

# The Marine Observer



*A quarterly journal*

*October 2000*





# THE MARINE OBSERVER

*A quarterly journal prepared by  
The Met. Office Observations–Voluntary (Marine) branch*

VOL. 70

No. 350

OCTOBER 2000

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COVER PHOTOGRAPH: Altocumulus lenticularis seen from the northern approaches to Falkland Sound (Falkland Islands) in August 1998. Photographed by G.C. Grey.

Views expressed in this journal are those of authors and not necessarily those of the Editor or of The Met. Office. All correspondence regarding the journal should be addressed to: **The Editor The Marine Observer The Met. Office OV(M) Scott Building Eastern Road Bracknell Berkshire RG12 2PW, or e-mailed to: obsmar@meto.gov.uk**  
**www.met-office.gov.uk**

LONDON: THE STATIONERY OFFICE

## Excellent Awards for 1999

This round of awards covers the year ending 31 December 1999 and, once again, we are very pleased to acknowledge the time and effort given to the making and transmission of weather observations by observers in the UK Voluntary Observing Fleet. Of the many thousands observations transmitted to The Met. Office during the year, the majority arrived in time to contribute directly to weather forecasting products. Observers are assured, however, that all observations whether or not they were used in this way, have been stored for future use in research and climatological programmes.

The most desirable attribute of any weather observation is quality; all meteorological logbooks are carefully assessed by staff of the Observations-Voluntary (Marine) branch, and the work of the observing teams on the following vessels has been found to be of a very high standard.

In order of merit, the top three vessels for 1999 are:

- 1 *Al Shuhadaa* (Kuwait Oil Tanker Company). Captain P.J. Ward.  
Principal Observing Officers S.D. Bari and F.C. Torres.
- 2 *Western Bridge* (Ropner Ship Management Ltd). Captain I.C. Gravatt.  
Principal Observing Officers M.A. Anthony and D.C. Alwis.
- 3 *Seki Pine* (Denholm Ship Management (UK) Ltd). Captain P.W. Jackson.  
Principal Observing Officers J. Hunter and D.L. Brown.

Information from UK coastal waters, particularly regarding sea temperature, is an important contribution to the forecasting of fog around home shores, and those vessels undertaking this work (reporting in the MARID code) also deserve mention. In this respect, the *Marine Explorer* (Eidesvik Shipping Ltd) has, as in 1998, achieved top place in this category, with *Stena Challenger* (Stena Line Ltd) and *Petro Avon* (Standard Marine Services Ltd) in hot pursuit. We are particularly grateful for the contribution made by all MARID vessels, especially in view of the difficulties experienced by many, during the year, in transmitting weather observations ashore to coast radio stations.

Our thanks go to all observers. The lists on pages 155–157 contain the names of all those nominated to receive an award for their work during 1999, and photographs of the top ships are on page 172. At the time of publication of these lists a letter of official notification will already have been sent to each person named, but we would ask that all observers check the lists, subsequently contacting us if their name appears but no letter has yet been received. Our contact addresses appear on the first page of this edition.

We look forward to receiving your claims for this round of awards. Any UK Port Met. Officer will be pleased to assist or, alternatively, claims can be either emailed to **obsmar@meto.gov.uk** or faxed to the Observations–Voluntary (Marine) branch on +44 (0)1344 855921.



The following have been nominated to receive an award in recognition of the high standard of weather observations made and transmitted during 1999. Those named are advised that the closing date for receipt of claims for these awards is 30 April 2001. The names of Masters are highlighted in **bold face**.

### Excellent Awards (for the year ending 31 December 1999)

Name	Company (see Note 1)	Name	Company (see Note 1)	Name	Company (see Note 1)
Adey, S.*	36	<b>Briand, J.P.</b>	34	<b>Elson, D.J.</b>	4
Agapov, Y.	40	<b>Brierley, J.H.</b>	1	Fardey, C.	20
<b>Ainscough, A.F.</b>	8	Brockbank, C.P.	17	<b>Farrell, G.P.</b>	17
Alayon, L.G.	15	Brown, D.L.	10	<b>Fee, A.J.</b>	26
Alba, R.O.	34	Butler, G.	6	Feleppa, G.M.	26
Alledahm, R.	22	<b>Byrne, K.P.</b>	26	<b>Ferguson, I.G.</b>	9
Allen, S.D.	11	<b>Campbell, C.F.</b>	14	<b>Fillingham, N.</b>	8
<b>Allen, S.R.</b>	27	Campbell, D.	35	Finlayson, I.F.	4
Alwis, D.C.	30	Capes, S.W.	26	<b>Fitton, C.N.</b>	21
Andaya, B.I.	37	Cartwright, J.*	11	<b>Fletcher, L.J.</b>	26
Anderson, P.R.	6	Catt, M.J.	22	Flores, V.T.	37
Anthony, M.A.	30	Chamberlain, R.J.	23	Forrest, R.W.	20
<b>Anvelt, T.J.M.</b>	16	<b>Chambers, P.J.</b>	22	Forrest, T.	6
<b>Avenin, R.C.</b>	38	Charlton, J.	14	<b>French, P.C.</b>	26
Babidar, E.B.	2	Chase, S.C.	30	Fuller, C.	26
<b>Badham, J.F.</b>	14	Chidlow, M.B.	34	Fuller, K.E.	26
Bagaporo, B.I.	37	Cole, S.J.	10	Gabutin, R.M.	16
<b>Ball, A.J.</b>	26	<b>Conway, D.J.</b>	34	Gallacher, S.	26
Banerjee, A.	1	Cooney, J.J.	26	Garner-Richards, P.E.	26
<b>Banton, R.M.</b>	20	Coyle, D.	33	<b>Gaukroger, C.S.</b>	6
Barane, L.*	11	Cropley, D.	26	<b>Gauld, P.D.</b>	23
Bari, S.D.	18	Daria, J.A.	13	Gill, S.S.	38
<b>Barnes, N.</b>	27	Davidson, T.	26	Gloistein, M.	3
Barry, R.G.	17	<b>Davies, C.J.</b>	1	Gonzaga, O.B.	16
<b>Baxter, M.N.</b>	11	Decretales, R.A.	2	Gopal, M.	1
Bayley, T.B.	26	Desai, K.	1	Gove, G.C.	27
Bell, D.G.	26	Devereux, L.*	35	<b>Graham, B.</b>	26
<b>Bent, G.L.</b>	14	Dew, S.J.	26	<b>Gravatt, I.C.</b>	30
Berglund, P.	28	Dewan, P.D.	1	Gray, I.R.	21
Beveridge, A.S.T.	33	Dhule, P.D.	1	<b>Greig, N.J.</b>	6
<b>Beveridge, D.L.</b>	33	<b>Dixon, J.L.W.</b>	26	Greig, R.D.	27
Bhadra, J.K.	1	<b>Dixon-Carter, R.B.</b>	22	<b>Greig, T.R.</b>	17
Bingham, M.W.	10	<b>Dobson, J.F.</b>	9	Gunasekara, K.W.K.	19
Blacker, N.J.G.	4	Donnelly, M.P.	33	Guthrie, G.	20
Blair, I.R.	21	Doshi, R.	1	Hale, J.A.	26
<b>Booker, P.A.</b>	17	Dumangas, G.	16	Hansen, F.J.	31
Booth, M.J.	17	Dunlop, J.A.*	35	<b>Hawkins, B.F.</b>	15
Borbon, G.M.	37	Echin, R.P.	14	Heslop, P.	3
<b>Boreman, J.</b>	20	<b>Ellis, A.W.</b>	26	Hill, M.K.	26
Bradley, M.	9	<b>Ellsmoor, R.M.</b>	1	Hingpit, H.C.	24

## Excellent Awards (*contd*)

Name	Company ( <i>see Note 1</i> )	Name	Company ( <i>see Note 1</i> )	Name	Company ( <i>see Note 1</i> )
Hiremath, G.C.	1	<b>MacCorquodale, D.</b>	26	Pacis, R.A.	14
<b>Hodgson, A.</b>	35	Mackay, E.	27	Pacuk, M.	29
Holmes, C.E.	33	Mackenzie, A.	26	<b>Parsons, R.A.</b>	12
Holmes, J.C.	23	MacKinnon, N.J.	26	Patnakar, B.G.	1
<b>Holmyard, E.M.</b>	1	<b>MacPherson, A.D.</b>	41	<b>Peaston, G.J.H.</b>	26
Hope, W.D.	26	MacSweeney, R.P.	20	<b>Pereira, F.K.</b>	1
Hopton, C.C.	14	<b>Mansbridge, M.</b>	6	Phadke, S.B.	8
<b>Horsburgh, O.S.</b>	33	<b>Marr, D.</b>	17	Pierce, R.	20
<b>Howarth, M.J.</b>	1	<b>Marshall, J.B.</b>	3	Pink, L.C.	41
<b>Hughes, C.J.A.</b>	26	Marsham, J.I.N.	17	<b>Plumley, R.C.</b>	23
Hughes, C.J.	26	Mathews, S.	1	Puttock, C.G.	26
Hunter, J.	10	Mathias, G.	26	<b>Rafferty, P.G.</b>	19
Ilar, R.	18	Mayers, N.P.	26	Rajesh, T.	1
Inserto, R.	15	McCardle, P.G.	5	Ramsay, M.	6
Iqbal, S.	26	McCarthy, J.A.	3	<b>Ramsbottom, M.</b>	28
Irani, D.B.	1	McCormack, W.	5	Ravindran, B.	1
<b>Jackson, P.W.</b>	10	McHardy, F.	28	Rayburn, A.C.	26
Jassim, K.F.	26	McMahon, T.	17	Razbitnov, I.	41
Jayatilleke, L..P.G.	19	Mealor, J.	13	Recamadas, S.O.	7
Jayawickreme, S.R.	39	<b>Mesbah, M.</b>	40	Reyalosa, T.P.	19
Jenkins, L.A.	26	Middleton, C.	25	Ridyard, O.R.	26
Jeppesen, J.	29	<b>Miley, P.A.</b>	1	Rifkman, M.H.M.	19
<b>Jewell, M.C.J.</b>	33	<b>Millar, J.J.</b>	41	<b>Robinson, D.</b>	14
<b>Johnson, L.H.M.</b>	26	<b>Milloy, J.M.</b>	1	Rojesh, S.	1
<b>Jones, B.N.</b>	2	Milner, J.A.	26	Russell, M.E.	9
Jones, W.K.*	36	Minnitt, N. G.	32	Ruszczynski, P.	14
Kaul, S.	37	Miraflores, M.	14	Samin, M.A.	26
<b>Kelleher, J.N.</b>	26	Miranda, M.	1	Sarma, R.N.	1
<b>Kenchington, R.</b>	26	Mistry, N.F.	8	Selvido, D.A.	32
<b>Khan, M.I.</b>	20	<b>Mottram, C.A.</b>	22	Semilla, J.	29
Kitteringham, D.	4	Murray, P.A.	17	Senador, T.F.	4
Klaminsky, A.	16	Nabor, F.R.	7	Shahadah, M.	26
<b>Knight, R.</b>	25	Naj, S.	1	Sharma, P.	4
<b>Lacey, A.G.</b>	17	Neale, R.J.C.	26	Shearer, A.N.	6
Lapitan, L.C.	14	<b>Nicholls, G.</b>	1	Shenai, U.C.	1
Lavis-Jones, A.*	36	Nicholson, R.	26	Silva, G.A.	30
<b>Lawrence, S.J.</b>	3	Nonato, J.N.	16	Simpson, B.R.	26
<b>Lax, D.W.</b>	26	<b>Nordfjord, S.</b>	4	Singh, S.	1
Leyland, T.B.	26	Nyunt, T.	10	Siwach, S.	8
Liddell, A.A.	26	Oliver, G.R.	12	Siyukov, A.	41
<b>Liden, T.E.</b>	16	<b>Olley, D.G.</b>	13	Smart, J.	25
Littlewood, M.	22	Oriatto, J.	31	<b>Smeeton, J.A.</b>	1
Lobo, A.G.M.	8	Osel-Amoako, I.	2	Smith, D.A.	33
Lowcock, S.*	35	Owoso, T.A.	23	Smith, E.L.	27
MacCallum, A.	33	Paala, R.C.	15	Smith, K.R.	26

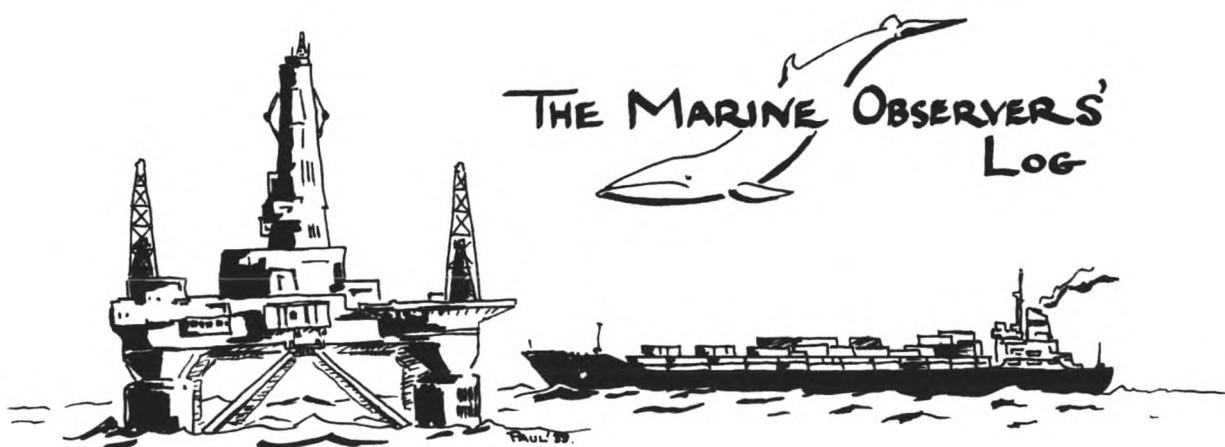
## Excellent Awards (*contd*)

Name	Company (see Note 1)	Name	Company (see Note 1)	Name	Company (see Note 1)
Smith, M.	12	Thompson, J.	9	<b>Ward, P.J.</b>	18
Sorra, M.	16	<b>Thomson, G.K.</b>	2	Wardle, D.	41
Spencer, P.	17	Tolosa, B.A.	19	Warner, R.A.	23
<b>Stares, M.J.</b>	17	<b>Tongo, F.O.</b>	15	<b>Watson, M.A.</b>	6
Stevens, D.	26	Topczewski, G.	6	Webb, G.D.	22
<b>Stockley, R.A.</b>	5	Torres, F.C.	18	<b>Whittaker, T.G.</b>	26
<b>Sturgess, J.E.</b>	19	Tudor, S.B.	1	<b>Whitty, J.V.</b>	31
Sukanov, A.	16	Ul, S.	1	<b>Winser, D.S.</b>	19
Tandog, P.	14	Vaswani, S.G.	1	<b>Winter, B.</b>	37
Tasker, B.R.G.	10	Villas, A.C.	2	<b>Woomble, J.B.</b>	19
Taylor, K.C.	22	Vinarao, D.	22	Worthington, J.G.	17
Teodoro, D.C.	14	Wade, G.E.	26	<b>Worthington, K.</b>	26
Terriza, G.J.	30	<b>Walker, M.J.</b>	1	<b>Wright, H.S.</b>	14
<b>Thompson, B.</b>	32	<b>Wallbom, A.</b>	16	Young, R.*	11
<b>Thompson, D.C.</b>	26	Ward, J.S.	17	Zubeir, S.	18

*Note 1.* The digit(s) entered under 'Company' indicate the employing shipping company, manager or operator, according to the following list.

1 Associated Bulk Carriers (London) Ltd	22 Mobil Shipping Co. Ltd
2 Acomarit (UK) Ltd	23 NERC Research Vessel Services
3 British Antarctic Survey	24 Norbulk Shipping UK Ltd
4 Bergesen d.y. ASA	25 P&O Cruises UK Ltd
5 Boston-Putford Offshore Safety Ltd	26 P&O Nedlloyd Ltd
6 BP Amoco Shipping Ltd	27 P&O Scottish Ferries Ltd
7 Blue Star Ship Management Ltd	28 Reading & Bates Falcon Ltd
8 BT Shipping (London) Ltd	29 Red Band AS
9 BUE North Sea Ltd	30 Ropner Ship Management Ltd
10 Denholm Ship Management (UK) Ltd	31 Sealion Shipping Ltd
11 Eidesvik Shipping Ltd	32 South African Marine Corporation Ltd
12 F.T. Everard & Sons Ltd	33 Scottish Fisheries Protection Agency
13 Furness Withy (Shipping) Ltd	34 Shell Marine Personnel (IOM) Ltd
14 Great White Fleet Ltd	35 Standard Marine Services Ltd
15 Hoegh Fleet Services AS	36 Stena Line (Holyhead) Ltd
16 Holy House Shipping AB	37 Sosema S.A.
17 James Fisher (Shipping Services) Ltd	38 V.Ships (UK) Ltd
18 Kuwait Oil Tanker Company	39 Wah Tung Shipping Agency Co. Ltd
19 London Ship Managers Ltd	40 Wallem Shipmanagement Ltd
20 The Maersk Company Ltd	41 Andrew Weir Shipping Ltd
21 Maersk Co. (IOM) Ltd	

*Note 2.* \* Denotes observers sending reports in the MARID code.



*The Marine Observers' Log* comprises observations of interest and value contributed by weather observers primarily from the UK Voluntary Observing Fleet. Responsibility for each item rests with the contributor although texts may be subject to amendment at the discretion of the Editor.

Unless otherwise stated the following apply: all temperatures are degrees Celsius; barometric pressure is given in millibars (mb), although the standard international unit is the hectopascal (hPa) which is the numerical equivalent; 'miles' where mentioned are nautical miles.

## Depression

North Sea

29 November 1999

**m.v. *North Pacific*. Captain A. Tewari. Brofjorden to Scapa Flow. Observers: Captain Tewari and ship's company.**

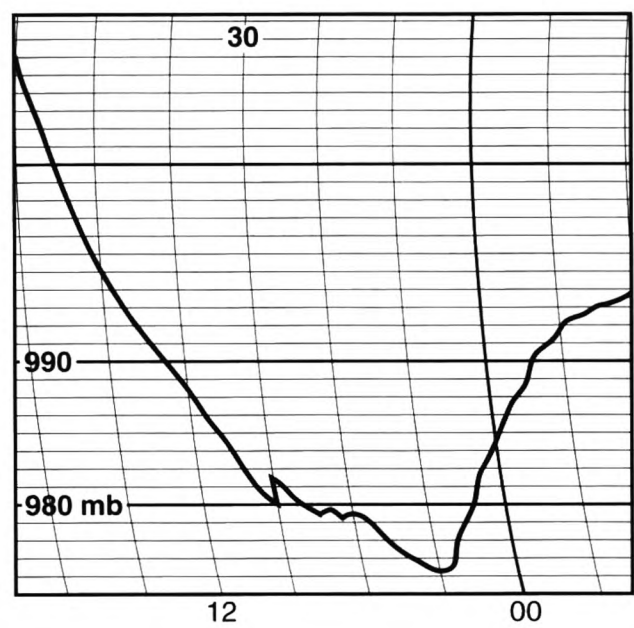
The vessel departed Brofjorden at 0912 UTC on 29 November and, by 1200, was experiencing winds of hurricane force accompanied by very rough 'seas and phenomenal swell. The air temperature at this time was 12° while the pressure was 994 mb, rising sharply. These conditions were associated with a deep depression which was moving north-east over southern Norway. The heavy swell and gale-force WNW'ly winds continued until 1600 but then improved, relatively, as the ship parted company with the depression and sailed into the South Utsire sea area.

On the 30th, two depressions, with central pressures of 968 mb and 973 mb, were noted south of Iceland moving eastwards. The swell became confused, comprising two systems; the first was a heavy swell from the north-west while the second was from the south-west. Intermittent rain showers fell until about 1200 before giving way to continuous rain.

The following table has been compiled from further details supplied by the observers, and indicates the weather conditions encountered during the day.

Date and time	Temperature		Pressure Dir'n	Wind		Remarks
	Air	Wet bulb		Force		
30th Nov. 0200	8.0	8.0	1015.0	SW 6	}	Overcast sky. Confused swell. Two depressions south of Iceland moving eastwards.
	10.0	9.5	1008.0	SW 7		
1200	11.0	10.0	988.0	SW×W 7	}	Pressure falling steadily. Wind increasing. Visibility affected by spray and rain. Heavy, deep swell caused by low south-west of Iceland deepening to 956 mb.
1400	11.0	10.0	984.0	WSW 8		
1600	10.0	10.0	981.0	W 10		
1800	10.0	9.0	979.0	W×N 10		
2000	10.0	10.0	977.0	W×N 11		

During the next four hours the pressure continued to fall, steadying at 976 mb at about 2100, then started to rise slowly as the wind veered to WNW'yly, force 11 with the depression passing less than 50 miles to the east of the vessel. The barograph chart shows the pressure changes experienced.



Between 0000 and 1200 on 1 December the pressure rose steadily, reaching 996 mb by 1200. The wind veered to NNW'yly, gradually decreased to force 5, and the clouds dissolved. Swell conditions remained heavy.

The *North Pacific* has a permanent ballast capacity of 40,000 tons, but an additional 24,000 tons of heavy weather ballast were required for the maintenance of course and headway. The ship's position at noon on 30 November was 58° 28' N, 02° 51' E.

**In brief:** A waterspout was sighted from the *Foylebank* on 24 October 1999 by Captain E. Stewart, Second Officer V. Tarubarov and Third Officer S.J. Wallace when the ship was in position 36° 42' N, 12° 46.3' W. Disturbance of the sea surface was easily visible but the waterspout itself was harder to see. The spout lasted for six or seven minutes, passing astern about half a mile away.



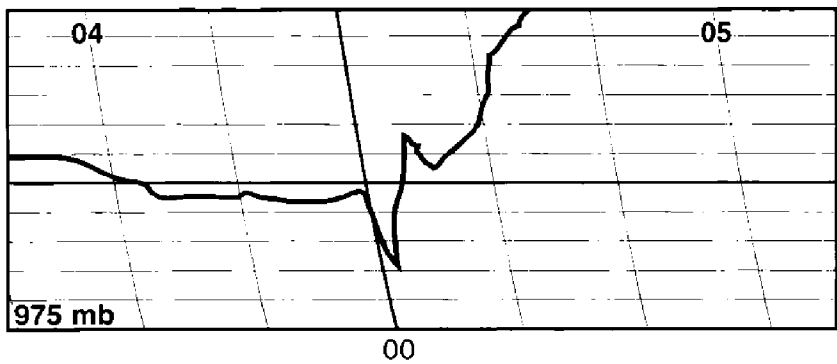
# Passage of front

North Sea

5/6 November 1999

**Glomar Adriatic XI (Offshore installation).**  
**Observer: S. Mulvana. Radio Operator.**

A sudden and very marked change in pressure was experienced during the night of 5/6 November 1999 as a depression passed close to the installation. The barograph trace shows the steep fall and rise in pressure, and the table summarises the weather conditions before and after the event.



Date and time		Dry-bulb temperature	Pressure	Wind		Sea (m)	Cloud (oktas)	Visibility (miles)	Weather
				Dir'n	Speed (kn)				
5th Nov	0600	9.0	991.0	200°	35-42	3-3.5	8	8	No rain
	1200	9.2	989.0	180°	40-44	6-8	8	2	Rain
	1800	9.0	981.0	210°	25	4	8	10	Rain
	2359	9.0	980.0	200°	30	4	8	8	Rain
6th	0030	—	978.0	—	50+	7+	8	—	V. heavy rain
	0100	—	—	300°	—	—	—	—	—
	0130	—	978.0	—	62	—	8	—	Torrential rain
	0600	6.0	988.0	310°	50-60	6+	8	2-3	Heavy rain

*Note.* Some elements were unobserved owing to darkness and prevailing weather conditions. At 0130 on the 6th, the wind speed of 62 knots was constant.

The seas peaked at 9–10 m at about midday on the 6th, and by approximately 1800 the rain had stopped. The wind also eased to 40 knots and the pressure started to rise. The installation was sited at 54° 00' N, 00° 48' E.

# Waterspout

South China Sea

12 November 1999

**m.v. Erradale. Captain M. Pidgeon. Tubarao to Beilun.**  
**Observers: N.M. Hennessy, 2nd Officer and R.L. Chadwick, Deck Cadet.**

Whilst the vessel was following a course of 009° at 14 knots, the observers noted a circular patch of agitated water about 10 m in diameter at one mile on the starboard bow. Upon closer inspection as the patch passed 20 m down the starboard side, it was noticed that concentrated winds were causing mild 'chop' with slight spray in an anticlockwise direction across the diameter. The ship's position was 12° 50.7' N, 118° 56.3' E.

A slight increase in the wind speed was also noted but this dropped as the vessel passed the area. The observers wondered if the phenomenon was perhaps the beginnings of a waterspout.

At the time of the sighting the air temperature was  $30^{\circ}$ , the wet bulb was  $25.8^{\circ}$  and the pressure was 1007.8 mb. The cloud cover was 4 oktas of cumulus having a moderate vertical extent.

## Waterspout

Indian Ocean

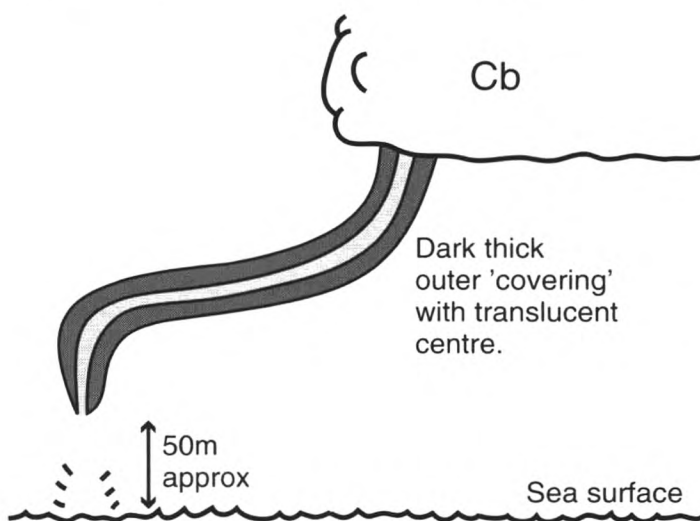
12 December 1999

**m.v. *Providence Bay*. Captain D. Batchelor. Suez Canal to Singapore.**

**Observers: Captain Batchelor, C.G. Puttock, 3rd Officer and members of ship's company.**

The vessel was approaching the coast of Sri Lanka at 0415 UTC, in position  $05^{\circ} 57.4' \text{ N}$ ,  $79^{\circ} 39.1' \text{ E}$ . when a waterspout was observed forming. It started as a small funnel extending from the following end of a large cumulonimbus cloud, then became an almost complete spout which stopped about 50 m short of the sea surface. Its direction of movement was south-east.

As indicated in the sketch, the waterspout was not straight, and showed a thick outer 'covering' with a translucent central core. The sea below the spout was slightly agitated, with an area of 5–10 m being disrupted.



After five minutes the spout appeared to start breaking up in its middle section and, once that had happened, it quickly dissipated. Temperatures at the time were: air  $27.9^{\circ}$ , wet bulb  $24.9^{\circ}$ , sea  $28.2^{\circ}$ ; the wind was WNW'ly, force 4, and the cloud cover was 8 oktas.

**In brief:** Excellent visibility was noted at 1300 UTC on 10 November 1999 when Captain I.C. Gravatt and Third Officer M.A.G.S. Anthony on the *Eastern Bridge* sighted the summit of Pico on Pico Island in the Azores. The peak is 2,351 m high, and the vertical sextant angle of  $02^{\circ} 40.2'$  gave a distance to the island of 33 miles.

## **Thundery weather**

**Mediterranean Sea**

**8 December 1999**

**m.v. *Shenzhen Bay*. Captain D.W. Lax. Southampton to Port Said.**

**Observers: G. Mathias, 3rd Officer.**

At 1500 UTC large cumulonimbus clouds, with and without anvils, were stretching over the whole of the eastern horizon while rain clouds were visible on radar 6 miles ahead of the vessel. Numerous lightning bolts were visible at this time, and a waterspout was seen 3 miles ahead.

At 1510 rain commenced, and 10 minutes later when the vessel was beneath the clouds the rain stopped. Thunder and lightning were all around the vessel, and there was no increase in wind speed or change in the wind direction [at 1200 the wind direction was variable, force 1]. At 1525 torrential rain accompanied by hail was experienced, reducing the visibility to 50 m. At this point the barograph trace rose vertically by 1 mb

Twenty minutes later the vessel was passing clear of the cumulonimbus clouds and the rain eased but electrical activity was still visible all around the horizon. At the start of the observation, the ship's position was 32° 40' N, 28° 16' E.

## **St Elmo's fire**

**Red Sea**

**18 December 1999**

**m.v. *Colombo Bay*. Captain P.D. Davies. Singapore to Suez.**

**Observers: Captain Davies, R. Halewood, 3rd Officer and ship's company.**

At 0435 UTC while passing through a heavy rain shower the observers saw lightning although no thunder was heard at first. From the wheel-house a loud 'buzzing' noise was heard coming from the bridge wing. Upon investigation it was deduced that the cause was St Elmo's fire although the glow could not be seen in daylight.

When the observers' arms were raised, it was possible to feel the discharge of static electricity into the air, giving a mild shock; hair on arms and heads was also standing 'on end'. A flash of lightning would 'release' the static, which would then build up once more until the next flash. This phenomenon persisted for about 45 minutes. The ship's position was 17° 09.6' N, 40° 44.8' E.

## **Thunderstorm**

**Eastern North Atlantic**

**18 October 1999**

**m.v. *British Resource*. Captain P. Hebden. Cape Town to Rotterdam.**

**Observers: M. Cumpstey, Chief Officer, T. Rutledge, 2nd Officer, A. Svenningsson, Supernumerary and ship's company.**

At about 0500 UTC, when the ship was off Dakar on a course of 360° at 12 knots, an intense electrical storm commenced with the passage of several squalls which were followed by heavy rain, thunder and lightning. The squalls were observed on both the 3-cm and 10-cm radars while lightning was discharging between the clouds and between clouds and the sea. During the heaviest activity, at about 0620 (when the ship's position was approximately 17° 12' N, 18° 06' W) thunder was audible three or four seconds after each lightning flash. The storm then weakened and, when daylight arrived, thunder-clouds with strong vertical extent could be seen. St Elmo's fire was present on the tops of the ship's aerials.

After the storm was over, at about 0800, hundreds of locusts were found on deck; they ranged in length from 1 cm to 4 cm, and in colour from green, to buff, to black. Their chirping sounds could be heard intermittently all around the ship, in the air-conditioning ducts and on deck.

## **Thunderstorm**

**North Atlantic Ocean**

**14/15 December 1999**

**m.v. *Torben Maersk*. Captain I. Khan. Algeciras to Pointe-à-Pitre, Guadeloupe. Observers: Captain Khan, G. McCarthy, Chief Officer and D. O'Donovan, 3rd Officer.**

A prolonged and intense thunderstorm was experienced between 2100 UTC on the 14th and 0100 on the 15th during which time the ship was almost constantly lit up by lightning flashes, sometimes several at once and from different directions. It was assumed that there were several thunderstorm cells in action rather than one very large storm. The ship's position at 2300 on the 14th was 21° 44' N, 44° 28' W.

## **Current**

**Indian Ocean**

**11 October 1999**

**m.v. *Singapore Bay*. Captain P.A. Furneaux. Singapore to Suez. Observer: R.G.C. Noble, 1st Officer.**

As the vessel approached Socotra on a course of 286° at 21 knots, a very strong set to the south-south-east (170° × 2.5 knots) was experienced at 1400 UTC. This was in direct opposition to the wind experienced at the time, which had backed to S'ly and increased to force 7. The sea temperature had also increased from 26.2° (at the reading taken at 1200) to 27.3°; no unusual change was noticed on the barograph trace.

Reference was made to the *October Routeing Chart for the Indian Ocean (5126-10)* which indicated that an easterly or even east-by-northerly set of up to 1.5 knots should be expected, plus light NE'ly winds. The conditions experienced at this time were obviously completely at odds with those indicated in relevant publications. The vessel's position at the start of the observation was 12° 03' N, 58° 23' E, while at 1600 when the observation ended, it was 12° 12' N, 57° 43' E.

**In brief:** At 0315 UTC, as the dawn daylight increased, a narrow band of cloud was noted at the horizon by J.G. Swindlehurst, First Officer on board the *Mairangi Bay*. Very shortly before sunrise a 'reflection' of the sun appeared at the upper edge of this band. Then, as the sun appeared, a green flash lasting approximately seven seconds was seen. The ship's position was 34° 22' S, 23° 18' E.

**In brief:** On 5 December 1999, four or five whales were spotted from the *British Valour* by Chief Officer L.N. Paul, when the ship was at 33° 08' S, 37° 38' E. They were about 15 m long and were on the same heading as the ship, 069°. As they were being passed, the closest one did a 'back flip' and was given almost full marks for 'artistic impression'. It was thought that they may have been Sei Whales.

## Iceberg

South Pacific Ocean

18 October 1999

**m.v. *Palliser Bay*. Captain S. Smith. Port Chalmers to Lisbon.**

**Observers: Captain Smith, J. Nuttall, 3rd Officer and J. Southam, Cadet.**

Whilst the ship was following a course of 090° a tabular iceberg was sighted in position 55° 00.1' S, 139° 33.9' W at 1100 UTC and the ship's course was then altered to 120° in order to pass south of it.

The berg was sighted at 17 miles, and was half a mile long with a height of 30–40 m; it was plotted on the radar and seemed to be moving south-south-east at about one knot. No further icebergs of any form were seen. Temperatures at the time were: air 1.2°, wet bulb 0.7°, sea 3.5°. The wind was WxS'y, force 7.

## Dolphins

North Atlantic Ocean

5 November 1999

**m.v. *City of Cape Town*. Captain G.J.H. Peaston. Cape Town to Las Palmas.**

**Observer: J.H. Beale, 2nd Officer and passengers.**

On a bright but cloudy day with a rippled sea and no swell, 50–60 dolphins were spotted swimming towards the vessel's starboard side at 1422 UTC, jumping in the normal 'porpoising' fashion, often over each other. On approaching the vessel's side they quickly turned away and reversed their course.

This gave the observers an opportunity to note the classic 'figure of eight' markings of the Common Dolphin. No juveniles were seen. When passing through the substantial wake of the vessel, a few dolphins were seen jumping in an upright manner identical to the actions of performing dolphins in captivity. Such behaviour had not been seen in the wild before, and it added to the spectacle of seeing a large group of dolphins together.

At the time of the dolphins' appearance, the ship's position, course and speed were: 08° 22' N, 15° 29' W, 323° at 20.6 knots.

*Note.* Kelly Macleod, of the Natural Resources Institute, University of Greenwich, said:

"The Common Dolphin (*Delphinus delphis*) is perhaps one of the easiest dolphins to identify. This species occurs in large groups, often of several hundred individuals, and readily approaches boats to bowride. Its energetic swimming style, during which dolphins will clear the water, gives observers an ideal opportunity to see the 'hourglass' pattern on this species' flanks. Most noticeable is the yellow-tan colour of the forward flank, although this varies between the two distinct forms of this species — the long-snouted and short-snouted varieties.

"The observers comment on the behaviour of some of the dolphins, which included vertical leaps. This species is also known to slap the water with its chin, flippers and flukes (lobtailing) and may perform complete somersaults. This behaviour is completely natural unlike that seen by dolphins held in captivity. In display facilities dolphins (most commonly Bottlenose Dolphins — the 'Flipper' variety) have to perform to get their reward of fish. In the wild, such displays may have a variety of functions including communication, sexual display or they may simply be play activities for fun."

*Editor's note.* A photograph of Common Dolphins appears on page 123 of the July 2000 edition of *The Marine Observer*.



## Whales

South Atlantic Ocean

7 October 1999

**m.v. *British Resource*. Captain P. Hebden. Kharg Island to Rotterdam.**

**Observers: Captain Hebden, T. Rutledge, 2nd Officer, G. McCracken and P. Reucki, 3rd Officers, and B. Hughes, Cadet.**

The ship was stopped for engine repairs at approximately 0700 UTC at which time it was about 270 miles off the Namibian coast. Two whales were sighted about one mile off the port bow, passing astern.

When the ship had been drifting for about four hours the whales returned and swam around it, diving and reappearing, being very inquisitive. They left but then returned five hours later, again swimming around the bow and coming right up to the ship's sides. Staying with the ship until darkness, they were identified as Humpback Whales; there were encrustations of barnacles on their tails and fins, they raised their flukes upon diving and there was a white underside to the belly, fins and tail. The blow extended to about 1.5 m, and the whales were close enough for their breathing to be heard. The whales investigated the vessel until 1730, and during this time a pod of 10–15 pilot whales was also seen passing astern. The ship's position at 1730 was 23° 47.2' S, 09° 10.1' E.

*Note.* Kelly Macleod said:

“This sighting of Humpback Whales (*Megaptera novaeangliae*) is very close to one of the main winter breeding grounds, known as the Gabon grounds, which extend from in the Gulf of Guinea from eastern Nigeria to about Lobito, Angola. This species seems to show little fear of boats and is known to be inquisitive. Humpbacks also have distinctly ‘knobbed’ flippers and heads. In general, the underside of the flippers is white but the degree of ‘whiteness’ on the undersides of the belly and flukes varies. There is such a significant difference geographically in the colouration of Humpbacks, in terms of the amount of white on their underside, that arguments were made for them to be divided as subspecies. However, the generally accepted view is that they are a single species i.e. monotypic.”

## Whales

South Pacific Ocean

8 December 1999

**m.v. *Berlin Express*. Captain A. Spencer. Port Chalmers to Rio Grande (Brazil).**

**Observers: Captain Spencer and D.C. Winter, 1st Officer.**

The ship was in position 45° 44' S, 171° 20' W on a heading of 090° at 20 knots when numerous whale blows were sighted on both bows some 5 miles ahead. Upon nearing the group about 20 blows were counted, some reaching 5 m in height. Unfortunately, little was seen of the whales although a glimpse of one showed a slightly curved dorsal fin. The blows were sighted until 1830 and then sporadically for the following two hours.

**In brief:** Three Killer Whales were sighted from the *Maersk Baffin* on 25 October 1999 when the vessel was in position 35° 00' S, 38° 34' W. They were spotted 400 m off the port beam, and their distinctive blows, colouring and dorsal fin made identification easy. Third Officer J. Carter and Chief Officer D. Brearley watched them for two or three minutes.

## Fish

North Atlantic Ocean

15 October 1999

**m.v. *CGM Caravelle*. Captain R.M. Raybould. Kingston to Rotterdam.**

**Observers: Captain Raybould, D. Miller, Chief Officer and most of ship's company.**

Whilst the vessel was drifting and undergoing engine repairs, the Master spotted two fish swimming very close to the surface near the vessel's starboard quarter. They were approximately 1.5 m long and were coloured blue above, pale beige below, and had yellow tail fins; the tips of the tail fin also seemed to show long thin 'extensions'.

The fish stayed around the quarter for a while, seeming to know they had an audience (most of the ship's company was present for a boat and fire drill). Unfortunately, by the time a camera could be produced, they had swum away. At 1520 UTC (the time of the sighting) the ship's position was 23° 34' N, 66° 35' W.

## Locusts

North Atlantic Ocean

9 November 1999

**m.v. *British Hawk*. Captain K.E. Peacock. Malaga to Gamba.**

**Observers: Captain Peacock, J. Rumsby, Chief Officer and D. Sutton, 3rd Officer.**

Whilst approximately 80 miles south-south-west of Dakar, in position 13° 32.6' N, 17° 43.2' W, and on a heading of 180° at 16 knots, the vessel was found to be hosting two isolated locusts at 0930 UTC. They were grey in colour and about 9 cm long. The average wind direction and speed was 030° at 13 knots. A report of the finding was telexed to the Food and Agriculture Organisation in Rome. During the course of the day more sightings of locusts were made, the insects ranging in size and colour. Several were very small, about 20 mm long, of a sandy colour and could have been taken to be grasshoppers.

A few were slightly larger, measuring up to 40 mm; these were mainly sandy in colour and had a definite 'locust' shape. One or two insects were larger again, at 40–60 mm long, and more of a light-brown colour, but the largest, at 90 mm, were light-brown to grey in colour.

Actual numbers were difficult to assess what with reports coming in from different parts of the ship, and two sparrow-like brown birds darting about and having a feast on the insects.

A Nav warning had been received two days earlier with a request to report any locust sightings to the local coast station, but the areas of concern were south-east Spain and the Canary Islands. The *British Hawk* was some distance from both.

*Note.* In his reply to the telex sent from the *British Hawk*, Keith Cressman, Locust Forcecast Officer with the Food and Agricultural Organisation, Rome, said:

"... it is difficult to say with precision what species you are seeing, but my best assessment is that what you do not, repeat do not have, are desert locusts because it is too far south for them. Instead, they may be either African migratory locusts (*locusta*) or ose (*Oedaleus senegalensis*), or both. Our trajectory model suggests that these are arriving from south-west Mauretania and western Senegal. We understand that there has been very good ose breeding this summer in the former."

## Bird

North Pacific Ocean

3 December 1999

**m.v. C.S. Nexus. Captain D. King. Cable laying.**

**Observers: Captain King and ship's company.**

The vessel was engaged in cable-laying operations 500 miles north-east of Hawaii when, at approximately 0300 UTC, a hawk-like bird was seen roosting on the foremast. By searching back issues of *The Marine Observer*, the bird was identified as a Peregrine Falcon. Later in the day the bird was watched as it caught and fed upon a smaller unidentified bird. It was noted that a similar report of this species has been made before from the same area. The falcon remained with the vessel for about two days.

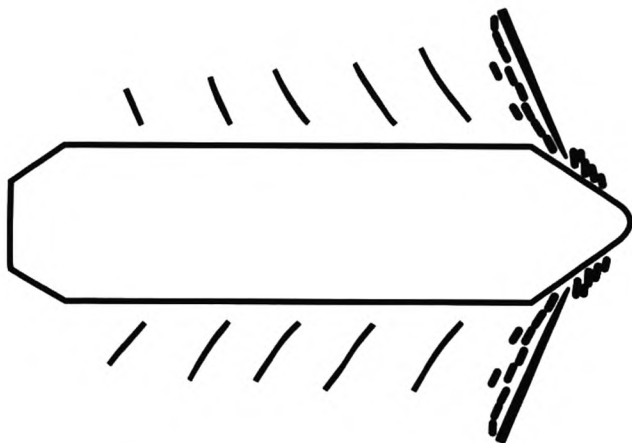
## Bioluminescence

Indian Ocean

10 December 1999

**m.v. British Skill. Captain B. Pritchard. Singapore to Yanbu.**

**Observer: S. Moss, 2nd Officer.**



At 2300 UTC on a moonless night the observer noticed quite bright flashes of light in the bow wave as it broke. An idea of its appearance is given in the sketch. The phenomenon continued down each side of the vessel in the waves caused by its movement.

The bioluminescence continued for a further 10 minutes, increasing in

intensity only in the bow wave itself before ceasing quite suddenly, only to reappear intermittently until sunrise. Temperatures at the time were: air 27.5°, wet bulb 24.5°, sea 29°. The ship's heading was 267° in position 05° 59' N, 91° 45' E.

**In brief:** A swarm of bees was discovered attached to a pipeline on the starboard side of the maindeck on the *Maracas Bay*. It was thought that the bees had joined the ship whilst it was alongside at Point Lisas on 30 November.

**In brief:** Bioluminescence in the form of patches was seen around the *Comanche* at 2000 UTC on 27 December, in position 28° 08' S, 12° 43.4' E. The patches were 4–6 m in diameter and were seen all along the ship's sides for two hours although they gradually reduced after the first 15–20 minutes. The ship's heading was 323° at 13.5 knots, and the sea-water temperature at the time was 21°.

## Discoloured water

Indian Ocean

27 November 1999

**m.v. *Pegasus Bay*. Captain T.D. Morrison. Table Bay to Fremantle.**

**Observer: P.B.W. Newton, Chief Officer.**

At 1020 UTC the vessel passed through a patch of discoloured water in position 35° 24' S, 105° 32' E. The water was a dark red-brown colour and covered an area of about 300 m by 100 m, while its depth was estimated to be 3–4 m. The discolouration was thought to have been caused by natural phenomena rather than by pollution. The water depth at the time of the observation was 5,000 m and the sea-water temperature was 17.9°; the wind was SW'ly, force 3 and there was a south-westerly swell of 3 m.

## Discoloured water

South Atlantic Ocean

19 December 1999

**m.v. *York*. Captain J.M. Milloy. Montoir to Huasco.**

**Observers: Captain Milloy, and L.J.A. Vaz, Chief Officer.**

The ship was on a heading of 220° at 12.5 knots in position 43° 00.7' S, 52° 17.2' W when, at 2128 UTC, patches of reddish-brown discolouration were noted in the sea, stretching for about 0.4 miles fore and aft, and 0.3 miles athwartship. The sea temperature at the time was 14° and, upon consulting reference books, the phenomenon was found to be either plankton in a very dense cluster, or plankton being killed as a result of the sudden change in sea temperature (16° at 1200). At the time, the vessel was about 450 miles seaward of the north-east coast of Argentina — an area not known for the occurrence of this type of phenomenon.

**In brief:** A large school of about 100 unidentified dolphins surrounded the *British Ranger* in position 18° 19' N, 57° 27' E on 26 November 1999. Third Officer A. Chalk and L. Henderson, Cadet watched as many jumped well clear of the water, and also noted that there were also distinct groups within the school.

**In brief:** A lunar fogbow was observed from the *Colombo Bay* on 26 October when the vessel was in the Sicily Channel. Third Officer C.W. Longmuir and M. Fry, SM1 observed it along the port side for about 15 min, but although the arc was clearly evident, no colours could be distinguished and it appeared a milky-white colour. The vessel was in fog at the time, the visibility being 0.75 miles, and the moon was astern at an elevation of approximately 45° and at 96 per cent full.

**In brief:** A school of about 20 small dolphins was sighted from the *P&O Nedlloyd Southampton* on 3 December 1999 by Second Officer L. Rainford and Third Officer G. Feleppa. The dolphins were medium grey over their top halves, with white patches on parts, or most of, their undersides. They were highly acrobatic, leaping in the air and breaching upside-down, and were thought to be spinner dolphins because of this activity. The ship's position was 08° 46' N, 69° 07' E.

**In brief:** On 25 November 1999 during a crossing of the Irish Sea from Fleetwood to Larne, a single unidentified dolphin was spotted from the *European Seafarer*.

**In brief:** At sunset on 19 December 1999, an extreme green flash was observed as the sun dipped below the horizon in a totally cloudless sky. The flash was witnessed from the *Maersk Humber* by Captain N. Vause and Chief Officer P. Wood, the vessel's position being  $23^{\circ} 54.8' \text{ N}$ ,  $108^{\circ} 24' \text{ W}$  on passage between Topolobampo and Salina Cruz.

## Meteor shower

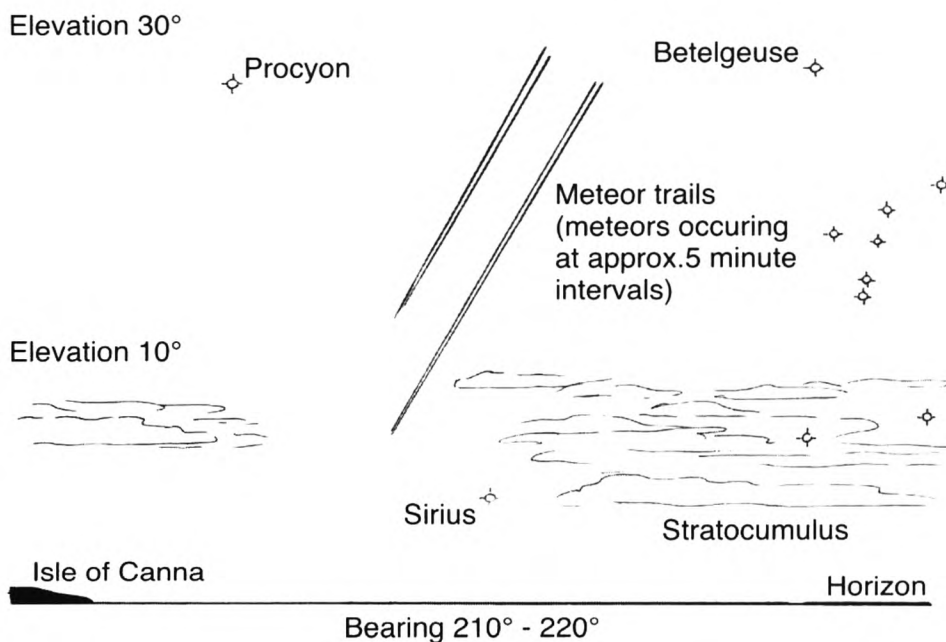
Sea of the Hebrides

14 December 1999

**f.p.v. Norna. Captain M.C.J. Jewell. Fishery Patrol duties.**

**Observers: M. Donnelly, 1st Officer and R. MacNeil, SG1A.**

At 0400 UTC meteors were sighted between bearings of  $210^{\circ}$  and  $220^{\circ}$ , first appearing at about  $30^{\circ}$  elevation, between Procyon and Betelgeuse. See sketch.



Their rate of fall was one every two or three seconds up to 0410, decreasing to about one every five minutes by 0500. The meteors left trails behind them, as indicated in the sketch, these fading away in the region of  $10^{\circ}$  elevation.

By 0500 the cloud cover, consisting of stratocumulus, was increasing, and further observation was made difficult. During the period of observation, the ship's heading was  $125^{\circ}$  at 4 knots in approximate position  $57^{\circ} 16' \text{ N}$ ,  $06^{\circ} 40.5' \text{ W}$  with the island of Skye to the north, and Canna to the south.



## ... and finally

Wherever possible we endeavour to print observers' sightings together with full expert comment and analysis. Should our production schedule preclude this, then we will publish comments retrospectively, referring readers to the appropriate edition of *The Marine Observer*.

Sunfish reported from R.R.S. *Charles Darwin*. April 2000. Page 58.

Frank Evans, of the Dove Marine Observatory, said:

"I am glad to receive these reports of two sunfish. The location at which they were seen is close to the extreme northern limit of their range since they are warm water, even tropical, creatures. It was interesting that they were swimming on their sides. I have had occasion before to discuss the lazy fin flap and side posture of these deep-bodied fish; it is surely to alter the visual sweep of the eye. Whether such a posture is for hunting the jellyfish on which they mostly feed, or whether they are looking upward through the surface with the other at the passing ship is problematical. Let us say they were being curious."

Editor's note. For more about sunfish, see page 176 of this edition.

Whale reported from m.v. *British Valour*. July 2000. Page 101.

Kelly Macleod, of the Natural Resources Institute, University of Greenwich, said:

"The observer correctly suggests that this animal is a Fin Whale. Of the baleen whales (those which have baleen plates for filter feeding rather than teeth), the Fin Whale is the second largest, averaging a length of about 22 m. At sea, and from a distance, it can easily be confused with the other baleen species, in particular the Sei and Bryde's whales. The asymmetric pigmentation on the jaws is unique to the Fin Whale, and can be used as a positive identification cue when the whale can be seen closely. The purpose of the white markings on the right lower jaw is not clear although it has been suggested that it may be related to the feeding strategy of the whale. The Fin Whale also has a white chevron behind the head on each side, although it is usually more prominent on the right. It is untrue that Fin Whales never raise their flukes prior to a dive, but it is rare in comparison with some of the other large whale species, such as the Sperm and Humpback, which are regularly observed 'fluking up'."

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**Excellent Awards for the year ending 31 December 1999**  
(see page 154).



*Al Shuhadaa.*  
Kuwait Oil Tanker Company

*Western Bridge.*  
Ropner Ship  
Management Ltd



*Seki Pine.*  
Denholm Ship  
Management (UK) Ltd

*Marine Explorer.*  
Eidesvik Shipping Ltd



Fotofile

# **The UK contribution to Argo**

By J. Turton and H. Cattle

(Ocean Applications Branch, The Met. Office)

A global array of profiling floats (Argo) has been proposed as a major contribution to the Global Ocean Observing System (GOOS). The aim of Argo is to have approximately 3,000 floats deployed globally by 2003. It is expected that Argo will provide significant benefits for seasonal forecasting, climate prediction and operational oceanography. The Met. Office is responsible for the management and co-ordination of the UK contribution to Argo, with funding and support provided by DETR, MoD and NERC.

## **Benefits from Argo**

Seasonal forecasting with ocean-atmosphere models relies heavily on information about the initial upper ocean state. However, observations of the upper ocean are sparse and remotely sensed data (sea surface temperature and sea level anomaly) are unable to provide sufficient detail about the upper ocean structure. The Argo data will benefit seasonal forecasting in several ways. With better initialisation of dynamical ocean-atmosphere models, the predictive skill of these models will improve. Similarly, statistical seasonal forecasts that use ocean heat content patterns as predictors will also be improved. Over several years the Argo data will provide information on inter-annual ocean variability that can be used to assess, verify and further improve seasonal prediction models.

The climate of the UK is particularly influenced by the Atlantic Ocean. Variations in sea temperatures can influence the climate over periods of several years. Deep ocean measurements are needed for:

- monitoring trends;
- validating climate models;
- providing starting conditions for decadal time-scale climate forecasting; and
- assessing the role of the ocean in the carbon cycle.

Improved observation of the ocean through Argo will therefore improve our ability to understand climate variability and predict climate change.

Data from Argo will help to capitalise on the previous investment made by both The Met Office and the Royal Navy (RN) in the development of oceanographic modelling capabilities, and will lead to better forecasts of the ocean structure for the RN from the Forecasting Ocean-Atmosphere Model (FOAM). Improved boundary conditions from FOAM should also result in improved predictions from shallow water (and shelf-seas) models. Improved predictions from the deep ocean and shallow water models will also support the development of new services in the marine and oceanographic areas.

## **The Argo programme**

Each Argo float (including its antenna) is typically 2 to 2.5 m long and up to 30 kg in weight. Currently there are two commercial float manufacturers: MARTEC in France and Webb Research Corporation in the US. The floats drift at a parking depth of about 2,000 m, returning to the surface at predetermined intervals to record a temperature and salinity profile. When at the surface the floats



relay their data and position to an orbiting satellite before returning to depth and continuing another cycle (Figure 1). They each have a lifetime of up to four years, dependent on parking depth and cycle time (typically 10 days), and are expected to be capable of making as many as 100 profiles.

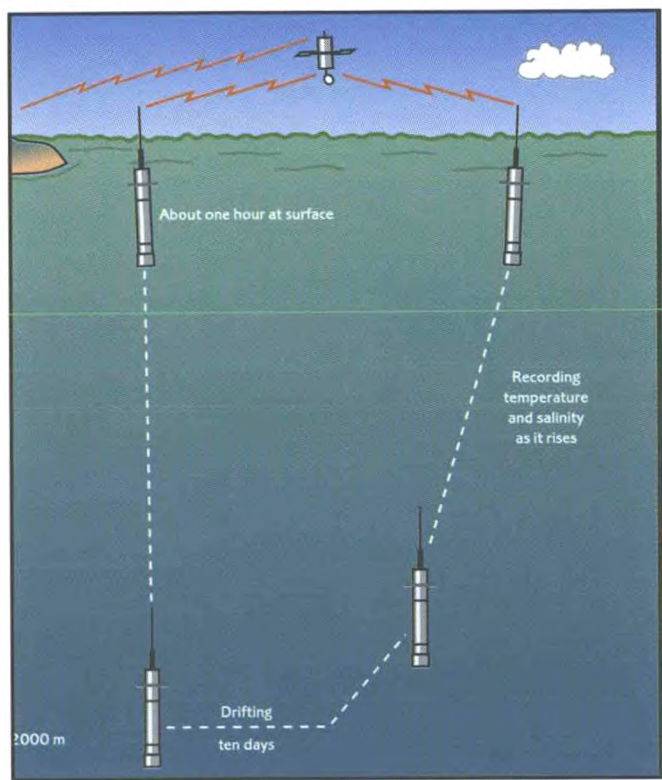


Figure 1. Measurement and transmission of a single profile by an Argo float. (Taken from the Argo Brochure produced by the US Woods Hole Oceanographic Institution, and reproduced with permission.)

Traditionally, temperature and salinity profiles have been provided by bathy-thermograph soundings from naval and merchant vessels, and sampling from research vessels. The bulk of the data is from merchant vessels taking part in the Ship of Opportunity Programme (SOOP), and is mainly confined to shipping lanes. Figure 2 shows the locations of temperature profiles, received over the Global Telecommunication System (GTS) during September 1999, and which are used in the FOAM global model.

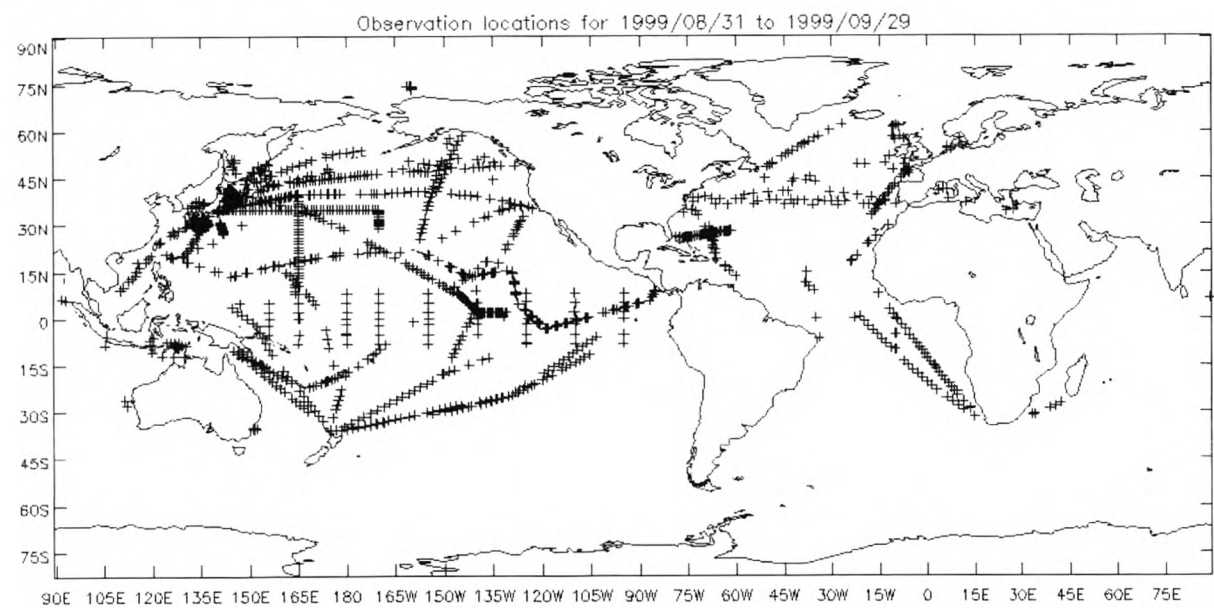


Figure 2. Locations of profile data received via GTS during September 1999 and used in FOAM.



The float technology has been demonstrated during WOCE (World Ocean Circulation Experiment) and shown to offer a viable alternative means of making ocean measurements at a lower overall cost. In the UK, the Southampton Oceanography Centre (SOC) has gained considerable experience in operating floats and analysing float data, and currently has four floats (in the Irminger Sea) which have recently been designated as Argo floats with their real-time data now being placed on the GTS. SOC have also contributed to the International Argo Science Team on the design of Argo.

The aim of Argo is to have approximately 3,000 profiling floats (giving a spacing of about  $3^\circ$  or 300 km) deployed globally by 2003, and maintained thereafter. Figure 3 illustrates the projected coverage of floats once Argo is fully realised, illustrating the significant improvement in data coverage over that which is currently available. In particular, through air dropping, floats can be deployed in the remotest regions of the ocean.

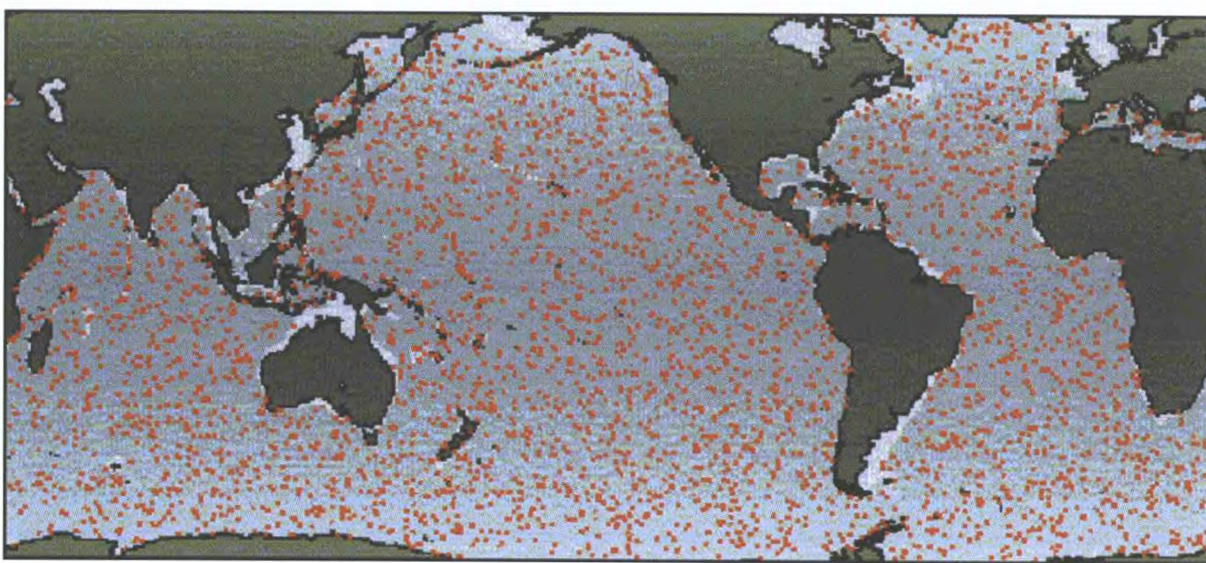


Figure 3. Example of the projected distribution of 3,000 Argo floats. (Taken from the Argo Brochure produced by the US Woods Hole Oceanographic Institution, and reproduced with permission.)

### **The UK Argo project**

The UK Argo project is being led by the Ocean Applications branch of The Met. Office, and in conjunction with SOC it is hoped to have about 15 UK Argo floats operating by the end of 2000/01. The aim of the project is to establish by March 2003 an operational system with the capacity to deploy about 50 floats each year, thus maintaining about 100 to 150 floats in the water at any one time, and to capture the data in real-time in support of operational ocean forecasting, as well as processing in delayed mode for climatological and hydrographic purposes. Following completion of the project it is expected that there will be a joint long-term commitment from the Department of the Environment, Transport and the Regions, and also the Ministry of Defence, for the continued operational funding of Argo floats.



## Scene at sea



D. S. Warren

The sunfish shown above was found on the maindeck of the *Allurity* following a sea passage from Whitegate (Cork, Eire) to Galway between 2000 UTC on 21 August 1999 and 1900 on the 22nd.

The fish was found under the manifold pipes by J. Crowley (AB), and was taken away by a local fish merchant. Regretably, no measurements could be made of the fish, but Captain D.S. Warren, and the ship's company were later informed that the sunfish weighed in at 56 lb [approx. 25 kg].

The wind during the passage was E'ly to SE'ly, force 5–7.

*Editor's note.* This report was of great interest to Dr Frank Evans, of the Dove Marine Laboratory, who said:

"This sunfish (*Mola mola*) was washed aboard, most likely in the Celtic Sea given the reported E'ly, force 7, wind. Sunfish are rather rarely reported from this area, being more southerly in distribution, and this is a valuable observation. I have a report from a year or two ago of a sunfish from 47° N, 8° W. Sunfish are lazy swimmers found sometimes near the surface and there are other reports of them being washed aboard. Norman Fraser's little book *Giant Fishes, Whales and Dolphins* has an enthusiastic sketch of a sunfish which lay stranded on deck, having smashed down the rail of an ocean liner. It was taller than the seamen who were standing looking at it.

"You say that no measurements of this fish were taken but the local fish merchant who acquired it gave its weight as 56 lb. From this and from published weight-length measurements of other sunfish, it is possible to deduce its length as 32 inches [approx. 81 cm]. (The length is in proportion to the cube root of the weight.)"



## Scene at sea



J. D. Davison

A small visitor on board the *Matilde* when the vessel was off New Britain, Papua New Guinea, during October 1998.

Third Engineer J.D. Davison (who took the photograph) found the bird to be either very tame, or else tired. It stayed for a brief visit of an hour or so before flying off into the night.

*Editor's note.* Commander M.B. Casement, of the Royal Naval Birdwatching Society, and his colleagues believe that this bird was most likely to have been an Arctic Warbler (*Phylloscopus borealis*.) Commander Casement said, "the curious black markings on the throat are due to damaged or missing feathers which reveal the dark bases of the throat feathers. This species of 'leaf warbler' typically breeds in Siberia, and winters in south-east Asia."

## Ribbons in the sky

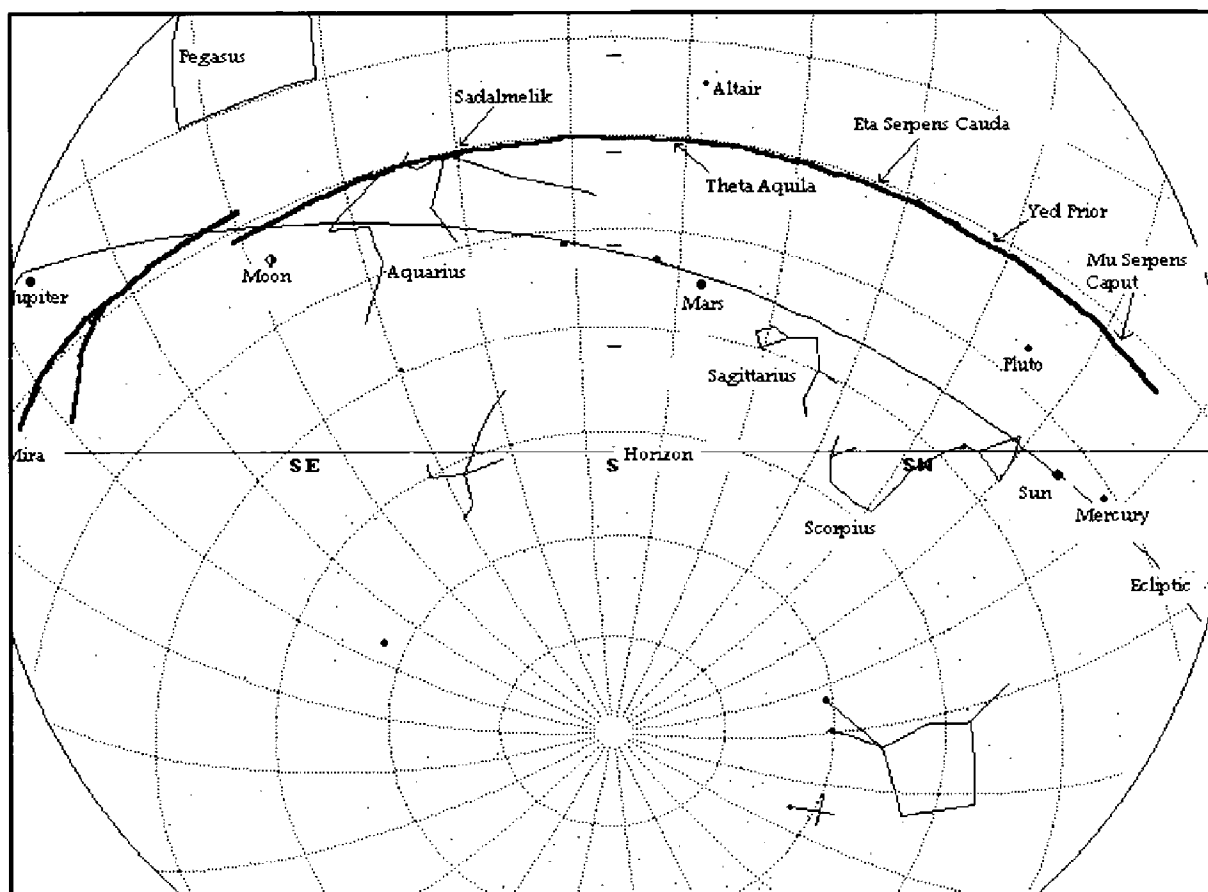
The following account details a sighting of what was assumed to be an unusual cloud observed in the North Atlantic on the evening of 18 November 1999. Paul Bennett, one of the observers on the m.v. *Waterford* at the time, takes up the story.

"At 1832 UTC an azimuth of Jupiter was taken shortly after sunset. The sky in the vicinity of Jupiter was completely clear, no cloud of any type, with but a few small cumulus dotted around the horizon.

"About five minutes later, having completed the calculations, the observer again looked out to see a ribbon type cloud, broken in formation, stretching almost from [the] eastern horizon to [the] western horizon. If the estimated height (see below) is reasonably correct, then the bandwidth couldn't have been more than a few hundred feet, apparently more cigar-shaped in cross-section than flat, the maximum axis being horizontal, the minimum vertical. The cloud was fairly consistent in its density, and at a fairly stable altitude, not undulating or rippled, having the general consistency similar to that of a small cumulus cloud (white and fleecy), but also translucent.

"Initially, it was thought to be a condensation trail, but this was shortly dismissed as it was considered too low (estimated less than 10,000 ft altitude, probably around 7,000–8,000 ft). Both ends of the cloud were checked with binoculars but no aircraft was evident; however, as a yardstick, and by good fortune, one did appear around 1910, presumed to be at the usual 30,000, or so, feet, heading west-south-westwards.

“Adding to the dismissal of the ‘contrail’ theory for this cloud, as seen from the accompanying computer-generated image of the celestial sphere, the cloud was both forked at the eastern end, and broken in the vicinity of the moon (see diagram).



“The cloud maintained its form until it could no longer be seen due to darkness, about 50 minutes later. The eastern portion of the cloud, from about 100° azimuth/4° altitude bore a resemblance to a diving rod, the branches converging south and east of Jupiter, and continuing in an arc to a few degrees north of the moon. From there, the second cloud stretched in an arc above the observer to an altitude of about 45–50°, curving away to the western horizon, and petering out bearing 263°/about 4° altitude. The cloud was within the observer’s horizon at both extremities.

“The cloud drifted south-eastwards, the fork section starting south-east of Jupiter, until it was too far from the moon to be observed any more, at around 1930, with the western portion also lost in the darkness.

“The vessel’s median position was 42° 05’ N, 25° 47’ W, course 063° at 12 knots, on passage from Pto Bolivar, Colombia to Ijmuiden. General meteorology at the time: pressure 1037.1 mb (corrected), wind NW×W’ly, force 3 or 4, cloud cover (except for this phenomenon) one okta or less of small cumulus around the horizon only. Air temperature 15.5°, wet bulb 12.7°.”

Our thanks to Paul and his fellow observers (Captain R.M. Ellsmoor, Chief Engineer P.H. Evans, and A. Escobia (Lookout)) for this account. In the absence of an obvious meteorological explanation for the sighting, we contacted the British Astronomical Association for advice and, after some investigation on our behalf, Howard Miles, who investigates transient and unusual phenomena on behalf of the Association, said that several theories had been offered to explain it, including the suggestions that it may have been connected with the Leonids meteor shower, or else associated with occasional US military experiments originating in the Caribbean. However, no specific cause could be identified.



# The *Titanic* disaster — a meteorologist's perspective

By E.N. Lawrence

(Reprinted from *Weather*, 55, 66–78. Published by the Royal Meteorological Society)

The purpose of this article is to examine the wider meteorological aspects of the terrible tragedy that beset the White Star Line passenger ship RMS *Titanic* – one of the world's two largest ships of her time – when she struck an iceberg at 11.40 p.m. on Sunday 14 April 1912, on her maiden voyage from Southampton to New York. She foundered at 2.20 a.m. on 15 April 1912 in calm, icy waters in the North Atlantic, with the loss of some 1,500 lives (McHenry 1998; Mercer 1988; Stowell 1958).

In relation to the disaster, this survey discusses iceberg sources, movement, size, deterioration and duration; synoptic pressure patterns; reported weather observations; general air, sea and solar conditions; comments and analyses; and clues to imminent and long-term iceberg risk.

## Iceberg sources and factors controlling iceberg movement

US Coast Guard (1999) summarises that icebergs in the North Atlantic Ocean originate principally from the 100 tidewater glaciers of west Greenland which, it is estimated, account for 85% of the icebergs that reach the Grand Banks of Newfoundland. The east Greenland glaciers, which produce about half the amount of icebergs of the west Greenland glaciers, account for only 10% of the icebergs reaching the Grand Banks. The remaining 5% are thought to come from the glaciers and ice shelves of northern Ellesmere Island (off the extreme north-west of Greenland). Land topography along the Greenland coast governs the general form, size and rate of production of icebergs.

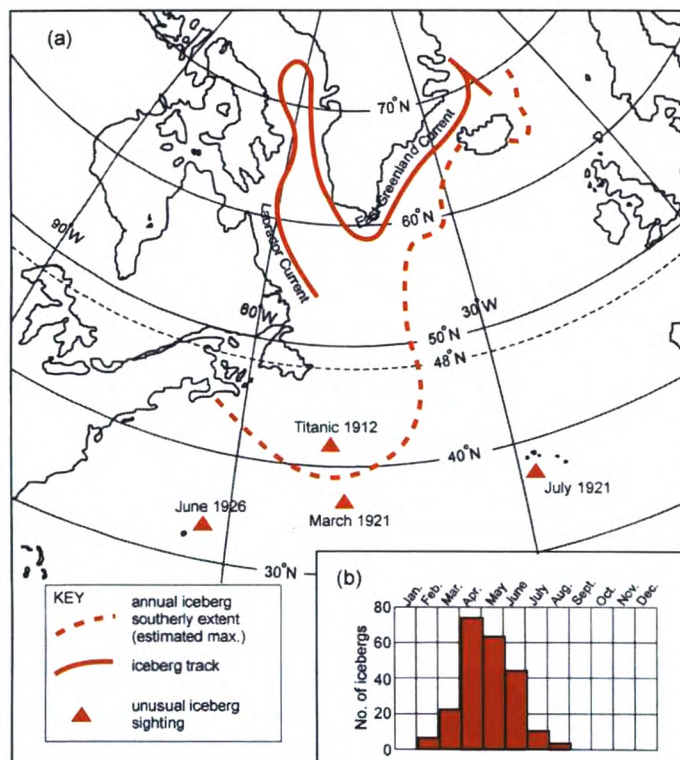


Fig 1 (a). Locations and dates of unusually southern iceberg sightings in the North Atlantic, and (b) mean monthly number of icebergs sighted south of 48° N annually (approximately 200 icebergs sighted annually) (from Couper 1983).

As shown in Fig. 1, icebergs off the coast of west Greenland first travel northwards along the west Greenland coast before turning south (at Ellesmere Island) along the west side of the Baffin Bay–Davis Strait waterway (between Greenland and the North American land mass), to the Labrador coast, Newfoundland, and the Grand Banks.

Factors controlling iceberg movement are summarised from McHenry (1998). The day-to-day movement of an iceberg is governed by its size and shape, present and past winds, wind-driven sea surface current, and the general ocean current. In assessing the wind drift of icebergs, the most important factors are size and shape. For example, ‘winged’ icebergs are very much influenced by wind; a steady wind of 30 kn could move such an iceberg at the rate of 1 kn. However, the drift of icebergs is generally the combined result of both wind and ocean current.

Concerning the ocean current in the calm conditions of the *Titanic* disaster area, the Marine Accident Investigation Branch (1992) states “there is strong evidence that it was setting [towards] a little west of south at rather more than one knot”. Marine Accident Investigation Branch (1992) continues: “Allowing such a current, and working back from the position of sinking [assumed to be close to the point vertically above the heaviest part of the sea-bed wreckage at 41° 43′ 6″ N, 49° 56′ 9″ W, fixed by Ballard’s 1985 expedition – described in Ballard (1987)], the position yielded for collision with the berg is approximately 41° 47′ N, 49° 55′ W”. Figure 1 shows this position of collision as well as three other notable iceberg sightings in the North Atlantic, all reported for their unusually southern positions.

### **Size of icebergs in the disaster area**

The disastrous iceberg was described by a *Titanic* lookout, Frederick Fleet, as “a black mass [see later] ... a little higher than the forecastle head ...” that is, more than 55 ft (17 m) high (Gardiner *et al.* 1995). *The Times* of Saturday 20 April 1912 reports that Dr J.F. Kemp, physician on the rescue ship SS *Carpathia*, described “the iceberg which sank the *Titanic* as being 400 ft [122 m] long [about half the *Titanic*’s length] and 90 ft [27 m] high” (Bryceson 1997). Various accounts assess the iceberg’s visible height as 50–100 ft (15–31 m) (Lord 1978).

There were icebergs with visible height of over 200 ft (61 m) in the vicinity (Eaton and Haas 1998). Likewise, Gardiner *et al.* (1995) refer to an “unforgettable scene” at dawn on 15 April, with “Some two dozen icebergs – over 200 ft [61 m] showing ...”. Sketches (Eaton and Haas 1998) show the fatal iceberg as double-humped, as described also by Able Seaman Joseph Scarrott of the *Titanic*: “like the Rock of Gibraltar” (Bryceson 1997, quoting the *Daily Sketch* of 4 May 1912). These visible-iceberg-height estimates suggest that the total height of the fatal iceberg, including the submerged portion, was of the order of 400–800 ft (120–250 m) (using US Coast Guard 1999).

### **Deterioration and duration of icebergs**

According to US Coast Guard (1999), North Atlantic observations indicate the deterioration time for an average medium-sized iceberg [165 ft (50 m) high by 330 ft (100 m) long] in 6 ft (1.8 m) seas, as shown in Table 1. As Table 1 implies, deterioration accelerates where the cold Labrador Current from the Davis Strait meets the warm Gulf Stream waters.



Table 1 — Melting times for an average iceberg

Water temperature (° C)	Iceberg melting time (approx.) (days)
-1	180
3	20
6	12
10	8
15	5

The main causes of iceberg deterioration are: melting, both by heat exchange with the sea and by insolation; erosion, mainly by sea-wave motion; and calving/splitting-up, by breaking-off of overhanging ice sheets formed by waterline wave erosion (Hanson 1990). Quantification of the different deterioration mechanisms (El-Tahan *et al.* 1987) has shown that sea-wave motion and calving together typically account for nearly 80% of the deterioration rate (Venkatesh *et al.* 1994).

Kollmeyer (1966) studied the radiation balance and concluded that direct and indirect radiation cannot theoretically account for even 1% of the energy needed to melt an iceberg. Radiation may have a considerable effect, however, on calving – through the creation of thermal stresses in the surface layer of the iceberg (Robe 1980). Such ongoing research on deterioration due to other factors besides sea temperature suggests that sea temperature cannot be considered in isolation.

Synoptic pressure patterns

Synoptic pressure patterns at sea-level around the time of the disaster are shown in Figs. 2 (1300 GMT on 14 April 1912) and 3 (1300 GMT on 15 April 1912).

Figure 2 shows the *Titanic* in a col calm between two anticyclones and in an area a little north of a cold front slowly receding southwards — probably a diffuse type of front as is so often associated with fairly high pressure.

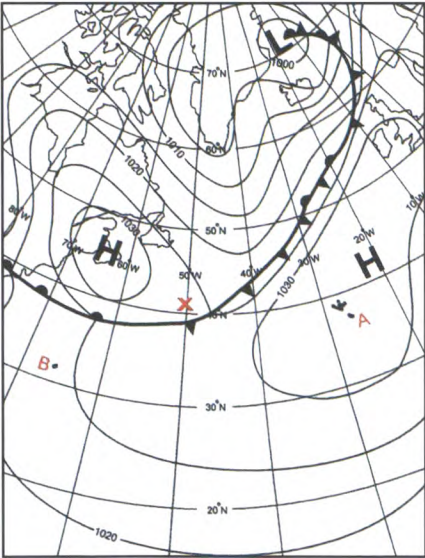


Fig.2 Mean sea-level synoptic chart (mbar) for 1300 GMT on Sunday 14 April 1912 (from USAAF Daily Synoptic Series of Historical Weather Maps). Scene of the *Titanic* disaster is marked with a cross. A indicates Azores and B Bermuda.



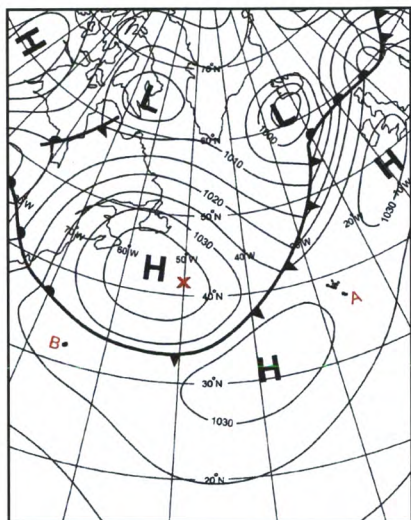


Fig.3 Mean sea-level synoptic chart (mbar) for 1300 GMT on Monday 15 April 1912 (from USAAF Daily Synoptic Series of Historical Weather Maps). Scene of the *Titanic* disaster is marked with a cross. A indicates Azores and B Bermuda.

Figure 3 shows the disaster area relatively further north of the cold front, evidently denoting a slowly deepening, colder polar airmass — and under the influence of an anticyclonic light or moderate northerly wind. The series of weather maps shows that for the greater part of the period from at least 1 January 1912 the disaster area had been in polar air (that is, north of the North Atlantic polar front of which the above-mentioned cold front was part). Consistent with the above synoptic chart analysis for the *Titanic* disaster area, observations from different locations follow in the next section.

## Weather statements relevant to the disaster

### *Aboard the Titanic*

Quotes are from Gardiner *et al.* (1995) with temperatures also documented by Lord (1978): "... the air temperature was registered in the early evening [of 14 April 1912; daylight till about 6.30–7.00 p.m.] as an uninviting 43 °F [6 °C] and falling quite noticeably ... By nine o'clock [p.m.] the air temperature had fallen to a decidedly cold 33 °F [0.6 °C], a drop of 10 degF [6 degC] in two hours."

"... at 10 p.m. the air temperature was at freezing point ... The weather remained clear and absolutely still, the sea dead calm ... At 10.30 p.m., the sea temperature was still down to an unusually low 31 °F [-0.6 °C]."

"At 11.30 p.m. ... a slight but definite haze appeared dead ahead of the ship ... There had been a faint haze for 10 minutes until the collision [11.40 p.m.] ... The berg was in a haze ...". However, according to Bryceson (1997), "Mr Lightoller, 2nd Officer, was on the bridge till ten o'clock p.m. and during his watch the weather was clear. Neither was there any haze he said, when he went on deck after the accident."

“The temperature of the sea round the ship slowly sinking in the icefield was 28 °F [-2 °C], boding ill for anyone forced to spend more than a few minutes in the water.”

### *A Titanic survivor's weather observations*

Jessop's (1998) weather observations from the evening of 14 April 1912 to daylight on the 15th strike a more personal note: “[Evening 14 April 1912]: Greyish skies replaced sunshine ... calm sea ... Perfect serenity for miles ... grey sky, deepening into haziness as evening fell, made the water look like molten silver as it caught the soft beams of [brilliant starlight].”

“[Early 15 April, in lifeboat]: A tiny breeze, the first we had felt on this calm night, blew an icy blast across my face; it felt like a knife in its penetrating coldness. I sat paralysed with cold ...”

“After a night [14/15 April 1912] of calm sea and floating mists, the wind rose to an icy keenness, cutting through our numbed bodies ... the sea began to lash itself against [the lifeboat's] frailty ... no human being could live long in these frozen waters. The sea became more violent, tossing our overloaded boat helplessly about.”

“As the first streaks of dawn lit the horizon, majestic shapes of icebergs like fairy castles crossed our vision, passing in panoramic procession ... water and ice everywhere.”

### *Aboard the Cunard Line rescue ship SS Carpathia*

From somewhat south of the *Titanic* route came the contrasting report of “the balmy breeze of the Gulf Stream that Sunday afternoon [14 April 1912]. Towards five o'clock [p.m.] it grew so warm that Mr Chapin shifted his deck chair to the shade” (Lord 1978).

At about 12.25 a.m. on 15 April, *Titanic* time, the *Carpathia*, eastbound at her normal top speed of 14.5 kn, received a distress call. Captain Rostron quickly calculated the *Titanic*'s distance as about 58 miles (93.3 km) and the required course of 52 degrees west of north towards the disaster area (Eaton and Haas 1998), and worked his ship up to the maximal speed of about 17 kn (Lord 1978).

Lord (1978) reports that during this mission “... there was an amazing change — the frigid blast that swept through every crack and seam felt like the Arctic ... Then at 2.45 a.m. on 15 April 1912, at about an hour's distance from the disaster area, Second Officer Bisset sighted a tiny shaft of light glistening two points off the port bow: it was the first iceberg — revealed by, of all things, the mirrored light of a star. Then another berg, then another ... icebergs on all sides.”

The *Carpathia* arrived at the scene of disaster at 4.00 a.m. on the 15th, after the *Titanic* had gone down, and picked up all 705 survivors (Gardiner *et al.* 1995), mostly from lifeboats, in a then comparatively rough sea.

### *The 'denouement atmospheric advection regime' in the disaster area*

The climax of the unforeseen tragedy that had insidiously developed around the *Titanic* in the nocturnal calm of 14/15 April 1912 was followed swiftly by the neighbouring advection regime, which had completely taken over the disaster area before the *Carpathia's* rescue operations began. A chilling northerly wind had sprung up and increased (Figs. 2 and 3), enabling the nearby army of massive icebergs to quickly overwhelm the disaster area. The entire dramatic scene of graphic meteorological/oceanographic sequence around the *Titanic* adds poignancy to Jessop's (1998) descriptions of the pleasant evening's "perfect serenity for miles" and the following early-morning's contrasting icy, keen, knife-like blast and lashing seas tossing the lifeboat helplessly about with "water and ice everywhere".

### *At the official inquiry*

Details of the official inquiry into the disaster are from Gardiner *et al.* (1995) unless otherwise stated or bracketed.

All the nautical witnesses at the British inquiry agreed that the conditions of flat calm on the evening of 14 April 1912 were so rare in the North Atlantic that they were unlikely to recur in a lifetime's experience. Bryceson (1997), quoting the *Daily Sketch* of Tuesday 21 May 1912, records that Mr Lightoller stated it was the first time in his 24 years of experience that he had seen an absolutely flat sea. Mr Lightoller regretted aloud that there was not even a breeze as they entered the icy region because this meant that there would be no tell-tale phosphorescent ripple against an iceberg, helping to reveal its presence.

According to Bryceson (1997), quoting from the *Daily Sketch* of Wednesday 22 May 1912, Mr Lightoller also explained to the court that, with even a slight swell, there would be a phosphorescent line around an iceberg ... If there had been the slightest swell, the berg would doubtless have been seen in plenty of time.

### *Further relevant comments on weather conditions in the disaster area*

Gardiner *et al.* (1995) summarised that the night of the disaster had been marked by "an extraordinary combination of circumstances" ...no moon, no wind, no swell; the iceberg had probably rolled over recently and was not white but "black". With so many stars in the sky, there should (and would) have been a little reflection from a white iceberg. (Icebergs can roll over if the equilibrium is disturbed by one or more of the deterioration mechanisms (see earlier section on "Deterioration and duration of icebergs").)

It is stated in US Coast Guard (1999) that on a clear, dark, starlit night, a look-out will not pick up an iceberg at a greater distance than  $\frac{1}{4}$  mile (0.4 km). The *Titanic's* speed of 22 kn (25 mph) could thus allow 30–40 seconds' warning. The same source goes on to point out that echoes from a ship's whistle are not to be relied on, because the shape of an iceberg may prevent any echo and because echoes are often obtained from fog banks (though there was no fog in the disaster area under the prevailing conditions shown in Figs. 2 and 3).

### **Air and sea conditions — human survival limits**

Concerning earlier-quoted comments on survival in the cold sea of the disaster area, the US Naval Weather Service (1974) *Marine climatological atlas of the world* chart gives the April 1% minimum sea surface temperature — that is, the temperature below which, on the average, only 1 in 100 observations fall — as approximately 2 °C for that area. A table in the atlas indicates that in sea temperatures of 0–5 °C, a person overboard in ordinary clothes and a life-preserver may be expected to reach exhaustion or unconsciousness in 15–30 minutes and to survive for 30–90 minutes. For the reported markedly lower sea temperature around the sinking *Titanic* of 28 °F (-2 °C) the corresponding times are reduced to less than 15 minutes and less than 15 minutes to 45 minutes, respectively. The relatively few immersed passengers and crew who succeeded in boarding a lifeboat or other floatable would most probably have still suffered wind-chill effects from the increasing northerly wind that sprang up late in the night, especially when these were exacerbated by evaporation from wet skin and clothing.

### **Urgent iceberg-proximity clues**

The extraordinarily large, rapid fall in air temperature reported aboard the *Titanic* could not be explained by diurnal variation over sea, even in the prevailing calm, cloudless conditions. Furthermore, neither the southward shift of the cold front shown in Figs. 2 and 3, nor the ship's change in location, westbound at about 22 kn through a sea of normal surface temperatures, nor, indeed, any combination of these factors, could feasibly provide a satisfactory explanation of the extraordinary air cooling.

However, consideration of all the earlier-quoted *Titanic* and *Carpathia* observations stimulates two basic and very appropriate questions:

- (i) To what extent did the large rapid fall in air temperature aboard the *Titanic* relate to the proximity/approach of icebergs?
- (ii) What caused the accompanying low and decreasing sea temperature in the *Titanic* disaster area?

The answers could prove to be vital for human survival and an aid to formulating some kind of helpful short-range/urgent iceberg-warning system.

In pursuit of answers, the foregoing data were used as a basis in determining the following suggested local marine-air mechanism which could account for these remarkable temperature changes:

1. Large areas of contact of submerged iceberg surfaces with relatively warm (and saline) sea water produce copious melted ice water.
2. In conditions where salinity controls the vertical profile of sea density (discussed later in this section), this initially practically pure melted ice water would rise to the ocean surface. The now surface water, having acquired a measure of salinity from the ocean during its ascent, was able to exist in liquid form below 0 °C as evidenced by sea temperatures around the *Titanic*, which were “still down to an unusually low 31 °F [-0.6 °C]” at 10.30 p.m., ahead of collision, and 28 °F (-2 °C) around the sinking ship. (These low temperatures were the result of process 3 below.)

3. At the ocean surface, in the absence of wave motion and atmospheric advection (wind), the low-salinity, sub-zero water would be forced to spread laterally from around icebergs into the as yet not-iced-up disaster area, where also it would inhibit vertical water-mixing and continually cool both sea surface and adjacent atmosphere.

4. In the extensive, cloudless flat calm, the spreading, very cold surface water and adjacent cooled air of process 3 may have been accompanied at the air-sea interface by a comparatively limited, slow spread of cooled air which had descended katabatically to sea-level from around exposed iceberg surfaces (Lawrence 1954).

5. Even if the cooled surface air in the as yet not-iced-up area had not already extended upwards to deck height, it could be transferred upwards to deck/thermograph level by limited air mixing and/or air displacement due to the ship's movement.

In view of the absence of normal cold air advection (pressure gradient wind) on 14 April 1912, the above-described five-part marine-air mechanism is proffered as the main contributory cause of the drop in sea temperature around the *Titanic*, and the consequent and accompanying large, rapid fall in air temperature.

So, in the *Titanic* disaster conditions of absolutely flat sea and “perfect serenity for miles” (Jessop 1998), the potentially strong indications of iceberg proximity appear to be: decrease in sea surface layer salinity and in air and sea surface temperature, together with no wave motion. By contrast, in normal conditions, i.e. involving wave motion and wind-driven surface currents, melted ice water from an iceberg would undergo more mixing with adjacent briny sea water. This reduces the gradient of the vertical profile of sea salinity, even until salinity no longer controls the vertical profile of sea density in the upper sea layer. The result would then be either of the following:

- (i) The relatively low temperature of the melted ice water — not its low salinity — would be the factor controlling the vertical gradient of sea density, so that the melted ice water would then sink.
- (ii) The vertical gradients of both salinity and sea temperature — and thus of sea density — would be weakened so that vertical motion of the melted ice water in the upper sea layer would then be suppressed.

In other words, under normal weather conditions (i.e. with wave motion and advection), the net result in either case would be that both sea surface temperature and sea surface salinity surrounding an iceberg would not be appreciably affected by the presence of the berg. Such conditions are, indeed, given as normal by US Coast Guard (1999).

There is a greater tendency for a salinity-controlled density profile in northern seas — for a number of reasons characteristic of that area. For example:

- (i) Comparatively greater restriction of wave motion and hence of water mixing, due to remoteness from the main westerlies zone and proximity to the northern polar high pressure region, and to more land-locked topography and associated sea-ice.
- (ii) Smaller differences between the temperatures of melted ice water and the surrounding sea.

There is thus a parallel between northern seas — with salient conditions of relatively restricted wave motion and lower sea temperatures — and the ‘abnormal’ North Atlantic conditions attending the *Titanic* on 14/15 April 1912.

Regarding the drop in sea temperature around the *Titanic* and the accompanying large rapid drop in air temperature aboard the *Titanic* well before the collision, none of the evidence quoted herein suggests any explanation other than the five-part mechanism outlined above, wherein salinity controlled the vertical gradient of sea density — a condition made possible by the extensive flat sea around the icebergs.

### **Iceberg proximity — two abortive clues**

At the British inquiry, a possible but applicably less-useful detail of the ‘large rapid fall of air temperature’ clue was brought to public attention by Mr Lightoller, the *Titanic*’s Second Officer. He is reported to have “said it was not his experience that the temperature fell as large bodies of ice were approached [as did occur in the *Titanic* disaster]. It might even go up, he said” (Bryceson 1997, quoting the *Daily Sketch* of 21 May 1912).

Bryceson (1997) quotes some support for part of Mr Lightoller’s statement, from the *Daily Sketch* of 1 June 1912. In a lecture on icebergs at the Royal Institution, Professor H. T. Barnes “pointed out that as a ship drew near a berg, there was first a rise in temperature and then a rapid fall”. It is here suggested that any such initial rise in air temperature is transient, comparatively small and not dependable. When it does occur, it could be merely the result of slight upward displacement, in calm, stable (stratified) air conditions, of some residual unmixed warmer air from below deck/thermograph level, which had been present over a previously warmer sea until upwardly displaced by the arrival of the ship itself, and/or cold surface air spreading from nearby iceberg areas.

The absence of evidence of air temperature rise aboard the *Titanic* on the approach of the fatal berg could be due to the *Titanic*’s great size and high speed having caused excessive air mixing below thermograph level, or due to the ship’s high speed having caused any measurably warmer air to be left behind in the ship’s track.

Concerning the second ‘abortive clue’, it would be wrong to regard the atmospheric cold front indicated in Figs. 2 and 3 as a valid clue to iceberg proximity. Even if a cold front were not diffuse (difficult to pinpoint, as in the disaster area), the speed and location of a cold (atmospheric) front and a field of icebergs are most unlikely to coincide.

### **Clues to long-range forecasting of iceberg hazard**

Weather and solar observations, mainly from twentieth-century data, are here examined for application with hindsight as long-range clues to an iceberg hazard warning for the *Titanic*. Relevant factors are discussed in the form of five ‘clues’.

#### ***1. Generally lower than normal sea surface temperatures in the Titanic area and other southern iceberg locations***

The 1% minimum sea surface temperatures (defined earlier) for North Atlantic locations and months of the unusually southern iceberg sightings of Fig. 1 are shown in Table 2 (estimated from US Naval Weather Service (1974) and subject to an error of up to 2 degC).

Table 2 — North Atlantic area 1% minimum sea temperatures of the unusually southern iceberg sightings indicated in Fig. 1.

Approx. position	Month/year	1% min. sea surface temp.
42° N, 50° W ( <i>Titanic</i> area)	Apr. 1912	2° C (36° F)
37° N, 48° W (south of <i>Titanic</i> area)	Mar. 1921	14° C (57° F)
33° N, 63° W(near Bermuda)	June 1926	20° C (68° F)
37° N, 28° W (near Azores)	July 1921	19° C (66° F)

None of these 1% minimum sea temperatures are iceberg-friendly and, in view of data on iceberg deterioration and duration, it would appear that at the time and location of the *Titanic* disaster and the other three listed iceberg sightings:

- (i) The actual sea temperature came below or well below even the 1% minimum in the area of each sighting and probably also en route — as would be expected, especially in tropical latitudes.
- (ii) The much colder than normal actual sea surface temperatures in iceberg-sighting areas are characteristic of the much more northern North Atlantic.
- (iii) The icebergs had survived into unusually southern latitudes.

Therefore, much lower than normal sea temperatures could serve as a general clue to shipping of iceberg hazard (linked with clues 2–5 below).

*2. The prevailing low mean sunspot regime could have served as a basic contributory factor in an iceberg-hazard warning to the Titanic*

Figure 4 shows the dates of the following important ice events in relation to 10-year running means of sunspots, plotted at mid dates of the 10-year periods (Waldmeier 1961; Deutscher Wetterdienst 1961–99):

- (i) The sightings of the unusually southern (possibly groups of) icebergs of Fig. 1, listed in Table 2, including the sighting of the numerous icebergs, one of which was fatal to the *Titanic*.
- (ii) Four “Known examples of extreme [southern] iceberg drifts [twentieth-century]” in 1907, 1912, 1921, 1935 (US Naval Oceanographic Office 1968; Sielbeck, personal communication\*).
- (iii) The three years when more than 1,000 icebergs were counted crossing 48° N in the North Atlantic, namely 1,042 in 1909, 1,032 in 1912, 1,350 in 1929 (US Coast Guard 1999), from 1900 up to 1971 (after which series homogeneity was irreversibly broken, due to improved air reconnaissance and use of radar etc.), excluding war years, when normal reconnaissance was disrupted.
- (iv) A 1907 berg, about 100 n.mile south-west of Fastnet, Ireland (Sielbeck, personal communication\*), surviving the Atlantic crossing and not far from the early part of the *Titanic* route.
- (v) The excessive sea-icing years of 1903–05 (Gardiner *et al.* 1995).

\* Internet site <http://www.uscg.mil/lantarea/iip/faq/faq15.html>



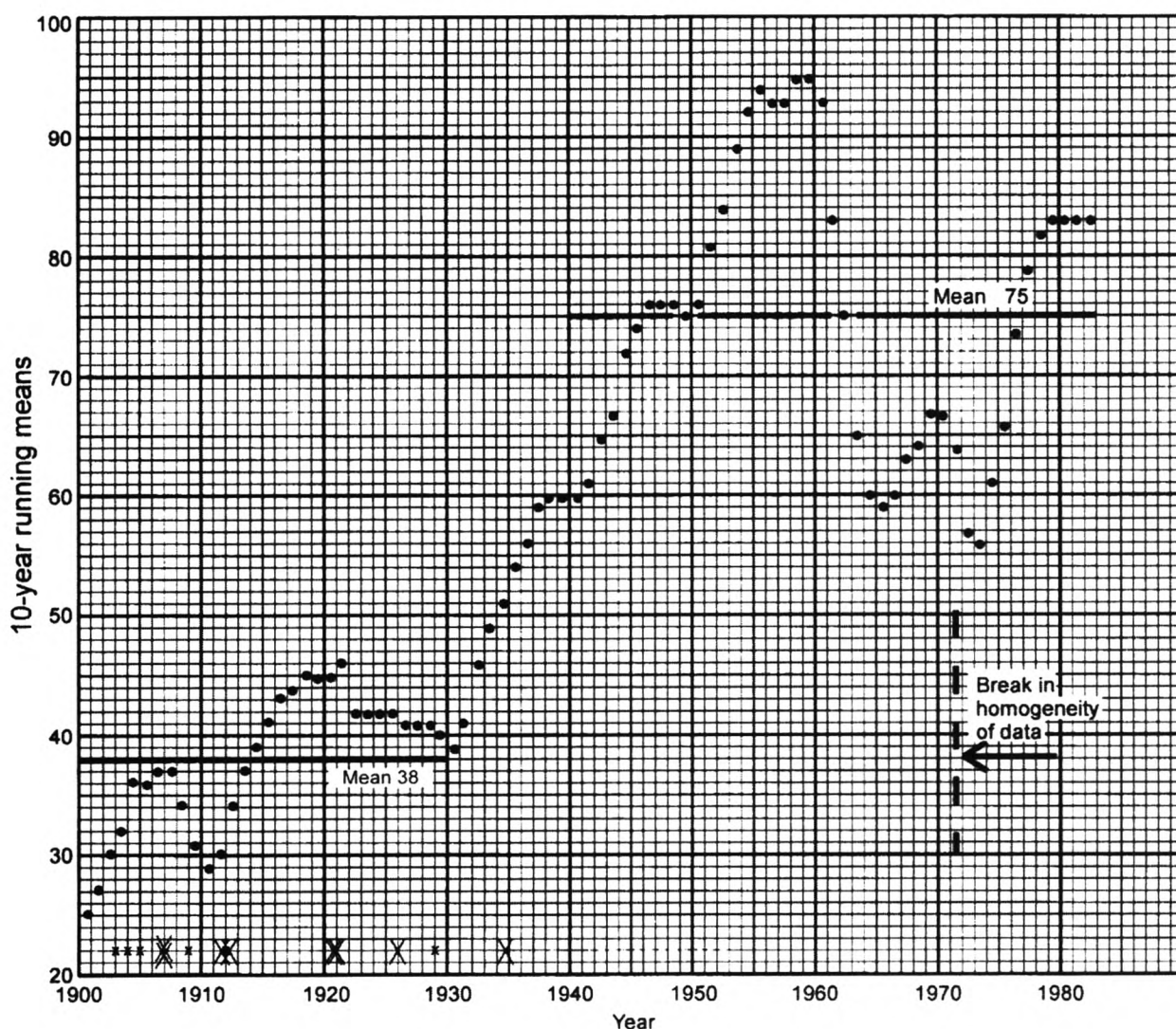


Fig. 4. Sunspot numbers (10-year running means plotted at mid-dates), and dates of ice events, 1900–83. X indicates a year of unusually southern iceberg sighting in North Atlantic or iceberg off south-west Ireland, x indicates a year of reported extensive sea-ice in North Atlantic, or a year with a count of over 1,000 icebergs crossing 48° N during 1900–71.

The dates of all these ice events came within the low mean sunspot regime which started about 1880. Comparably, on a larger scale, the Little Ice Age around the 1690s coincided with a record period of almost no sunspots, emphasising both the ice link with, and the ice hazard inherent in, a low mean sunspot regime.

It would not be unreasonable, of course, to infer from Fig. 4 that the sudden dearth of ice events after 1935 was produced by global warming. Nonetheless, Fig. 4's sharp increase in mean sunspots, plus the sudden dearth of ice events, and the concurrence of these two marked changes, together suggests that the low mean sunspot regime may have been a contributory cause of the ice events of 1903 to 1935.

Accordingly, the marked decrease in ice events after 1935 is matched by a synchronous decrease from the mid-1930s to the mid-1960s, in 10-year running means of annual counts of icebergs crossing 48° N in the North Atlantic — yet another fact pointing to a possible inverse relationship between ice events and sunspots, as apparent in Fig. 4.

### 3. 'Low mean sunspot—lower than normal sea temperature' link

Clues 1 and 2 suggest a third — a link between low mean sunspots and lower than normal sea temperature. This sunspot–sea temperature link is paralleled in a land link between low mean sunspots and lower mean 20–26 ft (6–8 m) earth temperatures (with naturally damped-out short-term variations (Lawrence 1965)). Thus the sunspot–sea temperature link reinforces the sunspot–iceberg link of clue 2 (Fig. 4) as an iceberg-hazard warning to shipping, inherent in the low mean sunspot regime.

### 4. April, the month of the *Titanic* disaster, begins the annual spring peak of icebergs in the north-west North Atlantic

Figure 1 (b) shows that, annually, April is the month with the highest number of icebergs sighted south of 48° N in the North Atlantic, with the number tailing off in May and June. April, May and June are given by the US Coast Guard (1999) as the period of maximum icebergs reported off Newfoundland. April was thus an inauspicious month for the *Titanic* route. The spring iceberg peak is the culmination of seasonal tendencies, including a tendency for a cold winter radiation anticyclone over the North American land mass and northerlies on its eastern side, resulting in a tendency for lower sea temperatures (clue 1) with seasonal lag (Lawrence 1999). These factors are conducive to southern icebergs.

### 5. The *Titanic* voyage was 1–2 years before a sunspot minimum

April 14 1912 was in a light-westerlies regime. In such conditions, factors in clue 4 are accentuated in light westerly regimes — notably, a stronger than normal winter radiation anticyclone, more than normal northerlies and lower than normal sea temperatures in the north-west North Atlantic. All of these changes were conducive to the occurrence of unusually southern icebergs.

Note, however, that light westerly winds tend to prevail during that part of the solar cycle when sunspots are decreasing and around the sunspot minimum, and to peak at about 1–2 years before a sunspot minimum (Lawrence 1965, 1966, 1996). In the North Atlantic, this cyclic peak-timing tendency is demonstrated by the occurrence of the fatal *Titanic* iceberg, two others of the icebergs indicated in Fig. 1, the extremely southern icebergs of September 1912 at 35° N, 44° W and of July 1921 at 38° N, 27° W (US Coast Guard 1999; see also footnote on p. 188) and the highest annual count this century (2,202 in 1984) of icebergs crossing 48° N in the North Atlantic (US Coast Guard 1999) — all at about 1–2 years before a sunspot minimum.

A similar weather–sunspot link operated over Europe, where weak westerlies assisted the build-up of stronger than normal winter radiation anticyclones, resulting in the notorious London smog of December 1952, preceding the sunspot minimum of 1954, and the London smog of December 1962, preceding the sunspot minimum of 1964 (Lawrence 1966). Finally, the time of 1 to 2 years before a sunspot minimum was noted also as an upper-layer ozone maximum (Lawrence 1965), suggesting that this part of the solar cycle is special.

A connection between maximum ozone and weak westerlies could arise in the following way. "Most ozone is formed in the tropics where levels of solar radiation are high, but is then swept around the globe by winds — so the ozone

layer is thicker towards the poles” (Department of the Environment, Transport and the Regions 1998). Atmospheric convection likewise is greatest in tropical regions, with a tendency for stronger convection at the thermal equator at 1–2 years before a sunspot minimum (Lawrence 1965). These maxima, ozone and convection, would together tend to lead to a maximum spread northwards of both ozone and ozone-transporting air, from the tropical high pressure belts to normally lower pressure temperate latitudes, at 1–2 years before a sunspot minimum. The result in temperate latitudes, at this part of the solar cycle, could be an ozone maximum accompanied by a more even spread of air pressure and hence more than normal light westerlies, allowing the stronger development of cold, winter radiation anticyclones, leading to more winter smog in Europe and more spring southern icebergs in the North Atlantic, as described earlier.

In summary, 1–2 years before a sunspot minimum is thus shown as a significant and critical part of the sunspot cycle. This very timing for a voyage could have constituted a contributory clue in a warning of the iceberg hazard that awaited the *Titanic* in April 1912, 1–2 years before the sunspot minimum of 1913.6.\*

### **The date of the *Titanic* disaster fatally coincided with a climax in the iceberg–weather–sunspot link system**

The foregoing five clues form the basis for a comprehensive hindsight long-range iceberg forecast that might have prevented the *Titanic* tragedy. To sum up, icebergs originating in the Greenland area require two basic conditions to reach unusually southern latitudes in the North Atlantic:

- (A) Lower than normal sea surface temperature.
- (B) Stronger/more frequent than normal northerly wind.

In April 1912, these two requirements were abundantly provided in the north-west North Atlantic by three important time factors:

- (i) The prevailing low mean sunspot regime (clues 1, 2 and 3).
- (ii) The annual spring iceberg peak in April (clue 4).
- (iii) The timing of 1–2 years before a sunspot minimum, featuring a tendency to weaker westerlies, which accentuated the April 1912 iceberg peak (clues 4 and 5).

Specifically:

Requirement (A) was provided as a warning by time factor (i), with support from (ii) and (iii).

Requirement (B) was provided as a warning by the conditions associated with time factor (ii) accentuated by conditions in (iii).

The *Titanic* sailed when these three time factors synchronised, at a climax in the iceberg–weather–sunspot system. At this extremely dangerous time for shipping on the UK–New York route, the historic iceberg invasion proved fatal for the RMS *Titanic* on 14/15 April 1912.

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\* Dates quoted in this style refer to the year and the decimal fraction of that year.

### Longer-term iceberg risk

The data and discussion suggest that, combined with other causes (such as enhanced greenhouse warming), the current series of high-maximum sunspot cycles contributes to the present minimal risk of extremely southern icebergs in the North Atlantic such as were encountered by the *Titanic* (Fig. 4). Although a low mean sunspot-number period is most likely to return, it is suggested that it would take an extreme and prolonged low sunspot-number regime to reverse the present dearth of southern icebergs in the North Atlantic. However, such a development, even commencing within the next few sunspot cycles, cannot be ruled out.

### In conclusion

Regarding iceberg vigilance for longer-range application, the International Ice Patrol, managed and operated by the US Coast Guard, was inaugurated as a result of the impetus aroused by the *Titanic* disaster, and has ever since consistently monitored iceberg presence, size and movement, etc. to minimise hazard in North Atlantic shipping lanes. This practical, competent and excellent service will endure as an eminently fitting mark of respect, and as a memorial, in honour of all those, both passengers and crew, whose lives were precipitously cut short with the loss of the RMS *Titanic*.

### Acknowledgements

The helpful co-operation of the National Meteorological Library; S.L. Sielbeck, Commander, US Coast Guard and Commander, International Ice Patrol; the Department of the Environment, Transport and the Regions; and the competent, laborious sub-editing by my wife, Sonia, are all greatly appreciated.

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## December 1999 — observers' records of severe weather

Some exceptional depressions affected parts of north-west Europe and associated sea areas during the month. The effects of those of 3 and 24/25 December were felt largely by observers in the North Sea. On 27 December, following an intense depression that had affected northern France only 36 hours earlier, another one probably most notable because of its consequences for some areas of south-west France, was crossing the Bay of Biscay.

### 3 December 1999

On 3 December an intense depression crossed the UK, bringing heavy rain (nearly 50 mm in north-west England), over 15 cm of snow across much of central and northern Scotland, and severe gales with gusts of 50–60 knots over much of the UK from southern Scotland to the south coast. As the low moved out into the North Sea during the afternoon, it deepened explosively to around 960 mb. A NOAA-15 satellite image of the depression is shown in Figure 1.

Two offshore installations that felt the full effects of this low were the rig *Santa Fe Magellan* (at 56° 53' N, 01° 52.12' E) and the semi-submersible production unit *Janice 'A'*. Among those working on the latter, positioned at 56° 24' N, 02° 15' E, were Barge Operators D. McLuckie and C. Thompson, both voluntary weather observers, who provided the following account.



“The day started off like any other day, with a light WSW’ly breeze. The pressure soon began to fall, and by 0500 UTC the glass was in ‘free fall’. The reading at 0400 was 999.2 mb, and by midday it [had] bottomed out at 956 mb; up to that point the wind remained more or less steady at SW’ly although it did steadily increase up to a maximum of 55 knots. The sea attained a significant height of five or six metres

“Just after midday the glass stopped dropping and we thought we were through the worst, but it was really only beginning. No sooner had the barometer settled, than it decided to go ‘ballistic’. The sea became confused with swells from the south-west and north; the wind started to veer to the north and, as soon as it had settled, the real storm began. Winds in excess of 80 knots hammered the unit, at one

point the anemometer touched 90 knots, the mean reading being 86 knots. This continued for just short of one hour, then the wind settled to a mere 60 knots. The sea settled out as a 6-m run from the north-west or north. From 1600 onwards the ferocity of the winds had reduced to a rather sedate gale.”

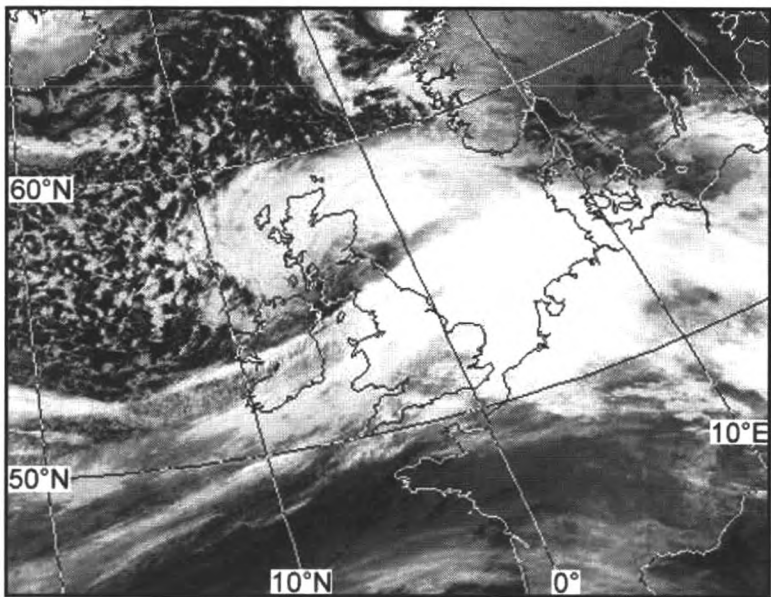


Figure 1 NOAA-15 satellite infrared image for 0636 UTC on 3 December 1999.



The barograph trace from the *Santa Fe Magellan* (see left) shows the rapid fall and rise of pressure as the storm passed. The Radio Officer, G. Downie noted that between 0530 and 0830 the winds were very light and variable, averaging less than 10 knots even though there was a very rapid decrease in pressure. As the centre of the depression approached, between 1000 and 1045, the wind speed was variable ranging from 8–65 knots with severe swings in direction of 180°. The lowest pressure for the rig, 954.1 mb, was recorded at 1045 and, between that time and 1300 the mean wind speed was 76–80 knots, with a maximum gust of 93 knots.

The cold front associated with this depression lay across central parts of the UK, trailing across the Irish Sea and Eire, then into the North Atlantic.

The *European Envoy* was on passage from Liverpool to Dublin on the 3rd, and Captain N.C.E. Spencer, along with Second Officers D. Crerar and D. McAuley recorded the passing of the front between 0600 and 0800. The pressure fell steadily ahead of the front, rising sharply as it passed, and continued a steady rise to the rear of it.

The minimum pressure recorded on the barograph trace was 990 mb. The wind increased in advance of the front before veering from SW'ly to WNW'ly, the speed maintained at a steady 55 knots for a time. Heavy cumulonimbus cloud at the front gave way to 2 oktas of altocumulus to the rear of it, and there was also a marked improvement in the visibility.

The vessel's speed was reduced by headwinds throughout its passage; being reduced to 4 knots even with both main engines at 60 per cent.

24/25 December 1999

On 24 December another deep low (Figure 2) was about to arrive in the northern North Sea. The *Ocean Guardian* was positioned at 56° 49' 45" N, 00° 52'50" E and, since 0600 UTC on 21 December, had been waiting for a weather window in which to lift anchors and tow to a lay up anchorage.

Throughout the 24th winds were S'ly, veering SW'ly and gradually decreasing from a maximum observed gust of 87 knots. After 1800 the wind backed steadily, decreasing more rapidly until, at 2200, it was E×S'ly, force 8–10. By 2300 the wind had veered to S'ly but was increasing rapidly while the pressure dropped "like a stone". Shortly after midnight on the 25th, the wind was approximately SSW'ly with gusts in excess of 100 knots (off the anemometer scale); the minimum pressure of 948 mb was recorded at 0122.

Table 1 — *Ocean Guardian* observations on the night of 24/25 December 1999

Date and time		Pressure	Wind dir'n	Wind speed (kn)		Sea (ft)	
				Av.	Max.	Av.	Max.
24th	1800	979.7	205°	36	44	12	16
	1900	976.3	155°	36	47	13	17
	2000	972.9	140°	42	48	13	18
	2100	967.5	115°	40	51	13	17
25th	0000	951.3	190°	72	85	16	24
	0100	948.6	195°	86	100+	20	30
	0200	948.7	200°	87	100+	20	35
	0300	948.8	200°	95	100+	25	35
	0400	950.5	225°	85	100+	25	40
	0500	953.5	230°	68	88	25	40
	0600	955.1	230°	72	86	25	38

The depression tracked north-east towards the Norwegian coast, gradually weakening, but not before the *Sedco 711*, in position 57° 21' N, 00° 49' E had registered a minimum pressure of 942 mb for that location, and recorded a maximum wind speed of 100.3 knots. The *Gryphon 'A'* at 59° 22' N, 01° 34' E fared little better, noting a minimum pressure of 939.4 mb at approximately 0600 on the 25th, whilst the *Sedco 712*, at 61° 09' N, 01° 06'E, recorded 937.4 mb a few hours later at 1330.

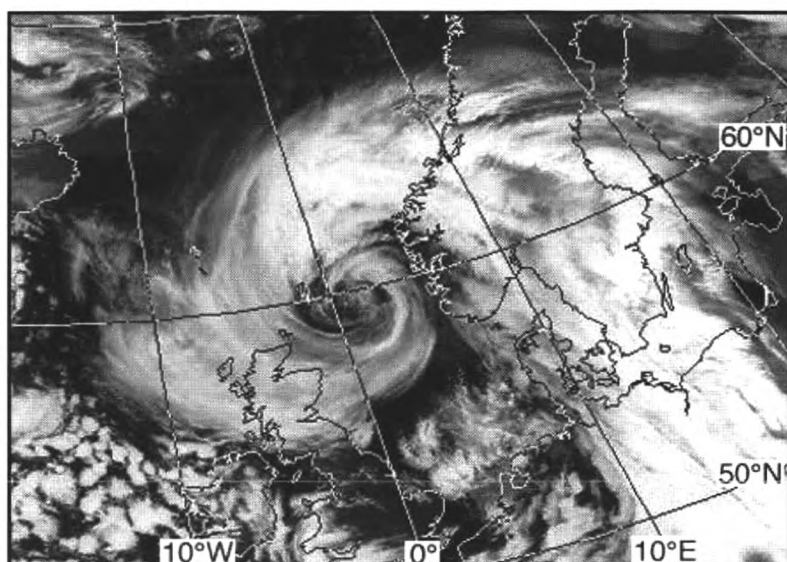


Figure 2. NOAA-15 satellite infrared image for 0816 UTC on 25 December 1999.

## 27 December

During the 26th, a rapidly deepening depression had raced east from the North Atlantic Ocean. Its centre was to pass close to the Channel Islands before crossing the French coast and following a track that would take it just north of Paris, wreaking havoc on the French mainland (a gust of 107 m.p.h. was reported at Orly Airport). Barely 36 hours later another intense depression, following a track a little further south, charged across the Bay of Biscay. (Figure 3.)

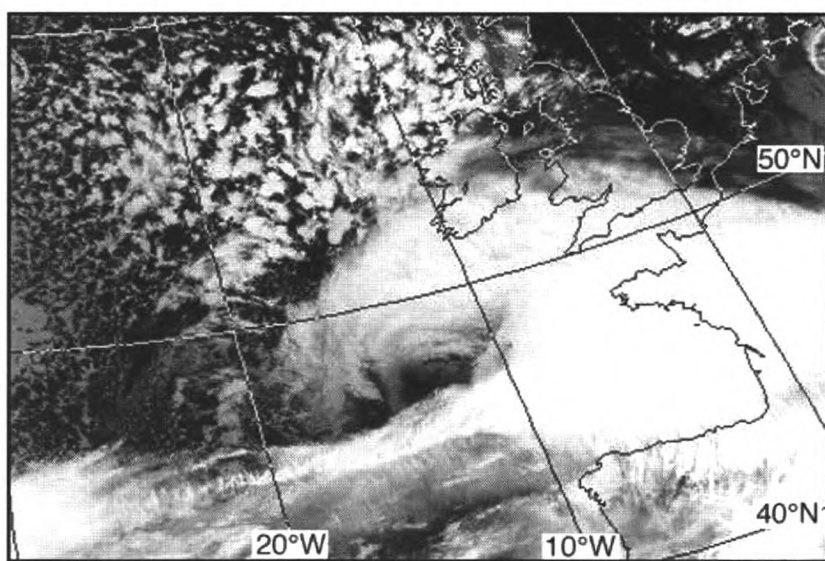


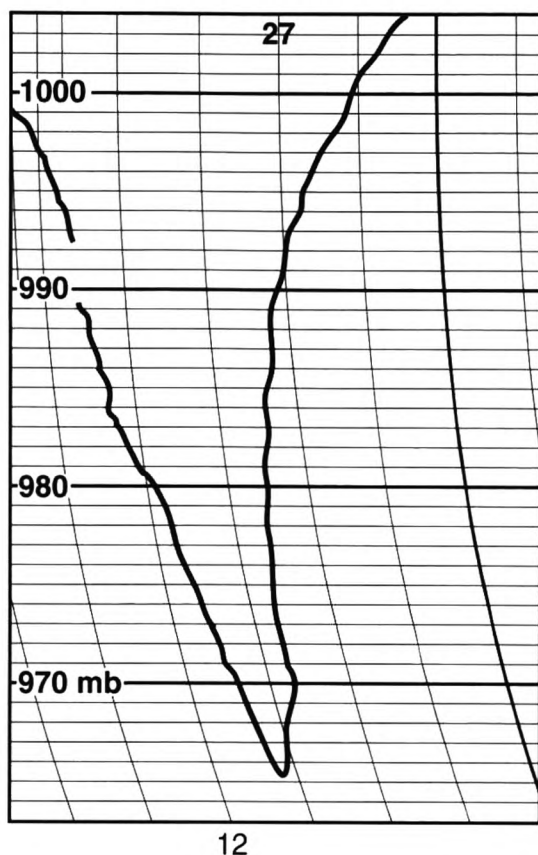
Figure 3. NOAA-15 satellite infrared image for 0912 UTC on 27 December 1999.

On 27 December, the *Tobias Maersk* was heading south-west in the Bay of Biscay when this intense low was encountered. Captain Colin Robinson recalls:

“At about 0950, we were in position 46° 50' N, 05° 20' W in rough seas on a south-westerly course towards Cape Finisterre.

“We received a weather report issued by Météo-France stating that a depression, 980 mb, was moving quickly east along 46° N. The winds on the north side of the depression were predicted as SE'ly, force 8 becoming N'ly, force 7/8. I estimated that we were on the north side of the depression, and turned west to pass round the safer side to take advantage of the SE'ly and, later, N'ly winds. At the time the wind was freshening from the south-east.

“However, the wind soon began to veer to SW’ly and then WSW’ly, so it was soon apparent that the storm centre was somewhat further north than expected, and we were in for trouble. What followed can be seen from the barograph trace (see below).



“As the pressure fell steeply we experienced WSW’ly winds of up to 70 knots, according to the ship’s anemometer. “At the centre, as the ‘glass’ began to rise, a brief ray of sunshine broke through and the wind veered to WNW’ly moderating to a mere force 8. The smiles soon disappeared from our faces, however, when the wind began to blow more fiercely than ever. The highest speed noted on the anemometer was 90 knots, but gusts were felt, and heard, that seemed stronger.

“At the height of the storm the visibility was virtually nil except for the sight of wave crests looming close and passing us on the bridge at eye level (height of eye was 28 m). The wind backed a little to W’ly or WSW’ly, and remained in that quarter until the storm passed. We learned later on that the storm went on to cause chaos in France.”

As was widely reported by the media, this storm did indeed bring another bout of destruction, this time to south-west France.

## Acknowledgement

With thanks to all those who sent in reports of these storms, and to the Dundee Satellite Receiving Station for use of the satellite images.

## Postbag

### Solo whale

P.S.V. *Highland Drummer*. Captain D.I. Howse and ship’s company on supply duty at Brae Oil Field, 120 miles north-east of Peterhead, February 2000 to present day [2 May].

All on board have been witness to the various marine life this field holds. The Brae ‘A’ is home to three seals, all of which seem to be getting bigger every run out here. The Brae ‘B’ is home to two seals who are joined, frequently, by a young Killer Whale of about 3–4 m long. He/she has the distinctive markings of such a whale: white markings to the side and behind the small dorsal fin, a large white patch under the jaw and large white patches either side of the head, above and behind the eye. Just before we sight the whale, the surface of the sea is disturbed and looks as if the sea is boiling, but on closer inspection it is found to be fish, hundreds of them, apparently gasping for air; these have been identified as Saithe or Coley. The disturbance lasts for three to five minutes and then the whale approaches the shoal from underneath and to one side, at some speed, jaws open and in for the fish

supper! This sight is clearly observed from the bridge due to the clear aquamarine waters. What surprises all onboard is why the seals are never attacked, as they are usually on their backs feeding at the same time on the plentiful fish on offer.

Meanwhile, at the East Brae platform this has been the habit of another three seals, which also look well fed. The whale, on a few occasions, comes alongside the vessel (only at the 'B') when we carry out pre-arrival checks at the platform's 500-m zone, [it is] probably attracted by the sound generated through the water by the thrusters.

After seeing the whale quite a few times, and checking out the markings, I am sure it is a 'loner'. All identifications were helped using the book *SEALIFE: A complete guide to the marine environment*. Must take my camera next trip!

From P.G. McCardle, Chief Officer.

*Editor's note.* We passed Mr McCardle's letter to Kelly Macleod, at the Natural Resources Institute, at the University of Greenwich, who said:

"This is an extremely unusual report. There is no doubt from the description of the animal's markings that it is a Killer Whale. However, I am puzzled as to why it is on its own, especially as it is a young animal. Lone Killer Whales do occur but they tend to be the large adult bulls which are about 10 m long. This species is usually seen in pods which are close-knit family groups. In north-west North America two distinct types of Killer Whales have been distinguished, transients and residents. One of the ways in which they differ is in their prey preference with transients taking marine mammals and residents eating mainly fish. This animal may have come from a pod where fish was the main prey item. It has obviously located an area where there are abundant fish and will probably continue to visit the area as long as the food remains. The seals could be potential food but it is my guess that this individual would not have the skills to hunt them. The hunting techniques used by Killer Whales are passed to calves within a pod from the older members i.e. the calves have to learn. The length at birth for Killer Whales is about 2 m to 2.5 m and then it is likely that the calf suckles for at least 12 months. This animal will therefore, have had very little opportunity to learn hunting techniques before leaving or having become separated from the rest of the pod. I think it unlikely, but perhaps this animal is not permanently separated from its pod and having taken its fill of fish rejoins its pod again.

"When the whale is sighted, I would ask that photographs be taken, particularly of the dorsal fin and saddle patch (light patch behind the dorsal fin). However, these would need to be taken with a good camera with a zoom lens — ideally at least 200–300 mm. These can then be used to check whether you are seeing the same whale over again. It can also be compared with existing Killer Whale photograph catalogues. The Shetland Sea Mammal Group is collecting photographs as they have fairly regular sightings of Killer Whales around their coasts."

## Book review

*QE2: The Cunard Line Flagship, Queen Elizabeth 2* by Captain Ronald R. Warwick. 260 mm × 225 mm, illus. 224 pp. inclusive of appendices, bibliography and index. Published by W.W. Norton & Company Ltd 10 Coptic Street London WC1A 1PU. ISBN: 0 393 04772 5. Price: £30.00.

The book commences with a general history of Cunard from its foundation to the present day. Throughout its long history it soon becomes obvious that Cunard has always been in the vanguard of marine developments. This policy applied no less to the ordering of the 'Queen Elizabeth the Second'.

Often fraught with lack of finance, and building difficulties, the determination and eventual success in the making of this remarkable ship marks the 'swan-song' of British shipbuilding as well as Cunard. It is difficult to believe that this occurred some 30 years ago.



Chapter Three describes the early years of Atlantic crossings; the *Queen Elizabeth 2* was to be the last of the great passenger liners which had plied this ocean for many a generation. Since it was not possible to compete with transatlantic passenger aircraft, winter cruises to the Caribbean were introduced as an experiment and, following this successful venture, the future soon became obvious.

In 1971 Trafalgar House became the new owner of Cunard. The take-over and subsequent events are briefly described before the narrative moves on to the halcyon days of cruising which, by now, had become the well-established practice.

Another milestone in a progressively changing career occurred in 1975, with the first 'round-the-world' cruise by the *Queen Elizabeth 2*. However, the requisitioning of the ship in 1982 by the Government for 'trooping' duties in support of the Falkland Islands Conflict, came as something of a shock. Restructuring work had to be undertaken before the ship was deemed capable of troop transportation. Following the Falkland Islands 'episode' and subsequent refit, the ship returned to her more traditional role of carrying fare-paying passengers.

The book continues to elaborate on the history of this fine ship, marking the highlights as well as the problems. Subjects such as the Fleet Review of 1977 (the year of Her Majesty's Silver Jubilee), the transit of the Panama Canal, the replacement of her engines, and visits by the Royal Family are all well documented. Well written and exceptionally well illustrated, this book is a joy to read and own.

For three decades this beautiful ship has become a familiar sight around the world. In the words of Captain Warwick, "The *QE2* has become a legend before she becomes a memory".

James Roe  
Port Met. Officer  
South-west England

## Noticeboard

### Weather information promulgated via NAVTEX

Since 19 April 2000 the weather bulletins issued via the UK NAVTEX service have been brought into line with relevant Recommendations of the World Meteorological Organisation. These Recommendations require that the weather bulletins include three sections — warnings, synopses and forecasts — and that the latter should contain an outlook beyond the period of the forecast. All these sections are now included in the routine broadcasts from Niton [S], Portpatrick [O] and Cullercoats [G]. The outlook information is brief and signals the expectancy of gales; in certain situations it also signals the increase to Force 6 or above after a period of quiet weather. The onset of extensive sea fog is also indicated if relevant.

These improvements were agreed at a meeting on 6 March hosted by the Maritime and Coastguard Agency (MCA). The meeting was convened to discuss the findings of a Research Project commissioned by the MCA to seek views on the practical use made of existing NAVTEX weather information. Those invited to the

meeting included a cross-section of users of the information, several of those involved with the manufacture of NAVTEX equipment, and The Met. Office.

It became clear during the discussions that there was a requirement for additional outlook information to signal hazards expected beyond the 24-hour outlook period. Accordingly, the MCA commissioned a trial in which an Extended Outlook would be prepared once a day by The Met. Office for the Niton service area and would be broadcast by Niton [S] at 2300 UTC each day for a period of three months. It was agreed that this Extended Outlook would again signal hazards expected and that the text would link such hazards with the synoptic evolution.

The results of the trial to date were considered at a further meeting in July at the MCA, and it was clear that the trial had been a complete success. It was agreed that the trial would become operational and that Extended Outlooks for all three UK NAVTEX service areas will be broadcast, commencing in early September 2000. The Extended Outlooks will be included in the 2230 transmission from Portpatrick [O], the 2300 transmission from Niton [S] and the 0100 transmission from Cullercoats [G]).

Following the implementation of a full NAVTEX service from Malin Head [Q] and Valentia [W] arrangements have been put in hand to rationalise the MSI (Marine Safety Information) issued by the UK and Irish transmitters. This has been necessitated because the loading, particularly on Niton [S] and Cullercoats [G], has been such that over-running of the 10-minute times slots has become a problem (partly owing to the number of sea areas included in the routine forecast bulletins). It is intended that in the future each station will include the weather information for those areas within the designated MSI area with some overlap. Thus the Malin Head [Q] transmission will now include the forecasts for Shannon, Rockall, Malin and Bailey, while Valentia [W] will include those for Sole, Fastnet and Shannon. In the latter part of 2000 the output from the three UK stations will be reduced accordingly and will include some rationalisation of the forecasts for the North Sea and reduction of the overlap of areas available in the broadcasts from Cullercoats [G] and Rogaland [L].

## **Port Met. Office for eastern England — change of address**

The Port Met. Office for eastern England was relocated on 1 August 2000. The new address is:

**Port Met. Office Crosskill House Mill Lane Beverley HU17 9JB**

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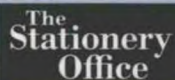
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£29 including postage

£8

ISSN 0025-3251

ISBN 0-11-782039-3



9 780117 820395