, as has been said in another place and in another context, "is not the end, it is not even the beginning of the end. Perhaps it may be called the end of the beginning".

L. B. P.

April, May, June

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



Positions of ships whose observations are recorded in the "Marine Observers' Log".

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.

ST. ELMO'S FIRE

North Atlantic Ocean

s.s. *Mangla*. Captain J. B. Newman. Port Said to Wilmington. Observers, Mr. P. F. Blackburn, 2nd Officer, Apprentice Singer and Q.M. Morrison.

10th April 1962. At 0215 SMT St. Elmo's fire was seen on the port main aerial and on the port and starboard whip aerials on the bridge. Continuous lightning had been seen for the past three hours. The wind was S'W force 6. After the wind veered to W the St. Elmo's fire was no longer seen but the display of vivid lightning continued. The air temp. fell from 65°F to 58°.

Position of ship: 37°04'N, 66°25'W.

Note. St. Elmo's Fire is frequently observed during the passage of a cold front or a line squall particularly in the western North Atlantic. (See, for example, report of s.s. *Imperial St. Lawrence* on page 9 of *The Marine Observer* for January 1960.)

WATERSPOUT

Gulf of Genoa

m.v. *Glenorchy*. Captain N. S. Clarke. Genoa to London. Observers, Mr. D. M. Bell, 2nd Officer and Mr. D. Richard, Midshipman.

15th April 1962. At 1415 GMT a waterspout was seen very close to the vessel on the starboard side. It was estimated to cover an area of about 50 sq. yd. and the spray round its edge was rising to a height of 6 ft., revolving in an anticlockwise direction; there was a flat calm at the centre of the disturbed water. After the passing of the spout the wind increased from force 2 to force 5, the direction backing from E'ly to SW'ly. At 1800: Air temp. 49°F, wet bulb 44°, sea 54°.

Position of ship: 44°13'N, 8°39'E.

Indian Ocean

m.v. *Port Dunedin*. Captain A. M. Downes. Lyttelton to Durban. Observers, Mr. D. Orr, Chief Officer, Mr. D. Atkinson, 2nd Officer, Mr. V. Bowe, 3rd Officer, Mr. W. Watts, Junior 3rd Officer, Mr. P. Dwyer, Radio Officer and Mr. D. A. Tucker, Assistant Steward.

18th June 1962. At 1356 GMT a waterspout, the base of which was rotating in a clockwise direction, was seen about a ¼ mile away moving towards the east. The spout looked solid, there being no signs of a hollow core anywhere in its whole length. At 1405 there were indications of turbulence occurring at about two-thirds of the distance up the column and at the same time the speed of rotation was seen to be decreasing. One minute later the spout collapsed abruptly and water fell from the cloud base for about 30 secs. afterwards. Vivid lightning was seen and thunder heard.

Shortly after the passage of the waterspout the lightning became more intense and strikes were occurring very close to the vessel. It may be that the vessel was actually hit, as a small fire broke out in a pantry fuse box immediately after a flash at about 1425.

At the same time the Radio Officer reported that an aerial condenser was 'blown' and a steward stated that a spark had leapt across the two pins of an empty light socket in the Radio Officer's cabin adjoining the radio room. When the compasses were checked, however, no change was observed. Air temp. 73°F, wet bulb 69°, sea 72°. Wind WNW, force 5. Cloud, heavy Cb.

Position of ship: 30°05'S, 34°16'E.

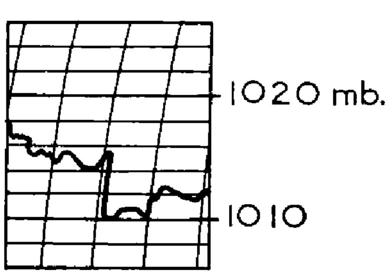
Note. m.v. *Port Dunedin* appears to have been in an area of complex instability with the orderly waterspout mechanism breaking down. The collapse of the waterspout followed by rain falling from the cloud base is evidence that the waterspout was supporting raindrops and transporting them vertically into the thunderclouds.

VIOLENT SQUALL

Mediterranean Sea

m.v. *Clan Macnab*. Captain T. A. Watkinson. Port Said to Tilbury. Observer, Mr. C. F. I. Robinson, 3rd Officer.

18th May 1962. Between 2115 and 2135 GMT the vessel encountered a SE'ly squall of marked suddenness and violence. The wind which had been ESE, force 2, veered about two points and rapidly increased to an estimated force 9, the sea being white with foam streaks. This was accompanied by a very rapid fall of pressure (shown in the accompanying diagram), and a rise in temperature from about 65°F



to 78°. The sky had been heavily overcast with very low stratus and visibility had been only moderate, but on the passing of the squall the ship entered a zone of clear sky and maximum visibility. The squall continued for about 15 min. at the end of which time the wind quickly decreased to a light breeze and continued to veer slowly. Later it freshened from the west.

Position of ship at 2115: 37°35′N, 8°00′E.

Note. An examination of weather charts suggests that this was a very local storm. It appears to have been associated with a northward movement of desert air which caused a very local depression off Tunisia.

DRY SQUALL

Mediterranean Sea

r.v. *Atlantis.* Woods Hole Oceanographical Institution. Woods Hole, Massachusetts. Observer, Mr. Arthur R. Miller, Physical Oceanographer.

A radar photograph, made with a polaroid camera (reproduced opposite page 76), shows an unusual sea return which was observed on 21st February 1961 while on a cruise in the Western Mediterranean. Brief notes made during the observation are as follows:

21st February 1961 at 1915 GMT. The look-out noted haze on the starboard bow. Surface of water glassy calm. Steering 000°. No local sea return. The mate noted return on Scope corresponding to phenomenon noted by look-out.

1930. Two radar photos taken, bulb exposure. Radar on 3-mile scale (each ring equals one mile). Localized echo bearing 030°. During photo, wind came up from north-east, disturbing sea, no haze, night fine and clear.

1950. "Sea return" on starboard quarter, no disturbance of barometer or humidity recorder.

Extracts from deck log:

Time GMT	Log Reading	True Course	Wind	Baro in.	Air °F	Weather	Remarks
1400	15·8	007	Calm	30·25	58	c	
1500		007	Calm	30·27	57	c	
1600			Calm	30·25	57	c	1600 Stopped on station. Visibility good. Vessel steady
1700			Calm	30·25	56	bc	
1800			Calm	30·24	55	bc	1855 Proceeded. Rolling easily
1900		000	E′N force 2	30·24	55	bc	
2000	46·8	000	E force 2	30·23	54	bc	Visibility good
2100	57·3	000	E′S force 2	30·23	54	bc	2140 Stopped on station
2200			ESE force 1	30·23	54	bc	
2300			SE′E force 1	30·22	53	bc	2355 Proceeded
0000	64·6	002	SE force 1	30·21	53	bc	Visibility excellent. Vessel steady

Position of ship at 1930: 40°12·5′N, 06°01′E

Note. Captain F. J. Wylie, Director of the Radio Advisory Service, comments:

"The appearance of sea return was possibly due to super refraction conditions, in the form of a reflecting tropospheric layer, permitting back scatter from surface waves in an area distant from the ship.

"Previous reports of this particular phenomena have been received, one from the Cape Verde area and the other from the vicinity of Cape St. Vincent. On both occasions the vessels reported the sea a flat calm.

"From time to time radar observers may perceive peculiar phenomena on their screens which they consider unworthy of a report. Similarly, in particular areas, certain phenomena may have become commonplace to the regular voyages.

"If the facts were reported in all such cases and were then carefully analysed this might help to solve problems connected with unexplained echoes or new effects displayed by radar in different parts of the world. Various channels exist for the recording and collection of information of this kind: meteorological logbooks, hydrographic notes (H102), radar log of targets, part 2, and individual reports by correspondence. Radar observers are asked to make their experiences available by one of these methods."

GIANT HAILSTONES

Persian Gulf

s.s. *City of Durban.* Captain F. C. O'Neill, R.D. Kuwait Harbour. Observers, Mr. M. Tozer, 3rd Officer and the majority of the ship's complement.

20th April 1962. From 2145 to 2210 SMT while the vessel was at No. 5 anchorage in Kuwait Harbour, a severe squall from a NNW'ly direction passed over the area, bringing with it an exceptionally intense hailstorm. Hailstones of 4 inches diameter were seen to fall on the decks, followed by a deluge of icy rain. The storm passed over and then turned back, over the sea, moving towards the delta lands of the Shatt-el-Arab.

Position of ship: Kuwait Harbour.

Note. This report is in circumstances very similar to those of 7th April 1961 when s.s. *Afghanistan* reported hailstones at least 5 in. in diameter. (See page 112 of *The Marine Observer* for July 1962.) The Daily Weather Reports of the United Arab Republic give upper air maps which suggest that the above report and that of 1961 were both associated with complex depressions caused by a southerly displacement of very cold air from Russia during a south-westerly extension of the Siberian 'High'. (See article on general circulation on page 72 of *The Marine Observer* of April 1960.)

WHIRLWIND

Mouth of Rangoon River

s.s. *Leicestershire.* Captain H. Kerbyson. Colombo to Rangoon. Observers, the Master and Mr. G. R. Excell, Senior 3rd Officer.

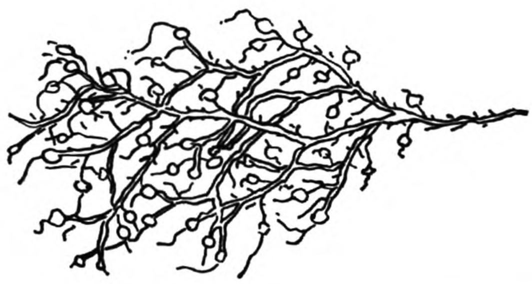
17th April 1962. A small dust storm travelling overland in a NW'ly direction was seen at 1245 SMT. It was moving at an estimated speed of about 8 or 9 kt. and rotating in an anticlockwise direction. The whirl was about 80 to 100 ft. in diameter and dust was being carried approx. 40 ft. into the air. Later, dust was seen rising to around 150 ft., the base of the column at that time being only about 10 ft. The appearance presented was that of the typical 'mushroom' of atomic explosion. The storm was observed for 4 to 5 minutes before it faded out. Air temp. 88°F, wet bulb 80°. Wind SE, force 2–3. 2/8 fair weather Cu.

CURRENT RIPS AND GULF WEED

North Atlantic Ocean

m.v. *Rangitane.* Captain R. G. Rees. London to Curaçao. Observers, Mr. M. Cox, Senior 3rd Officer and Mr. E. Smith, 3rd Officer.

24th May 1962. Between 1200 and 1700 GMT the vessel passed through an area of tide rips which generally lay in a N–S direction. The steering of the vessel was affected to the extent of 2°–3°. Sea temps. were taken at 10 min. intervals and were found to vary from 70°F to 75·5°, there being no systematic change.



Gulf weed, as shown in the sketch, was seen lying in dense patches, either separately or along the line of the rips. Wind variable, force 1. Low swell from SE'E. Course 238°. Speed 17·5 kt.

Position of ship at 1200: 33°12'N, 40°30'W.

Note. It is difficult to explain this phenomenon except to suggest that large-scale wind systems had produced a local area of convergence of ocean currents. Gulf weed far to the east of the Gulf has been seen before. (See report from m.v. *Nottingham* on page 50 of *The Marine Observer* for April 1959.)

CURRENT RIP

Indian Ocean

m.v. *Port Invercargill.* Captain R. H. Finch. Melbourne to Aden. Observers, the Master and Mr. R. H. Mitchell, 3rd Officer.

8th June 1962. At 1145 GMT, the vessel which was on gyro-pilot and steering ½° on either side of 313°, began to yaw 5°–6° on each side of the course line. At first it was thought that a fault had developed in the gyro-pilot but after 14 min. the vessel steadied up again to ½° as previously. The engine room reported that revolutions had been irregular during this period, in one instance dropping back 5 revolutions. This rather indicated that the vessel had passed through two strong conflicting currents, accordingly the sea water temperature was read and found to have fallen from 84°F to 82°. The sea at the time was choppy and confused. The current from p.m. stars on the 8th to a.m. stars on the 9th was 106°, 14 miles, whereas over the previous 12 hrs it had been 202°, 5·5 miles. Course 313°. Speed 16·4 kt. Wind SE'ly, force 3.

Position of ship: 4°00'S, 60°56'E.

Note. m.v. *Port Invercargill* appears to have passed from the Equatorial current into the Equatorial Counter Current of the Indian Ocean.

Indian Ocean

m.v. *Benvannoch.* Captain K. H. Montgomery. Aden to Penang. Observer, Mr. J. G. Austin, 3rd Officer.

8th April 1962. Between 0300 and 0700 GMT a considerable number of current rips were observed. The areas of disturbed water lay in a N–S direction and were from ½ to 1 mile long: they were about 200 yd. wide, and lying between them there was about a mile of undisturbed water. The sea was rippled with a long low swell, but in the current rips wavelets, with broken crests, up to 1 ft. in height were noted.

On entering the rips, the vessel swung off course 5°–7°. The sea temperature throughout the area remained at 85°F. Wind NNE, force 1–2.

Position of ship: 5°52'N, 88°48'E to 5°53'N, 89°30'E.

Note. This current rip occurred where the east-flowing water of the Equatorial Counter Current encounters water coming from the Pacific through the Straits of Malacca.

LARGE SEA TEMPERATURE CHANGE

North Atlantic Ocean

m.v. *Iron Barque.* Captain D. S. Brady. Cardiff to Vitoria (Brazil).

8th April 1962. The sea temperature at 1800 GMT was taken by bucket and found to be 67°F but when read again at 0000 on the 9th it had risen to 82°. The wind, which was mainly light and variable, increased at times in squalls which were estimated to reach force 6. There were occasional showers.

Position of vessel at 1800: 4°30′N, 27°30′W.

Note. The second sea temperature quoted above is normal; the low sea temperature is abnormal and the ship then appears to have been in water upwelled from considerable depths. It is very unusual for this to be experienced so far from the African coast.

LARGE AIR AND SEA TEMPERATURE CHANGES

North Atlantic Ocean

m.v. *Arthur Albright.* Captain S. J. Bristow. Port Tampa to Portishead.

27th April 1962. In the four hours between 2000 GMT on the 27th and 0000 on the 28th the air temperature fell from 68°F to 44°, while the sea temperature changed from 69° to 44°. Hourly readings of air and sea temperature were taken thereafter and by 1100 on the 28th the sea temperature had risen to 61°. The air temperature however remained at 44° throughout. Wind at 1800, NNW'ly, force 4. At 0000 on the 28th NE'E, force 2.

Position of ship at 2000: 39°36′N, 48°30′W.

Position of ship at 0000 on 28th: 40°12′N, 47°54′W.

Note. m.v. *Arthur Albright* appears to have experienced an isolated patch of arctic water. This observation does not fit in with the synoptic situation but the ship's log appears quite consistent and one can only suggest that a fairly large area of cold water had broken away from the main arctic water mass. This process goes on continuously in the transition zones between Arctic and Atlantic water.

FALL OF SEA TEMPERATURE

South Pacific Ocean

m.v. *Rangitata.* Captain A. Hocken. Pitcairn Island to Balboa. Observers, Mr. P. J. Henderson, 3rd Officer and Mr. R. M. McNair, 4th Officer.

9th April 1962, 0100 GMT. The sea temperature was observed to fall from 76°F to 70° within 5 min. The weather immediately became misty with patches of shallow fog. Air temp. 72°, wet bulb 72°. Wind SE, force 3. 1500 GMT. The sea temperature rose from 72° to 78° and the mist cleared rapidly. Air temp. 78°, wet bulb 72°. Wind SSE'ly, force 3.

Position of ship at 0100: 1°30′S, 89°29′W.

Position of ship at 1500: 0°18′N, 86°29′W.

Note. This fall of temperature occurred when m.v. *Rangitata* encountered temporarily the cool waters of the Peru current.

DISCOLOURED WATER

North Atlantic Ocean

s.s. *Perthshire.* Captain W. Graham. Dakar to Cape Town. Observer, Mr. A. A. Rawlins, 3rd Officer.

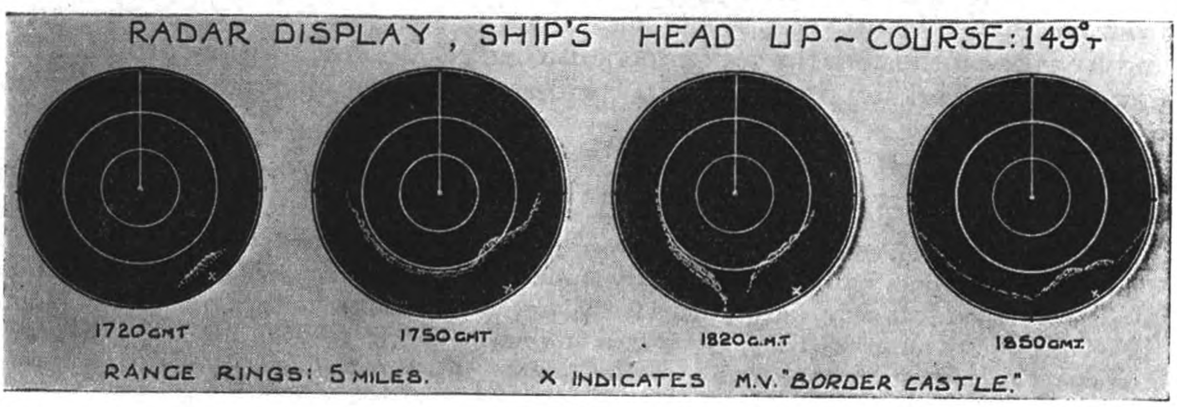
9th April 1962, 1335 GMT. The vessel passed through a band of what resembled soap-suds, about 10 feet wide and stretching in a wavy line for at least 3 miles and probably further. It lay in a direction 230°–050°. Wind SW, force 2. Sea slight with low s'ly swell. Sea temp. 85°F.

Position of ship: 2°25′N, 10°50′W.

UNIDENTIFIED RADAR CONTACT
Red Sea

m.v. *Cornwall.* Captain J. North. Suez to Aden. Observers, Mr. J. Bayliss, Chief Officer and Mr. P. King, 3rd Officer.

18th June 1962. At 1720 GMT shortly after moonrise an echo was observed on the PPI (Radiolocator Mk. IV), 12 miles off the starboard quarter of the ship, similar to that returned by a rain squall. It increased in size and closed the ship, so that by 1750 it stretched from either beam in a semi-circle round our stern at a range of about 10 miles. At 1820 the echo suddenly split astern of the ship, the strongly defined left arm sweeping away in a clockwise direction, while the nearer right-hand arm continued to close our starboard quarter, coming to within 9 miles of the ship. By 1850 the two arms had joined together again but the strength of the echo as a whole had diminished, and it gradually receded astern, being completely lost on the PPI by 1915. In view of the dusty condition of the atmosphere at the time, as indicated by the rising moon, the echo was assumed at first to be due to sand, but this idea was discounted when the m.v. *Border Castle*, known to be some 15 miles away on our starboard quarter, was contacted by W/T. This vessel reported that she



had encountered no sandstorms and that she had experienced a similar echo astern of her, at the same time as our contact. The possibility of the image being a second-trace echo from land seems unlikely, for the sides of the Red Sea are between 64 and 80 miles away from the ship at this position. The radar set in use has a PRF on the 40 mile range of 700, so that equivalent target ranges would be approx. 0–40 miles, 130–170 miles, 250–290 miles, etc. Thus the sides of the Red Sea would fall into the silent period from 40 miles to 130 miles. Further to that, the rapid changes of shape and the generally concave form of the image would seem to preclude second-trace echoes. (N.B. When the contact came within 10 miles it was clearly visible on the 10 mile display.) One theory put forward to account for the contact was a swarm of locusts. Air temp. 81°F, wet bulb 79·3°, sea 81·9°. Cloud $\frac{3}{8}$ Ci. Visibility over 10 miles. Wind N'W, force 3. Course 149°. Speed 15½ kt.

Position of ship: 23°30'N, 36°46'E–23°10'N, 36°58'E.

Note. Captain F. J. Wylie, Director of the Radio Advisory Service, comments:

"This is an excellent report with much valuable detail which enables a number of probabilities to be eliminated, as has been done by the observer.

"One vital piece of information, not available or obtainable, is the vertical lapse rate or rate of change of temperature or humidity a few hundred feet above sea level.

"Sharp changes in the lapse rate may give rise to echoes of an indefinite character, rather like second-trace echoes of land, but extending over several miles. These echoes have been observed when there has been no possibility of multiple-trace echoes of land nor echoes from rain or cloud.

"These echoes are usually seen at ranges of around 10 miles and may be 20 miles or more in length. They are echoes arising from what are called atmospheric discontinuities and they frequently form an arc with the ship as centre.

"Reports of echoes from swarms of locusts suggest the appearance of a large cloud. One such report of a swarm in the Persian Gulf area said it was 30 miles in diameter.

"It seems, therefore, that the echoes observed by m.v. *Cornwall* were almost certainly due to atmospheric discontinuities."

WHITE WHALE

North Atlantic Ocean

m.v. *Manchester Fame.* Captain A. Cookson. Manchester to Montreal. Observer, Mr. A. S. Bashford, 2nd Officer.

7th May 1962. At 2015 GMT a large white whale was sighted blowing, on the port bow. Due to the roughness of the sea it was not possible to determine the species, but the animal appeared to have a humped back and was snowy white all over. It was seen for five minutes, at a distance of about half a mile from the ship. Sea temp. 50°F. Wind NE'E, force 5–6.

Position of ship: 50°16'N, 39°59'W.

Note. This report has been sent to the National Institute of Oceanography.

FLYING FOX

Red Sea

s.s. *Velletia.* Captain W. S. Atkinson. Genoa to Bandar Mashur. Observers, the Master, Mr. N. Sloan, 1st Officer and Mr. W. Burnett, Deck Apprentice.

13th May 1962. At 0230 GMT a large bat was seen alighting on the foremast back stay. It then climbed up this, using what appeared to be arms on the foreside of its wings, and, holding on to the joining shackle with its legs, swung into an inverted position. It folded its wings across its body and then its head was seen to resemble that of a fox, except for a pair of large ears. We assumed that it was a flying fox. Throughout daylight it remained in the inverted position and was seen at times to move its head, apparently watching the movements of people on the bridge. At sunset the creature made evident preparations for flight, unfolding its wings and moving down the stay. Finally it spread its wings and took off when it had sufficient clearance. It was last seen heading in the direction of Great Hannish Island.

The approx. dimensions were: Length of body, 10 in. Wing span, 27 in. Breadth of wings, 7 in. The latter were black and leathery in appearance; the body was covered with short sandy brown fur. When the bat landed on the ship the wind was NW'ly, force 3: when it left, the wind was E'ly, force 2–3.

Position of ship: 16°39'N, 40°52'E.

Note. This report has been sent to the Natural History Museum.

PHOSPHORESCENCE

Cabot Strait

s.s. *Beaverlake.* Captain E. F. Aikman. Quebec to Antwerp. Observer, Mr. D. J. F. Bruce, 4th Officer.

27th May 1962. At about 0200 GMT during heavy continuous rain and reduced visibility, there was seen about a mile ahead what appeared to be a fog bank. The night was very dark with a heavily overcast sky making this whitish-looking patch easily discernible. On closer approach, the look-out on the forecastle head reported the patch as ice, but when the vessel entered the area thin lines or shreds of phosphorescent material were found to be floating on, or near, the surface of the sea. The whole area, about ½ mile long and 100 yd. wide emitted a dull green-white glow. Other similar smaller patches were seen during the following three hours. The shreds of material were probably less than 1 in. across and varied in length from 1 to 4 ft. They lay in a direction 040°–220°, their distance apart being from 6 in. to 4 ft.: at close quarters the shreds resembled small thin neon lights. Sea temp. 38°F. Wind variable, force 1–2. Sea rippled. Continuous rain. Course 118° at 16 kt.

Position of ship: 60 miles E's of Cape Gaspé.

West African waters

m.v. *Journalist.* Captain R. F. Longster. Walvis Bay to Avonmouth. Observer, Mr. D. A. Browne, 3rd Officer.

5th–6th May 1962, 2300–0130 GMT. A large amount of greenish phosphorescence was observed in the ship's wake and in the breaking wave tops. There were bright green flashes on the surface lasting about a second and diffused green patches below the surface persisting for several seconds. At one period, for about 10 min., a solitary porpoise was seen leaving a bright green trail, and it was clearly illuminated several times by the light caused by its motion through the water. Sea temp. 70·5°F. Sea rough with moderate N'W swell.

Position of ship: 17°20'N, 17°16'W.

PHOSPHORESCENT WHEEL

South China Sea

s.s. *Nellore.* Captain G. S. H. Champion. Observers, the Master and Mr. J. Low, 2nd Officer.

11th May 1962. At about 1815 GMT the sea appeared to be pulsating with faint luminosity which gradually took the form of bands of light. These began to rotate like the spokes of a huge wheel, the hub of which was estimated to be at a distance of one cable, four points on the port bow. At first the bands, which were about 15 ft. wide, were indistinct and curved, but later on they became clearly defined and straight, sweeping past in an anticlockwise direction at intervals of about half a second. When the display was at its brightest the rotation became confused, then changed to a clockwise direction. The bands became fainter and curved, finally disappearing leaving only a faintly pulsating glow. Sea temp. 86°F. Sea slight. Wind NE'E, force 2. Course 116° at 16 kt. Height of eye 58 ft.

Position of ship: 5°04'N, 111°33'E.

CREPUSCULAR RAYS

North Atlantic Ocean

m.v. *Potaro.* Captain J. Chester. London to Kingston, Jamaica. Observer, Mr. J. S. Wisden, Chief Officer.

23rd May 1962. At 0457 SMT, two minutes before the sun rose, on a bearing of 066°, two pink coloured rays of light were seen to extend upwards from the horizon to an altitude of about 8°. One was angled at 15° to the left of the vertical and the other at 25° to the right of the vertical. Immediately before the sun came over the horizon the rays shortened, and as the sun rose they disappeared completely. There were some fine weather Cu. around the horizon and one Cb. cloud in the direction of sunrise. Air temp. 70·0°F, wet bulb 65·8°, sea 70·7°. Wind W, force 2.

Position of ship: 30°39'N, 43°55'W.

DOUBLE LUNAR RAINBOW

Indian Ocean

s.s. *Southern Cross.* Captain L. J. Hopkins. Durban to Fremantle.

18th June 1962. At 2345 GMT (on 17th) a double lunar rainbow was observed, both bows being complete to the sea on either side of the vessel. The inner one showed the full colours of the spectrum very clearly, but the outer bow was mainly white, though with a faint suggestion of colouring near the sea surface. Air temp. 55·4°F, wet bulb 51·1°, sea 62·1°. Wind SSE, force 8.

Position of ship: 30°50'S, 73°14'E.

Note. This is an example of primary and secondary lunar rainbows. The lack of colours in the outer, or secondary, bow is not unusual. Clearly observed lunar rainbows are rare. Measurement of the angular radii of the bows would have been of interest. (See the report of s.s. *Paparoa* on page 18 of *The Marine Observer* of January 1960.)

ABNORMAL REFRACTION

Gulf of St. Lawrence

s.s. *Beaverlake*. Captain E. F. Aikman. Le Havre to Montreal. Observer, Mr. D. J. F. Bruce, 4th Officer.

12th May 1962. Cape Gaspé Light (height 355 ft.) was sighted at 2226 EDST at a distance of 50 miles, the theoretical range for 53 ft. height of eye being 30·6 miles. It was shining with great brilliance, each flash being plainly seen. As the light was approached, however, the brilliance decreased until, at 0000, when some 25 miles away, it had only the brightness to be expected at dipping range.

Fame Point Light (height 190 ft.) was seen at 2345 at 45 miles distance (theoretical range for 53 ft. height of eye is 24·6 miles). Cape de Rosiers light was picked up at 0000 at 22½ miles (theoretical range 22·1 miles at 53 ft.). It is interesting to note that although Fame Point Light was further away than Cape de Rosiers Light, it was seen earlier. The latter, it would seem, did not experience the same effects of abnormal refraction as did the other lights on either side of it. The weather was cloudless and clear with a firm horizon and bright moonlight, the moon being in its second quarter. It bore 260° at 2230 EDST. At 2200: Air temp. 37·2°F, wet bulb 36·5°, sea 34°. Wind WSW, force 2–3. Sea rippled, no swell.

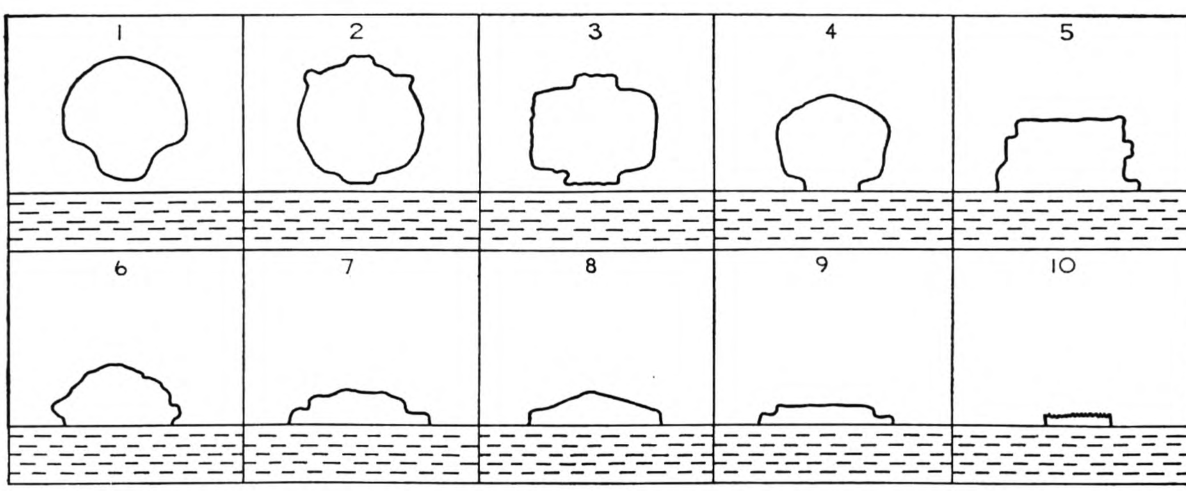
Position of ship: 49°N, 64°W (approx.)

Note. These interesting observations were caused by horizontal variations in sea surface temperature. Clear air over a cold sea produces great visibilities. Frequently Arctic water and Atlantic water exist at the same time in the Gulf of St. Lawrence.

Persian Gulf

s.s. *Velletia*. Captain W. S. Atkinson, Genoa to Bandar Mashur. Observers, Mr. N. Sloan, 1st Officer and Mr. W. Burnett, Deck Apprentice.

18th May 1962. The observer's impressions of the sun's appearance throughout the sunset period from 1413 to 1421 GMT are shown in the accompanying sketches.



Simultaneously with the disappearance of the sun's upper limb below the horizon, there was a short but distinct green flash. Air temp. 82°F, sea 81°. Slight haze. Light airs and rippled sea with no swell.

Position of ship: 27°38′N, 51°10′E.

Note. The abnormal refraction that produces distortions of the sun's image is frequently associated with green flash.

Gulf of Suez

s.s. *Stratheden*. Captain W. N. Eade. Suez to Aden. Observer Mr. M. G. Bingham, 3rd Officer.

21st June 1962, 1500 GMT. The weather was hot and hazy as the vessel was heading southwards down the Gulf of Suez. Mirages were observed on the port bow, the sea on the horizon appearing to be heaped up in gigantic waves, giving the impression that a great storm was in progress. Actually the sea was calm and there was little swell. The mirages gradually faded out as the sun set. At 1800: Air temp. 84°F, wet bulb 71°, sea 80°. Wind N, force 3. Visibility 10 miles.

Position of ship at 1800: 28°18′N, 33°18′E.

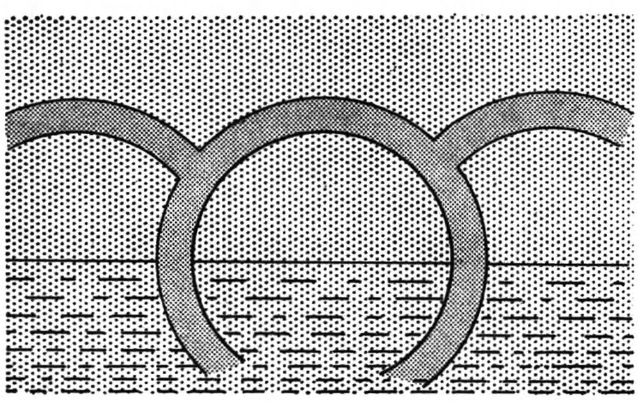
Note. Air and sea temperatures suggest that this effect was probably caused mainly by the passage of warm air over a cold sea; this tended to make the sea appear concave. However, mirages are formed when cool air flows over a warm sea, therefore there was probably considerable horizontal variation between the ship and the horizon to port.

FOG BOW

South Pacific Ocean

s.s. *Devon.* Captain R. B. C. Brown. Napier to Balboa. Observer, Mr. R. Laycock, 3rd Officer.

14th May 1962. Throughout the day the vessel passed through extensive fog patches and small, well formed, pale fog bows were frequently seen, very close at hand. At 2120 GMT a bow was seen having the shape shown in the sketch. It lasted



for a few seconds only. Air temp. 65·7°F, wet bulb 65·7°, sea 68·6°. No cloud. Sea calm. Mod. ENE'ly swell. Wind variable, force 1.

Position of ship: 31°43′S, 133°13′W.

Note. The fog bows were produced by the very small droplets of the mist. Angular measurements of the radii of the bows would have given information concerning the size of the water drops that produced them.

VENUS—GREEN FLASH

Western Pacific Ocean

s.s. *Tofua.* Observers, Mr. M. Jenkins, 3rd Officer and Mr. Lennon, A.B.

13th June, 1962. At approx. 0720 GMT on the 14th Venus was observed shortly before setting. When at about 5° altitude it looked extremely bright and about twice as large as usual. Disappearing temporarily behind a bank of Cu. it reappeared at normal size, alternating in colour from orange to white, the period being approx. a second. As Venus decreased in altitude the orange colour became gradually deeper, until at about 2° it was a bright 'side-light red'; at the same time the period of pulsation quickened, the planet now appearing half red and half white. At the actual moment of setting the colour changed for an instant to a bright green. This was observed both by the naked eye and with the aid of an ordinary 'opera-glass' type of binoculars. About 30 min. before, the sky had rapidly cleared from the northward, having been overcast with light rain. Air temp. 76°F, wet bulb 72°, sea 78°. 2/8 C_L2. Wind, light airs, Sea calm.

Position of ship: 18°13′S, 170°05′W.

Note. These changes of colour are typical of planets when near the horizon. (See, for example, report from s.s. *Tongariro* on page 20 of *The Marine Observer* for January 1960.)

South Atlantic Ocean

m.v. *Bamburgh Castle*. Captain H. Dishman. Newport to Vitoria.

8th May 1962. From the time that Venus was about 2° above the horizon until it set at 2135 GMT it was seen to vary rapidly in colour, alternating from bright red to brilliant blue, the latter colour being especially well marked when the planet touched the horizon. At the actual moment of setting Venus and the horizon merged to form an hour-glass figure and a brilliant green flash was observed. Air temp. 81·5°F, wet bulb 78°, sea 83°. Cloud ⅛ Cu. Visibility seemed unlimited.

Position of ship: 5°20′S, 29°55′W.

Note. See note for report from s.s. *Tofua*.

GREEN FLASH

South Pacific Ocean

m.v. *Otaio*. Captain K. Barnett, R.D. Balboa to Suva. Observers, Mr. M. H. Weston, Junior 3rd Officer and Mr. D. F. Craddock, Apprentice.

19th May 1962. An exceptionally well defined green flash was seen as the sun set at 0022 GMT. The flash extended over an arc of the horizon of 15°–20° and was of an intense green colour. Air temp. 76°F, wet bulb 74°, sea 74°. Visibility excellent. ⅛ C_L1 Wind SE, force 3.

Position of ship: 1°10′S, 110°51′W.

Note. This observation is unusual because of the wide angle over which the flash was observed.

METEOR SHOWER

North Atlantic Ocean

m.v. *Athelcrest*. Captain C. R. J. Roberts. Kingston to New York. Observer, Mr. G. A. Angus, 2nd Officer.

4th May, 1962. Intense meteor activity was observed 0720–0815 GMT; the main direction of movement being from east to west at an approx. altitude of 40°–50°. Meteors were seen about every 40 or 50 sec., some having very bright heads and leaving intense trails. Every 16 minutes a meteor came into sight from a region in the sky which bore 042°, altitude 44°. These were visible for approx. 2½ sec. before disappearing on a bearing of 338°, altitude 33°: in each case the head emitted a very intense bluish-white light, the tail being about 14°–15° in length. The sky was clear with light haze near the horizon.

Position of ship: 25°47′N, 74°13′W.

Note 1: Mr. H. B. Ridley, Director of the Meteor Section of the British Astronomical Association, comments:

"This would appear to be a display of Eta Aquarid meteors, which are active during the first week in May and are best seen from low latitudes. The Eta Aquarid shower has not been well seen for many years, but it looks as though it may be reviving again."

Note 2: An article by Mr. Ridley on Meteor Showers appears on page 85.

RADIO FADE-OUT

North Atlantic Ocean

m.v. *Essex*. Captain S. G. Robinson. Takoradi to Las Palmas. Observer, Mr. K. Anderson, Chief Radio Officer.

27th April 1962. Between 1413 and 1440 GMT a complete fade-out of all signals was experienced on frequencies of 8, 12, 16 and 22 mc/s.

Position of ship: 7°10′N, 13°22′W.

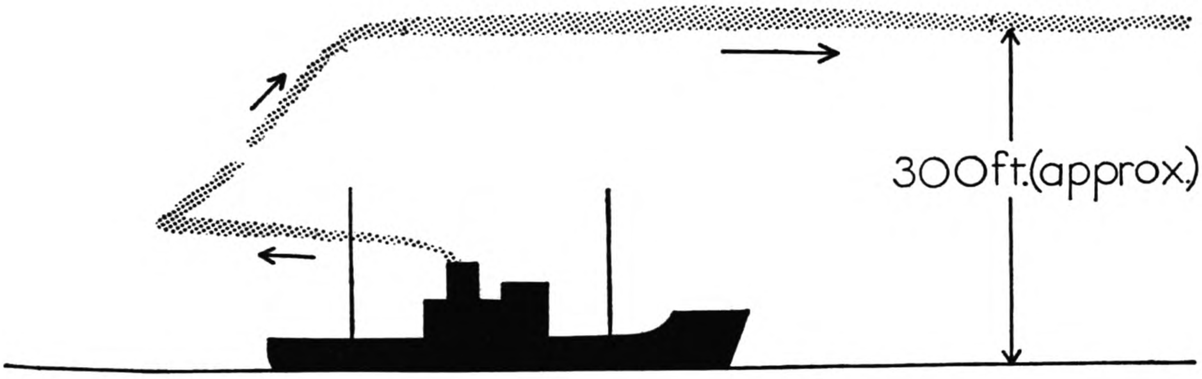
Note. Mr. G. O. Evans, of the Post Office Engineering Department, comments:
"This short wave fade-out coincided with a Dellinger fade-out which affected all routes incoming to the United Kingdom.
"The Dellinger fade-out was associated with a large sunspot which was visible during the period 24th April to 7th May."

WIND LAYER

Red Sea

m.v. *Chindwara.* Captain F. A. J. Downer, D.S.C., R.D. Port Sudan to Suez. Observer, Mr. B. R. Sanderson, 2nd Officer.

17th May 1962. At 0245 GMT a vessel 2·7 miles away, steaming on an opposite course to ours, was seen to 'blow tubes' with dense smoke coming from the funnel. The smoke appeared to move slowly astern and rose slightly, reaching to almost



mast head height when it was about half a ship's length from the funnel. At this point it moved quickly upwards and then, at a height of about 300 ft., it was carried rapidly ahead of the ship for nearly half a mile, the speed of travel being estimated at 40 kt.

This condition persisted for some 10 min. At our ship there was no wind at sea level. Air temp. 80°F, wet bulb 71·8°. Sea 80°. Weather, fine.

Position of ship: 24°32′N, 37°51′E.

Note. The Daily Weather Report of the United Arab Republic for 0000 GMT for 17th May gives a small depression, extending from the Sudan 'Low', over this part of the Red Sea. It is probable that m.v. *Chindwara* observed the division between a warm, moist air-mass originating from the south adjacent to the sea and a high-level desert air-mass originating from desert areas to the north-east or north-west. The phenomena could result from a small-scale local system or one on a continental scale. The hot gases from the ship's funnel first mixed with and then passed through the lower unstable layer into the more stable upper layer.

RESCUE OF SURVIVORS

Bay of Bengal

s.s. *Prome.* Captain W. D. E. Campbell. Colombo to Rangoon. Reported by Mr. A. Crawford, 2nd Officer.

7th April 1962. At 0300 LMT survivors from a native out-rigger canoe were picked up. The canoe which was 25–30 ft. in length and about 3 ft. wide had been on a coastal passage from Car Nicobar Island to Chowra, an island approx. 50 miles to the south. According to survivors' reports they were blown out to sea in a squall on the evening of the 23rd March and had been drifting for 15 days in light easterly airs. The canoe had drifted about 300 miles and made a course of 290°. The survivors, who were natives of the Nicobar Islands, were 10 days without food or water and out of a total complement of 24 persons, 19 survived by soaking their clothes in salt water and chewing them.

Position of ship: 10°28′N, 88°06′E.

Note. Mr. E. C. B. Lee, Secretary of the Naval Life-Saving Committee (Admiralty, Ship-department), comments:

"This is a feat of endurance and the indication is that the will to live, which is probably the most important factor in survival, was very strong. It also seems that with so many men in such a small craft there was good leadership, and this also is an important factor in survival.

"The absence of food for ten days is not very serious, provided that there is no exertion; the absence of drinking water is important. There is no information whether rain water was collected; the collection of rain water in an outrigger canoe would not have been very efficient however.

"Soaking clothes in sea-water reduces the loss of body-water by evaporation and this practice is advised particularly in warm climates and where there is no protection from the sun. The value of chewing wet clothes is problematical. The mouth would be kept clean (the mouth tends to be filled with slime under conditions of dehydration) and this would help in morale. But there is danger in getting the taste of salt; the survivor may start in a small way and go on increasing the salt intake with fatal consequences. The temptation to drink sea-water appears to have been resisted; it is good to learn that the practice popularised by Dr. Bombard a few years ago has not caught on.

"Information is not given on the death rate during the last few days afloat nor on the condition of the survivors when rescued and whether they recovered. This sort of information is always useful.

"In a somewhat similar incident in February, 1962, ten Indonesians survived at sea for 20 days, for 18 of which they were without water other than that obtained by licking raindrops which fell in a few light showers.

"In the absence of fuller information, it is difficult to draw conclusions from the incident reported by s.s. *Prome*, but it may well be that the ingestion of salt through chewing wet clothes hastened the deaths."

AURORA

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

A combination of approaching minimum in the sunspot cycle, almost continuous daylight and cloudy conditions (especially in June) result in a very short list for the three months April–June, 1962. This brief summary of auroral data is made up of positive data from special forms filled in each hour of darkness by Ocean Weather Ships and of extracts from logbooks of British ships, forwarded to the Balfour Stewart Auroral Laboratory of the University of Edinburgh by the Meteorological Office. We welcome, too, a report from another Canadian ship, *Lord Kelvin*, forwarded by the Canadian Meteorological Office.

The list gives no indication, of course, of the valuable descriptions of auroral displays, often reported in great detail by observers, or of negative reports and data on radio blackouts which are also of great help when compiling charts of auroral occurrence. To all those who take the trouble to watch, to report, to extract and to forward, we are most grateful, and we hope that you will continue to report each appearance of aurora, whether definite or merely suspected.

Date	Ship	Geographic Position		Λ	Φ	I	Time (GMT)	Forms
1962								
1st Apr.	*Cretic*	45°13′S	141°35′E	220	−55	−74	1100–1300	DR,R,F,G
	Durham	46°41′S	168°28′E	250	−51	−71	0800–0815+	RA,R,G
6th Apr.	*Bristol City*	45°58′N	46°00′W	030	56	+70	0445–0520	HA
7th Apr.	*Lord Kelvin*	48°42′N	49°42′W	030	59	+71	0600	HB,P
3rd May	*Weather Reporter*	62°10′N	33°20′W	050	70	+76	0217–0310	HA,G
27th May	*Port Dunedin*	46°31′S	153°00′E	230	−54	−74	1010–1105	R,G
June	No confirmed reports							

KEY: Λ = geomagnetic longitude; Φ = geomagnetic latitude; I = inclination; G = glow; HA = homogeneous arc; HB = homogeneous band; RA = rayed arc; R = rays; DR = drapery or curtain; P = pulsating; F = flaming.

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International Indian Ocean Expedition

METEOROLOGICAL RESEARCH GOES TO SEA

By C. S. Ramage
(Scientific Director for Meteorology, International Indian Ocean Expedition)

An article in the April 1961 issue of *The Marine Observer* described plans for an extensive meteorological programme as part of the International Indian Ocean Expedition. Since that time preparations have gone steadily ahead and it is perhaps appropriate to report on developments to date.

One of the most important features of the plan calls for increased co-operation from merchant ships traversing the Indian Ocean. Gratifyingly this co-operation is already being given. In the Indian Ocean north of the equator over 20% more ships' reports were received in November and December 1962 than were received in the corresponding months of 1961 and there is every reason to believe that a similar increase occurred south of the equator. Many oceanographic vessels have already visited the Indian Ocean on a variety of scientific missions, not the least important of which has been the making of meteorological observations. Two of the ships, the *Koyo Maru* and I.N.S. *Kistna*, have made regular balloon soundings to considerable heights, recording temperature, pressures and humidities. *Kistna* has also tracked the balloons with a marine pilot balloon theodolite to determine upper winds. Oceanographic vessels will continue to traverse the Indian Ocean in increasing numbers during 1963 and 1964 which will be the years of greatest Expedition activity.

In order properly to co-ordinate the far-flung meteorological operations, an International Meteorological Centre has been established in Bombay, on the southern tip of Bombay peninsula, in the compound of Colaba Observatory. The India Meteorological Department operates the Centre. Significant contributions of men and materials are also being made or being planned by the U.S. National Science Foundation and the U.N. Special Fund. The Centre is undertaking routine synoptic weather chart analyses over the region extending from 45°N to 50°S and from 20°E to 155°E for the whole of the years 1963 and 1964. Besides analyses professional meteorologists at the Centre will engage in a variety of research, aimed at understanding both the general atmospheric circulation over the Indian Ocean and the exchange of energy between the surface of the ocean and the atmosphere. The Centre will also act as a data collecting, processing and clearing agent so that all researchers no matter where they may be, will have equal opportunities for investigating Indian Ocean atmospheric problems of interest to them.

A part of the plan includes the making of deep atmospheric soundings from all the mid-ocean island groups. Many of these aerological stations are already functioning. The Seychelles, Minicoy, Diego Garcia and Christmas Island are expected to begin operations within the next few months.

Readers may be interested in a few details of some of the new observing and research devices which will be operating in the Indian Ocean area for the first time.

Marine Automatic Weather Station

After exhaustive trials in the Gulf of Mexico (described in the January 1961 issue of *The Marine Observer*) the boat type marine automatic weather station (NOMAD) has been ordered in quantity by the U.S. Navy. The first boat off the production line has been assigned to the International Indian Ocean Expedition Meteorology programme. It will be delivered to Madras early in 1963 and from there towed by the Indian Navy to its anchor point at 12·5°N 86°E in the Bay of Bengal. This point is half-way between Madras and Port Blair in the Andamans, in the centre of an area where tropical cyclones very frequently develop. Using call sign

VVC 21 and a frequency of 5342 kc/s., the boat will broadcast every 6 hours coded weather messages containing information on air temperature, sea surface temperature, atmospheric pressure, wind speed and wind direction. Under reasonable conditions the broadcast should be heard at distances from 600 to 1000 miles and can be picked up readily on standard radio receiving equipment. As soon as possible the coding used in the messages and the exact times of broadcast will be widely promulgated so that ships in the vicinity may tune in to the boat's transmissions.

U.S. Weather Bureau Research Flight

The Research Flight which consists of 4 heavily instrumented aircraft (2 DC-6As, 1 W-57A and 1 W-26C) to be joined later by an R-4D research aircraft of the Woods Hole Oceanographic Institution, will spend May, June and July of 1963 and January and February of 1964 in the Indian Ocean region. The aircraft, which can accurately measure and automatically record photographically and on magnetic tape, flying level winds, temperature, humidity and turbulence at one second intervals will also be equipped to make pressure, temperature and humidity measurements with dropsondes and to photograph and make radar records of clouds. They will fly reconnaissance missions into the Bay of Bengal during the period of the Burma monsoon, along the surface trajectory of the SW monsoon in the Arabian Sea, across the line of this monsoon from the Gulf of Oman to South India, equatorial sections between Nairobi and Singapore and along the chain of island observing stations near 73°E. In co-operation with oceanographic vessels, other missions will be flown to study heat, moisture and energy exchanges between ocean and atmosphere and wind stress in moving meteorological systems.

Weather Satellites

During the next two years, increasingly sophisticated weather satellites will be put into orbit and give concentrated attention to photography and temperature sensing over the Indian Ocean. Records from the satellites will supplement those of ships, land stations and research aircraft, helping the researchers to interpolate valuable information between rather sparsely distributed observing points.

Ocean–atmosphere exchange

Many of the nations taking part in the International Indian Ocean Expedition are planning to make various types of radiation and flux measurements designed particularly to determine the nature and magnitude of energy exchange between the ocean and the atmosphere. A new departure in ocean-going measurements is being attempted by a group from the University of Michigan Meteorological Laboratories. They have designed a complete package which includes equipment to measure solar radiation, sea surface temperature, relative humidity, air temperature and wind. The boxes will be mounted suitably on oceanographic vessels and on mid-ocean island stations. The shipboard installations provide for automatically recording all data on magnetic tape.

Data from the island and shipboard network will be used in conjunction with information from the weather satellites to determine variations in sea surface temperature, reflected solar radiation and infra-red radiation from the ocean.

Electronic Computers

The method used by the research flight and the University of Michigan of recording measurements directly on magnetic tape has enormous advantages. When the tapes have been filled with data, they can be inserted into a properly programmed electronic computer which will then conduct complex computations to bring out the results in any desired tabular or graphical form, for rapid evaluation. For example, in the University of Michigan project, computers will calculate evaporation and sensible heat transfer from data averaged over short space and time intervals.

At the International Meteorological Centre an IBM 1620 computer (provided by a grant from the U.N. Special Fund) will be used to check and average all surface weather observations made by ships in the Indian Ocean and all aerological observations made over the Indian Ocean and surrounding countries. Results of importance in other disciplines will be forthcoming. The computer will determine 15-day means of sea surface temperatures for 1° and 5° squares, data of use not only to meteorologists but also of considerable value to fisheries scientists. The computer will also be used to derive fields of divergence and vorticity from the observed surface and upper winds, to test techniques of objective weather map analysis and to make preliminary evaluations of Indian Ocean atmospheric circulation models. More detailed modelling will be undertaken by the much larger computers available for this work in the U.S. and other countries.

Scientific results of the International Indian Ocean Expedition will be published in a variety of journals. However, the UNESCO Office of Oceanography plans to reproduce 500 to 600 copies for further distribution as "Collected reprints of the International Indian Ocean Expedition".

The help given by Dr. Donald J. Portman of the University of Michigan is gratefully acknowledged.

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The Intergovernmental Oceanographic Commission

By Vice-Admiral Sir Archibald Day

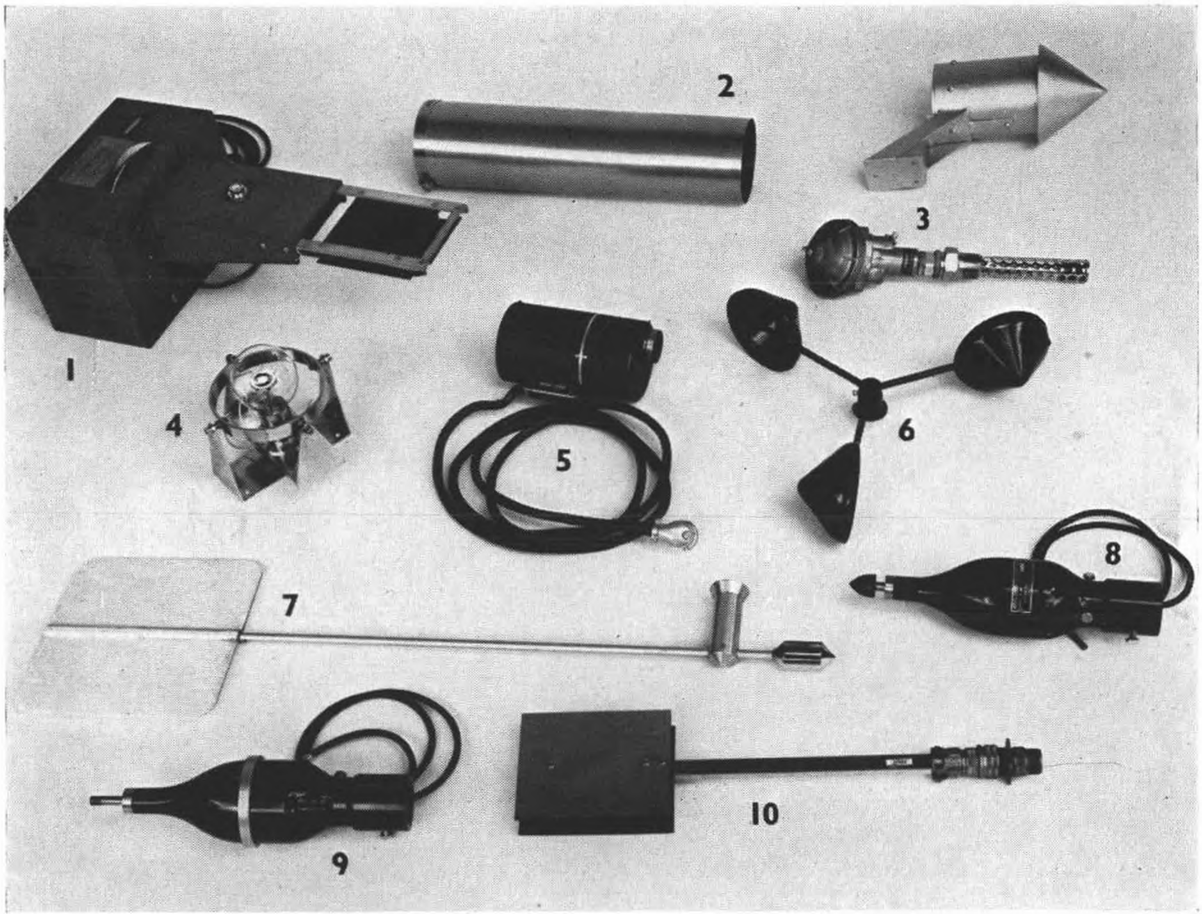
(Hydrographer of the Navy from 1950 to 1955. Since retiring, Vice-Admiral Sir Archibald Day acted as co-ordinator, the International Geophysical Year from 1956 to 1959)

The I.O.C. was born in October 1960 at an intergovernmental conference convened in Copenhagen by the United Nations Educational, Scientific and Cultural Organisation (U.N.E.S.C.O.). A declaration was then adopted which noted that the oceans, covering some 70% of the earth's surface, exert a profound influence on mankind and indeed upon all forms of life on the Earth; they are inexhaustible sources of water and heat, and control the climate of many parts of the world; the seas also have great potential as a source of food, raw materials and energy. It concluded that "... to secure progress in oceanic investigations there is a need for concerted action by States and for co-operation between international bodies; and as an essential instrument for furthering progress in this important field, the Conference recommends setting up, within the framework of U.N.E.S.C.O. an Intergovernmental Oceanographic Commission to facilitate the concerted action of Member States of the Commission". Readers of this Journal will be well aware of the vastness of the oceans and will well understand the high cost in time and money

Radar photograph from r.v. *Atlantis*. (See page 62.)

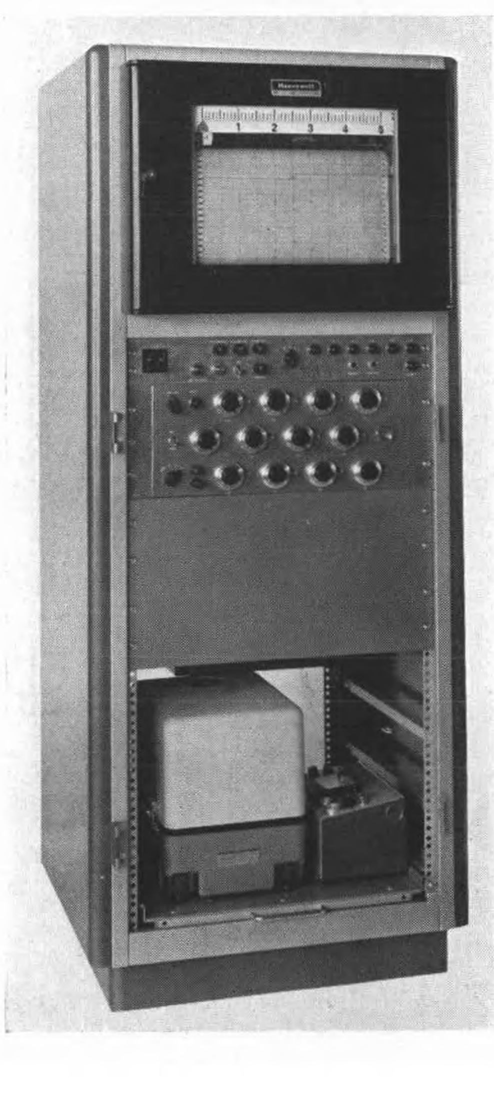
1. DC-6A of the U.S. Weather Bureau's Research Flight Facility. The gust probe protrudes in front of the nose; the small blister rearward of the nose wheel houses a 16 mm. cloud movie camera, the large blister houses an 8 ft. search radar antenna, doppler antenna and radio altimeter antenna; various protrusions on the top of the fuselage, house temperature and liquid water measuring devices. (See page 74.)

Photo by U.S. Weather Bureau



2. (*Above*) Meteorological sensors for installation on oceanographic vessels. From top, left: (1) total hemispherical radiometer, (2) housing for infra-red sea surface thermometer, (3) dewcel and its housing, (4) pyrheliometer, (5) infra-red sea surface thermometer, (6) anemometer cups, (7) wind vane, (8) wind speed transmitter, (9) wind direction transmitter, (10) thermistor thermometer mounted in radiation shield. (See page 74.)

Photo by University of Michigan



3. (*Left*) Automatic recorder for logging meteorological information on oceanographic vessels—front panel door removed. (See page 74.)

Top: Multi-point recorder

Centre: Control, digital display and manual input dial panels.

Bottom, left: Digital magnetic tape recorder.

Bottom, right: Circuitry for Barnes infra-red sea surface thermometer.

of seaborne research; so they will not be surprised that oceanographers, like the meteorologists before them, have felt the need to obtain the support of governments.

The success of any I.O.C. programme will, as in the case of the International Geophysical Year (I.G.Y.), depend on the contributions volunteered by the various members according to their means. There is, however, the difference that representation at I.O.C. deliberations is on a governmental basis, whereas the Special Committee for the I.G.Y. was formed by the International Council of Scientific Unions (I.C.S.U.) from members nominated by National Academies of Science (or, in this country, by the Royal Society). National programmes will continue as heretofore, as will their appropriate contributions to the programmes of existing governmental bodies like the Food and Agriculture Organisation (F.A.O.), and to non-governmental organisations like the International Council for the Exploration of the Sea or the International Council for North Atlantic Fisheries.

Much depends on U.N.E.S.C.O. It already has a Marine Sciences Division giving assistance to the institutions of those countries in need of it and helping with the training of their scientists. Now the Marine Sciences budget will allocate monies so that the Director of its Office of Oceanography can also be Secretary of the Commission with an appropriate staff and the means to organise meetings, to support the publication of results and to produce a periodic News Letter.

Sessions of the I.O.C. have been held at U.N.E.S.C.O., Paris, in the autumns of 1961 and 1962 and they follow the customary pattern whereby their conclusions are embodied in a series of resolutions. There is a Bureau of a chairman and two vice-chairmen. Dr. Anton Bruun, of Denmark, renowned as the leader of the Galatea expedition, was elected as the first chairman. On his death last year he was succeeded by Dr. Cameron of Canada whose place as vice-chairman was taken by Captain Capurro of Argentina. The other vice-chairman has been Admiral Tchekourov of U.S.S.R. The Bureau may call on a consultative committee made up of representatives of half a dozen other member countries to attend any necessary deliberations between sessions of the I.O.C.

It was soon appreciated that the Commission as constituted would need access to scientific advice on the various programmes that individual members might put forward. For the broad scientific aspects of oceanography, this role has been accepted by the Special Committee for Oceanic Research (S.C.O.R.), a body which was formed by I.C.S.U. soon after the I.G.Y. and which continues to foster international co-operation at non-governmental level. For the fisheries aspects of oceanography there is the Advisory Committee on Marine Resources Research of the Food and Agriculture Organisation which will be augmented by two scientists in this field from the U.S.S.R., not herself a member of F.A.O. In addition the Bureau and Secretary are authorised to consult the World Meteorological Organisation, the International Atomic Energy Association and appropriate intergovernmental and non-governmental organisations of a world wide and regional nature on international programmes in oceanography. Such bodies are moreover invited to attend sessions of the I.O.C.

Many interests are involved. The U.K. delegation to I.O.C. sessions has been formed from representatives of the National Institute of Oceanography (N.I.O.), the Hydrographic Department of the Admiralty, the Ministry of Agriculture and Fisheries and the Department of Agriculture and Fisheries for Scotland, with the writer acting as leader. Our brief has been prepared after full discussions with interested government departments held at the Office for the Minister for Science; for example, the General Post Office has given advice on the communications problems. Armed with a well-discussed brief and backed by Britain's long experience in oceanography the delegation has been able to play an effective part.

Turning to present and proposed activities of the Commission, mention must first be made of the International Indian Ocean Expedition which is now getting into its stride. It was originally organised by S.C.O.R. acting through each national committee engaged, that of this country formed by the Royal Society. As with each major programme there is a co-ordinator who is now the I.O.C. Secretary, Dr. Wooster, but was formerly Mr. Snider also of the U.S.A. Then there is a present investigation of the Tropical Atlantic sponsored by the U.S.A. and in prospect there are a Dynamic Study of the Northern Oceans on a U.S.S.R. proposal, one co-operative study of the Kuroshio current proposed by Japan and another of the South Atlantic proposed by the South American countries. A comprehensive guiding programme of world study has been designed for future use. In this ambitious resolution, a balance has had to be struck between, on the one hand, extensive observations over an ocean, and, on the other hand, concentrated studies of selected areas from which theoretical development may be expected to lead to the solution of wider processes and problems hidden in the oceans. There is moreover the need to further research work as well as to conduct surveys.

Of world wide concern, there are the steps being taken to encourage an increased number of tide gauges to study mean sea level and the speeding up of the general bathymetric chart of the oceans, which was already in hand by the International Hydrographic Bureau at Monaco. In parallel with the latter was a resolution on the dire need for an accurate and ocean-wide navigational system available to all and unaffected by meteorological conditions such as may, it is hoped, be provided by some low frequency radio or transit satellite development. Only then will ships using modern precision echo-sounding equipment be able to send in soundings accurate for geographical position as well as depth.

Of basic importance there is the standardisation and intercalibration of measuring instruments in which S.C.O.R.'s help has been sought; there is the development of automatic buoys requiring also the allocation of a radio frequency and a study of their legal status in order to prevent their molestation (weather ships are already making their contribution); and last, but by no means least, there are the arrangements for the exchange of data, which involves the form they should take, the occasions when they should be forwarded, the places in which they shall be stored and how they shall be made available to research workers without risk of misuse. In the last case there is the experience of the I.G.Y. to help, and indeed the last session of the I.O.C. took occasion to remember the work that had gone before in the I.G.Y. and the various regional activities, and was still in the lengthy process of being worked up and published.

By the time of the last session, the I.O.C. had 44 member states and considerable contributions were offered by many of them to the various programmes according to their available resources. For the Indian Ocean Expedition, the British element has already started work and, with the N.I.O.'s research ship and naval surveying ships, as well as other resources being deployed, the part being played is a significant one. There remains much to be done in organising effective programmes of survey and research, more in their execution and more still in the working up of their results. That the number of scientists, whether physical oceanographers or marine biologists, is small indeed in comparison with the size of the challenge has been recorded in a resolution. It invited U.N.E.S.C.O. to address an urgent appeal to governments for the creation by them, within the specialised organs, of permanent posts and assured careers for the many young scientists and technicians who are attracted by the marine sciences. Herein also is a severely practical reason which, coupled with the expense of travel from distant countries, dictated the decision that sessions of the I.O.C. shall not in future be held more frequently than at eighteen months' intervals. The hope for the I.O.C. is that governments will be farsighted enough to allocate sufficient resources for the stated objectives despite the unlikelihood of quick or spectacular results, and resources which will be sufficient to cover also the inevitable demand in some countries for oceanic information to meet defence needs.

It may be of interest to take a brief look back at the British record in oceanography. One finds that in 1849 there was a world chart entitled *The approximate limits of the Great Currents and Drifts of the Ocean* compiled by Captain F. Beechey

RN, later to be naval adviser at the Board of Trade. It appears as the frontispiece of the first edition of the Admiralty Manual of Scientific Enquiry and with its flocks of arrows is a fine example of the copper engraving of the day. In 1853 Beaufort, then Hydrographer of the Navy and renowned of his services to marine meteorology, drafted a reply to a question in the House of Lords regarding a proposal of Maury, his opposite in Washington. It said that H.M. Government was ready to take its part in any well-digested scheme for the survey of the oceans; that it would be an easy matter to supply all H.M. ships with air and water thermometers but that Lloyds and Chambers of Commerce would need to be consulted on offering instruments to those merchant vessels that would undertake to employ them regularly. He said that about 8000 vessels clear out annually in the foreign trade and to supply half of them with thermometers would cost £3500 with a third needing replacement every year. A wise paragraph read "A large accumulation of such observations is already available (from log books) to any person who pleased, but the digesting of these materials and separating the ore from the dross would require not only the labour of several hands but the superintendence of a competent person who, proceeding on some certain principles, will endeavour to establish some certain conclusions or to refute certain unsound prejudices." In the same year Maury at Brussels was showing how meteorologists and seamen themselves would benefit from climatological observations made over the oceans by ships on passage. (Maybe an advance in navigational and echo-sounding equipment mentioned earlier will lead oceanographers also to solicit the aid of merchant vessels in bathymetry.)

In 1854 Becher, naval assistant to Beaufort, reported that as long ago as 1831 he had planned a series of monthly wind and weather charts of the Indian ocean from log book entries. Other work had supervened, notably his editorship of the *Nautical Magazine*, and now Beaufort transferred the material to the naval office of the Board of Trade expressing the hope that its superior means would enable it to accomplish the great object which was judiciously planned and so courageously begun by Commander Becher. In 1868 the Hydrographer, Richards, referred to physical charts of the oceans as a necessary and indeed urgent duty but lately undertaken by the Hydrographic Department.

In 1872–74 there came the famous deep sea world cruise of the *Challenger* and after a long interval there were from 1925 to 1951 the cruises of the *Discovery* mainly in the Southern Ocean; and in 1933–34 there was the John Murray expedition to the Indian Ocean in the *Mabahiss*. Research vessels from the laboratories of Plymouth, Lowestoft and Aberdeen have been active in home waters since 1889, often joining with other vessels of north European countries in furthering the aims of I.C.E.C. or I.C.N.A.F. The Liverpool Tidal Institute has achieved world renown since it was established in 1919. Finally at the instigation of the Royal Society, and none too soon for a country so deeply concerned with things maritime, there was set up the National Institute of Oceanography in 1949. Its new research ship, another *Discovery*, should be operating early in 1963.

551.5: 06(09)

The Meteorological Office

63, Victoria Street, Westminster, London, S.W.

January, 1898—November, 1910

By A. T. Bench

(The following notes regarding life and conditions in the Meteorological Office at the beginning of this century are from an article compiled by Mr. Bench from his own recollections and those of Messrs. H. E. Carter, W. Hayes and H. L. B. Tarrant, all of whom served in the Office in this period.)

In 1898, the Meteorological Office was situated in Victoria Street, Westminster, and was under the direction of Dr. R. H. Scott until early in 1901 when Dr. W. N.

Shaw succeeded him. The annual budget was £12,500. The office premises occupied the four upper floors of a building on the corner of Strutton Ground which had been originally a private residence, the ground floor having been converted into two shops—a piano dealer on the corner, with an oriental rug and carpet shop next door.

The boy clerks who joined the staff about the turn of the century might almost have thought they were joining a family party, several members of which were in the original 'hive off' from the Board of Trade in 1855. In a staff of just under 40 persons there were four or five sets of brothers and a pair of sisters. The sisters, Miss Rose Smith and Miss Beatrice Smith, with Miss E. A. Anderson in charge, were ensconced in a veritable 'purdah' on the top floor of the building behind double doors and were allowed to arrive 10 minutes later and leave 10 minutes earlier than the male staff in order (ostensibly) to avoid contact with the men. They comprised a section of the Marine Branch and such was their strict seclusion that permission to interview them had to be obtained from their chief.

The principal part of the library was located in the room of the head of the office, Dr. R. H. Scott (succeeded by Dr. W. N. Shaw) whose official designation was that of Secretary. Owing to lack of other space the regular meetings of the Meteorological Committee were held in that room, when afternoon tea was provided, the tea being a special brand at 6/– per pound obtained from a firm in Inverness. In the course of years the accession of books and bound volumes of observations had overflowed into other rooms and the increasing weight of these and of several thousands of marine meteorological logs, caused some of the floor joists to sag and it became necessary for iron girders to be put in to hold up the floors.

Even in a small company of individuals there can always be found some with amusing characteristics, and the M.O. staff were by no means lacking in this respect. A recreation of one Marine Superintendent, Captain Toynbee, was writing evangelical pamphlets which he distributed to the staff from time to time. One of these had the intriguing title of "Go down, proud stomach", another was headed "Of the dead, say nothing but good". Captain Toynbee, when on the active list in the merchant navy, kept meteorological logs, and at one office function some of these were exhibited, as they were beautifully illustrated by coloured sketches of marine animals drawn by Mrs. Toynbee, who often accompanied her husband on his voyages. On the same occasion a logbook was shown which had been kept by King George V when, as Prince George, he served as an officer in the Navy.

Around the corner from the office, in Strutton Ground, was, and still is, a public house named "The Grafton" and it was the invariable practice of the two senior forecasters to pay a visit there immediately before settling down with the synoptic chart to dictate the forecasts. In those days public houses were open all day. The senior clerk in the Marine Branch, also had the habit of slipping out in the morning and invariably remarked on leaving the Marine Room "just want to call at the Stores" (i.e. the 'Army and Navy' which had not then become one of London's popular public Stores; business was restricted to ticket holders who were members or ex-members of the armed or civil services).

Street musicians, notably 'German' bands, often played outside "The Grafton" and, when they became too noisy, Dr. Shaw would send one of the staff down to request them to soften their music as his room overlooked the side street.

Mr. Gaster was addicted to taking patent medicines for unknown complaints and the large mantelpiece in his room was completely loaded with bottles, empty and otherwise. He always had his lunch in his room, served by Mrs. Drane, and had the curious habit of removing his dentures before his meal, placing them on a table-napkin beside his plate. At one period Mr. Gaster had a cask of ale in the basement for his own consumption and for anyone else who would pay for a drink. This arrangement, however, did not last very long, as he found that the ale disappeared and he lost money. He was Meteorological Correspondent for *The Times* and usually prepared a special account of the day's weather experienced over the country. This was sent to *The Times* office by the messenger who called each evening for a copy of the official forecast and notes which were issued to the Press.

T. E. Allen, in charge of the autographic records from the first-class observatories (photographic in those days), was formerly an assistant of Glaisher, the famous balloonist, at Greenwich Observatory. Quill pens were included among the stationery stores and these were invariably used by Mr. Allen for his reports.

One of the junior clerks, who earlier framed pictures in his spare time, was Frank T. Bullen, who had spent many years in the merchant navy, ending up as Chief Mate before entering the office. He achieved fame and fortune by his books, notably *The Cruise of the* Cachalot. This publication, however, was treated with scorn by William Allingham of the Marine Branch who started his career before the mast in a sailing ship, and was the author of a standard textbook on Marine Meteorology. As two of the juniors who joined at this period had also graduated from naval schools (viz. Greenwich and the *Worcester*), there was a distinctly nautical atmosphere in some of the rooms.

In 1900 it was discovered that observers at certain seaside resorts were joining up intermittent burns on the sunshine cards by a hot wire in order to augment their daily totals.

Frank Snell was an expert telegraphist who had been transferred to the office from the General Post Office, but in common with other members of the staff in those days, was not averse to doing any other work required of him, and became the first person in the Meteorological Office to use a typewriter.

With the outbreak of the Boer War in 1899, the staff suffered the temporary loss of two of its lads who joined the City Imperial Volunteers.

The general messenger of the office was a uniformed member of the Corps of Commissionaires, whose main duty was to take lithographic transfers of the Daily Weather Report, etc., to Messrs. Weller and Graham in the City at 11 a.m. daily, and bring back the printed copies in the early afternoon. Reports posted by 5 p.m. were delivered in Liverpool, Manchester, etc., by the first delivery on the following morning.

As to sartorial matters, most of the seniors wore top hats and frock or tail coats. In those days a good silk hat could be bought for 12*s*. 6*d*. Almost everyone changed into an old 'office coat' on arrival, and some of these were very dilapidated. Behind a screen in his room Dr. Scott always changed his suit for a shabby one. The consistently best dressed man of this period was Henry Harries, who changed his shoes also on arrival and stuffed them with paper to help in keeping their shape.

Sartorial comment would be incomplete without a reference to Mr. Sargeant, a forecaster. He was completely uninhibited and dressed for comfort regardless of appearance. He wore very wide trousers to avoid bagging at the knees and in summer would come to the office wearing his black frock coat, a straw hat (known as a 'boater') with brown canvas shoes and carrying an umbrella in case the forecast 'went wrong'. He was a very likeable man, fond of chess, but had an annoying habit of whistling softly through his teeth—no tune but just audible.

Except for those of the forecasting shifts, time keeping and discipline were very strict. A red line was drawn in the Attendance Book at 9.15 a.m. and anyone who had to sign below this line twice in a week was 'had up' on the carpet in the Secretary's room. Richard Curtis once reproved his brother-in-law, Charles Thompson, for exceeding the lunch period of three-quarters of an hour by a couple of minutes! Talking in the rooms except on official matters was not allowed and smoking, of course, was not even dreamt of.

Although official discipline in the office was so strict, it did not debar some of the senior clerks from sending boy clerks on personal errands almost daily; in particular to the Army and Navy Stores for such necessities as tobacco and whisky.

The situation of the office in Victoria Street was advantageous for viewing the processions of those days which passed on their way to Westminster Abbey, including those connected with the death of Queen Victoria and the Coronation of King Edward VII. For the latter occasion the office building was suitably decorated. There was also a time of great excitement when a scare caused a 'run' on the London Penny Bank on the opposite corner of Strutton Ground. For a couple of days the Bank was besieged by hundreds of depositors making withdrawals, but the Bank of England stepped in with funds and the excitement abated.

Books and papers were circulated from floor to floor by means of a leather bag which hung on a long cord fastened to the top banister of the wide staircase by which it could be hauled up. Before the installation of house telephones communications between some of the rooms was by speaking tubes with a whistle at each end.

As there was no telephone in the office at this time, communication with the outside world was by letter, telegram or 'by hand' and boy clerks made fairly frequent trips to the Admiralty with matter for the Atlantic Charts for approval by the Hydrographer. In cases of urgency the use of a hansom cab was authorised. Some journeys could be made in part by horse-drawn buses which passed the office about three times an hour. The first telephone was not installed until after Dr. Shaw had succeeded Dr. Scott as Secretary. The installation of this telephone caused such excitement in the office that discipline was temporarily relaxed and a crowd of seniors and juniors stood around as the Post Office engineers fitted it to the wall in the office keeper's little room. When it was installed the Chief Clerk was called down to inspect it and with appropriate dignity he made the first call to the Royal Meteorological Society amid hushed silence, to proclaim the news that the Meteorological Office was now 'on the telephone' and would they please note that the number was 'VICTORIA 153'. Members of the staff rushed to use it as a novelty to ring up friends and a few expressed surprise and indignation when asked to pay for private calls.

A feature of office routine was the daily circulation of *The Times* to all the seniors; starting with the Secretary it eventually found its way to the top floor ending up in the Ladies' Room. A kitchen was situated on the top floor from which Mrs. Drane supplied good satisfying dinners to the staff at the modest price of 8*d*. per head for the juniors and 1*s*. 2*d*. for seniors. Facilities for washing by some of the staff were met by the provision of a small cabinet in their room containing a basin, water jug, etc. There was, of course, no hot water circulation in the building.

For lighting purposes, tables in most rooms were supplied with Argand gas lamps which gave very good illumination, but oil lamps were used in the Forecast rooms until 1901. Mr. Francis, who was rather bald, used to say that he lost his hair because for years he had to sit under a powerful hanging oil lamp when the Forecast Room was on the first floor. The rooms were warmed in cold weather by coal fires which were kept well stoked by the boy clerks.

For the reception and transmission of telegrams the office was connected by a direct telegraph line to the Central Telegraph Office and this could be switched to instruments (Siemen's tape printers) in different rooms. When there was an occasional breakdown it must have been surprising to passers-by to see an almost continuous procession of telegraph messengers from the Southwest District Office in Howick Place bringing telegrams addressed "Weather London" to the building.

The annual leave of 4 weeks was generous compared with other offices. Salaries were paid by monthly cheque on the Western Branch of the Bank of England to those 'on the staff' and weekly in cash to boy clerks and temporary clerks. The wages of Boy Clerks were 12*s*. 6*d*. weekly at 15 years of age increasing by 1*s*. 6*d*. annually to a maximum of 20*s*. weekly. Junior clerks rose to a maximum of £150 per annum, Seniors to £275 and the Chief Clerk to £333. The senior clerk in the Forecast Division (F. Gaster) received £309 per annum for a 9-hour day.

Other members of the Forecasting Branch received additions to their pay as compensation for time worked before 9 a.m. and after 5 p.m. and Sunday duty. The salary of the Marine Superintendent was £350 per annum and that of the Secretary £800.

The office hours were originally 10 a.m. to 4 p.m. but an agitation for some increase of the previous low salaries had been met by additions to the salary scales (as quoted above) and an addition of two hours to the working day, i.e. from 9 a.m. to 5 p.m. At one time alternate Saturdays were worked as full days, but in 1901 this was altered to a regular half-day every Saturday. On Sunday mornings the telegraph line to the Central Telegraph Office was closed and the staff on duty went there to work. The junior of the shift went from his home to take the morning observations at Westminster and then walked to Charing Cross Post Office to send them by telegram to C.T.O. For this service he received the sum of 1*s*. 6*d*.

In the Forecast Branch the hours of duty were 8 a.m. to 4 p.m. or 1.30 p.m. to 8.30 p.m.; 1 p.m. to 8.30 p.m. on Saturdays and on Sunday 8 a.m. to Noon at the Central Telegraph Office and 6 p.m. to 8.30 p.m. at Victoria Street. Subsequently, with the change in time of the morning observations, the day duty was from 7 a.m. to 3 p.m. A day off in lieu of Sunday duty did not come into operation until during the 1914–18 war.

Although observations were made on the roof of the Office, the published records for London for many years were those taken by Mr. Gaster at his house in Acre Lane, Brixton. A station was subsequently set up in the grounds of Christ Church opposite the Office. (Christ Church was demolished by bombing in World War II.) At the beginning of the century no electric torches were available, and when it was dark at the time of the 6 p.m. observations a colza oil lantern was used to read the instruments. When windy it was difficult to keep this alight and the observers hit on the idea of using a small mirror to reflect the light from a nearby street lamp on to the thermometers. Records from St. James' Park commenced in November 1904, and a 'master' key was provided by the Office of Works in order that entry to the park could be made at any time.

The Instruments Branch was housed on the first floor of the building in one room, divided by a partition to separate the stores from the office. A 'high-light' of this part-time service by the boy clerk was an occasional trip to the docks to deliver a barometer to a ship, the journey being made partly by Underground Railway. In those days the Underground was very dirty and smoky due to emissions from the funnels of the steam locomotives.

The safety bicycle with its inflatable tyres in place of the former solid tyres had become popular. Many of the juniors used cycles for their journeys to and from the office and the basement resembled a cycle shop. Some of the cycles had also the new free-wheel hub!

Across the front of the office building was a narrow balcony on the second floor and on this balcony boards were displayed which gave weather information from Valencia, Stornoway, Holyhead, Yarmouth and Dungeness with the state of the sea at Dover. These boards were changed each morning and afternoon. A chart showing the distribution of pressure and station reports at 8 a.m. (later 7), 1 p.m. and 6 p.m. was displayed at the door, together with the latest district forecasts.

The forecasts and remarks thereon were written and duplicated by hectograph process (gelatine plate) every evening for distribution to the newspapers and press agencies until September 1905 when a more modern method of typing them on stencil sheets for reproduction on a Gestetner Duplicator was introduced.

Throughout its existence the Meteorological Office has always been subject to the attention of cranks, and there was an occasion one evening when the forecast staff had a visit from a man who came from Plumstead and declared he was a 'weather chart'. Mr. Brodie asked if he had come so that he could be filed away with the official charts. After some argument he was persuaded to go away and come another day.

Among notable visitors to the office was Dr. Alexander Buchan (of Buchan periods fame), Secretary of the Scottish Meteorological Society. He was a tall, venerable figure, with a long patriarchal beard, and came from time to time, until his death in 1907, in connection with the Scottish stations.

551.575: 621.396.9: 629.12

USE OF RADAR AT SEA—INCIDENCE OF FOG

(Reprint of a report from the Radio Advisory Service)

Interest will have been aroused by Court Judgments containing comments on the use of radar by vessels before entering an area of poor visibility. In the *Bergechief/Burgan* judgment of a United States Court of Appeal it is recorded:

> "... The Court then went on to say if a vessel carried properly functioning radar equipment and was in or approaching an area of known poor visibility, there was an affirmative duty to use radar."

The area of poor visibility may however not be known and in such a case the British Court of Appeal judgment on the *Verena/Grepa* collision states:

> "... One question was whether the radar ought to have been switched on earlier than it was. As to that the learned judge found, on the advice of his assessors, that it was not negligent not to use it whilst the weather was clear. No argument to the contrary had been addressed to us here, and I accept the learned judge's finding."

The judgment in the lower Court on the *Verena/Grepa* collision stated:

> "... those who don't use it (radar) must take every effort to make sure of keeping a very effective lookout. This decision, and others relating to the use of radar when a vessel so equipped is not herself in fog suggest the need for what is possibly a new mental approach by the navigator towards his radar. He may find it of advantage to ask himself not whether he should switch on his radar, but rather, is he sure beyond all reasonable possible doubt that he is justified in switching it off."

The meteorological instruments carried by most vessels may give useful indications whether conditions conducive to the formation of fog are present.

The following advice with which the Meteorological Office concurs may be of assistance to masters:

"Radiation fog, which may be very dense, depends on the cooling of the ground at night. It is therefore land fog but it might drift over coastal water with a light wind. There is no reliable way at sea of predicting the presence of fog of this type a few miles ahead. If the weather forecast for the coastal area mentions the possibility of fog, it would be wise to switch on the radar.

"Over the sea a type known as advection fog occurs when warm damp air moves from the land over a cooler sea or from a region of warm water to one of relatively cold water. Such fogs are liable to occur when the temperature of the dew-point of the air is higher than the temperature of the sea. Unfortunately, no matter how careful a watch is kept on changes in these temperatures, in critical conditions there is no guarantee that fog will not be suddenly encountered owing to abrupt, even though only small, changes in them. If the weather forecast mentions the possibility of fog it would be advisable to switch on the radar. In the absence of such a forecast, if the dew-point and sea temperature are approaching each other the wisest plan would be to switch on the radar as soon as the difference between the two temperatures becomes less than 2°F (1°C) provided the wind does not exceed force 5. If the wind exceeds force 5 fog is very unlikely except in notoriously foggy regions such as the Newfoundland Banks.

"The dew-point can be found from readings of the dry and wet bulb thermometers using appropriate tables. If no tables are available, it may be taken as a rough guide that, when the difference between the dry and wet bulb temperatures is less than 1°F (0·5°C), the dew-point will be very little below the wet bulb reading."

Meteor Streams

By H. B. Ridley, F.R.A.S.

(Director of the Meteor Section of the British Astronomical Association, to whom all observations of meteors in ships' meteorological logbooks are sent)

A meteor stream is a swarm of particles each of which is describing an orbit around the sun, all the orbits being closely similar in shape and size and orientation; generally, the particles have had a common origin with, or from, a comet, and their orbits are very nearly identical with the parent cometary orbit. When such a swarm of particles encounters the Earth, it will produce numerous visible meteors moving through the atmosphere in parallel paths. Owing to the effect of perspective the tracks of these meteors will, if projected backwards, meet in a point or small area. Conversely the meteors, as seen, appear to radiate from this position, which is known as the 'radiant' of the stream. The radiant will appear in the same position in the sky on corresponding dates from year to year, but will move slowly, about 1°, from night to night if the shower persists.

There are not many comets whose orbits exactly intersect that of the Earth or even come within a few hundred thousands of miles of it, and meteor showers are correspondingly few in numbers; the really great meteor storms are quite rare, the last three having occurred in 1885, 1933 and 1946 respectively. However, there are some fairly strong showers that appear regularly every year, and others, normally weaker, that occasionally flare up to give a good display; yet others appear once and are never seen again. The continual interplay of gravitational forces exerted by the planets, particularly Jupiter, creates an everchanging pattern of meteor orbits, and other forces are constantly tending to disrupt and disperse originally compact swarms, so that apart from a few reliable streams in stable orbits and certain overall regularities of meteor distribution we cannot make exact predictions of meteor activity and must maintain a continuous survey of current phenomena.

The arrangement whereby astronomical phenomena are logged by ships' officers and are subsequently reported by the Meteorological Office to the British Astronomical Association is providing useful information concerning meteors. Most of the reports refer to fireballs or bolides (brilliant individuals that appear sporadically and force themselves on the attention), but occasionally reference is made to the observation of large numbers of fainter meteors, and it is with this type of occurrence that the present article is concerned.

On 5th December 1956 a new meteor shower unexpectedly appeared and was widely observed in the southern hemisphere. Reports from two British ships in the Indian Ocean, *British Piper* and *Stirlingshire*, added valuable information to the other data received. The Leonid meteor shower, usually rather weak since its last great outburst in 1866, was abnormally rich in 1961, and on 16th November that year both *Perthshire* and *Queensland Star* recorded the observation of large numbers of meteors. These reports enabled us to establish the fact that the shower was active some twelve hours before it was observed in the U.S.A.. Reports from *Hemiglypta* on 6th May 1960 and from *Athelcrest* (see p. 71) on 4th May 1962 indicate that the Eta Aquarid shower is still in existence and may be stronger than had been thought. These examples may stimulate observers to note similar occurrences in the future, and, to guide them as to the nights on which enhanced meteor activity may be expected, the following table of the main annual showers has been compiled, but it must be stressed that all predictions of meteor numbers are liable to error, and that the unpredicted events are often the most important and sometimes the most spectacular.

Table 1.

Name of Shower	Date(s) of Maximum	Radiant R.A. Dec. ° °	Probable Hourly Rate
Quadrantids	January 3–4	232+50	45
Lyrids	April 21–22	271+33	10
Eta Aquarids ..	May 3–6	336+0	10
Delta Aquarids ..	July 28–30	339−17	40
Perseids	August 11–12	46+58	50
Orionids	October 20–22	96+15	20
Leonids	November 15–17	152+22	10
Geminids	December 12–13	112+32	60
Ursids	December 21–22	217+76	5

Notes on Table 1

Quadrantids. This is one of the three strongest and most reliable of the annual showers, the other two being the *Perseids* and the *Geminids.* The main shower is of short duration and may be lost if it happens during daylight or much weakened if the Moon is bright or the radiant altitude is low.

Lyrids. Usually rather weak but has an illustrious history and was very strong in 1922.

Eta Aquarids. Not normally very strong but is rarely well observed because the radiant never attains a useful altitude in the higher northern latitudes where most meteor watchers are located. Probably associated with Halley's comet.

Delta Aquarids. The strongest of the southern showers, but rather variable. Active for about two weeks around maximum.

Perseids. Strong, punctual and almost infallible—an ideal shower, lasting from the end of July till the middle of August, though only at its best for two or three nights around 11th August and cutting off sharply after 14th August.

Orionids. Fairly strong and rarely fails to appear. Associated with *Eta Aquarids* and possibly also with Halley's comet.

Leonids. One of the most famous of all showers, but has been living on its past for some time and now generally only produces a few meteors per hour at maximum. The strong return of 1961 raises hopes that the stream may yet return to its previous splendour, but it is too soon to be confident about it; this shower has been responsible for some grievous disappointments in the past.

Geminids. The strongest of the regular annual showers and one of the most reliable.

Ursids. This stream achieved eminence in 1945 with a strong display but neither before nor since has it been other than weak and uncertain.

The probable hourly rate given in Column 4 is the number of meteors per hour likely to be seen by a single observer watching a clear dark sky and with the radiant at an altitude greater than about 60°. For lower altitudes the hourly rate falls off sharply.

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NOTES ON ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM OCTOBER TO DECEMBER 1962

Relevant Weather Factors

October. During October the atmosphere over the Arctic Basin and Greenland remained abnormally cold; very severe ice conditions were reported in the Russian Arctic seaways. Pressure was mainly above normal over the Arctic except over the Barents Sea where on average it was more than 7 mb. below normal. Pressure was also abnormally high over western Europe. Many depressions particularly in the latter half of the month followed a general track from Newfoundland north of Iceland into the Barents Sea and on into the Russian Arctic. Isolated depressions moved over the central area of the Arctic Basin. The Barents Sea was the location of many intense and thundery depressions associated with abnormally high precipitation. There was a considerable change in the distribution of sea surface temperature during October. At the end of the month most of the cold currents flowing out of the Arctic appeared colder than normal. Sea surface temperatures were locally above normal south of Iceland and west of Norway.

November. Average air temperature in the Arctic was above normal and mean pressure below normal. A large belt of high pressure covered the eastern North Atlantic and linked up with the Asiatic high. Sea surface temperatures were several degrees above normal off northern Norway, in the Barents Sea, east of Iceland and off south-east Greenland. Water moving south out of the Arctic Basin continued to appear colder than normal but the east Greenland current was apparently weaker than normal in Denmark Strait where sea temperatures against the Greenland coast were considerably above normal. During November there was another great increase in the area with mean air temperatures below 0°C. It increased to include all Scandinavia, Greenland and most of Canada.

December. The Arctic again became colder during December and a situation similar to that in October developed with a well developed depression track from north-east Canada to the Barents Sea. Towards the end of the month a deep cyclonic circulation again developed over the Barents Sea pouring the cold Arctic air into northern Europe. A large ridge also built up again from southern Greenland to northern Europe which transferred much of the very cold air inland over the continent towards the western seaboard of Europe and the Mediterranean area. Sea temperatures continued above normal south and south-west of Iceland. The surface temperatures of the Gulf Stream water south and south-west of Newfoundland and due west of the British Isles were as much as 7°C below normal. North Sea temperatures were mainly below normal, particularly in the Kattegat and Skagerrak which were 1°C below normal.

Canadian Arctic Archipelago including Baffin Bay and Hudson Bay and Strait

October. The normal considerable increase in fast and new ice had occurred by the end of the month over the northern part of the Canadian Arctic Archipelago and Baffin Bay. The number of icebergs on both sides of Baffin Bay had decreased and appeared less than normal. Small groups of icebergs (less than 20 at a sighting) were observed off Greenland, Baffin Island and in Hudson Strait. In spite of considerable atmospheric cooling and sea temperatures apparently below normal (judging from observations to the south) most of Baffin Bay remained ice free.

November. The seasonal development of ice continued. There was less pack-ice in Baffin Bay than at the corresponding time in 1961 and somewhat more than in 1960. The number of icebergs off the West Greenland glaciers appeared to be considerably less than in 1961 but similar to the number in 1960. At the end of November young ice had begun to form in the shallow waters of Hudson Bay; close or very close pack-ice covered Foxe Basin.

December. The normal increase in pack-ice occurred during December. Much pack-ice and fast-ice covered Hudson Bay. Large numbers of icebergs were reported (more than 200 at a sighting) by individual land stations towards 70°N off the West Greenland glaciers.

Davis Strait and Labrador Sea

October and November. This area was largely free of pack-ice except for isolated patches off south-east Baffin Island. Only isolated groups of icebergs moved northwards off western Greenland and southwards off the Labrador coast. Isolated icebergs approached the Great Bank during October otherwise no icebergs were reported moving southwards off Belle Isle.

December. The seasonal development of pack-ice continued over Baffin Bay particularly off Baffin Island and at the entrance to Hudson Strait but the amount of pack-ice and the number of icebergs continued below normal off the Labrador coast. The number of icebergs moving northwards around Cape Farewell had increased by the end of December and groups of up to 50 were observed by individual land stations moving northwards while fast-ice and new ice were reported forming in fjords.

BELLE ISLE STRAIT, GREAT BANK AND EAST NEWFOUNDLAND COAST

October to December. This area remained largely free of ice although the Arctic water of the Labrador Current flowed freely over the Great Bank. Isolated icebergs moved south of Belle Isle during October at approximate rates of less than half a knot.

GULF OF ST. LAWRENCE, RIVER ST. LAWRENCE AND GREAT LAKES

October and November. Ice was reported locally in the River and Great Lakes but the Gulf remained ice free.

December. The whole area remained remarkably free of ice until well into December. Montreal was open until the 22nd December. In the latter half of December young ice and winter ice with mainly small or medium sized floes existed in the River above Baie Comeau at times filling the whole waterway. In the Great Lakes ice existed in the shallower water only. The amount and extent of ice in both the River and the Great Lakes was less than normal. The St. Lawrence Seaway closed on the 7th December but was still ice free, and the weather was mild. The Gulf of St. Lawrence also remained ice free except in the shallow water in Chaleur Bay and west of Prince Edward Island. Overall the weather conditions have been somewhat colder than normal but this does not appear to have greatly affected the ice situation.

GREENLAND SEA

October to December. At the end of October the area of fast-ice off Eastern Greenland was about normal but the area of polar pack moving south out of the Polar Basin appeared to be well above normal. Individual land stations of Eastern Greenland reported up to 50 icebergs moving southwards within the polar pack-ice. Warm Atlantic water continued to flow from the south towards north-west Spitzbergen but pack-ice and Arctic water of the Spitzbergen current flowed strongly round from the east to south-west Spitzbergen causing new ice to form in the fjords. There was also a south-westerly penetration of the cold water of the Bear Island current to south-west of Bear Island which advanced deeply into the warm Atlantic water.

At the end of November and on into December the trends described above continued with the area of polar pack off Eastern Greenland increasing to considerably in excess of normal, and approaching Jan Mayen and north-west Iceland.

DENMARK STRAIT

October to December. At the end of October Denmark Strait appeared full of Atlantic water of the Irminger Current. (Sea surface temperatures were generally above normal.) Arctic water of the East Greenland Current appeared to have become very narrow suggesting that much Arctic water was flowing into the East Icelandic Current. North of 65°N the extent of the polar pack was generally in excess of normal extending almost to north-west Iceland but there was very little polar pack along the Greenland coast to the south. The polar pack increased and extended slowly southwards along the Greenland coast throughout November and December exceeding in places the recorded eastward limit of polar pack. Individual land stations continued to report up to 50 icebergs moving southwards towards Cape Farewell. Early in the period some of these groups were drifting in open water.

BARENTS SEA

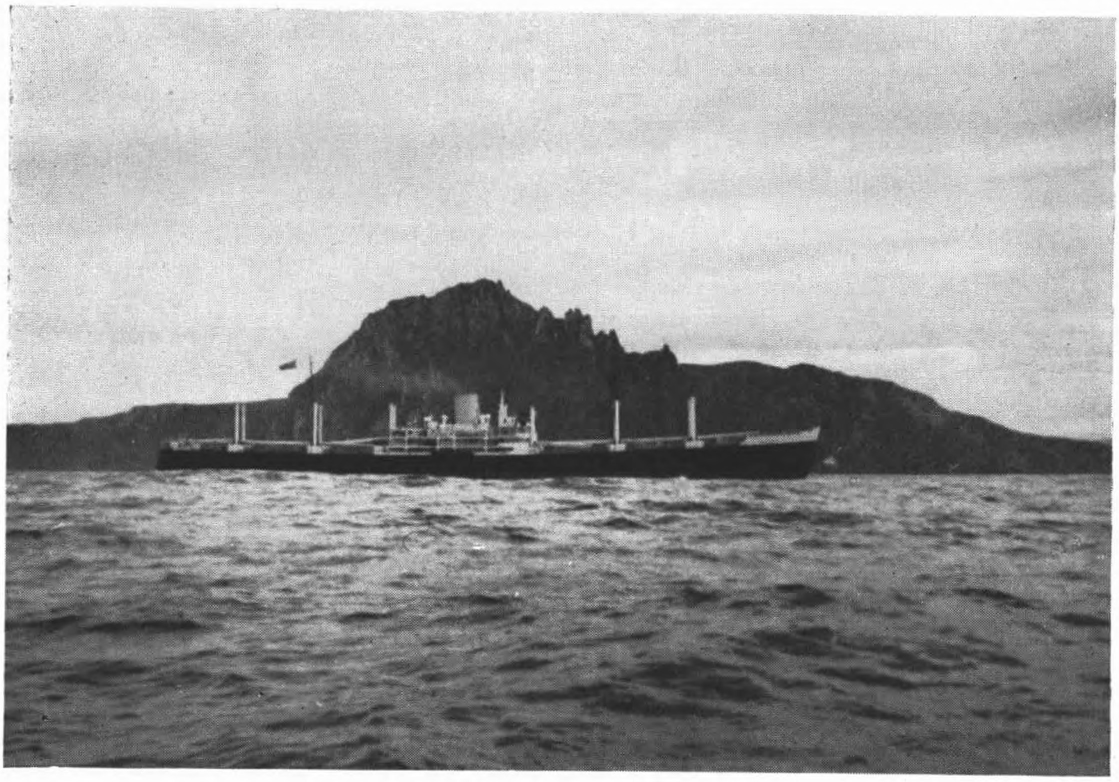
October. The south of the area remained ice free but in the north polar pack was in excess of normal and was moving south, east of Spitzbergen and towards Bear Island. Sea temperatures in the south of the Barents Sea appeared to be above normal.

November. Sea temperatures rose generally in the southern half of the Barents Sea during November. It is also probable that large amounts of polar pack extended east of Spitzbergen but its limits appeared to have retreated northwards and north-eastwards from the Bear Island area.

December. Polar pack again penetrated west of Spitzbergen and moved towards Bear Island. There also appeared to be a rapid formation of fast-ice and polar pack in the White Sea, in the southern approaches to the Kara Sea and in the Russian coastal areas east of Murmansk. It is probable that in these latter areas the mass of ice was above normal, although it is also probable that sea temperatures in the southern Barents Sea continued above normal.

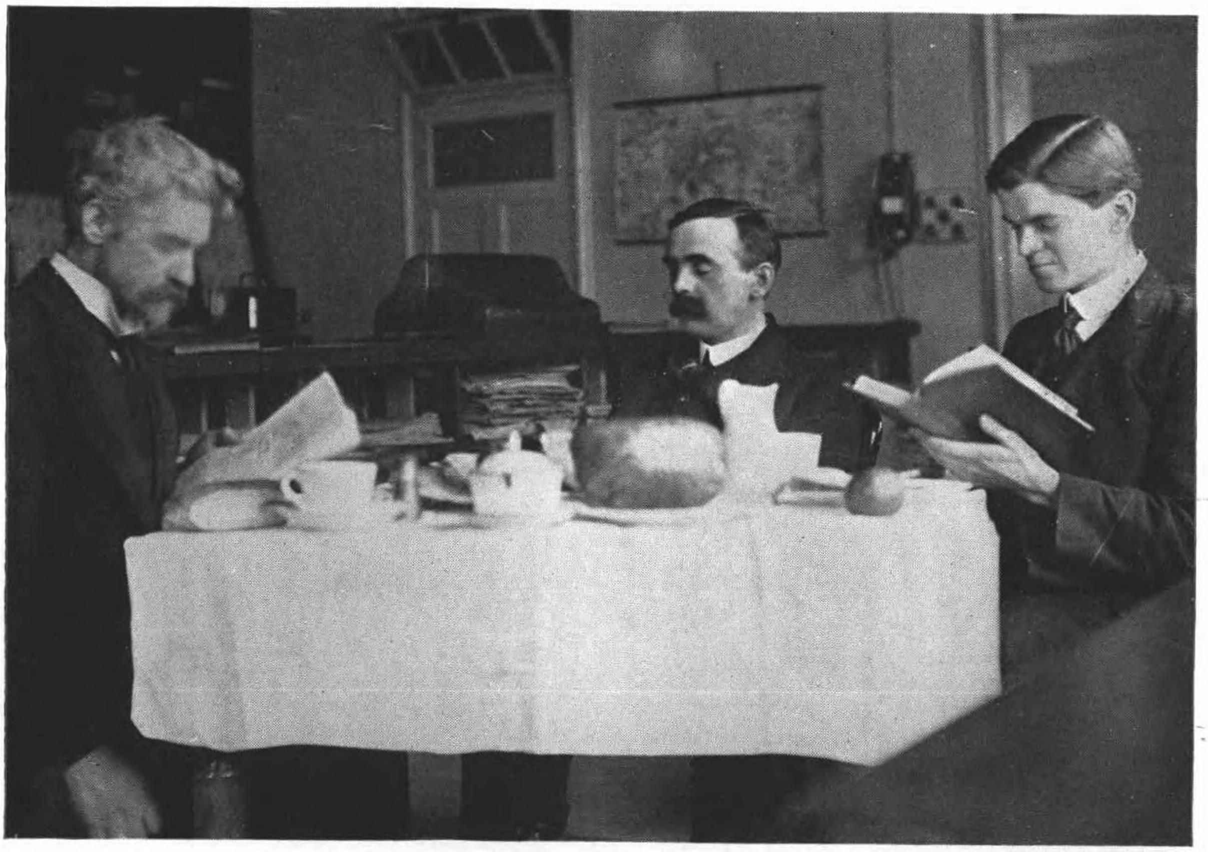
BALTIC SEA

October to December. Early in the period the Finnish authorities published that the waters of the Gulf of Bothnia contained an above normal amount of heat and sea temperatures throughout the Baltic remained above normal until late in December when they became below normal. It was therefore apparent that it took a considerable period of abnormally cold weather to start the formation of ice. By the end of November ice had formed in the shallow water of the north of the Gulf of Bothnia; at the end of December fast-ice 25 cm. thick was in existence over an extensive part of the north of the Gulf of Bothnia with fast-ice and pack-ice 10 to 20 cm. thick along the Finnish coast and the north of the Gulf of Finland. In the northern half of the Gulf of Bothnia ice was hummocked and there were considerable



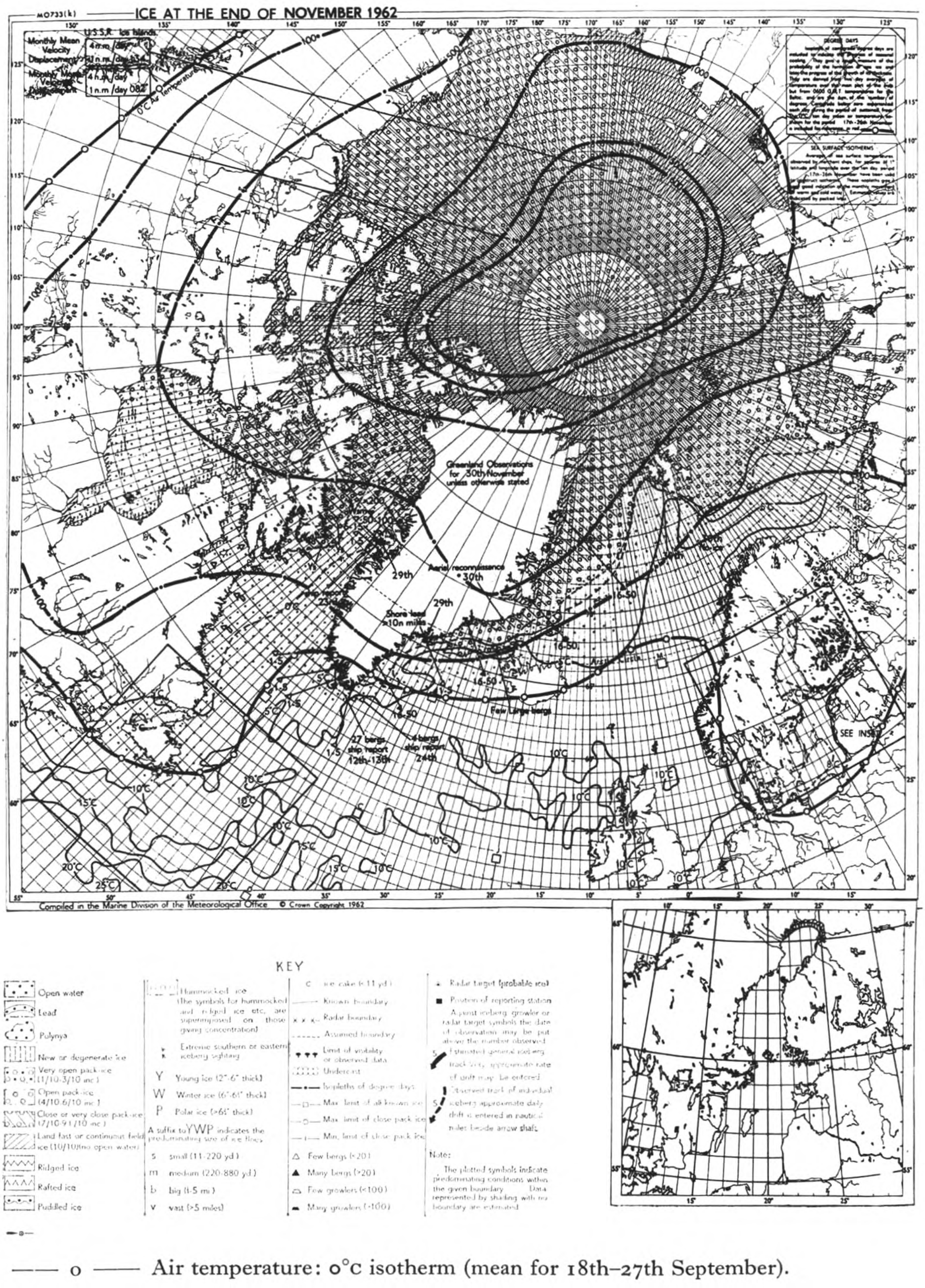
Hauraki off Cape Horn. (See page 96.)

Photograph by Captain D. A. G. Dickens



Saturday afternoon tea in the Forecast Room of the Meteorological Office, 63 Victoria Street, Westminster, 25th March 1911; L. to R.: Mr. Sargeant, Mr. Snell and Mr. W. Hayes. (See page 79.)

Photograph by courtesy of W. Hayes.



—— o —— Air temperature: 0°C isotherm (mean for 18th–27th September).

—— · —— Air temperature: degree days, °C.

———————— Sea temperature, °C, for 18th–27th September. These isopleths give an indication of the monthly movement of warm and cold water.

— — — Sea temperature, as above, but only estimated values.

areas of pack-ice. However the extent of the ice remained generally below normal. It will be noted from Table 2, which gives an analysis of Baltic ice, that the port of Lulea closed towards the end of December.

Table 1. Icebergs sighted by Merchant Ships in the North Atlantic

(This does not include growlers or radar targets.)

OCTOBER 1962

LIMITS OF LATITUDE AND LONGITUDE	DEGREES NORTH AND WEST					
	60	58	56	54	52	50
Number of bergs reported south of limit	18	18	18	17	6	0
Number of bergs reported east of limit	18	18	18	2	0	0
Extreme southern limit	50°27′N 54°04′W on 4.10.62					
Extreme eastern limit	52°38′N 52°46′W on 11.10.62					

No icebergs were sighted in November and December

Table 2. Baltic Ice Summary. Oct.–Dec. 1962

No ice was reported at any of the stations during October.

STATION	NOVEMBER 1962									DECEMBER 1962								
	LENGTH OF SEASON		ICE DAYS			NAVIGATION CONDITIONS			DEGREE DAYS	LENGTH OF SEASON		ICE DAYS			NAVIGATION CONDITIONS			DEGREE DAYS
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Kiel	0	0	0	0	0	0	0	0	—	26	27	2	0	0	0	0	0	—
Tonning	0	0	0	0	0	0	0	0	—	22	31	10	2	8	3	0	7	—
Husum	0	0	0	0	0	0	0	0	—	3	31	14	7	1	9	0	0	—
Emden	0	0	0	0	0	0	0	0	—	24	31	3	0	1	1	0	0	—
Lubeck	0	0	0	0	0	0	0	0	—	4	31	9	0	7	4	0	0	—
Gluckstadt	0	0	0	0	0	0	0	0	—	3	31	13	0	8	9	0	0	—
Bremerhaven	0	0	0	0	0	0	0	0	—	27	31	5	0	5	4	0	0	—
Riga	0	0	0	0	0	0	0	0	2	19	31	13	7	1	8	0	0	165
Pjarnu	0	0	0	0	0	0	0	0	4	19	31	13	12	0	4	9	0	146
Leningrad	0	0	0	0	0	0	0	0	13	8	31	20	13	5	7	7	0	202
Viborg	0	0	0	0	0	0	0	0	—	8	31	24	24	0	14	10	0	—
Stettin	0	0	0	0	0	0	0	0	0	28	31	4	0	0	4	0	0	102
Gdansk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114
Klajpeda	0	0	0	0	0	0	0	0	2	21	31	7	0	0	3	0	0	149
Tallin	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Ventspils	0	0	0	0	0	0	0	0	—	19	31	13	1	4	7	0	0	—
Helsinki	0	0	0	0	0	0	0	0	8	19	31	13	11	0	13	0	0	226
Mariehamn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53
W. Norrskar	0	0	0	0	0	0	0	0	—	29	31	3	0	0	1	2	0	—
Turku	0	0	0	0	0	0	0	0	26	18	31	5	0	0	1	0	0	190
Mantyluoto	0	0	0	0	0	0	0	0	—	28	31	4	1	0	3	0	0	—
Vaasa	0	0	0	0	0	0	0	0	39	1	31	25	18	0	7	13	0	304
Oulu	28	30	3	2	0	1	1	0	43	1	31	31	31	0	0	31	0	346
Lulea	21	30	10	6	0	10	0	0	82	1	31	31	31	0	14	8	9	434
Bredskar	28	30	3	0	0	1	0	0	—	1	31	31	5	0	21	0	0	—
Alnosund	24	30	7	0	0	7	0	0	98	1	31	20	16	0	20	0	0	291
Stockholm	0	0	0	0	0	0	0	0	13	18	31	14	12	0	14	0	0	136
Kalmar	0	0	0	0	0	0	0	0	6	23	31	9	5	2	9	0	0	125
Visby	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	83
Goteborg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
Skelleftea	0	0	0	0	0	0	0	0	—	14	31	18	17	0	2	16	0	—
Roytaa	24	30	6	2	0	5	0	0	67	1	31	31	31	0	3	14	14	447
Yxspihlaja	0	0	0	0	0	0	0	0	—	1	31	22	17	0	7	12	0	—
Aarhus	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Copenhagen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
Oslo	0	0	0	0	0	0	0	0	63	0	0	0	0	0	0	0	0	288
Kristiansandfjord	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—

CODE: A First day ice reported.
B Last day ice reported.
C No. of days that ice was reported.
D No. of days continuous landfast ice.
E No. of days of pack-ice.
F No. of days dangerous to navigation, but assistance not required.
G No. of days assistance required.
H No. of days closed to navigation.
I Accumulated degree-days of air temperature (°C) where known*

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

North Sea

December. Towards the end of December there were extensive areas of fast-ice in the estuaries of north-west Germany and north Holland. Inland waterways in West Germany, including the Rhine, were badly congested by ice. Inland waterways of Holland were also similarly blocked. There were also considerable amounts of pack-ice around the islands of the German Bight and navigation ceased in a number of ports on the western side of Schleswig-Holstein. The Kiel Canal also contained much pack-ice.

G. A. T.

PRESENTATION OF BAROGRAPHS

As stated in the October 1962 number of *The Marine Observer*, inscribed barographs were, in 1962, awarded by the Director-General of the Meteorological Office to Captain J. L. Gibson, O.B.E. (Anchor Line), Captain F. L. Osborne (Manchester Liners), Captain G. W. B. Lloyd (Union Castle Line) and Captain N. L. Warren (New Zealand Shipping Company).

In only one year of the fifteen in which these four long service awards have been made has it been possible to bring all four recipients together in one ceremony, and in this year the presentation had to be in three stages.

Captain N. L. Warren received his award from the Director-General, Sir Graham Sutton, at Bracknell on 9th October. As customary on these occasions a small luncheon party was staged at which we were pleased to welcome Mrs. Warren, Captain Holley, Assistant Marine Superintendent and Mr. L. K. Cooper, General Manager of the New Zealand Shipping Company.

Sir Graham also personally presented the barographs to Captain J. L. Gibson and Captain G. W. B. Lloyd at a similar ceremony at Bracknell on 16th November. On this occasion we were glad to welcome Mrs. Lloyd and Captain Culpin, Assistant Marine Superintendent of the Union Castle Line whilst Captain Gibson was accompanied by Mr. C. Dewey, Deputy General Manager of the Anchor Line. Some amusement was caused at the tardy arrival of the latter two who claimed to have received erroneous sailing directions at Waterloo and were subsequently rescued from a wayside station by a member of the Marine Division in a car. It is only fair to mention that this is not the first time that the sailing orders issued at Waterloo have been found to be ambiguous and intending visitors are asked to make doubly, if not trebly, sure that they get into the right part of the train, which always bifurcates at Ascot.

Both these luncheon parties were attended by the Marine Superintendent and senior officers of the branches of the Meteorological Office associated with ships' observations, and afterwards the visitors were shown the working of the office.

The presentation to Captain Osborne was made aboard the *Manchester Miller* at Manchester on 26th November 1962 by Dr. A. C. Best, Director of Services in the Meteorological Office. Dr. Best was accompanied by Cdr. C. E. N. Frankcom, Marine Superintendent and Captain J. R. Radley, Port Meteorological Officer at Liverpool and the party were the guests of Manchester Liners at luncheon aboard the ship, there being present in addition to the master Captain Downing, also Captain Clay, their Marine Superintendent and Mr. Stokes, Managing Director of the company.

L. B. P.

A REPLY TO MANY LETTERS

At the Daily Weather Conference, here at Bracknell, a chart is sometimes markedly different from what would be expected on seeing the chart of six hours before. The explanation may be given that, although it had been obvious that a depression was 'somewhere' over the Eastern Atlantic, it had been impossible to pin-point its position, or to judge its intensity, as it had found an area where ships happened to be sparse. On the following chart, however, a ship had been in a very significant position and it had been possible to draw in the depression accurately. Obviously, the forecast made on the second chart would probably be much better than the one made earlier! Thus, any individual report may be the one that sets the forecasters on the right line; the writer of one of the many letters, which we have received from captains and officers of ships which have won 'Excellent' Awards, says, "It is a pleasure to know that the efforts of one small team are of some slight help in the vast field of exploration undertaken by your office". Several writers emphasise the 'team-work' aspect; one officer wrote, "I would like to say that as I was the Principal Observing Officer on the ship and so get the award, without the excellent and untiring help from the other observing officers, radio officer and also the cadets, my own puny efforts would have amounted to nothing". Another master says that his conscience is slightly troubled in accepting the award because "whereas my officers do all the work, I only sign the Log". Many masters and officers have written of the keen interest taken in meteorology and hope to continue observing. The Captain of one of the award-winning ships says, "We shall endeavour to give you similar service in the years to come, and hope that we may even improve the winter weather to enable us to send better books! Especially rounding the *Longships* when it is difficult to keep our feet, at times". We are also told that receiving an award is an incentive to keep up the good work; one Captain writes "I am sure it (the award) will be most gratifying for the officers concerned who do the regular observing and whose lively and continuous interest you consider worthy of a very stimulating pat on the back". We are pleased to be able to offer some kind of reward for all the work that is done for us, even if we are unable to give an award to all of our helpers. As usual, we have received so many letters that it isn't possible to reply to them all individually, so we would like to say, through *The Marine Observer*, "Thank you for your letters, and, of course, for all of your observations".

C. E. A.

Official Publication

METEOROLOGICAL OFFICE REPORT FOR THE YEAR ENDED 31st DECEMBER 1961

Included in this report, as well as a summary of the weather in 1961, are sections on Physical and Dynamical Research—with particular reference to Numerical Forecasting—descriptions of the various services provided and photos of the new Headquarters at Bracknell. There are sections on International Organizations, Meteorological Office organization, publications and also a list of books and papers by members of staff which were published during the year.

The report is published by H.M. Stationery Office at a price of 5*s.* 6*d.* net.

Book Reviews

Seven Miles Down: the story of the bathyscaph Trieste, by Jacques Piccard and Robert S. Dietz. 8¼ in. × 5⅝ in. pp. 249. *Illus.* Longmans, Green and Co. Ltd., London, 1962. 25*s.*

The word bathyscaph is derived from the greek words, 'bathos' and 'skaphe' meaning 'deep boat'; this vessel, named *Trieste* was invented and constructed by Professor Auguste Piccard, father of the joint author, to whom the book is rightly dedicated.

Briefly, the authors tell us that the bathyscaph is, in effect, a submersible balloon filled with 28,000 gallons of gasoline, the gasoline being the only practicable substance of low compressibility, lighter than water, that is readily available. Slung beneath the 'balloon' is a 10-ton steel sphere, fitted with an access hatch, a large plastic window, and all the necessary lighting, instruments and photographic apparatus. The 'balloon' is more or less open to the sea through a hole in the bottom which maintains the gasolene at ambient sea pressure, thus permitting light construction of the balloon itself as there is no pressure difference; as the gasolene is lighter than water and does not mix it cannot escape. The bathyscaph submerges as a submarine, by flooding a tank, and surfaces by releasing an easily controlled quantity of iron pellets, which are held in place by an electro-magnet, which would automatically drop the ballast if the vessel's electric current failed.

This book tells the *Trieste*'s story—a prototype (unmanned) dive off Dakar to a depth of 4600 feet in 1948, 48 'manned' dives of various depths in the Mediterranean between 1953 and 1957, 15 dives at various depths in the Pacific, culminating in 2 additional deep dives there, in the vicinity of Guam, to a depth of 23,000 and 35,800 feet respectively.

Jacques Piccard was aboard the *Trieste* for all these dives, and the book is therefore an authentic account of this ambitious and novel oceanographic venture. It is a venture which has considerable scientific value, in view of the world wide interest in oceanography at present. A vessel such as the bathyscaph, allied with underwater photography and modern instrumentation points the way towards the practical realisation of Jules Verne's vision of 20,000 leagues under the sea. Robert Dietz comes into the picture because the *Trieste* was purchased from Professor Piccard in 1957 by the United States Government for use by the Navy, in fact the 35,800 feet dive in the Challenger Deep in January 1960 was a U.S. Navy project and Dietz was a civilian oceanographer in the Navy's scientific service, who worked closely with Piccard from 1955 onwards.

The book is profusely illustrated with some magnificent photos, both of the bathyscaph herself and of various underwater scenes. The narrative is written in a pleasant and unassuming style and is not too technical; the appendices give details of the vessel herself with drawings, and some tabular details of her various dives. The first chapter gives some oceanographical background, while the final chapter entitled "Deep ships of tomorrow" makes some suggestions as to possible developments arising from the bathyscaph experiments. C. E. N. F.

Marine Cartography in Britain, by A. H. W. Robinson. $11\frac{1}{4}$ in. × $8\frac{3}{4}$ in. pp. 222. *Illus*. Leicester University Press, 1962. £5 5*s*. 0*d*.

This history of the sea chart and marine cartography from the primitive manuscript charts of the early sixteenth century, to the completion of the accurate survey of the British Isles, initiated and directed by the distinguished hydrographer Admiral Sir Francis Beaufort before his retirement in 1855 at the venerable age of eighty, cannot fail to interest the reader. To readers of this journal Admiral Beaufort, who also devised the descriptive weather system known as the Beaufort notation, and the Beaufort scale of wind force, needs no introduction.

The pioneer work done by hydrographers such as Greenvile Collins, Murdoch Mackenzie (Senior), Lewis Morris and Graeme Spence, to whom mariners owe much, is not widely known outside the Hydrographic Service. The author describes how their achievements were carried out with great skill and determination with little more in the way of instruments than a compass, log and lead lines, octant, quadrant or sextant, and sometimes a theodolite of doubtful accuracy—the one used by Murdoch Mackenzie (Senior) in his survey of the Orkneys in 1751 could only be read to 5 minutes of arc with an estimate to the nearest minute. The station pointer was not invented until about 1774.

Readers may be surprised to find that the accurate fixing of the Scilly Isles relative to the mainland was not accomplished until 1792 when a survey for this purpose was carried out by Graeme Spence, a civilian hydrographer.

The author mentions the hardship and privations endured by these early hydrographers in pursuit of their calling, working for long hours at a time from open boats under oars or sail.

It is interesting to read in Chapter 6—"The Birth of Official Hydrography"—that Captain William Bligh of *Bounty* fame worked with the Admiralty Hydrographic Office between 1797 and 1803, normally as a hydrographic surveyor, but on occasions taking over the administration during the frequent absences on sick leave of Alexander Dalrymple, the Hydrographer in those early days of the Department's history. The Hydrographic Department of the Admiralty was founded in 1795.

We read that Captain Bligh's first hydrographic survey in home waters was the Humber entrance in February 1797, which lacked the accuracy of surveys carried out by others at that period. His fixing of the position of Spurn Point, for example, obtained by sextant observations of celestial bodies, using a chronometer carried from Yarmouth was, we are told, $2\frac{1}{2}'$ out in latitude and $3'$ in longitude, but he may have had only a limited amount of time to complete this survey. The author suggests that Captain Bligh was the first to provide mariners with a chart about the speed and direction of the surface currents in the Atlantic Ocean, the information for this being obtained during his voyage to St. Helena in the *Director* in 1799–1800.

The text of this book is divided into eight chapters, each a subject in itself—"The early Manuscript Charts of the 16th Century", "Sea Atlases", "The Development of an Accurate Marine Survey Technique", "The Rôle of the 'Amateur' Hydrographer in the 18th Century", "The Hydrographic Contribution of the Military Engineer", "The Birth of Official Hydrography", "The Private Chart Publishers", and "The Grand Survey of the British Isles". Twenty text illustrations are provided. There is a bibliography of selected references as well as additional comprehensive biographical notes on some of the sixteenth century surveyors and chart makers. There are eleven appendices giving lists of charts and hydrographic surveys of the period. At the end of the book are 42 very interesting plates showing the skill of the cartographers of the period. A key map and notes on the plates is provided.

The price of £5 5*s*. puts this authoritative book, on a subject on which too little has so far been written, beyond the means of many who would undoubtedly enjoy reading it. It is to be hoped that it will find its way to the shelves of public reference libraries.

A. D. W.

Paddy Henderson. The Story of P. Henderson & Company, by Dorothy Laird. $9\frac{1}{2}$ in. × $6\frac{1}{4}$ in. pp. 230. *Illus.* George Outram & Co., Ltd., Glasgow, 1961. 25*s*.

"In peace time the Merchant Service slides from the headlines, but its history is our history and P. Henderson & Company has had more to do with making it than most."

The author thus gives her reasons for writing this story but one feels that something would have been wanting in commercial maritime history had it not been told.

The genesis of the company was with four brothers, all of them under 30: Patrick, employed in Glasgow with a firm of weavers, Thomas and Robert in Leghorn with a firm of general merchants and George, master of a brig trading between U.K. and Mediterranean ports. In this setting it is not surprising that the Glasgow and Leghorn firms began to exchange goods using brother George's ship to carry woven goods outwards and marble home.

In 1829 the brothers bought their first ship, the brig *Tom and Jessie* of which George was master. He continued to command her until 1835 when he came ashore to build the first ship specially for the company, the barque *Peter Senn*, 195 tons, named after the Leghorn company.

By 1848 they were sufficiently well established to be one of the top signatories at a meeting of Glasgow shipowners who petitioned the Lord Provost of Glasgow for some system of examination for Masters and Mates. If they had never done anything else, they would have deserved a place in history for this contribution to the Safety of Life at Sea.

Their next venture was to have been to secure a mail contract through to Australia but this was interrupted by the Crimean war, during which their ships were chartered by the French Government. In recognition of these services they were authorised to adopt as their house flag the French Tricolour with the Union Jack in the white section. Later, the colours of the tricolour were reversed and that remains Henderson's house flag today.

With the Crimean war over, the Australian venture with steamships, which a mail contract demanded, was short lived because of their inability to provide adequate repair facilities so far from home. The company, however, found its feet again by a reversion to sail in opening up the new colony of New Zealand with their famous Albion line of sailing ships. Of these, the best known is probably the *Dunedin* which, in 1882, carried the first cargo of frozen meat from New Zealand to London. The author devotes a whole chapter to the "Triumph of the *Dunedin*". It was the ships of the Albion line which brought the Meteorological Office's first contact with Patrick Henderson for, on 11th November 1857, the full-rigged ship *Robert Henderson* was equipped as a selected ship for a voyage to New Zealand.

Thereafter, their ships appear continuously in our registers until the present day when two of their ships are equipped with our instruments.

It is perhaps the four chapters on the colonial adventures of the company that the reviewer found the most enjoyable, having been brought up in that trade himself. Moreover, these chapters contain some very fine narratives of calms and storms and living conditions, taken from the original letters of masters, crew and passengers and contemporary colonial newspapers. They form a complete picture of life in the deep water sailing ships carrying immigrants during that period.

In 1882, Henderson's Albion line was absorbed by Shaw Savill's, their close rivals over the previous 30 years and they then turned their full attention to the Burmese trade, with which their name is now always associated. This interest had started even in the early days of the New Zealand trade when homeward cargoes were few and ships often returned from New Zealand by way of Burma where they found cargoes of teak and rice.

The first outward sailing to Burma from the Clyde was by the full-rigged ship *Lady Douglas* in February 1860. The Meteorological Office's registers show that two years later she was equipped as a selected ship on this run.

The chapters on the Burmese venture and the progress of this trade make fascinating reading. In a country so dependent on water transport it was inevitable that Patrick Henderson & Company were quick to see the potentialities of an inland water fleet. Thus was born in 1865 the Irrawaddy Flotilla Company in the face of the seething politics of the Burma of that time. The company survived the war of 1885 and was in a prosperous condition in 1886 when Burma was unified under the British flag. In that year, inspired by their success, they started a similar service on the River Plate, but this project, termed by the author "South American Misadventure" was wound up four years later. In 1942 the Irrawaddy Flotilla Company had a strength of 650 vessels but within the short space of four months in that year the entire fleet was lost in the Japanese invasion of Burma, 550 vessels being scuttled to prevent them falling into enemy hands after efforts had been made time and again to withdraw them to safety in the face of the rapid Japanese advance. This courageous and tragic story to which the author devotes a whole chapter can have few equals in maritime history.

Burmese Independence in 1948 was quickly followed by the nationalisation of all inland water transport and thus the Flotilla Company as a private venture came to an end.

But the overseas fleet of Paddy Henderson still sails on. It is possible that the founder of the firm, who died when he was only 36, was never himself known as 'Paddy' for no record exists of the use of this nickname in his lifetime. But "Paddy Henderson's ships" they are always called, not without affection and certainly not without respect.

This is more than a mere house history, it is the story of a hundred years of shipping and its part in the building of an empire.

The management have asked the reviewer to state that it may be obtained, at the selling price, from their Glasgow office as well as through the usual bookselling channels. L. B. P.

Fisheries Hydrography, by Ilmo Hela and Taivo Laevastu. 10 in. × 8¾ in. pp. 136. *Illus.* Fishing News (Books) Ltd., 1961. £2 15*s.* 0*d.*

The essential purpose of this book is to show "how oceanography and meteorology can and do serve fisheries". Most readers of *The Marine Observer* will think at once of the weather reports, forecasts and gale warnings provided by many meteorological services and broadcast by radio for the benefit of shipping, both on the high seas and in coastal waters. Weather services for fishing and shipping are, in fact, described on pages 95 and 96 of the book and in a short Appendix written by Commander C. E. N. Frankcom, but the main interest of the book to meteorologists will lie in Chapter 2, which deals with the influence of environmental factors on fish behaviour. Foremost among these are sea surface temperature, light intensity, ocean currents, and up-welling, and these are all the concern, directly or indirectly, of the meteorologist. The study of sea temperature changes involves insolation, evaporation and transfer of sensible heat. The light intensity at the surface of the sea is greatly influenced by the amount and thickness of the clouds. Ocean currents in the surface layers are primarily produced by the surface winds, and most of the important regions of up-welling are caused by the trade winds where they are blowing roughly parallel to the west coasts of the continents, e.g. off south-west Africa.

Examples are given of the influence of sea temperature on the development and survival of larvae, on rates of feeding and growth of fish, and on the migration and shoaling of fish. There is evidence that long-term sea surface temperature changes have an influence on the distribution of species, e.g. heavy Greenland cod catches in recent years have occurred simultaneously with the general increase of sea surface temperature in the north Atlantic, but the authors wisely caution against reading too much into the high correlation between long-term temperature changes and changes in the distribution of species, since "the causal explanation must, in general, be more complicated".

Ocean currents are, however, important since pelagic eggs and larvae are carried along by them, and the boundaries between warm and cold currents are often associated with concentrations of fish. It is stated that "the use of cumulative wind data for the prediction of surface currents seems to be the only available means at present for estimation of the transport of eggs". Unfortunately, our knowledge of the relation between the wind and surface currents is at present very inadequate, the well-known Ekman spiral being a gross over-simplification of a complex problem.

Up-welling is also an important factor, since deeper water which is rich in nutrients is brought to the surface. These are used by phytoplankton, resulting in a higher organic production and a concentration of fish.

At a time when the Freedom from Hunger Campaign is being given much publicity, the map on page 76 showing the geographical distribution of the marine fisheries of the world, with their degree of exploitation, is of special interest. It shows that there are large fisheries, particularly in the Arabian Sea and in various parts of the Southern Hemisphere, which are as yet unexploited. Other maps on page 79 reveal that the main productive areas of the world are situated in regions of up-welling and in areas where the horizontal sea surface temperature gradients are steep, i.e. near the boundaries between cold and warm ocean currents. In other words, the general circulation of the atmosphere determines the location and extent of the main fisheries of the world.

It would seem that there is scope for co-operation between fishery biologists, physical oceanographers, and meteorologists, in applying their knowledge to the problem of making various kinds of prediction important for practical fisheries operations. As an example, development of synoptic oceanography for Japanese fisheries is quoted. A weekly combined sea surface temperature and current chart is published in the newspapers, showing the convergence line between cold and warm currents. Also the Japanese Meteorological Agency prepares five-day quasi-synoptic charts of sea surface temperature for the Japanese high seas salmon-fishing area, using data from merchant ships, fishing boats and research vessels. The authors merely state that the convergence line and the sea surface temperature distribution are "significant environmental parameters" in the Japanese fisheries, but it would be more convincing if some statistical evidence were given that the improvement in catch for a given effort by the use of these maps is sufficient to justify the large amount of work which must be done in order to produce them.

The authors are on surer ground in making a plea, in the final chapter, for improved forecasts for coastal areas in the tropics and sub-tropics, pointing out that the fishing vessels of the under-developed countries are mostly small and primitive and entirely exposed to the weather and sea. F. E. L.

ADDENDUM

The Marine Observer, January 1963. Page 50—

Sea Birds of the South Pacific, by P. P. O. Harrison. This book is not obtainable from booksellers on the open market but only direct from the publishers, H. G. Walters, Market Square, Narberth, Pembrokeshire, or through the Editor, R.N.B.W.S., Prattenden's, Bury, Pulborough, Sussex.

LETTERS TO THE EDITOR

16th February 1963

DEAR SIR,

In view of the many stories which have been written on rounding Cape Horn, it is felt that many readers might be interested to see this picture taken there at 1215 GMT.

A fair passage had been experienced from departure Lyttelton at 0930 GMT on the 4th February and in consequence of almost calm conditions prevailing off the Horn on the 16th, advantage was taken to hold an accident boat drill in a position some 1·3 miles to the Southward. It was during this exercise that the enclosed picture was taken, from an ordinary Kodak Brownie camera in one of the ship's lifeboats.

Yours sincerely,

m.v. *Hauraki* D. A. G. DICKENS, Master

Note: In the October 1958 number of *The Marine Observer* we published extracts from the meteorological logbook of the barque *Hermine*, which in a 133-days passage from Liverpool to Talcahuano in 1880, was 40 days beating round the Horn.

This was capped in the April 1959 number by the publication of a narrative and track chart from the ship *Blackbraes* sent to us by Captain Heseltine who was an apprentice in her in 1899–1900 when she made a 355-day passage from South Shields to San Francisco, being 67 days round the Horn.

In San Francisco with *Blackbraes* was the ship *Musselcraig* which had taken 334 days on a similar passage. In her case, however, the master despairing of ever weathering Cape Horn, had turned and completed the voyage eastbound.

Captain Dickens's photograph (reproduced opposite page 88) must be unique and we are glad of the opportunity of publishing it, with the permission of the New Zealand Shipping Co. Ltd. in whose 1962 calendar it originally appeared. On the back of it he has written, "Do you think your records could reveal the number of Captains who photographed their ships from a boat 1 mile off Cape Horn?"

DEAR SIR,

I have read the January '63 editorial of *The Marine Observer* with interest.

In my view the positive approach to the sweat problem is to admit it might happen on any vessel, and then to decide which 'ship areas' are likely to produce cargo damage if it does happen. These are then the areas with the greatest damage potential.

In my experience, the worst areas are under deckheads, and, assuming a homogeneous (vegetable origin) cargo, the worst deckhead areas are the corners adjacent to bulkheads and ship's sides. They are always furthest away from the usual ventilators. It appears to follow that considerable emphasis should be placed on the value of surface ventilation and that thermometers should be placed in inaccessible corners at cargo surface height.

Yours sincerely,

W. L. MANSON

(Captain Manson is Marine Superintendent of the Palm Line.)

Personalities

RETIREMENT.—With the arrival of the *Empress of Britain* at Liverpool on the 26th October 1962, a career of 43 years' service with the Canadian Pacific terminated for CAPTAIN S. W. KEAY, O.B.E. with his retirement.

Stanley Walter Keay, who was born in Dublin, joined the Canadian Pacific as a cadet on board the s.s. *Mottisfont* in 1919 and upon obtaining his certificates served in many of the company's ships. He was in the old *Empress of Britain* as 2nd and 1st Officer between 1935 and 1938 making round the world cruises.

He was 1st Officer in the troopship *Empress of Britain* in 1940, when she was bombed, burned and torpedoed off Northern Ireland. The injuries he received during this encounter kept him ashore for six months. In 1943, when Chief Officer of the *Duchess of York*, also on trooping duties, his ship was sunk off the Moroccan coast by enemy aircraft.

Captain Keay's first command was the *Empire Cutlass* in 1943, a government-owned ship but operated by the Canadian Pacific. His first command of an Empress Class ship was the *Empress of Australia* in 1950. Later he commanded *Empress of France*, *Empress of Scotland* and *Empress of Britain.*

For his war service Captain Keay was awarded the O.B.E., the citation reading "for outstanding courage, organizing ability and leadership in firefighting at sea", he also received Lloyds War Medal for "bravery at sea".

Captain Keay's record with the Meteorological Office dates back to 1923, and during 23 years observing he has sent in 75 logbooks, 33 of which have been classed 'excellent'. In 1955 he was presented with the Special Long Service Award of an inscribed Barograph.

We wish him many happy years retirement at his home at Colchester, Essex.

J. R. R.

RETIREMENT.—COMMODORE J. F. OAKLEY recently completed his last voyage at sea in command of the *Windsor Castle*, and retired on 31st December 1962 due to ill health.

John Frederick Oakley began his sea career as a cadet with Union Castle Steamship Company in 1917. During the First World War he served in the *Alnwick Castle* which was torpedoed and sunk. The exposure he experienced in a lifeboat at the time of this incident may well have been the cause of his ill health.

Commodore Oakley has served in all passenger and cargo vessels of the company and was appointed to his first command, *Roxburgh Castle*, in 1942. He was appointed to his first command of a mail vessel in 1950, when he was made master of the *Carnarvon Castle*, and has since been in command of the *Edinburgh Castle*, *Stirling Castle*, *Capetown Castle* and *Windsor Castle*, to which ship he was appointed in 1960. He was made Commodore of the Company in August 1962, on the retirement of Commodore H. A. Deller.

Commodore Oakley's record with the Meteorological Office dates back to 1934, and in 18 years he has sent in 51 log books, 11 of which were classed 'excellent'; in 1948 he received an Excellent Award.

We hope that he regains his health and wish him happiness in his retirement.

E. R. P.

RETIREMENT—CAPTAIN B. F. MOFFATT retired from the sea earlier this year due to ill health after seven years in command of the Shaw Savill and Albion liner *Wairangi*.

Bristow Forbes Moffatt was born in 1901, son of Captain Thomas Forbes Moffatt, who also served with the Shaw Savill and Albion line from 1868 until his death in 1925. He received his early training in H.M.S. *Worcester* and in July 1918 he obtained a temporary commission as Midshipman, R.N.R. In October 1919, he joined Shaw Savill and Albion as a cadet and obtained his Second Mate's Certificate in 1921. He was appointed 4th Officer of the *Pakeha* and afterwards served in many Shaw Savill and Albion ships receiving his first command, the *Samsylvan*, in September 1943. He subsequently commanded *Empire Might*, *Mahana*, *Waiwera*, *Athenic*, *Dominion Monarch* and *Wairangi*.

Captain Moffatt was serving as 2nd officer of the *Mamari* when she struck a large iceberg in 49°21'S, 53°38'W, on 5th August 1927 when bound from Wellington to London via Cape Horn. This adventure was recorded in *The Marine Observer* of August 1928.

In 1939 he was serving as Chief Officer of the *Karamea* when she was chased and shelled by a submarine, but escaped with the crew unharmed, and was Chief Officer of the old *Wairangi* when she was sunk in the famous Malta convoy of 1942.

We received Captain Moffatt's first Meteorological Logbook in 1929 when he was serving in the *Matakana* and in 28 years observing he has sent in 35 logbooks of which 25 were classed 'excellent'. He received Excellent Awards in 1951, 1952, 1954, 1956, 1957, 1959, and in 1961 he was presented with an inscribed barograph in recognition of his long and valuable voluntary service with the Meteorological Office.

His father was also a voluntary observer and his first entry in our registers is on 4th July 1877 when his ship *James Nicol Fleming* (Albion Line) was equipped in Glasgow. Father and son together therefore have a record with the Meteorological Office which spans a period of at least 85 years.

We wish Captain Moffatt happiness and improving health in his retirement.

J. C. M.

Notices to Marine Observers

LIVERPOOL PORT RADAR AND PORT OPERATION R/T SERVICE

(Prepared by the Port Meteorological Officer at Liverpool with the assistance of officials of the Mersey Docks and Harbour Board.)

The Liverpool Harbour Port Radar Station, which is situated at the north-west corner of Gladstone Dock (53°27'N, 3°12'W), was first brought into operation in July 1948; an Amplitude Modulated VHF/RT service was also provided in 1948. A new station was built in 1959 incorporating various modern improvements in equipment and facilities.

The radar coverage extends seawards over Liverpool Bay for a radius of 20 miles from the station and in the River Mersey as far south as New Ferry. The object of the station is to assist vessels to navigate the river and approach channels in periods of poor visibility and also to provide an efficient ship-to-shore communication service which is particularly essential in these congested waters.

Information is available, on request, as to the disposition and movement of all vessels at anchor or under way in the river, the sea channels and the approaches to the port. Vessels entering or leaving the port in conditions of low visibility can, on request, be supplied with continuous information of their position whilst navigating in the river or sea channels. In clear weather, disposition reports are broadcast by Frequency Modulated VHF/RT on Channel 12 every four hours, commencing at 0000h, and also at 4½ hours to high water. Weather reports and local navigational warnings are also broadcast with the disposition report. In fog (visibility less than 1,100 yd.), this information is broadcast half-hourly except when vessels are being assisted.

Traffic Co-ordination

A steady and regular flow of shipping at a port can be achieved when both incoming and outgoing vessels are kept continuously informed of the traffic, berthing and weather situation. Costly delays caused by ships anchoring in the fairways in bad visibility can be overcome by radar assistance. The use of Harbour Radar increases the efficiency of port operations and leads to considerable economies for the shipowner, the Harbour authorities, and for stevedoring and wharfage contractors, for all of whom even short delays can increase costs considerably.

Harbour Services

Enhanced economy in the operation of tugs, pilot vessels and miscellaneous service vessels is achieved when radar information is available. From the detailed radar picture, the operating authorities can forecast where and by whom such vessels will be required and can thus allocate them efficiently.

Emergency Assistance

Radar allows the Port Information and Operation Service to assess the importance of calls for emergency assistance immediately and to provide rescue or salvage services, if necessary improvising these at very short notice until more suitable craft can be brought to the scene. Disorganisation of port operation need not occur and the movements of vessels not involved in the emergency will frequently be unaffected by the incident.

Information

For the benefit of pilots, tugmasters, tug operating authorities, railway authorities, police, customs and port health officers, and for all those whose work must be planned in conjunction with shipping movements, the availability of up-to-the-minute information on the progress of incoming or outgoing ships leads to considerable economies in time and manpower, and improves punctuality.

Port Maintenance

The positions of buoys or other floating sea marks are checked by radar every four hours and a continuous watch kept during dark hours when gale conditions are being experienced; any that are adrift will be detected, so that warnings can be issued at once. Radar also aids the recovery of such marks and can assist vessels engaged in dredging, dumping, or laying buoys, etc., by passing accurate positional information.

Weather Information from Port Radar, Liverpool

As a preamble to the radar disposition reports, weather reports are broadcast. These consist of actual weather conditions prevailing at Point Lynas, the *Bar* light-vessel, Formby Coastguard Station and Port Radar. The *Bar* light-vessel and Formby Coastguard Station are equipped with instruments loaned by the Meteorological Office. Appended to the disposition report are any local navigational warnings that are in force.

Masters of ships about to sail can also readily obtain, from the Meteorological Office at Liverpool Airport, the very latest weather information by telephone and can, if necessary, consult the forecaster on duty. Actual and forecast charts may also be obtained from the clearance desk at the Liverpool Custom House. Advice can also be obtained from the Port Meteorological Office.

PORT METEOROLOGICAL OFFICE, CAPE TOWN

Lieutenant Commander A. B. Crawford, B.E.M., S.A.N.R., the Port Meteorological Officer, sends us the following information regarding services available to shipping at Cape Town.

The Port Meteorological Officer's Office, Cape Town docks, has been moved to the Old Harbour Engineer's Offices in the Victoria Basin, and is close to the offices of the Port Captain. The address has been altered to:

Port Meteorological Officer,
P.O. Box 4251,
CAPE TOWN.

The telephone number remains as before: 31915, but there is an additional telephone available during office hours—22548. This should be used if there is no reply on 31915.

The services of the Port Meteorological Officer, Cape Town, are available for all ships entering Table Bay, if required. This applies to non-observing, as well as observing ships. Barometers, including aneroid barometers, can be checked, and codes for weather reporting supplied. Synoptic weather charts are also available for ships requiring them, and it is anticipated that the international analysis code (I.A.C. Fleet) will be transmitted early in 1963 for the use of ships at sea.

Limited supplies of British meteorological logbooks, Forms 911 and 918, are held in stock for ships which may require them, likewise barograph charts (Forms 5823). Visits to the office by ships' officers are always welcome, and sometimes arrangements can be made to take ships' officers on a visit to the weather forecast office at the Airport.

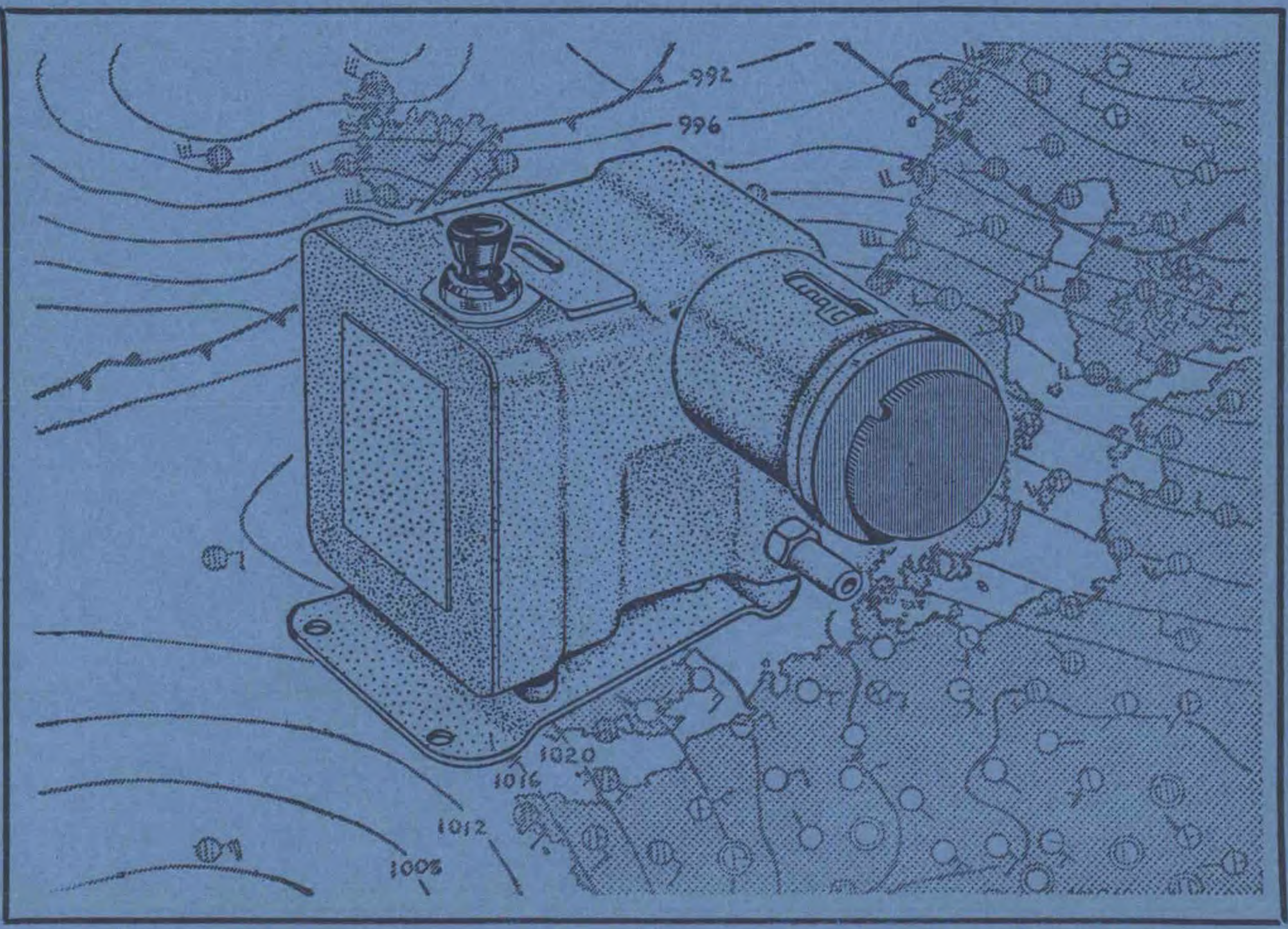
During 1961, seven British ships were presented with excellent awards by the South African Weather Bureau. The award in each case was a picture of a South African scene, with a suitably engraved plate attached. The ships which earned rewards for the excellence of reporting last year were the *Southern Harvester*, *Southern Venturer*, *Pendennis Castle*, *Stirling Castle*, *Capetown Castle*, *Clan Chattan* and H.M.S. *Owen*.

CHANGE OF TELEGRAPHIC ADDRESS:

The telegraphic address of the Meteorological Office, Bracknell has been changed to:

Metbrack London Telex (Telex 84160)

MECHANISM PRECISION ANEROID BAROMETERS WITH DIGITAL READOUT FACILITATE WEATHER REPORTING



A large quantity of these instruments has been ordered by the METEOROLOGICAL OFFICE *for use in ships responsible for making official weather reports where their* ROBUSTNESS, PORTABILITY, *and* ACCURACY *under adverse conditions make them the ideal choice.*

RANGE: 900 to 1050 mb. **DISCRIMINATION: 0·02 mb.**

ACCURACY: At 20°C, ± 0·3 mb. At 5°C & 35°C, ± 0·5 mb. Max. change.

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