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THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME METEOROLOGY PREPARED BY THE OBSERVATIONS VOLUNTARY (MARINE) BRANCH OF THE MET. OFFICE

VOL. 67 **No. 338** **OCTOBER 1997**

CONTENTS

COVER PHOTOGRAPH: Orcas preparing to dive under the fast ice at No. 9 creek (75° 18′ S, 25° 06′ W), Antarctica. Photographed in the midnight sun during January 1997 by R. Kilroy on board R.R.S. *Bransfield.*

Letters to the Editor, and books for review should be addressed to the Editor, *The Marine Observer* The Met. Office OV(M) Scott Building Eastern Road Bracknell Berks RG12 2PW.

LONDON: THE STATIONERY OFFICE

EXCELLENT AWARDS 1996

Ships' meteorological logbooks arriving in Bracknell are assessed for consideration for the annual Excellent Awards, taking into account the quality of the weather observations they contain and the frequency with which the reports have been made bearing in mind the availability and willingness of officers to undertake the observing duties and the opportunity for them to do so.

Out of the logbooks received from all UK VOF ships between 1 January and 31 December 1996, the following ships submitted examples which attained markings placing them in the top ranges for Excellent Awards. They are:

1. m.v. *British Ranger* (BP Shipping Ltd). Captain K.E. Peacock; Principal Observing Officer T.T. Latto; Navigating Officer rewarded for transmission K. Kowalczyk.

2. m.v. *Leonia*. (Shell International Trading & Shipping Co. Ltd). Captain A.F. DeVanney; Principal Observing Officer R.B. Moore; Navigating Officer rewarded for transmission A.A. Pathan.

3. m.v. *York*. (P&O Bulk Shipping Ltd). Captain D.F. Heaselden. Principal Observing Officer B.J. Dias; Radio Officer J.D. Crasto.
   m.v. *Corystes*. (The Centre for Environment, Fisheries & Aquaculture Science). Captain B.A. Chapman.
   m.v. *Berlin Express*. (P&O Nedlloyd Ltd). Captain I.M. Hill. Principal Observing Officer R.G.C. Noble; Radio Officer P.A. Whyley.

4. m.v. *Kazimah*. (Kuwait Oil Tanker Company). Captain P.J. Ward. Principal Observing Officer A.I. Osman, Radio Officer B. Nalam.

Our thanks and appreciation go to all those named above and to the rest of the nominees included in this round of awards.

The Fleet List published in the July 1997 edition of this journal continues to reflect the decreasing number of dedicated Radio Officers as the operation of the GMDSS becomes more widespread but we are pleased nevertheless to see Radio Officers listed for the 1996 awards. As initiated last year, the Excellent Award listings for Deck Officers and Radio Officers have been combined for convenience and it is hoped that all those whose names appear on the following pages will already have received their official letters of notification and that many will have claimed their awards. However, any nominee spotting his or her name in the lists but who has not received such notification, is invited to contact us direct (or through any UK Port Met. Office), giving his or her Discharge Book Number, so that appropriate action can be taken.

The books chosen for this round of awards are: *Sealife: A Complete Guide to the Marine Environment* and the *Collins Atlas of The World*. The use of a dictionary as an award book has been suspended.

The names of officers who have yet to claim their awards for 1995 were published in the July 1997 edition of this journal. We would ask you to check this listing too.

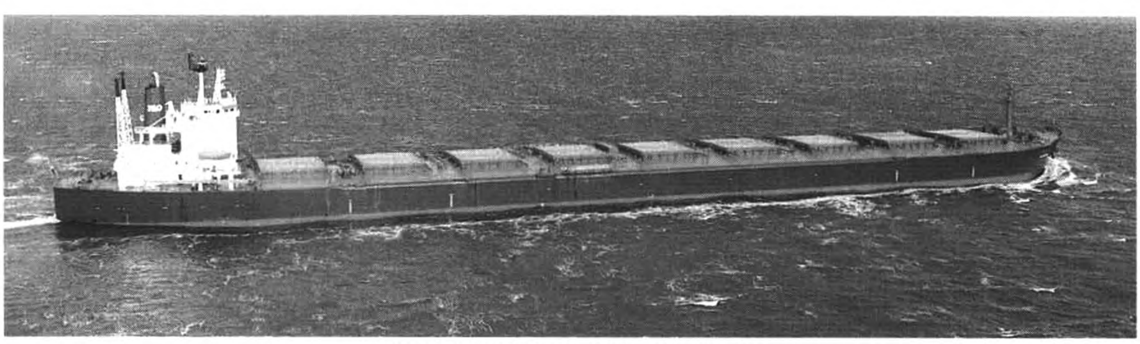
FOUR OF THE SHIPS GAINING TOP MARKS FOR THEIR METEOROLOGICAL LOGBOOKS IN 1996.

Photograph by courtesy of FotoFlite

British Ranger (BP Shipping Ltd)

Shell International Trading & Shipping Co. Ltd

Leonia (Shell International Trading & Shipping Co. Ltd)



Photograph by courtesy of FotoFlite

York (P&O Bulk Shipping Ltd)

Photograph by courtesy of FotoFlite

Corystes (The Centre for Environment, Fisheries & Aquaculture Science)

Excellent Awards (Year ended 31 December 1996)

CAPTAIN	COMPANY
I. Anderson	F.T. Everard & Sons Ltd
R. Banton	The Maersk Co. Ltd
N.J. Barr	Blue Star Ship Management Ltd
J.H. Birchenough	Mobil Shipping Co. Ltd
R.A.C. Bourne	NERC Research Vessel Services
P.J. Brown	Great White Fleet Ltd
C. Bunt	Great White Fleet Ltd
D.W. Bunyan	Marine Management Services Ltd
J. Burton-Hall	Cunard Line Ltd
W.A.J. Cameron	BP Shipping Ltd
K.D. Campbell	P&O Nedlloyd Ltd
B.A. Chapman	The Centre for Environment, Fisheries & Aquaculture
A.J. Clarke	Tidewater Marine (UK) Ltd
J.M. Collis	London Ship Managers Ltd
R. Cordon	Souter Shipping Ltd
S.A. Cresswell	The Maersk Co. Ltd
G.A. Cubbison	Boston-Putford Offshore Safety Ltd
R.N. Cumbers	Great White Fleet Ltd
P.D. Davies	P&O Nedlloyd Ltd
A.F. DeVanney	Shell International Trading & Shipping Co. Ltd
J.G.W Dixon	P&O Nedlloyd Ltd
G.P. Donnelly	Shell International Trading & Shipping Co. Ltd
C.R. Elliott	British Antarctic Survey
R.M. Ellsmoor	P&O Bulk Shipping Ltd
T.D. Faithfull	James Fisher & Sons (Liverpool) Ltd
T.N. Ferguson	Bergesen d.y. ASA
G.A.W. Fink	Great White Fleet Ltd
D. Freeman	Shell International Trading & Shipping Co. Ltd
W.E.L. Godsell	Acomarit (UK) Ltd
I.C. Gravatt	Ropner Shipping Services Ltd
G.M. Gray	Great White Fleet Ltd
B.A. Hall	Scottish Office, Agriculture & Fisheries Dept
K.S. Hardy	P&O Nedlloyd Ltd
P.C. Harris	Souter Shipping Ltd
W.J. Harwood	Great White Fleet Ltd
D.F. Heaselden	P&O Bulk Shipping Ltd
T.H. Henderson	Scottish Office, Agriculture & Fisheries Dept
L.J.Hesketh	P&O Bulk Shipping Ltd
I.M. Hill	P&O Nedlloyd Ltd
S.J. Honey	Ropner Shipping Services Ltd
M.A. Hooson	Tidewater Marine (UK) Ltd
P.W. Jackson	Denholm Ship Management (UK) Ltd
T.L. Jeffery	F.T. Everard & Sons Ltd
P. Johnson	Stephenson Clarke Shipping Ltd
B.N. Jones	Acomarit (UK) Ltd
R. Kararia	A/S Thor Dahl Shipping
J.N. Kelleher	P&O Nedlloyd Ltd
S.J. Kembery	P&O Bulk Shipping Ltd
R.A. Kenchington	P&O Nedlloyd Ltd
M.L. Kinnear	Great White Fleet Ltd
B.J. Kirtley	P&O Bulk Shipping Ltd
J.H. Lacey	P&O Bulk Shipping Ltd
M.R. Lovibond	Great White Fleet Ltd
C.I. MacKillop	Blue Star Ship Management Ltd
R.J. McLarty	P&O Nedlloyd Ltd
K.W.S. MacMillan	P&O Nedlloyd Ltd

Excellent Awards *(contd)*

Captain	Company
D. Marr	James Fisher & Sons plc
J.B. Marshall	British Antarctic Survey
E.M. Meare	Great White Fleet Ltd
P.A. Miley	P&O Bulk Shipping Ltd
S.G. Millar	P&O Nedlloyd Ltd
B.D. Miller	James Fisher & Sons plc
C.R. Mundy	Blue Star Ship Management Ltd
K. Nayyar	V.Ships (UK) Ltd
G. Nicholls	P&O Bulk Shipping Ltd
M.J. O'Sullivan	Sealion Shipping Ltd
K.E. Peacock	BP Shipping Ltd
D.E. Peers	Marine Management Services Ltd
L.C. Pink	F.T. Everard & Sons Ltd
P.G. Pinkerton	Great White Fleet Ltd
D.J. Pointon	BP Shipping Ltd
F.J. Powdrill	Boston-Putford Offshore Safety Ltd
K.D. Pykett	Blue Star Ship Management Ltd
G. Renardson	Marr Vessel Management Ltd
K.P. Riley	POETS Fleet Mangement Ltd
C.C. Rowdon	BP Shipping Ltd
G.T. Rymer	Petroleum Shipping Co. Ltd
J.W. Scarisbrick	P&O Bulk Shipping Ltd
J.E. Sinnott	P&O Bulk Shipping Ltd
D. Spivey	Boston-Putford Offshore Safety Ltd
K.H. Stanley	Cunard Line Ltd
R.A. Stockley	Boston-Putford Offshore Safety Ltd
W.A. Tebutt	Great White Fleet Ltd
D.W. Temple	Scottish Office, Agriculture & Fisheries Dept
G.K. Thomson	Acomarit (UK) Ltd
A. Tibbott	Blue Star Ship Management Ltd
A.R. Timbs	Adventure Under Sail
A.M. Tweedie	P&O Nedlloyd Ltd
W.V. Venning	Stephenson Clarke Shipping Ltd
R.B. Wade	Ropner Shipping Services Ltd
A.W. Walker	Boyd Line Management Services Ltd
P.J. Ward	Kuwait Oil Tanker Co.
G.W. Weaver	Great White Fleet Ltd
R. Wilson	J.H. Whitaker (Tankers) Ltd
R.T. Wood	P&O Nedlloyd Ltd
C.C. Woodward	P&O Nedlloyd Ltd
W. Yeo	Cast Line (Liverpool)

Principal Observing Officers and Radio Officers (where carried)	Company
M.A. Adams	Boston-Putford Offshore Safety Ltd
L.G. Alayon	Great White Fleet Ltd
E. Almeida	P&O Bulk Shipping Ltd
M. Allison	Boyd Line Management Services Ltd
I. Osei-Amoako	Acomarit (UK) Ltd
J.H. Ansari	P&O Bulk Shipping Ltd
R.B. Arenal	Union Kuhl-Schiffahrt GmbH

Principal Observing Officers and Radio Officers (where carried)	Company
J.N.A. Attoh	Acomarit (UK) Ltd
L. Attri	A/S Thor Dahl Shipping
T.A. Badawi	Kuwait Oil Tanker Co.
J.F. Badham	Great White Fleet Ltd
N. Balachandran	London Ship Managers Ltd
A.W. Barkworth	Marr Vessel Management Ltd
N.P. Barrington	P&O Nedlloyd Ltd
R.D. Basilio	Great White Fleet Ltd
A.C. Beltran	Blue Star Ship Mangement Ltd
R. Bhatia	P&O Bulk Shipping Ltd
D. Billington	James Fisher & Sons (Liverpool) Ltd
R.H. Boatman	P&O Nedlloyd Ltd
R.D.W. Bogue	P&O Nedlloyd Ltd
D. Boynton	Scottish Office, Agriculture & Fisheries Dept
P. Branagan	F.T. Everard & Sons Ltd
J.A. Brogan	BP Shipping Ltd
K.A. Brown	Souter Shipping Ltd
R. Bruce	Shell International Trading & Shipping Co. Ltd
C. Bryson	Marine Management Services Ltd
I.R. Buley	Boston-Putford Offshore Safety Ltd
L.M. Butler	P&O Nedlloyd Ltd
R.J. Camara	Blue Star Ship Management Ltd
J.C. Campbell	Shell International Trading & Shipping Co. Ltd
R.M. Canete	Blue Star Ship Management Ltd
T. Catchpole	Tidewater Marine (UK) Ltd
M.V. Cayone	Bergesen d.y. ASA
M.A. Chapman	Boston-Putford Offshore Safety Ltd
J.B. Clemente	Marine Management Services Ltd
J.J. Cooney	P&O Nedlloyd Ltd
J.J. Coyle	Scottish Office, Agriculture & Fisheries Dept
I.A. Craig	Scottish Office, Agriculture & Fisheries Dept
J.D. Crasto	P&O Bulk Shipping Ltd
M. Crofts	NERC Research Vessel Services
D.R.N. Cropley	P&O Nedlloyd Ltd
A.B.K. Crosland	P&O Nedlloyd Ltd
M.F. D'Silva	P&O Bulk Shipping Ltd
N.D. Dalangin	Great White Fleet Ltd
A.R. Davidson	Scottish Office, Agriculture & Fisheries Dept
A.M. Diana (Jr)	Great White Fleet Ltd
B.J. Dias	P&O Bulk Shipping Ltd
W. Dopheide	F.T. Everard & Sons Ltd
K.S. Dowden	P&O Nedlloyd Ltd
M.W.D. Dumbar	P&O Nedlloyd Ltd
E.E. Erispe	Marine Management Services Ltd
R. Espanola	Blue Star Ship Management Ltd
E. Espera	Great White Fleet Ltd
C.J. Etherington	BP Shipping Ltd
D.G. Evans	P&O Nedlloyd Ltd
A.A. Facey	POETS Fleet Management Ltd
C.F. Falculan	Marine Management Services Ltd
T.R. Falk	Great White Fleet Ltd
R.A. Farmery	Boston-Putford Offshore Safety Ltd
F.C. Favillaran	Great White Fleet Ltd
I. Finlay	Boston-Putford Offshore Safety Ltd
A. Firman	P&O Nedlloyd Ltd

Principal Observing Officers and Radio Officers (where carried)	Company
F.P. Flores	Great White Fleet Ltd
P.J. Fowler	P&O Nedlloyd Ltd
S. Gallacher	P&O Nedlloyd Ltd
B.B. Garing	Blue Star Ship Management Ltd
J.P. Gaskin	James Fisher & Sons plc
F. Girado	Blue Star Ship Management Ltd
M.E.P. Gloistein	British Antarctic Survey
R. Gonzaga	Acomarit (UK) Ltd
P.F. Goodchild	James Fisher & Sons plc
W.B. Goswell	Ropner Shipping Services Ltd
R. Gozon	Blue Star Ship Management Ltd
D.E. Grief	Tidewater Marine (UK) Ltd
I.L. Guinoo	Blue Star Ship Management Ltd
S. Gyasi	Acomarit (UK) Ltd
S.K.A. Hagan	Acomarit (UK) Ltd
J.S. Hallam	P&O Nedlloyd Ltd
P.C. Handley	P&O Nedlloyd Ltd
M.S. Hasan	Shell International Trading & Shipping Co. Ltd
M.A. Haynes	P&O Nedlloyd Ltd
C. Hellier	F.T. Everard & Sons Ltd
J.C. Holmes	NERC Research Vessel Services
J. Holmshaw	P&O Nedlloyd Ltd
P.J. Hudson	POETS Fleet Management Ltd
B.G.J. Hughes	P&O Nedlloyd Ltd
R.A. Ibasco	Great White Fleet Ltd
S. Ilisan	Blue Star Ship Management Ltd
R.V. Inserto	Great White Fleet Ltd
S. James	Great White Fleet Ltd
M. Jarecki	Andrew Weir Shipping Ltd
K.F. Jassim	Petroleum Shipping Co. Ltd
N. Jerrum	Ropner Shipping Services Ltd
M.C.J. Jewell	Scottish Office, Agriculture & Fisheries Dept
C.D. Joshi	P&O Bulk Shipping Ltd
J.A. Josue	London Ship Managers Ltd
H.J.M. Katindoy	Great White Fleet Ltd
J. Kazi	P&O Bulk Shipping Ltd
R. Keir	Cunard Line Ltd
J. Knight	Tidewater Marine (UK) Ltd
P. Kochhar	P&O Bulk Shipping Ltd
V. Koothur	A/S Thor Dahl Shipping
K. Kowalczyk	BP Shipping Ltd
P. Kuruvilla	P&O Bulk Shipping Ltd
M. Langford	P&O Nedlloyd Ltd
C.E. Langley	F.T. Everard & Sons Ltd
T.T. Latto	BP Shipping Ltd
A. Laurente	Holy House Shipping AB
M. Light	Union Kuhl-Schiffahrt GmbH
R.R. Littlefield	P&O Nedlloyd Ltd
P.M. Lontoc	Great White Fleet Ltd
P.G. McCardle	Boston-Putford Offshore Safety Ltd
G. Mallick	V.Ships (UK) Ltd
P.T. Martinez	Kuwait Oil Tanker Co.
P.A. Mathews	P&O Nedlloyd Ltd
R. Mattos	P&O Bulk Shipping Ltd
N.J. Mauger	Great White Fleet Ltd

Excellent Awards *(contd)*

Principal Observing Officers and Radio Officers (where carried)	Company
S.J. Mee	British Antarctic Survey
R. Miller	BP Shipping Ltd
M.V. Miranda	P&O Bulk Shipping Ltd
R.P.C. Mitcheson	James Fisher & Sons plc
F.O. Momongan	Great White Fleet Ltd
R.B. Moore	Shell International Trading & Shipping Co. Ltd
L.O. Moreno	Great White Fleet Ltd
B.A. Murnin	The Maersk Co. Ltd
B. Nalam	Kuwait Oil Tanker Co.
R.G. Nemmara	P&O Bulk Shipping Ltd
P.H.J. Nicholas	Sealion Shipping Ltd
F.P. Nidoy	Great White Fleet Ltd
R.A. Nieto	Blue Star Ship Management Ltd
R.G.C. Noble	P&O Nedlloyd Ltd
A.W. Nolan	Petroleum Shipping Co. Ltd
T.W. Noronha	P&O Bulk Shipping Ltd
T. Nyunt	Denholm Ship Management (UK) Ltd
J.P. O'Driscoll	Souter Shipping Ltd
A.I. Osman	Kuwait Oil Tanker Co.
M.A. Pagente	Bergesen d.y. ASA
A.A. Pathan	Shell International Trading & Shipping Co. Ltd
R.B. Patil	P&O Bulk Shipping Ltd
M.D. Pike	Sealion Shipping Ltd
L.D. Potnis	P&O Bulk Shipping Ltd
C. Pritchard	Sealion Shipping Ltd
H. Rameshwar	P&O Bulk Shipping Ltd
R.M.C. Ramos	Great White Fleet Ltd
A. Rashid	Shell International Trading & Shipping Co. Ltd
B. Ravindran	P&O Bulk Shipping Ltd
R.L. Reazo	Blue Star Ship Management Ltd
S. Regan	Ropner Shipping Services Ltd
A.V. Robinson	Marr Vessel Management Ltd
T. Robinson	London & Overseas Freighters Ltd
A. Ruchkin	Andrew Weir Shipping Ltd
J.S. Russell	P&O Nedlloyd Ltd
H.I. Salarzon	Great White Fleet Ltd
R.T. Santos	Great White Fleet Ltd
J.P. Melles-Sawyers	P&O Nedlloyd Ltd
A. Shakeel	P&O Nedlloyd Ltd
D.M. Shaw	Stephenson Clarke Shipping Ltd
N. Sheard	Tidewater Marine (UK) Ltd
M.J. Sheldon	POETS Fleet Management Ltd
S. Singh	P&O Bulk Shipping Ltd
A.K. Singhania	P&O Bulk Shipping Ltd
N.B.H. Skinner	P&O Nedlloyd Ltd
S.S.M. Smith	Cunard Line Ltd
R. Spencer	Souter Shipping Ltd
J.E. Stafford	Stephenson Clarke Shipping Ltd
B.A. Standerline	Stephenson Clarke Shipping Ltd
D. Stevens	P&O Nedlloyd Ltd
R.J. Stevens	Souter Shipping Ltd
E.L. Sumbillo	Great White Ltd
B.R.G. Tasker	Denholm Ship Management (UK) Ltd
G.M. Taylor	Souter Shipping Ltd
G.J. Terriza	Ropner Shipping Services Ltd

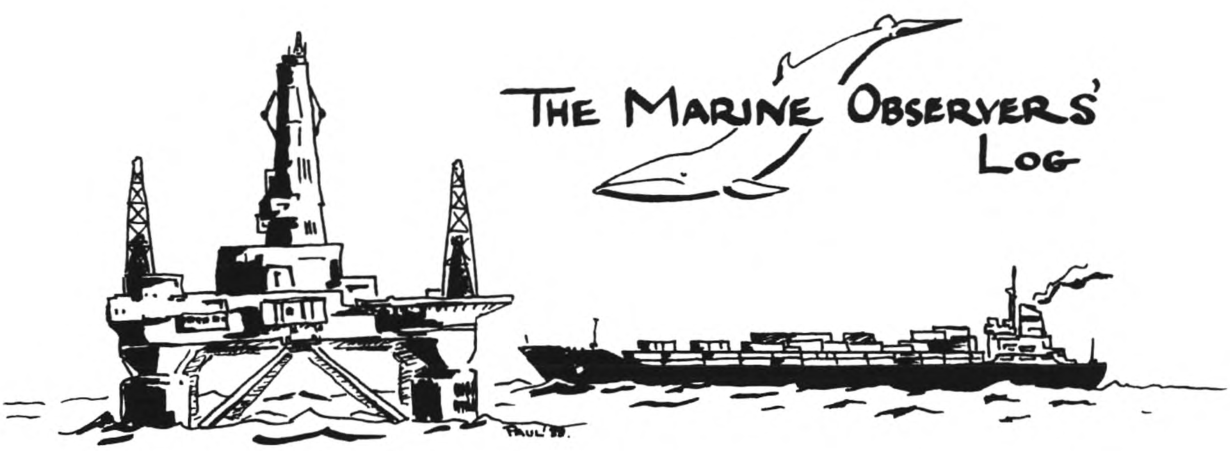
Excellent Awards *(contd)*

Principal Observing Officers and Radio Officers (where carried)	Company
W.M. Terry	The Maersk Co. Ltd
P.L. Thomas	Boston-Putford Offshore Safety Ltd
M.J. Thompson	Shell International Trading & Shipping Co. Ltd
A.A. Thomson	Denholm Ship Management (UK) Ltd
M.A.J. Thomson	Shell International Trading & Shipping Co. Ltd
L.P. Tipo	Great White Fleet Ltd
G. Vathiath	P&O Bulk Shipping Ltd
C. Veitch	Boston-Putford Offshore Safety Ltd
A.C. Villas	Acomarit (UK) Ltd
J.P. Vine	James Fisher & Sons (Liverpool) Ltd
P.C. Waiton	Scottish Office, Agriculture & Fisheries Dept
S.I. Wallace	British Antarctic Survey
A.P. Wallis	British Antarctic Survey
S.D. Ward	British Antarctic Survey
A.R. Watt	James Fisher & Sons plc
M. Westcott	Ropner Shipping Services Ltd
J.P. Whiteley	Ropner Shipping Services Ltd
P.A. Whyley	P&O Nedlloyd Ltd
D.J. Williams	J.H. Whitaker (Tankers) Ltd
E.K. Andoh-Wilson	F.T. Everard & Sons Ltd
D.B. Winder	Shell International Trading & Shipping Co. Ltd
H.S. Wright	Denholm Ship Management (UK) Ltd

'MARID' SHIPS †

Observers	Company
S. Quayle, R. McFerran, D. Corlett	Belfast Freight Ferries
J. McKenna, C. Thomas, S. Wood	Stena Line Ltd
P.J.L. Smith, R. Wood, R.G. Young	Eidesvik Shipping Ltd

† Vessels recruited primarily to observe and transmit sea temperatures together with non-instrumental observations from the North Sea and coastal waters.



October, November, December

The Marine Observers' Log is a quarterly selection of observations of interest and value compiled from the meteorological logbooks of marine observers and from individual reports. Responsibility for each observation rests with the contributor. All temperatures are Celsius unless otherwise stated. The standard international unit for barometric pressure is the hectopascal (hPa) which is numerically equivalent to the millibar (mb).

PASSAGE OF DEPRESSION

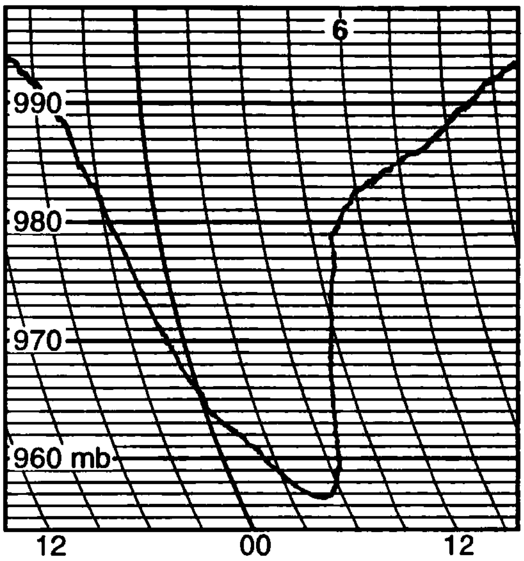
Scottish waters

f.r.v. *Scotia.* Captain J.B. Nichols. Aberdeen to Stornoway. Observers: the Master, Mr G. Jack, Fishing Master and ship's company.

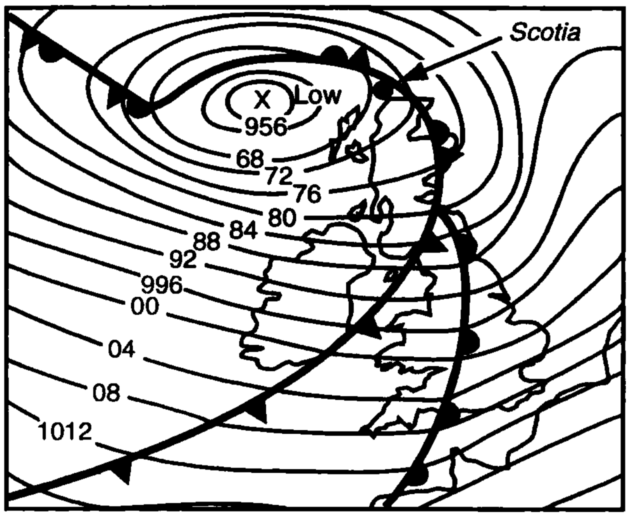
5–6 November 1996. The following observations were made as the vessel encountered a deep depression tracking across northern Scotland.

Date and time (UTC)	Wind Dir'n	Wind Force	Pressure	Remarks
5th 1100	NW	8	999.5	V/L cleared Aberdeen.
1400	NW	7	997.7	Rough sea, heavy swell, good visibility.
1600	W	6–7	997.1	
1800	SW	6	993.4	Moderate to rough sea.
2000	SW	5–6	991.3	
2200	SW	6	981.4	V/L in Pentland Firth.
2300	—	—	—	Pressure falling rapidly.
6th 0000	SE	8	971.6	Confused sea. Wind backed.
0200	SW	7	965.2	Cyclonic wind.
0400	SW×W	8	961.4	Passed Cape Wrath. Confused sea.
0500	SE	6	958.2	Wind cyclonic and decreased.
0600	NE	8	960.1	Pressure rising.
0700	N	9	962.0	V/L in North Minch.
0800	N	10	966.0	
0900	N	10	972.7	
1000	NNW	9	979.3	V/L sheltering east of Stornoway at 1030.

The vessel gained some lee from the north Scottish coastline during part of the passage. At 1200 on the 6th the wind was still force 9 but the conditions were moderating by 1400 as the wind decreased to N×W'ly, force 7 and the pressure continued to rise, reading 987.1 mb at this time. (See barograph trace.)



Barograph trace for 6 November 1996.

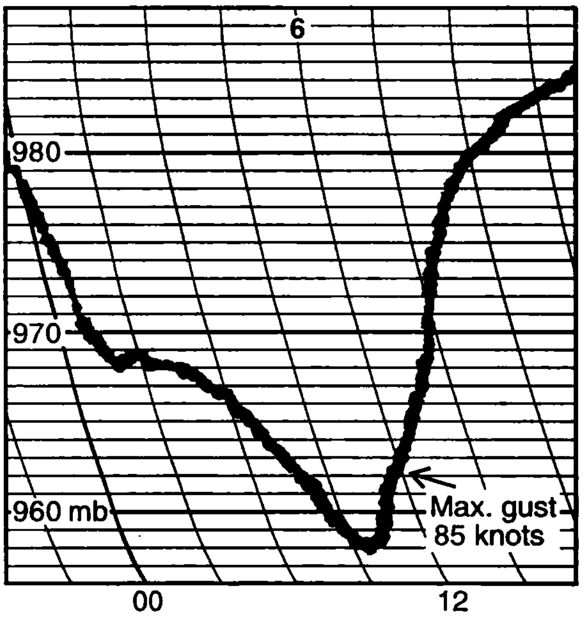


Synoptic situation at 0000 on 6 November 1996. The approximate position of the *Scotia* is shown for 0400 UTC.

After receiving the October 1996 edition of *The Marine Observer*, the observers remarked on how closely the depression resembled one experienced by the *Iolair* on 25 October 1995 in a similar location.

Position of ship at 0400 on the 6th: approximately 58° 36′ N, 05° 06′ W.

Editor's note. The depression was in the northern North Sea during the 6th where the drilling rig *Santa Fe Magellan* (in position 57° 22.4′ N, 01° 27.2′ E) was among the installations to record its presence. Oil Installation Manager J. McAuslin and observing officers D. Lever, B. Young, G. Wilson and A. McCallum recorded their minimum pressure about five hours after the *Scotia*'s minimum, (see barograph trace).



Barograph trace for 6 November 1996.

Winds at the installation averaged 60-65 knots with a maximum gust of 85 knots, and the seas reached 10 m.

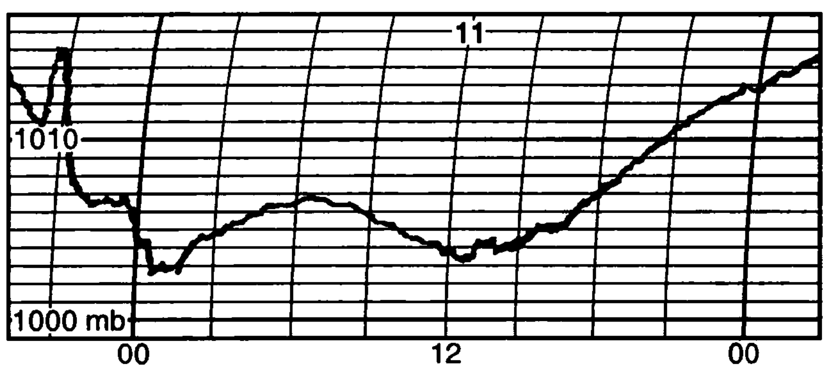
HEAVY WEATHER

South Atlantic Ocean

m.v. *Kazimah*. Captain P.J. Ward. Mina Al Ahmadi to Rotterdam. Observers: the Master, Mr A.I. Osman, 2nd Officer, Mr M. Al-Mejalhim, 3rd Officer, Mr A. Abdel Latif, 3rd Officer and ship's company.

11–12 October 1996. During the vessel's passage around the Cape of Good Hope, a period of heavy weather was encountered which peaked during the evening of the 11th.

At 0000 UTC on the 11th, the wind was NE×N'ly, force 8 but decreased to W×N'ly, force 6 by 0600. However, at 1200 it was force 7 but the full force of the wind came upon the vessel suddenly at 1300 when the wind speed increased dramatically from 28 knots to over 55 knots. The ship's speed was reduced to 7 knots from 14 knots achieved earlier in the day, and the vessel was hove to for securing purposes for some time to ensure no damage occurred to the vessel or equipment. The barograph trace indicates the pressure changes experienced.



By 1800 the wind was NW'ly, force 10 becoming W×N'ly, force 10 by 0000 on the 12th after which it moderated to WSW'ly, force 6 at 0600 as conditions improved.

Position of ship at 0600 UTC on the 11th: 34° 51′ S, 24° 33′ E.

Position of ship at 1300 UTC on the 11th: 35° 09′ S, 22° 46′ E.

SQUALL

North Atlantic Ocean

m.v. *Seki Pine*. Captain P.W. Jackson. Barcelona to Amsterdam. Observers: Mr I.D. Tranter, Chief Officer and Mr P. Milnes, GP Lookout.

3 December 1996. At 1826 UTC an approaching rain squall was at its most prominent on the radar PPI, stretching in an east-west orientation for 12 n mile either side of the heading marker. A clearly-defined structure was measured as being 2.25 n mile wide at the broadest point and 0.69 n mile wide at the narrowest which, coincidentally, was where the ship's course crossed the squall.

Shortly afterwards the ship was deluged with heavy rain and the wind veered rapidly from SSW'ly to NNW'ly, force 5. Before the wind veered, temperatures were noted as, air 15.2° and wet bulb 13.5° while shortly afterwards they read 12.4° and 12.2° respectively. The pressure, which had been falling quite rapidly, started to level off at 1011.9 mb.

Position of ship: 41° 56′ N, 09° 46 ′ W.

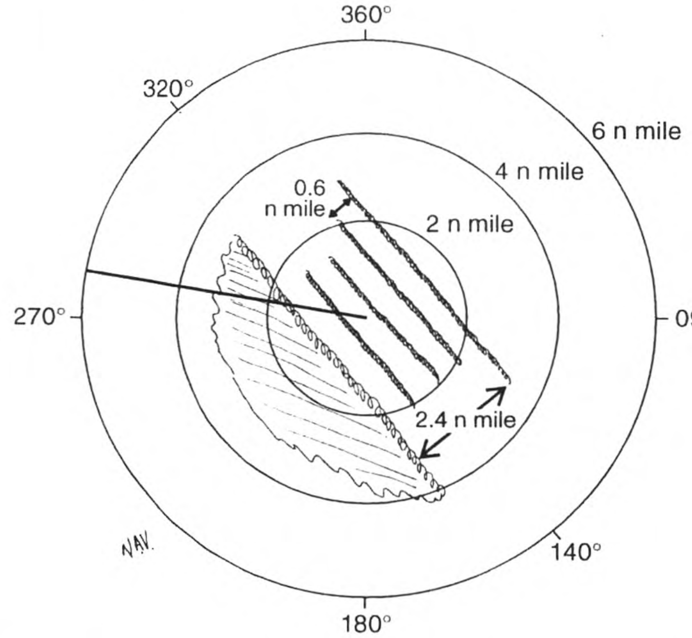
TIDE RIP

Gulf of Aden

m.v. *Shenzhen Bay*. Captain M. Watts. Colombo to Le Havre. Observers: the Master, Mr N.A. Voss, 2nd Officer, Mr R. Powell, SM1 and Mrs Voss, Supernumerary.

12 October 1996. At 1800 UTC the vessel had just rounded Cape Guardafui and entered the Gulf of Aden, the weather obs had just been entered into the Sat-C and sent when Mr Powell reported the vessel had altered course. As this was reported the off-course alarm sounded. The ship's head had swung to 265° before the autopilot could compensate and resettle on 281°, this was at 1817. The Master was called and he arrived to find everything back to normal; however, very shortly afterwards the ship's head was forced violently off to port again. Although there was no moon, a dark line was visible in the water off the port bow and numerous 'white caps' were visible too.

To stop the ship's head swinging from side to side, hand steering was engaged as the autopilot was obviously unable to compensate. The ship's course was maintained by hand steering without a problem and the disturbance was cleared by 1828; the sketch shows the radar image of the disturbance.



As soon as this rather unexpected overfall, tide race or rip had been cleared, flashes of bioluminescence were seen along the ship's side, gradually increasing in intensity during the next hour and flashing away from the ship as well as very brightly along the sides and in the bow wave. At 1930 it stopped abruptly.

Position of ship at 1817 UTC: 12° 00′ N, 51° 14′ E.

CETACEA

Indian Ocean

m.v. *Palliser Bay*. Captain S.D. Smith. Cape Town to Fremantle. Observers: Mr M. Stewart, 2nd Officer and Mr C. Seares, 3rd Officer.

2 November 1996. Isolated groups of whales had been observed throughout the morning 8–12 watch, these being identified as Humpback Whales owing to the

characteristics of the blow, small fin, raised flukes upon diving and the location of the vessel. Each group was apparently swimming in a southerly direction, keeping a wary distance from the vessel (approximately 0.5–1.0 n mile).

At 0600 UTC a pair of whales was observed 2 points off the starboard bow, basking roughly a quarter of a mile away. Both dived for a duration of about 10 minutes. Upon surfacing, one breached on two occasions, the second time getting two-thirds of its body clear of the water; following this, it proceeded to roll on its back and slap the sea with its left flipper. The underside of its belly was 'persil' white darkening to a mottled brown below its abdomen towards the tail. The slapping ceased after a few minutes, with both whales diving and observations being discontinued.

Could this surface-slapping have been some sort of courtship display, or a communication to other distant whales or simply to let us know that the ship's presence was unwelcome?

Position of ship: 36° 45′ S, 100° 35′ E.

m.v. *Leonia.* Captain B. Cosgrove. Juaymah to Europoort. Observers: Mr P. Richardson, 2nd Officer, Mr P. Courtney, 3rd Officer and Mr S.D. Crookes, Cadet.

10 December 1996. At about 1220 UTC whilst the vessel was on a course of 207° at a speed of 12.5 knots, a playful group of dolphins was sighted about 2 cables off the port beam. They approached the ship's side and then turned to speed off in a line perpendicular to the ship, as if racing one another. The dolphins had a black stripe along their flanks, and this feature led the observers to believe that they could be Striped Dolphins. This theory was backed up by the fact that they were in a large school and were performing amazing acrobatics including back somersaults and upside-down porpoising, all of which are well-known characteristics of said dolphin.

There were about 100 of these spectacular creatures present and they stayed with the vessel for about 20 minutes, approaching it and then racing away again. It was a pleasure to observe and, as Mr Courtney commented, "On days like this you'd almost work for nothing".

At the time the vessel was approximately 450 n mile north of the Comoros Islands, the air temperature was 28.0°, wet bulb 24.2°, sea 28.8° and the wind was E'ly, force 3.

Position of ship: 05° 06.7′ S, 46° 07.3′ E.

South Atlantic Ocean

m.v. *Scirocco Universal.* Captain G.A. McEwan. Paranagua to Jeddah. Observer: Mr T. Sobolak, 2nd Officer.

24 October 1996. AT 1400 UTC a large splash was seen about 0.5 n mile ahead of the vessel on the starboard bow. Looking through binoculars, it could be seen that there was one set of 'blows'.

For about five minutes the blow was seen regularly at intervals of 15 seconds; it was short in height, about 1–1.5 m. Whilst blowing, the body could be seen; its top surface was black and it was snowy-white underneath, the whole measuring approximately 5–6 m long.

When the 'object' was starboard abeam at 3 cables, he (or maybe she?) was observed without the aid of binoculars, and it was thought that he or she may have been an Orca, or Killer Whale.

Position of ship: 31° 47′ S, 03° 15′ W.

Banda Sea

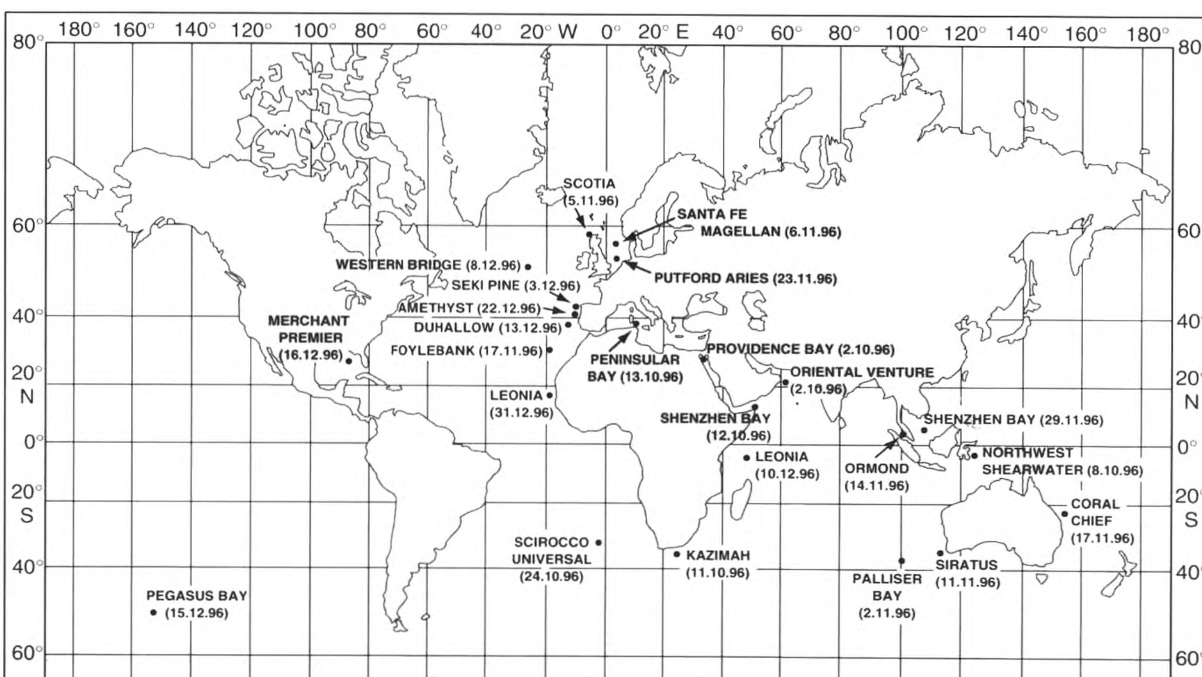
m.v. *Northwest Shearwater*. Captain K.M. McGregor. Withnell Bay, Australia to Yanai, Japan. Observers: Mr M. Tyler, Chief Officer, Mr T. Ruttledge, 3rd Officer, and Mr A. Coronado, OS.

8 October 1996. At 2145 UTC whilst west of Buru on a course of 032°, several large whales were observed. There were at least eight in groups of two or three and they had a very distinctive blow which lasted in the air as suspended mist for at least 30 seconds.

The whales passed only metres off the ship's side just below the surface, their wake clearly visible. On diving, the flukes were clear of the water, as described in *The Seafarer's Guide to Marine Life* for a Blue Whale. The size, although hard to judge, was obviously big enough for them to be Blue Whales; the length of back exposed during blowing was at least 10–12 m while the dorsal fin was not visible during blowing but was seen on the dive. Only one whale out of the eight was seen diving with flukes out of the water.

Position of ship: 03° 03′ S, 125° 53′ E.

Editor's note. The *Northwest Shearwater* is a Selected Ship observing for the Australian VOF.



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

FISH

North Atlantic Ocean

m.v. *Amethyst.* Captain B. Tucker. Ipswich to Palma de Mallorca. Observers: the Master, Mr B.A. Standerline, Chief Officer and members of ship's company.

22 December 1996. At 2000 UTC whilst checking forward following a period of adverse weather, two fish (see photographs on page 174) were found on the focsle head. Both of a similar species, the larger one was 13 cm long while the smaller one was 8 cm long; both were a silvery-blue colour with a black ridge to the top of the spine area. The tips of the tail and dorsal fins were also black but there was a vivid red pigment to the tops of the scales of the extreme lower body. The eyes were blue around a black pupil and both fish had an impressive array of backward-pointing and quite sharp teeth.

It was thought that they were washed aboard sometime between 0900 and 1800 on the 21st when the weather was at its worst and the vessel was shipping seas and spray overall. Means of positive identification of the fish was not available but they were thought to be deep sea hatchet fish which had been brought closer to the surface by upwellings during heavy seas and then shipped on board.

The vessel's course was 210° between Ushant and Cape Finisterre at a speed of 11.5 knots. The wind was E'ly, force 6–8, the sea temperature was 12°–15° while the seas were heavy with a north-easterly or easterly swell.

Position of ship at 2000 UTC on the 22nd: 41° 31′ N, 09° 55′ W.

Note. Dr F. Evans, of the Dove Marine Laboratory, Cullercoats, North Shields, comments:

"The two fish found on the focsle head were correctly identified as hatchet fish. The particular species was *Argyropelecus olfersi*, and we have received several previous records of these fish from the same locality. *The Marine Observer* in April 1979 reported the case of a lookout on the *Timaru Star*, in position 45° N, 8° W, who was hit on the head by a falling hatchet fish. Then, in April 1986, it was reported that a flock of gulls flew over the *Myrmidon* in position 47° N, 7° W. One was seen to make a catch, then hovered over the accommodation. It fumbled, and dropped the fish on deck. So hatchet fish arrive on board by avian agency and also, perhaps, by being washed aboard.

"The fish are a mid-water species, spending their days at depths of 400–600 m and their nights closer to or even at the surface. The fish found on the *Myrmidon* was dropped during the forenoon watch but as it was reported to glow brightly in the dark (they are bioluminescent) it presumably landed early in the watch.

"The size of the larger of the two fish in the present report is a little greater than that quoted by Alwyne Wheeler in his *Key to the Fishes of Northern Europe*. He gives a length of 10 cm.

"The oceanic range of hatchet fish in the North Atlantic is described as from the latitudes of Iceland and Norway down to Gibraltar and confined to the eastern Atlantic. Yet all our Selected Ship records are from the same circumscribed area between Ushant and Finisterre. The suggestion by the recorder that their frequency here may be due to a pattern of upwelling is a valuable one. The fish are not, of course, being forced to the surface by water movement but are probably finding a rich food supply in the upwelled water."

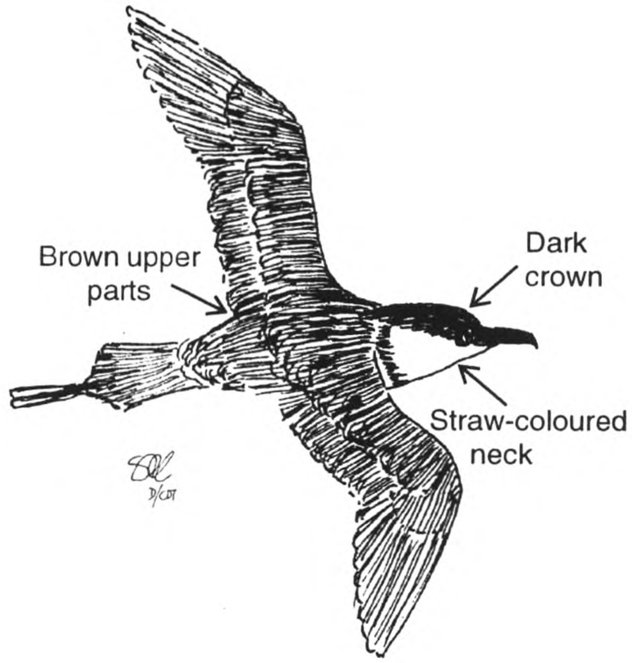
BIRDS

Eastern North Atlantic

m.v. *Leonia.* Captain B. Cosgrove. Juaymah to Europoort. Observers: Mr S.D. Crookes, Cadet and ship's company.

31 December 1996. The vessel was passing the Senegal city of Dakar when a bird was sighted gliding lazily around the midships mast. Upon consulting

Tuck's *Guide to Seabirds on the Ocean Routes* it was decided that the bird was perhaps a Pomarine Skua, see sketch, as it had the characteristic protruding central tail feathers.



The bird was in its 'light plumage' as it had brown upper parts, a straw-coloured neck, dark crown and pale underparts. It stayed with the vessel for two hours before flying off to the west.

Position of ship: 15° 55′ N, 18° 30′ W.

Strait of Malacca

m.v. *Ormond.* Captain G. Nicholls. Sept Isles to Singapore. Observers: the Master, Mr S. Avery, Chief Officer, Mr R. Mattos, Additional 2nd Officer, Mr S. Singh, Cadet and members of ship's company.

14 November 1996. At 0930 UTC whilst transitting the busy Strait of Malacca, *Ormond* was invaded by a flying Radio Surveyor who, after evading the anti-piracy measures, boarded the vessel and briskly went about his duties.

Flying straight into the Radio Room, he tried to send a Telex (see photograph on page 174), and next on his list were the radio publications. After browsing through them and finding all to his satisfaction, he decided to leave.

The bird was ringed on one leg and appeared to be in good health but could not be identified owing to lack of suitable books on board.

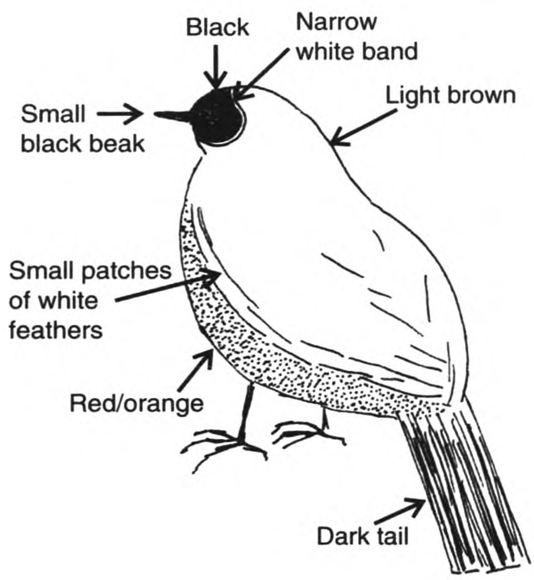
Position of ship: 02° 36.5′ N, 101° 20.3′ E.

Mediterranean Sea

m.v. *Peninsular Bay.* Captain J.W. Welch. Marsaxlokk to Antwerp. Observer: Mr M. Baker, 3rd Officer.

13 October 1996. The sketch shows one of several birds which were seen around the vessel at 0715 UTC. It perched on a container in front of the bridge for about 30 minutes.

It was similar in appearance to a robin but was larger. Its back was light-brown and its underside was reddish-orange leading to a dark-coloured tail. The wings



showed a few small patches of white feathers while the eyes were surrounded by a distinctive black patch which itself had a narrow white band around it. At the time of observation the vessel was 18 n mile north-north-east of Cap Bon.

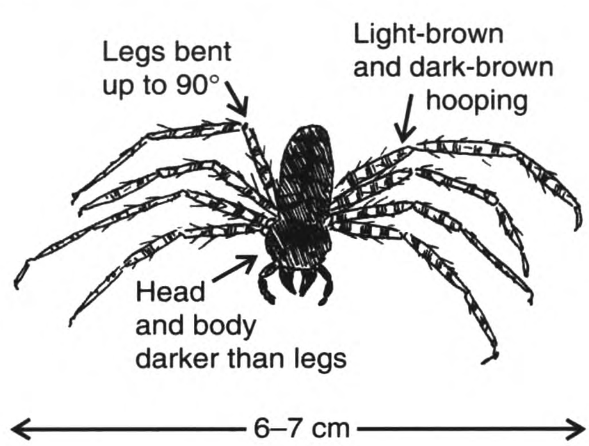
Position of ship: 37° 17′ N, 11° 24′ E.

SPIDER

Gulf of Suez

m.v. *Providence Bay*. Captain R.A. Kenchington. Sri Lanka to Port Said. Observers: the Master, Mr S. Kennedy, 2nd Officer, Mr L.-J. Cheesbrough, 3rd Officer, Mr D.A. Thomas, Cadet and most of ship's company.

2 October 1996. At around 0700 UTC the Cadet came across a spider on the main deck. Shown in the sketch, it measured 6–7 cm across, including its legs, its body was elongated and its leg joints bent at angles up to 90°.



The head and body were darker in colour than the legs which were light and dark-brown with 'hooping' marks. It was thought that 'he' may have been embarked for his Mediterranean cruise at Sri Lanka where open boxes of garlic had been loaded. The books held on board were consulted but nothing could be found about the specimen; the Master, on studying the spider, cancelled rig of the day and long trousers were adopted to avoid possible serious mishaps.

At the time, the vessel was in the Gulf of Suez and would transit the Suez Canal the following day.

Position of ship: approximately 28° 00′ N, 34° 00′ E.

BIOLUMINESCENCE

Arabian Sea

m.v. *Oriental Venture*. Captain D.R. Lewis. Fateh oil terminal to Singapore. Observers: Mr B. Ross, 3rd Officer and Mr J. Tiapon, AB.

2 October 1996. Bioluminescence had been present since the start of the watch at around 1540 UTC, taking the form of a dull-green colour emanating from the bow wave and dying out roughly 2–3 m from the ship's sides. At 1630 a large band of bioluminescence about 1–2 n mile wide was observed up ahead.

The band could be seen to extend about half a mile on the port and starboard sides, and was a light-green colour although not particularly bright. On passing through the band, the intensity of light increased in both brightness and regularity whilst the colour became a very light green and was given off in intense bursts from the bow wave, eventually dying out about 8–10 m from the ship. There was a constant light-green glow along the side of the hull, fading out at about 30 cm astern while bursts of light could also be seen coming from small wavelets further away from the vessel.

At around 1730 the bioluminescence died down to the level noted at the start of the watch. The wind was SE'ly, force 2, no clouds were present and the dry-bulb reading was 26°.

Later, at 1803 the moon rose and the vessel passed through a patch of very small, quick bursts of bioluminescence not unlike the shimmering of light on the water surface. The bioluminescence was no longer present on the port side (the moon side) but remained, albeit very dull, on the starboard side. By 1845, with the moon at an altitude of 10°, there was no bioluminescence to be seen. The ship's course was 137°.

Position of ship: 21° 11′ N, 61° 49′ E.

Note. Dr P.J. Herring, of the Southampton Oceanography Centre, comments:

"The band was probably a line (windrow?) of dinoflagellate accumulation, but the small quick bursts were different, perhaps lanternfish."

South Pacific Ocean

m.v. *Pegasus Bay*. Captain R.M. Herring. Port Chalmers to Lisbon. Observers: Mr A. Deans, 2nd Officer and Mr M. Villagomez, AB.

15 December 1996. At 1530 UTC whilst trying to observe the wave height and period, numerous luminous spots were noticed on the sea surface, scattered randomly around the vessel's track (095° at 19.5 knots). They had the appearance of bioluminescence but were brighter; at first glance, they were thought to be seabirds lit up by the ship's lights but on closer inspection with the Aldis lamp this idea was proved wrong, as was the possibility of the lights being 'white horses'. The sightings lasted for about 30 minutes.

The sea temperature was 11.1°, the wind was NW'ly, force 6 and the cloud cover was 8 oktas.

Position of ship: 49° 16′ S, 152° 17′ W.

DISCOLOURED WATER

Coral Sea

m.v. *Coral Chief.* Captain J.A. Hofton. Brisbane to Port Moresby. Observers: the Master and members of ship's company.

17 November 1996. At 0100 UTC the vessel encountered discoloured water, light-orange in colour and lying along the direction of the wind in strips 1–4 m wide and in varying lengths from 15 m to 100 m. The strips varied in density and were visible for 2 n mile around the ship.

A water sample was taken and, upon inspection, was found to contain particles resembling grass seed of about 1 mm in average length. After consulting *The Marine Observer* (April, 1996) the reasonable conclusion was that the particles were radiolarians, perhaps *Trichodesmium*, a species of phytoplankton that flourishes in tropical waters. The sightings lasted until 0230.

Weather conditions were: air temperature 26.5°, wet bulb 25.0°, wind NNW'ly, force 4.

Position of ship: 22° 35.6′ S, 153° 12.4′ E.

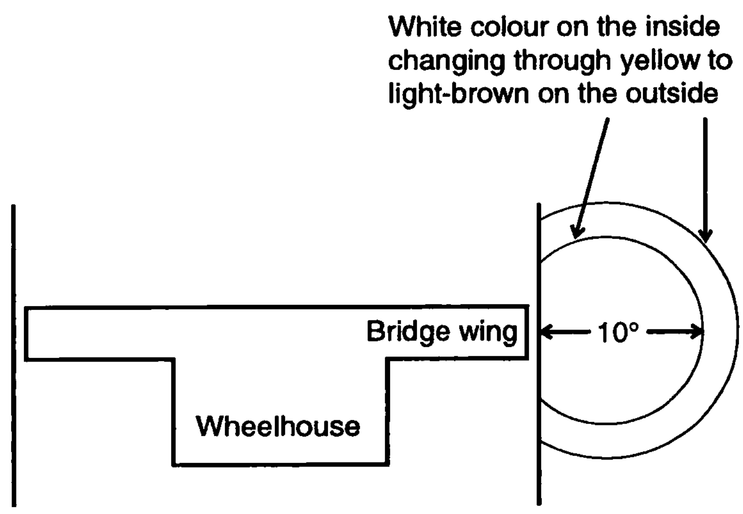
Editor's note. The *Coral Chief* is a Selected Ship observing for the Australian VOF.

GLORY

Indian Ocean

m.v. *Siratus.* Captain D. Freeman. Griffin Venture to Port Stanvac. Observers: the Master and Mr A. Rashid, 3rd Officer.

11 November 1996. At 0212 UTC the vessel was experiencing thick fog patches above which dense cirrus cloud was clearly visible. Whilst looking over the starboard bridge wing at the sea a corona-like arc of light was clearly seen, directly beneath the bridge wing. See sketch.



The beam of light covered about 10° of arc in diameter and was coloured white on the inner side and gradually changed through yellow to light-brown on the outside. The phenomenon lasted for about 10 minutes until the visibility improved to greater than 1,000 yards.

Position of ship: 35° 05.7′ S, 115° 26.5′ E.

Editor's note. The description and sketch seem to indicate that a glory was seen. The system of coloured rings are similar to those of a corona which can be seen around the sun or moon but surround the shadow of the observer on a bank of cloud or mist. In this case, the shadows of the observer and of the bridge wing probably merged so that the larger shadow was the apparent focus.

METEORS

North Atlantic Ocean

m.v. *Foylebank*. Captain P.S. Chase. La Coruna to Brazil. Observer: Mr G.R. Armstrong, Chief Officer.

17 November 1996. Throughout the observer's morning watch (0400–0800 UTC) and possibly before and afterwards there was a continuous falling of 'shooting stars'. For probably a period of about an hour there were no more than a few seconds between each individual sighting and, from what was seen during the watch, there was never more than one at a time (that is, not a shower of them).

Some were blindingly brilliant and left a 'scar' in the sky for a second or two, but mostly they fell vertically, or nearly so, and were very short-lived, not showing the usual long 'streak' across the sky. Observations became less noticeable towards daybreak.

Position of ship: 31° 53′ N, 18° 04′ W.

m.v. *Western Bridge*. Captain A. Crofts. Port Cartier to Port Talbot. Observers: Mr T. Ryan, 2nd Officer and Mr D. Kasthuriarachchi, AB.

8 December 1996. A yellowish-white coloured object was observed descending from the sky at 0310 UTC whilst the ship was on a heading of 079° at 14 knots. It was assumed to be a meteor, first appearing on a bearing of 067° at altitude 8° and vanishing bearing 060° at 5° altitude, the whole sighting lasting roughly 1.5 seconds. The cloud cover at the time was 4 oktas of cumulus and stratocumulus.

Position of ship: 48° 55.3′ N, 24° 46.9′ W.

m.v. *Duhallow*. Captain M.J. Walker. Amsterdam to Sepetiba Bay. Observers: Mr F.X. Pereira, Chief Officer, Mr H. Tagudando, GP1(D) and Mrs Pereira, Supernumerary.

13 December 1996. At 2010 UTC a 'shooting star' originating from about 10° altitude, bearing 235° from the ship, was observed leaving a bright-green trail to a bearing of about 245° and 2° altitude where it then burnt out.

This sighting lasted roughly two seconds but within a minute another shooting star at altitude 45°, bearing 260° was seen falling for a second; this one left behind a white trail. The ship's heading was 202°.

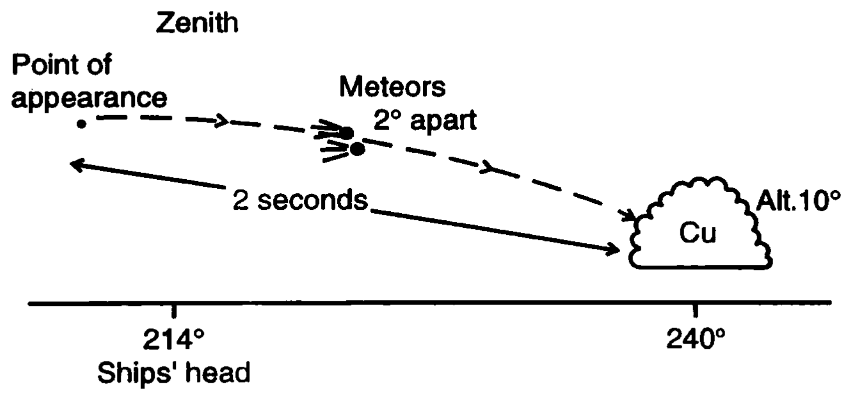
Position of ship: 38° 56.4′ N, 12° 04.8′ W.

Editor's note. On 16 December at 0525 UTC a meteor was spotted from the ***Merchant Premier*** on passage from Houston to Miami. It was a bright-white colour and was seen descending quickly ahead of the ship but disappeared as it reached an altitude of about 25°. The ship's heading was 114° in position 25° 46.4′ N, 87° 10.9′ W.

South China Sea

m.v. *Shenzhen Bay*. Captain D. Lax. Hong Kong to Singapore. Observers: Mr A. Lewington, 1st Officer and Mr D. Ewing, SMS.

29 November 1996. AT 1047 UTC whilst the vessel was on a heading of 214° in excellent visibility of more than 20 n mile, two very bright meteors were observed overhead initially, about 10° south of the zenith, see sketch.



Over the passage of 2 seconds both meteors tracked across the sky with their bright tails finally dispersing behind cumulus cloud bearing 240° at altitude 10°. Both meteors maintained their position in relation to each other and were approximately 2° apart.

At the time of observation the sky was still very bright to the south-west and the cloud cover was 3 oktas of cumulus and 1 okta of cirrus.

Position of ship: 04° 16′ N, 106° 09′ E.

RADIO RECEPTION

North Sea

m.v. *Putford Aries*. Captain I. Finlay. On station, Thames 'A' gas platform. Observers: the Master, Mr P.G. McCardle, Chief Officer and Mr R. Younger, Chief Engineer Officer.

23 November 1996. After making the 0600 UTC observation, the Chief Officer called Humber Radio on 2182 KHz. With the first transmission, Malta Radio answered quite clearly, wanting to know the vessel's position, and call sign, etc. Eventually, Mr McCardle was able to get through to Humber Radio who informed him that Malta Radio was still trying to obtain his message.

Position of ship: 53° 05′ N, 02° 31′ E.

MISCELLANY ...

An additional mélange of maritime sightings

Anja-C. 14 October 1996. At 1749 UTC, after some rain, a rainbow and secondary rainbow were observed to the east of the vessel. Their estimated heights were 1,000–1,500 feet. Both bows were full until 1752 when the secondary one faded leaving the primary bow in sight for another two minutes. The vessel was in the north bound lane off Finisterre.

BT Nestor. 26 November 1996. At 1630 UTC in position 21° 37′ N, 85° 25′ W a waterspout was sighted. The sky was cloudy with patches of medium-height cumulus and sheets of stratocumulus at the position of the spout. The initial formation was not seen but it was watched for 23 minutes before it suddenly faded; the central part of the spout was not well defined but was present for most of the time, and there was only a slight disturbance on the water. During the observation, the spout did not appear to move significantly although it 'danced' on the surface of the water. The vessel was about 100 n mile north of tropical storm 'Marco' at the time.

(*Note.* Dr Mike Rowe, of the Tornado and Storm Research Organisation (TORRO) was pleased to receive this observation and commented that "this was a large, well-formed waterspout. It is relatively unusual for spouts to form beneath cumulus and stratocumulus; cumulonimbus is more usual. The less well-developed section in the middle of the spout is often reported; it happens because the air at this level is drier, so less condensation occurs within the vortex".)

Berlin Express. 5 November 1996. Whilst in the North Atlantic on passage from Port Chalmers to Lisbon, Second Officer S. Holding watched an adult whale, possibly a Humpback, with its calf. The calf was continually breaching and occasionally tail-lobbing while its mother was tail-lobbing, diving and occasionally breaching, making huge splashes as she did so.

British Reliance. 19 November 1996. During the setting of the sun at 1800 UTC Second Officer Mrs E. Richardson and Mr P. Davies ETO noted a blue and a green loom on either side of it. As the sun disappeared below the horizon, its own red colour merged with the other two colours, the effect of which was highlighted by low cumulonimbus clouds in the area. The ship's position was 33° 35′ N, 13° 02′ W.

Discovery. 8/9 October 1996. Captain M.A. Harding and the ship's company watched the aurora borealis through 4 oktas of low cloud at 2300 UTC. The display, in the form of a glow, had a maximum elevation of 40° and was seen from the North Atlantic Ocean in position 60° 38′ N, 14° 53.3′ W.

English Star. 30 October 1996. At 2330 UTC in position 06° 06′ N, 105° 04′ E the vessel passed through an area of water with 'steam' rising from the surface. Captain N.J. Barr and Mrs Barr noted that the sea colour was normal but as the vessel's propeller disturbed it, it became a milky-cream colour. This lasted for about five minutes after which all returned to normal. On checking chart B.A. 4051, the vessel was passing over an area 1,390 m deep while the surrounding sea area was between 3,713 m and 3,733 m deep.

Hemina. 12 October 1996. In position 41° 44′ N, 51° 43′ W a group of six unidentified whales was sighted half a mile off the starboard bow at 1930 UTC. They were black in colour with a very prominent dorsal fin but no flukes were visible. Captain P. Venvell and Cadet M. Steel noted that they did not appear to be moving in any particular direction and their movement was long, slow and lazy; they appeared to be totally unconcerned about the presence of the vessel.

Jervis Bay. 18 December 1996. A lunar halo [of unstated radius] was seen by Third Officer C.W. Longmuir and SMS A Thorne at 1700 UTC whilst on passage from Singapore to Jeddah. Its thickness was about the same as the diameter of the moon, which was at an altitude of 80°, and was observed for 90 minutes.

Mairangi Bay. 8 November 1996. Captain B.W. Nuttall, First Officer C. Hall, Third Officer F.S. Wilson and ship's company observed a tabular iceberg in position 52° 59′ S, 97° 09.5′ W. At a range of 15 n mile the berg gave a good radar target at 17 miles. Horizontal sextant angles were taken and the berg was estimated to be about 350 m × 180 m × 20 m while its colour appeared to show a blue-green tinge. Using radar plotting it was estimated that the berg was travelling on a course of 025° at 1 knot. Within a 15-mile radius to the east and south of the main berg, another four bergy bits were sighted.

N.O.L. Delphi. 6 December 1996. At 1857 UTC in position 43° 20′ N, 59° 11′ W a double sonic boom was clearly heard by Captain D. Tracey, First Officer B. Holcombe and Second Officer S. Iqbal. An aircraft was observed heading 065°, Mach 1 at a 'guesstimated' altitude of 45,000 feet, and it was concluded that this was British Airways Concorde flight BA004 from New York to London.

OOCL Bravery. 13 October 1996. The vessel was proceeding through the Chenal D'Anticosti *en route* from Hamburg to Montreal when the aurora borealis was viewed between 0200 UTC and 0800 UTC. It was seen by Second Officer P. Woodcock and Third Officer W.J. Thompkins as a rayed arc of light, white in colour, at an elevation of 30°–35° between 0200 and 0300, and as a homogeneous arc bearing 280°–040° between 0300 and 0800. Cloud cover at the time was 3 oktas of stratus and ragged stratus while the visibility was 12 n mile.

OOCL Bravery. 2 December 1996. At 0238 UTC when at 52° 31′ N, 38° 21′ W, Second Officer P. Woodcock and M. Barlis, AB saw what was believed to be a piece of falling 'space junk' as it moved across the sky for 4–6 seconds. It appeared as a bright-white light with a blue-green tail, and moved from a point on the starboard bow, bearing about 105° at an elevation of 35°, to the port side where it finished at an elevation of about 20°, bearing 050°.

Oriental Venture. 3 October 1996. At 1140 UTC a pod of at least four Killer Whales approached the vessel while it was steaming on a south-easterly course at 14 knots, in position 17° 58′ N, 64° 59′ E. The whales were not scared off by the vessel; one male swam with it for about two minutes within 30 m of the ship's side, turning on his side at least twice just below the bridge wing, as if to get a better look at the vessel.

Providence Bay. 23 December 1996. Whilst off the coast of Oman at 1600 UTC, a halo was noted by Captain R.A. Kenchington, Third Officer Mrs C. Hickin, SM1 J. Fletcher and Mr Hickin, Supernumerary. Its diameter was 45° and it was centred around the moon, which was at altitude 75°. The halo became incomplete after about 20 minutes as a section of 20° disappeared from the top-right sector but was seen for 1.5 hours in total.

Sachem. 8 November 1996. A trough passed over the ship whilst it was off south-east Australia. The lowest pressure recorded was 1009.1 mb having fallen 6 mb in four hours, the wind was SW'ly, becoming SE'ly, force 7-8 and the sea was rough to very rough. The vessel was hove to for about 12 hours. Once passage was resumed, both sea and swell slowly decreased but entry into port prevented further observations.

Shetland Service. 4 December 1996. Captain A. Clarke and Mate D.E. Grief spotted seven Little Auks swimming and diving around the vessel (position 57° 30′ N, 00° 40′ E). On the 10th a male Mallard was seen swimming alongside.

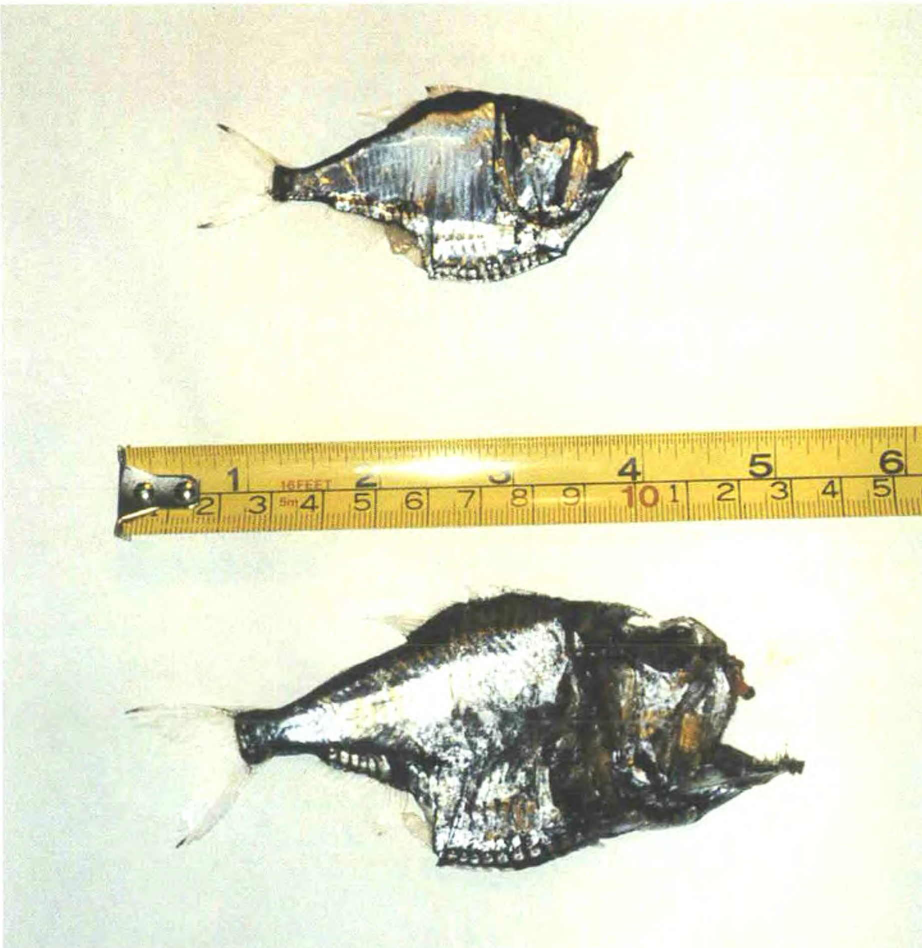
Singapore Bay. 14 November 1996. Whilst transiting the Suez Canal south bound, the Canal projector was switched on as darkness fell and it was noticed by Captain J.G.W. Dixon, Chief Officer A. Murray and Third Officer J.S. Orr that terns (species unknown) were attracted by the light beams. They became so dense in number, literally thousands of them, that they were clearly visible on all three radar sets up to a distance of about 3½ cables.They remained with the vessel for 3½ hours, settling on the water within the beam of light and then taking off again to keep up with the vessel.

(*Note.* Captain P.W. Chilman, of the Royal Naval Birdwatching Society said that "this is a very interesting report, I have seen flocks of birds attracted by lights at sea but never in the Suez Canal. Whiskered Tern (*Childonias hybridus*) or White-winged Black Tern (*Childonias leucopterus*) seem possible as they both migrate through Suez in very large numbers in the Autumn. There are other species possible as well, and the flock could well be mixed".)

Snow Cape. 24 December 1996. Cadet S.B. Clapperton and P. Murray, Seaman AB watched two seabirds which were later identified as Common Terns, as they flew alongside the ship, occasionally landing on board. The ship was in position 37° 17.5′ S, 02° 10.5′ E.

Welsh Venture. 27 October 1996. At 1325 UTC whilst the vessel was 180 n mile off the north-east coast of Somalia, Captain M. Pocklington, Chief Officer M. Cleugh, Third Engineer A. Barker and Fourth Engineer A. McNally noticed that the sea surface on the port bow was very agitatated with extensive spray being thrown up. The approximate diameter of the disturbance was 4 m and the phenomenon lasted 15 minutes. The cloud was dense cumulonimbus with a base at 700–800 feet while the wind was light and variable throughout the period. No precipitation was observed between the sea surface and the base of the cloud. The assumption was that the event was an unsuccessful waterspout formation.

(*Note.* Mr Mike Rowe, of TORRO, said that this was a most interesting observation, and commented that "the area of spray, 4 m in diameter must indeed have been a waterspout. There was no visible funnel cloud between the spray and the cloud base, and this is unusual. Most 'invisible' spouts are fair-weather spouts, though the presence of dense cumulonimbus would not suggest this on this occasion".)



B.A. Standerline

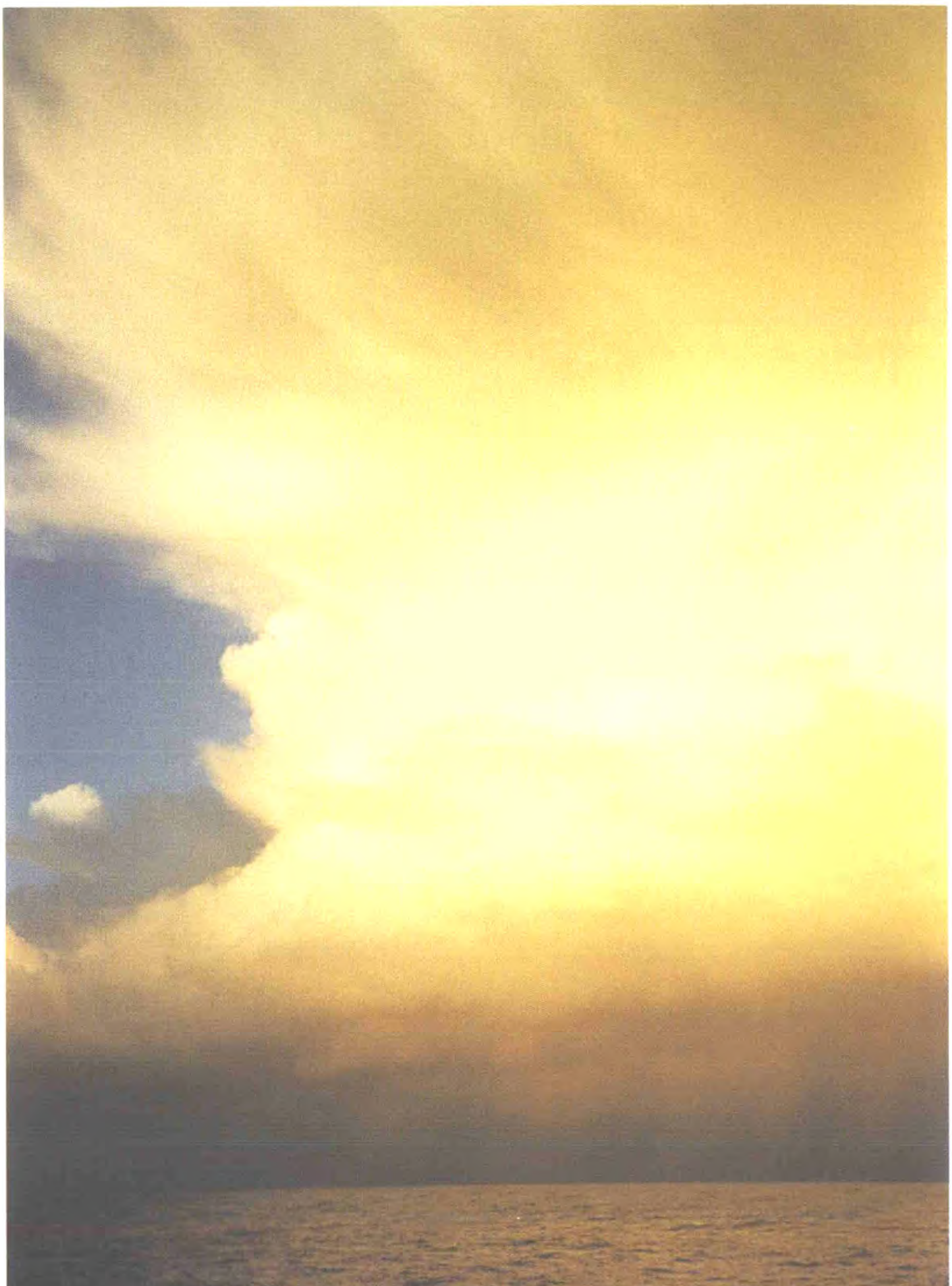
Hatchet fish on board the *Amethyst*. (See page 164.)

Captain G. Nicholls

The flying surveyor sends a Telex. (See page 165.)

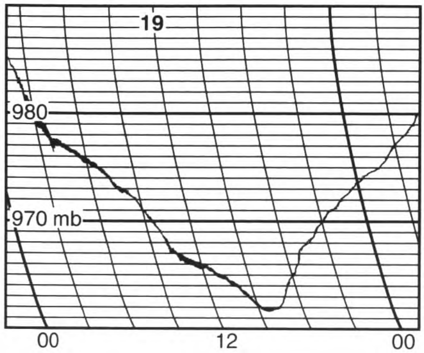
D. Fustandi

The *Anja-C* hove to on 29 November 1996 in position 38° 48′ N, 05° 06′ E. The Master, Captain J.W. Jackson said, "*Anja-C* is a Rhine type low air draft vessel with a fairly open aft deck, and is constantly swept by seas during bad weather conditions. This photograph may help to explain why the observer misses the sea-temperature reading when the wind exceeds force 5 or 6".



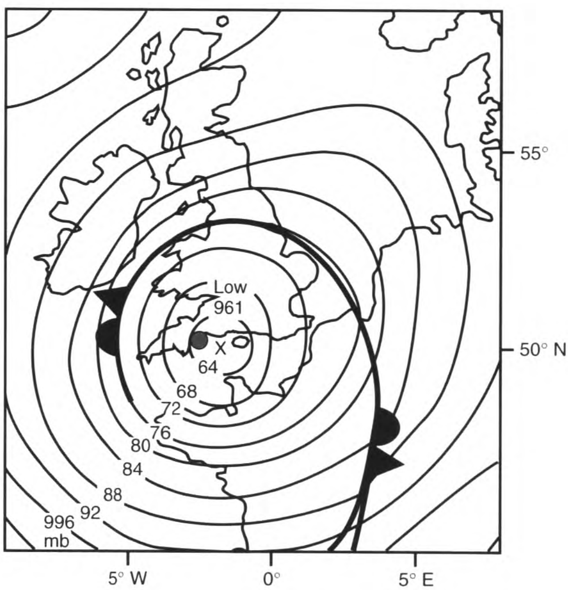
Captain P.W. Jackson

An approaching cumulonimbus cloud with squall photographed from *Seki Pine* on 4 December 1996 at about 0900 UTC while the vessel was on a heading of 031° in position 45° 00′ N, 08° 18′ W.



Above: Barograph trace from the *Corystes* (Captain B.A. Chapman) on 19 November 1996. The vessel was off the south Devon coast as a depression passed through its position. The lowest recorded pressure noted in the Deck Logbook was 959.0 mb (uncorrected) at 1600 UTC. At this time the wind dropped to 10 knots from 30 knots recorded at 1500, then increased again to 40 knots at 1700 while veering from 220° to 330°. Violent squally showers were experienced.

Below: The synoptic situation at 1800 UTC on 19 November 1996, with the vessel's approximate position indicated by ● near the centre of the depression.



An eye on the weather in Reading *

By A. Woods
(European Centre for Medium-Range Weather Forecasts, Shinfield Park, Reading)

My wife was the interested and somewhat amused eavesdropper to a conversation between two middle-aged ladies at a London bus-stop in January last:

"Windy today, isn't it!"
"Yes. Mind you, they did say it was going to be like this."
"Yes. Have you noticed, when they gave the weather a few years ago, they were always wrong. Now they're nearly always right!"

If the forecast was 'always right', research into improving forecasts would no longer be needed. It is perhaps fortunate, therefore, that chaos theory came along; I was able to reassure my wife that if the beat of a butterfly's wing in the Amazon rain forest could influence the path of a hurricane on the other side of the globe two weeks later, she could feel confident that there will be a continuing need for expertise in the field.

However, not only the citizens, but also the nations of the world are justified in having a reasonable expectation of getting accurate weather forecasts in exchange for the tax-payers' money — some thousands of millions of pounds of it — spent each year collecting weather data.

Technology

There have been enormous advances in computing technology. Perhaps we are all justified in wondering if these have been matched by corresponding advances in the accuracy of our forecasts.

One-day forecasts are more accurate than longer-range predictions and the accuracy falls off with forecast length. When the forecast accuracy falls below 60%, the forecasts are usually no longer useful.

Today, the 7-day forecasts from European Centre for Medium-Range Weather Forecasts (ECMWF) at Reading have the same accuracy as the 3-day forecasts back in 1972 — the first time that reliable numerical (using computers) weather forecasts for longer than two days ahead could be made — and the 5-day forecasts in 1979/80. The current five-day forecasts, which score above 80%, are more accurate than the two-day forecasts of 1972.

Physical laws

The behaviour of the atmosphere is governed by physical laws which can be expressed as mathematical equations. These take into account how atmospheric variables or fields (such as temperature, wind speed and direction and humidity) change.

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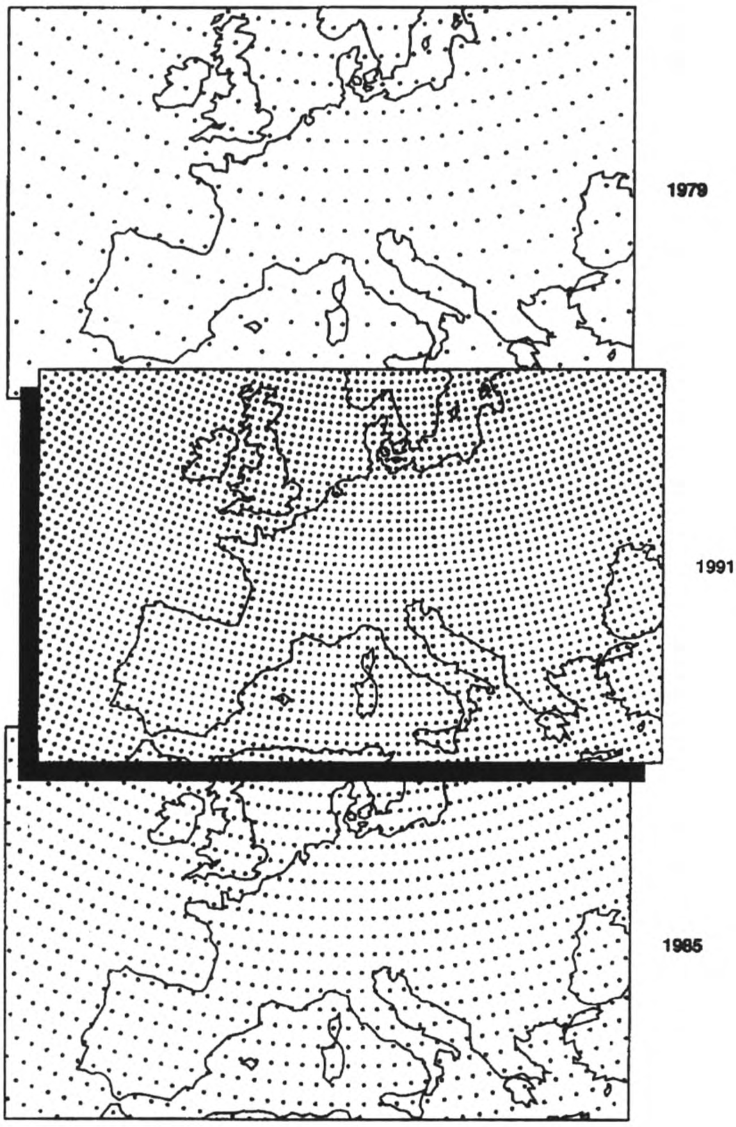
* Reproduced from *Science and Public Affairs*, Summer 1996, by kind permission of the Editor.

Dr Austin Woods is Scientific Officer in the Directorate of the European Centre for Medium-Range Weather Forecasts; he was formerly Head of Meteorological Operations Section in the Centre. He came to the Centre from the Irish Meteorological Service.

If we can solve these equations, then, starting from the current state of the atmosphere, we can predict the future state, which we can interpret in terms of 'weather' — rain, temperature, sunshine and wind.

However, these equations are complex; there is no exact solution that can give us the future values. Instead, numerical models are employed to provide approximate solutions. In these models the fields are represented by numbers — the values of temperature, wind speed and so on — at each point on our model grid. We calculate the future values of the numbers with a computer.

If the grid points are close together we will have more detail about the future state of the atmosphere. However, the further we separate the grid points, the fewer numbers we will have to crunch. So finer grids require much more powerful computers.

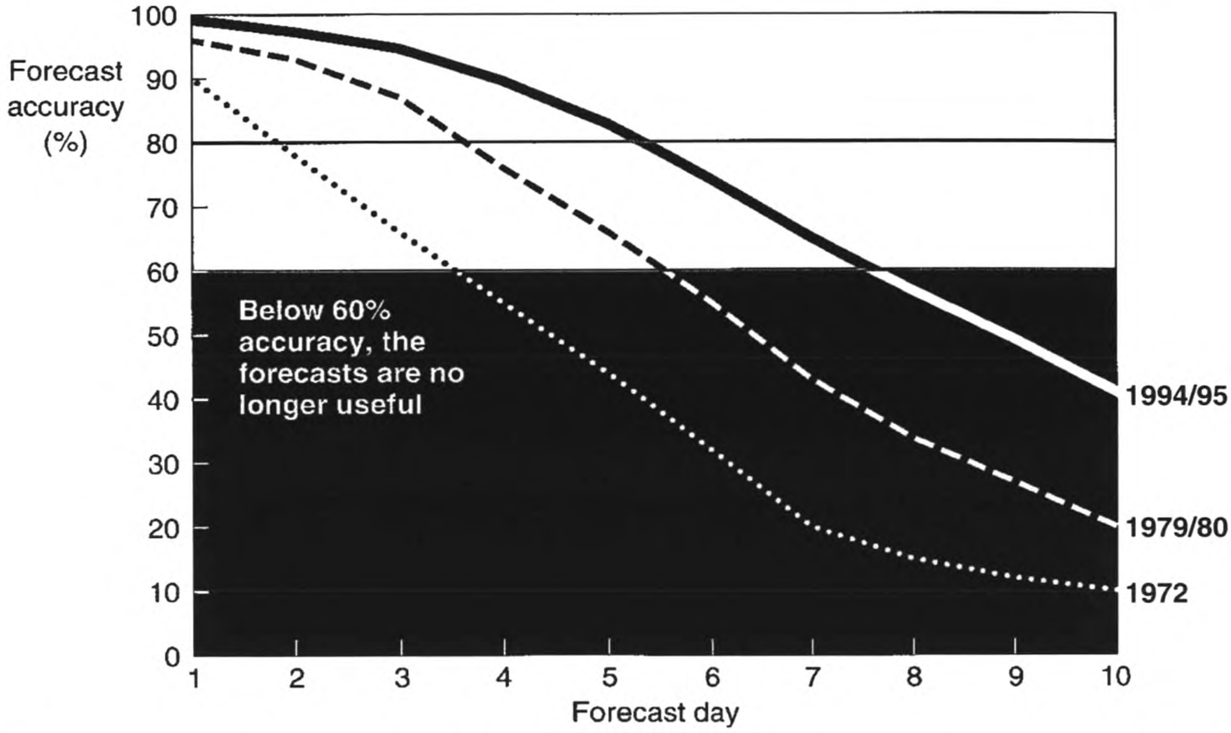


The European Centre for Medium-Range Weather Forecasts has tightened its grid over the years. The grid used today is the same as that for 1991.

Small-scale effects

Some important factors influencing the changes in the atmosphere occur on a small or even very small scale. These include the heating of the soil by the sun and the turbulence of the air near the ground and at high levels in the atmosphere, for example when air flows over mountains.

These cannot be represented properly by the grid scale that we can use with even the most powerful computers available. We must represent their effects by



The three lines show the accuracy of the ECMRWF operational forecasts made in 1994/95 (solid line), the operational forecasts made in 1979/80, the first year of the Centre's work (dashed line), and the best experimental forecasts published in the USA in 1972 (dotted line). The US data were the result of research using the 'most sophisticated and probably the most realistic' computer model of the atmosphere then available.

taking into account their influence on the behaviour of the large-scale parameters. This is one of the really difficult areas of work in numerical modelling.

The task can be made more manageable if we confine our forecast to a smaller area, e.g. part of Europe. We then have a limited area model — an LAM. These models can produce a very detailed forecast, but they are useful only in the range several hours to about two days into the future. What is happening outside the area influences the weather inside it, the more so the longer the forecast range.

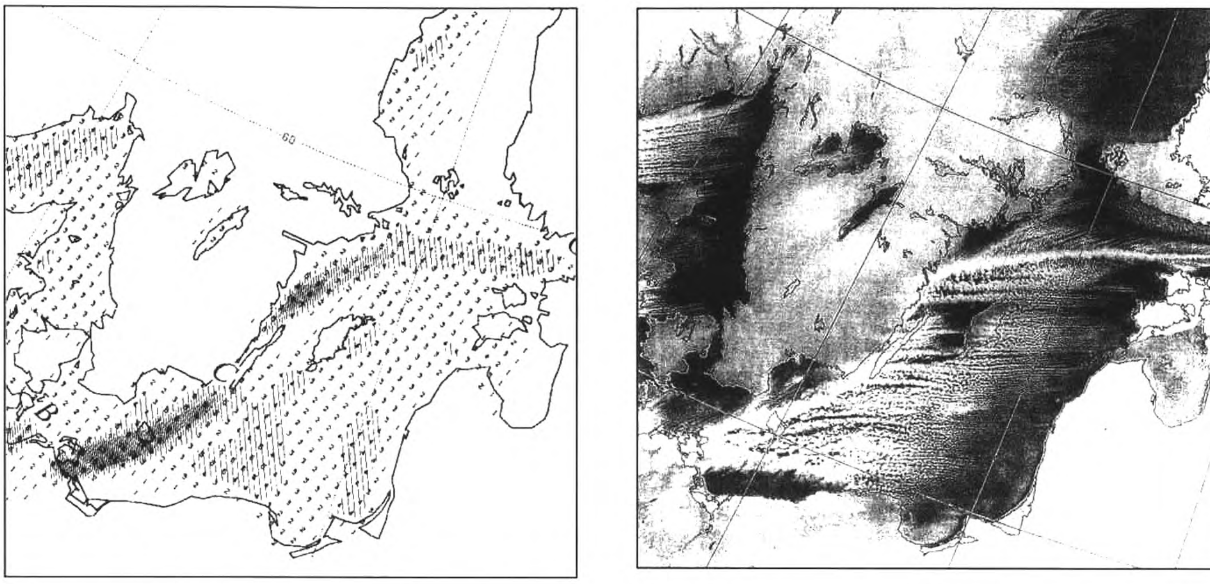
Medium-range forecasting

The ECMWF predicts the behaviour of the atmosphere in the medium range, up to 10 days ahead.

The weather over London today can be affected by what was happening in mid-Pacific five days ago. Furthermore, many applications of medium-range forecasting, for example ship routeing or pollution dispersion, are not confined to limited areas of the globe. Therefore, a model for medium-range forecasting must be global and has to describe the whole atmosphere from the Earth's surface to a height of 30 km. The model grid scale we can use depends on the power of the computer we have available and how efficiently we use this power.

In 1991, thanks to the availability of more powerful computers and some clever modelling tricks, the ECMWF increased the resolution of its model's grid to a 60 km spacing, evenly distributed around the globe.

The grid is repeated on 31 levels between the Earth's surface and 30 km above. The model forecasts the wind, temperature and humidity at 4,154,868 points throughout the atmosphere, plus several other weather parameters (snow, soil moisture, etc.) at 134,028 points on the Earth's surface.



Impressively detailed short-range forecasts can be made. The picture above [left] shows a forecast for the Baltic and part of Sweden made in Sweden by a limited area model with a 20 km grid. Note how the forecasts of cloud — forming as cold air streams from frozen Russia over the waters of the Baltic — compares with the satellite picture on the right. Even cloud formation over the lakes of Sweden is predicted.

Making the forecast

By interpolating from the weather observations — and using short-range forecasts provided by the global model itself — we calculate the weather at each point throughout the model atmosphere for noon. We have a picture of the world's atmosphere frozen in time.

Now the forecast begins. We calculate the weather at each of the four million or so points for a time 20 minutes later. This gives us a new starting point at 12.20. We then make a new forecast for 12.40, and so on, until we have a prediction for 10 days ahead.

As the forecast proceeds on the Centre's supercomputer, it is despatched via a dedicated high-speed telecommunications network into the computers in the national weather services in the ECMWF's 18 member states. The products are then used in the various forecast offices to prepare medium-range forecasts for end-users.

A selection of the most useful of the ECMWF's forecasts is made available to all countries of the world via the Global Telecommunications System, operated by the World Meteorological Organization.

What is the function of medium-range forecasting? National meteorological services, such as the Meteorological Office in the UK, Météo France in Toulouse or Deutsche Wetterdienst in Offenbach, are concerned with short-range forecasting — the weather for tomorrow and up to the next few days. The meteorological service runs its limited-area high-resolution model of the atmosphere during the early afternoon, from the weather data collected at noon. Some, with larger computers and responsibilities, run global models to a few days ahead, overlapping into the medium range. These short-range forecasts are made two or four times a day as required.

Medium range forecasting fulfills a different role. A ship leaves Tokyo to sail to San Francisco. Its trip will take ten days. What route should it follow to complete the trip in the shortest time, with maximum saving of fuel, avoiding strong head winds, and heavy seas which could damage the cargo?

Météo France wants to help Electricité de France to plan exchange of electric power with neighbouring countries for the coming week. In 1990, a 1° C temperature difference over France in winter meant a 1,000 megawatt difference in daily electricity consumption. At the end of the decade, the figure will reach 2,000 megawatt per degree.

A particularly high tide is expected next week. Low air pressure, especially if accompanied by on-shore winds, could cause severe flooding. What is the expected weather? Are special precautions required?

Making useful weather forecasts for a week or so ahead requires the most sophisticated numerical models, the most complete database of weather observations, and the most powerful computers. Complex scientific and technical problems must be solved. It was the recognition of the economic and social benefits to be derived from more accurate medium-range forecasts that led to the establishment of the ECMWF.

What of the Future?

Chaos theory is already being applied in practice in the European Centre, to provide the operational weather forecast with guidance on the expected accuracy and reliability of a forecast at the time it is issued. A measure of the day-to-day predictability of the weather is given together with probabilities of temperature, rain and so on. Active research is underway to exploit this further.

Data from satellites are collected at very great expense. The Centre is cooperating with the European Organization for the Exploitation of Meteorological satellites; a small team is working at the ECMWF to ensure that optimal use is made of these data. We have a reasonable expectation of being able to achieve further considerable improvement in forecast accuracy by applying current research into using observational data to produce the initial fields from which the forecast is made.

The national weather services in the Centre's 18 member states are actively applying the ECMWF's products for the benefit of their customers — and end-users of the forecasts.

Whatever the weather, it costs!

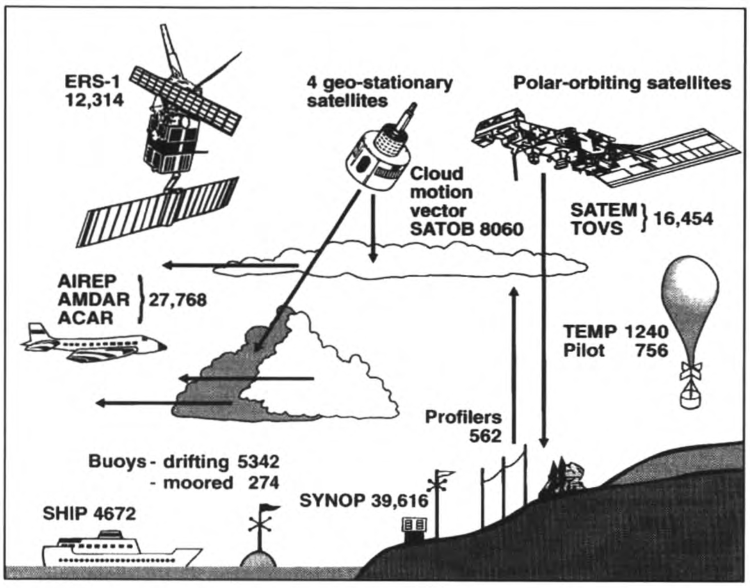
The nations of the world spend several billion pounds each year to collect weather data. Measuring systems of the Global Observing System of the World Weather Watch are illustrated below.

The data are made available free of charge by all countries to all countries of the world via the Global Telecommunications System (GTS), a telecommunications network connecting all countries of the world operating throughout the day on which vast amounts of data are ceaselessly being transmitted.

Not only weather observations but also forecast information in digital form are sent on the GTS. Some of the ECMWF's forecasts are made available to the countries which supply the observations which the ECMWF requires to make its forecasts — an example of mutual back-scratching? — perhaps positive feedback is a better term!

The World Weather Watch has been surprisingly robust. For instance, Argentina kept sending weather observations on the GTS from its territory during the Falklands conflict — data essential for ships operating in the area; ECMWF kept sending its forecasts on the GTS.

However, there was a data void from the area of Iran-Iraq for the years of the conflict between those states.



A 24-hour summary of observations received at the European Centre for Medium-Range Weather Forecasts on 3 February 1996. The data is collected using a variety of methods. Satellites, both geostationary and polar-orbiting, have instruments that are ceaselessly probing and measuring the atmosphere below. Buoys, some drifting over the world's oceans, some moored in mid-ocean, measure wind, sea-surface temperature and more. Helium-filled balloons tow instrument packages to heights of 30 km; about 1,200 of these are launched each day; the instruments radio back measurements of temperature, pressure and humidity as they rise, and are tracked by radar so that wind speed and direction are measured with great accuracy through the depth of our atmosphere. Instruments at thousands of measuring stations over land, on commercial aircraft or on ships, accumulate data which are manually or (increasingly) automatically read.

Why an international weather forecasting centre?

In the mid-1960s, flushed with the success of the European Economic Community, the six nations of the EEC decided that it would be advantageous if they cooperated in science and technology as well as in economic matters.

Very quickly, weather forecasting was identified as an area suitable for such cooperation. The weather does not respect national boundaries. Furthermore, it was already clear that to make sensible use of the supercomputers which could be foreseen, the nations of Europe should combine their scientific and technical resources to extend the range of useful weather forecasts. Research under way in the USA indicated that there was scientific justification for extending the range of forecasting beyond the next day or two, then the operational limit.

When the proposal was made, other states not in the EEC said that they too would like to be involved. In short order, 19 European states threw their hats into the ring.

A cost-benefit study was made. The 19 states were asked to estimate the economic benefits if forecasts to six days ahead could be provided, with the same accuracy as the best of the two-day forecasts then available. Ship routing, energy production and consumption, and out-door engineering and construction were among the areas examined.

The study estimated that benefits would total about £100 million. The Convention, establishing the European Centre for Medium-Range Weather Forecasts as an international organization, was signed in 1973.

... and why Reading?

The ECMWF could have been located in any of its member states. Taking into account the centres of excellence in the field of meteorology and related disciplines in the Meteorological Office in Bracknell, in Oxford University, in the University of Reading, in Imperial College London, and elsewhere in the vicinity, it was agreed to accept the offer made by the UK to provide a handsome building in a wooded site at Shinfield Park, south of Reading, with good access to Heathrow via the M4 motorway.

The Centre's staff of 142 are recruited from the various member states; they normally work at the ECMWF for a few years before returning to their home countries. Of the total, 55 are from the UK.

The European Centre for Medium-Range Weather Forecasts, in Reading.

Does the UK benefit?

A study of the economic benefit to the UK as host of ECMWF showed that in 1994 the total expenditure by the 18 Member States was £18,590,000, of which the UK contribution (which is GNP-related) was £2,564,400. The economic contribution of the Centre to the UK economy was £10,936,000, excluding any contribution from the benefits of the weather forecasts. Thus £4.26 was contributed by the Centre to the UK economy for each £1 spent by the UK on the Centre.

Future developments in weather forecasting*

By Martin.W. Stubbs †

Developments in weather forecasting are likely to be dependent on three main factors: customer requirements, improvements in predictability, and financial constraints. The question of predictability of the atmosphere has been a topic for discussion ever since numerical modelling of the atmosphere became a reality. Lorenz (1963) demonstrated the chaotic nature of the atmosphere and that weather was not predictable indefinitely into the future. Indeed when one considers the two main requirements for a good forecast, namely a perfect analysis of the atmosphere at the start of the forecast, and a mathematical model capable of predicting the future state of the atmosphere accurately, one realises that such practical requirements can never be met. However, there is still room for considerable improvement in all areas of forecasting which will translate into economic and human benefits. Future developments will depend on dialogue between the meteorologist and the customer in order to maximise the available resources for development.

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* Reproduced from *Weather*, May 1996 by kind permission of the Editor.

† Martin Stubbs recently retired from The Met. Office where he had spent several years on the Chief Forecaster's roster before his final appointment as Head of the Central Forecasting Office, Bracknell.

Customer requirements

Customers for weather forecasts are many and varied. In the United Kingdom they include Central Government, government departments and the private sector. For example, there is a defined service funded by Central Government which ensures that warnings of severe weather and general forecast information are freely available to the general public. Central Government is also responsible for ensuring that international obligations are met; for example, the provision of meteorological information to shipping as required by the International Convention for the Safety of Life at Sea. Services for aviation are provided by the Meteorological Office on behalf of the Civil Aviation Authority, the service provided being determined by international and national requirements. Private sector customers include the large commercial organisations, the public utilities, educational establishments, and individual customers requiring forecasts for specific purposes.

The availability of resources for development will depend on meeting customer requirements as fully as possible and demonstrating the value of developments to the customer. Ballentine (1994) stressed that an understanding of the market place and business practice is essential to those providing meteorological information in order to maximise the economic benefit to the customer. Herden and Otten (1994) described how the European market for commercial services in meteorology has grown and indicated that growth is expected to continue. It is likely that market forces will have an important bearing on developments in weather forecasting in the future.

Numerical models and predictability

Weather forecasting today is based on the output from numerical models of the atmosphere with added value provided by the meteorologist. Accepting that predictability is limited by several factors, it is counter-productive to carry out the computations if the initial data are poor. The initial data for a numerical model consist of a forecast field from a previous model run adjusted in the light of real-time observations. Any development in forecasting must involve improvements in the input of observational data at the beginning of the forecast process. Where data are sparse or non-existent there will be errors in the initial fields prior to the forecast run and such errors will grow, sometimes rapidly, sometimes slowly, but will ultimately dominate the deterministic forecast. Therefore, improvements in real-time data must be part of the development process.

Observational data

There are two types of observational data: from the surface-based observing network (synoptic observations from land stations, ships, buoys and aircraft), and from the space-based network (satellites). Each network complements the other. Data availability from satellites is not dependent on national boundaries, but satellites are very costly to operate. The surface-based network provides a reasonable coverage over populated areas based on minimum requirements established with the World Meteorological Organization (WMO) Commission for Basic Systems (details may be found in the relevant WMO publications, particularly those dealing with numerical modelling and the Global Observing System). However, the availability of observations from the surface-based network is sadly deficient over the oceans and many of the less-populated areas of the situation is unlikely to improve due to the high costs incurred by National Meteorological Services in maintaining a surface-based network. The main developments in the future are therefore expected to depend on developments in the remote-sensing area, such as data from satellites and radar networks.

Data from radiance measurements made from the polar-orbiting satellites have provided valuable geopotential information for numerical models and the quality of these data continues to improve. The relatively new European Resources Satellite (ERS-1) has already provided valuable estimates of surface winds over the ocean (utilising a radar technique to measure wave height) and this information is providing very valuable input into computer models, often locating a depression centre or the centre of a tropical cyclone. Estimates of wind at a lower and higher level in the atmosphere by means of cloud movement determined from a series of images from the geostationary satellites have been valuable numerical input into the models. The quality of these data will continue to improve and supplement the information from the surface-based network, particularly for global models.

Imagery from satellites has been available for several years, but has not been of direct use for numerical modelling. Forecasters have had to interpret the imagery and provide some form of human intervention into the models to ensure that the initialisation fields are in line with the observed cloud structures. It is in this area that considerable improvements will be seen in the next few years in that the imagery will be processed to provide direct digital input of humidity at various levels. Mesoscale forecast models require more detailed observational data than the global models. Thus additional information from the satellite imagery plus improved input from radar networks will greatly enhance the data available to these models without the expense of having to set up costly surface-based observation stations when the money could be used to greater advantage in other areas of forecast development. For a fuller discussion of the use of these non-conventional forms of observation in the future, readers are referred to the article by Browning and Szejwach (1994).

With the upsurge of electronic weather-sensing equipment in the amateur area and the increasing use of networking and the Internet, the future may see a new role for the amateur observer since surface-based observations will always have an important role in the provision of short-period forecasts and the issue of severe weather warnings. Blanchard (1995) has suggested a practical solution to involve the amateur in the making and dissemination of observations additional to those funded by the state.

New techniques to maximise the output of numerical models

The type of numerical model and the output from such models is now related to the specific type of forecast required. The nowcast (12–18 hours ahead) calls for continued development of mesoscale models which are looked to for the detail in the prediction of wind, precipitation, temperature, cloud height and visibility. Improved mesoscale modelling will enable the integration of detailed radar and satellite imagery with the model output to produce detailed forecasts of the areas of cloud and precipitation in the near forecast period. Forecasts for the short period (up to 2 or 3 days) will call for further improvements in global and regional modelling. As computing power increases it is likely that regional models will become redundant, with the global models able to predict more detailed patterns of pressure, geopotential, precipitation and humidity. Medium-range forecasts are in demand, with deterministic forecasts out to 5 and 6 days being considered useful.

Although forecasts are produced for longer periods, the European Centre for Medium-Range Weather Forecasts considers that its predictions are meaningful up to 10–11 days but improvements in these deterministic forecasts beyond 6 or 7 days are proving difficult and costly (in terms of computer power) to achieve. It is known that in certain situations random errors in the initial analysis field grow very rapidly (a computationally unstable situation) while in other (more stable) situations the random errors grow only slowly.

Computing power now makes it possible to run a global forecast model several times. If the initial conditions can be altered very slightly for each run, an ensemble of forecasts can be produced which all diverge with time. This divergence can then provide some assessment of the confidence in the predictions and be used to assess the probability of various defined quantities occurring (for example, the probability of winds above force 8 in sea area Portland on the eighth day of the forecast). First results in the use of ensemble forecasts for the provision of medium-range guidance are very encouraging, as indicated by Reed (1995). Results to date give an indication of the way forecasts in the medium and longer term are likely to be produced. Harrison (1995) has indicated that the future development of monthly forecasts will almost certainly be built around numerical ensembles used to generate probability forecasts. Harrison also expects that the use of ensembles will result in some improvement in the skill of probabilistic long-range predictions. There is a growing market for predictions of the weather for a month and more ahead and there are pressing demands for more useful seasonal forecasting, both for economic and humane reasons. For example, Krishna Kumar *et al.* (1995) have outlined the developments in seasonal forecasting of the Indian summer monsoon rainfall, and Landsea *et al.* (1994) have described seasonal forecasting of Atlantic hurricane activity.

The future

The role of the forecaster in the interpretation and fine-tuning of model output will continue to be an essential element in the provision of weather forecasts. But as improvements continue to be made in numerical modelling techniques and more sophisticated output products become available, the role of the forecaster will change quite dramatically in the next few years. There is likely to be more centralisation of the forecaster-added information to the numerical product and this will result in savings in human resources thus freeing resources for more development of the numerical products. Developments in the availability of data, improvements in numerical modelling, new techniques in the utilisation of numerical output, and careful organisation of staff resources will ensure that meteorology continues to provide a significant and increasing contribution to the safety and well-being of the community.

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Tropical cyclones of '96

By Julian Heming

(Forecasting Systems, The Met. office)

The 1995 Atlantic hurricane season was a hard act to follow, with a near record 19 tropical storms reported, but 1996 still managed to produce 13 tropical storms by the end of November. Nine of these became hurricanes — an unusually high proportion — with six classified as 'intense hurricanes'.

Weak tropical storm ***Arthur*** passed close to the Carolinas. However, the worst was to come for this part of the USA with the formation of hurricane ***Bertha*** in July. Having passed the Leeward Islands, Puerto Rico and the Bahamas, ***Bertha*** made landfall near Wilmington, North Carolina, bringing 105 m.p.h. winds before weakening and moving up the coast to affect Washington DC and New York. Damage costs were estimated at $270 million. ***Cesar*** reached hurricane strength in the southern Caribbean before weakening over Nicaragua. However, the storm redeveloped in the Pacific and later became typhoon ***Douglas***.

August and the first half of September often prove to be the most active part of the season and this was true in 1996. Hurricane ***Dolly*** formed in the western Caribbean before tracking across the Yucatan Peninsula and the southern Gulf of Mexico. ***Edouard*** formed in the east Atlantic and became the strongest storm of the season with winds of near 145 m.p.h. Initially headed towards the USA, ***Edouard*** turned out to sea and later turned north-east so avoiding a direct strike on the USA and Nova Scotia. ***Fran*** followed rapidly but, unlike her predecessor, she did not turn northwards soon enough to avoid a direct strike on North Carolina. She came ashore at aptly named Cape Fear with winds of near 115 m.p.h. More than 30 people died as a result and the damage cost an estimated $3.2 billion.

Tropical storm ***Gustav*** formed in the east Atlantic, but drifted harmlessly north-west. As September progressed, the activity resumed as hurricane ***Hortense*** formed near the Leeward Islands and tracked between Puerto Rico and the Dominican Republic causing much flooding and damage. The estimated costs amounted to $500 million. ***Hortense*** accelerated northwards and later affected Nova Scotia.

As September drew to a close hurricane ***Isidore*** formed in the eastern Atlantic and soon started moving northwards in open ocean. October saw tropical storm

Josephine form in the Gulf of Mexico and track across the Florida Panhandle towards the Carolinas. Despite not reaching hurricane status ***Josephine*** is estimated to have caused damage worth $130 million. A few days later tropical storm ***Kyle*** developed in the Gulf of Honduras, but was weak and short-lived.

The season was not over as hurricane ***Lili*** developed in the Caribbean and tracked across Cuba bringing devastation to the country's economy. Over 20 inches of rain were recorded at one location. Having crossed the Bahamas, ***Lili*** became almost stationary in mid-Atlantic for four days before resuming her north-eastward track. ***Lili*** had a sting in her tail as she became an extra-tropical storm just a day before bringing exceptionally strong winds and rain to many parts of the UK in October.

The season came to a close in November as hurricane ***Marco*** formed and meandered uncomfortably close to Jamaica before heading west and dissipating off the Yucatan Peninsula.

Away from the Atlantic

Tropical cyclones in the Atlantic only account for some 15% of the usual tropical cyclone activity across the globe. Each year, many more form in the tropical Pacific and Indian Oceans.

This year has been the most successful ever for UK Met. Office forecasts of tropical cyclones in the western North Pacific. The three-day forecast error in the track of tropical cyclones, which averaged 580 km between the years 1988 to 1993, has now fallen below 400 km for the first time.

There was much tropical cyclone activity in the western North Pacific in 1996 and, by the beginning of December, 40 tropical depressions had formed. Twenty-eight became tropical storms (winds greater than 39 m.p.h.) and of these, 20 became typhoons — the Pacific equivalent of a hurricane (winds greater than 74 m.p.h.).

Vietnam suffered strikes from typhoons ***Frankie***, ***Niki*** and ***Willie***, whilst in July Taiwan was hit in quick succession by typhoon ***Gloria*** and super typhoon ***Herb***. The latter produced winds in excess of 160 m.p.h. Japan received strikes from super typhoon ***Eve*** and typhoon ***Kirk***. The strongest storm of the year, super typhoon ***Dale*** occurred in November, with estimated winds of more than 170 m.p.h., but fortunately avoided all major land masses.

In contrast to the western Pacific, the eastern and central North Pacific were relatively quiet. A total of 13 tropical depressions formed, eight of which became storms and five became hurricanes. However, an unusually high proportion of these made landfall. ***Alma***, ***Boris*** and ***Fausto*** and tropical storm ***Cristina*** all hit coastal regions of Mexico.

The north Indian Ocean saw eight tropical cyclones by December, the most devastating of which hit eastern India in November, with winds of over 130 m.p.h. bringing flooding and destruction.

The southern hemisphere tropical cyclone season usually runs from about November through to April. The last storm of the 1995/6 season was tropical cyclone ***Jenna*** in the south Indian Ocean in early May. The new season made an early start with minor storms occurring in July, August and September. By the beginning of December, eight tropical cyclones had already formed, the strongest of which started in the south-east Indian Ocean as tropical cyclone ***Melanie***, but was renamed ***Bellamine*** as she crossed into the south-west Indian ocean bringing winds of near 135 m.p.h.

AURORA NOTES OCTOBER TO DECEMBER 1996

BY R.J. LIVESEY

(Director of the Aurora Section of the British Astronomical Association)

In Table 1 are listed the observations of the aurora from mariners that have been received to date for the period. It is pleasing to have an increase in reports at a time when it almost appeared that they were going to dry up altogether.

Table 1 — Marine aurora observations October to December 1996

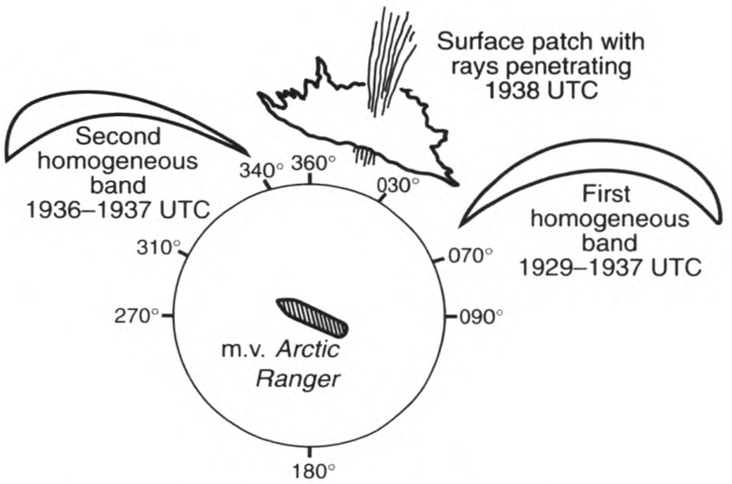
DATE	SHIP	GEOGRAPHIC POSITION	TIME (UTC)	FORMS IN SEQUENCE
8/9 Oct.	*London Splendour*	60° 33′ N, 00° 40′ E	0345	RB.
8/9	*Discovery*	60° 38′ N, 01° 53′ W	2300–—	G.
8/9	*Arctic Ranger*	71° 05′ N, 00° 33′ E	1914–1922	RB.p_1RB.ap_1RB.aRA. p_1RB+P.mP.p_1RB.
12/13	*OOCL Bravery*	50° 00′ N, 63° 00′ W	0200–0800	RA.HA.
17/18	*Arctic Ranger*	76° 18′ N, 29° 10′ E	1749–1752	RB+mP.aRB.aHB.mP.
18/19	*Arctic Ranger*	75° 52′ N, 26° 48′ E	1910–2251	HA+mP.mP.HA.G+mP. RB.HA.RB.RA.RB.mP.
23/24	*Arctic Ranger*	75° 10′ N, 26° 20′ E	1745–1911	HA+RR.aRB.am_2RB. P.m_2RB.m_2aRB.m_1RB.p_1 RB.RB.HB.mP.
30/31	*Arctic Ranger*	73° 36′ N, 19° 06′ E	1902–1911	mP.aHA.p_1HA.RB.RA. m_2RB+RRmP.amRR.RA. p_1RA.mP.
31 Oct./ 1 Nov.	*Arctic Ranger*	73° 37′ N, 19° 04′ E	1819–1905	HA.HA.m_2HA.m_4HA. m_2HA.RB+HB.p_1RB+p_1 HB.p_1RBaHB.mP.
4/5 Nov.	*Arctic Ranger*	73° 42′ N, 18° 08′ E	2054–2232	m_2P.mP.m_p+RR.mP.m_2 RBm_2RA.m_1RA.p_1RA. aHB.m_2P.
6/7 Nov.	*Arctic Ranger*	73° 51′ N, 18° 02′ E	1929–2025	HB+RR.mP.aHB.HB+HA. P+RR.mP.aRB.HA+mP. HA.mP.aRA.mP.
13/14 Nov.	*Amethyst*	58° 05′ N, 05° 45′ W	1800–2030	G.HA.HA+HB.HA+RB. m_3HB.

KEY: A=arc; B=band; G=glow; H=homogeneous; P=patch; R=rayed; a=active; m=multiple form (or forms); p_1=pulsating (uniform change in brightness).

The series of observations made from the *Arctic Ranger* were in the region of the northern polar auroral zone where activity is most frequently seen even at sunspot minimum. The forms in these aurorae frequently comprise multiple arcs, bands and patches with movement and pulsation. At present, land observers along the auroral zone at Reykjavik in Iceland and Fairbanks in Alaska, are reporting similar apparitions to those noted by the observers on the *Arctic Ranger* but not necessarily on the same dates. The variations that are found relate not only to the weather conditions and availability of observers at the locations but also which longitude is closest to the most active part of the auroral activity.

Referring to Table 1, the activity on the nights of 8/9, 17/18 and 18/19 October expanded equatorwards to be observed by an amateur aurora observing station in

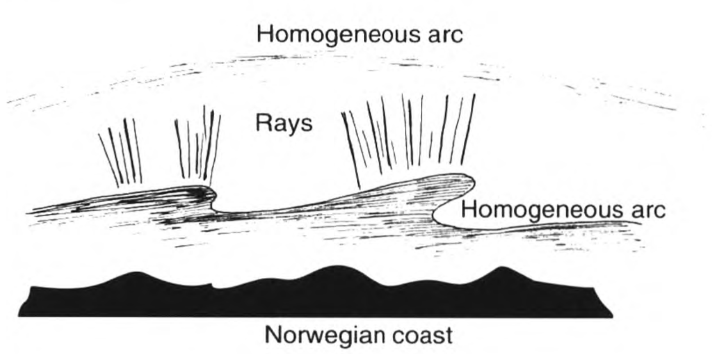
North Dakota. The events of 23/24 and 30/31 October and 31 October/ 1 November were attributed to particle streams from a solar coronal hole that impacted and reacted with the Earth's magnetic field to induce auroral conditions. The activity of 4/5 and 6/7 November was also recorded at Reykjavik.



The *Arctic Ranger*'s sighting between 1929 UTC and 1939 UTC on 6/7 November 1996.

The aurora observed by the *OOCL Bravery* on 12/13 October was seen near to Anticosti Island at the entrance to the Gulf of St Lawrence which is a favoured location from which marine auroral observations have been received over the years. This particular event was noted also by the meteorological station and by an amateur observer at Halifax, Nova Scotia and by the North Dakotan auroral station.

The aurora reported from the *Amethyst* on 13/14 November was the result of coronal hole particle stream activity. At Fairbanks, Alaska this aurora was seen to cover half of the sky.



Part of the display seen from the *Amethyst*, at approximately 1900 UTC on 13/14 November 1996.

Taking marine, meteorological station and amateur auroral observers into account, auroral light was noted in Scottish waters on four occasions in October, two occasions in November and three times in December. Only that of 3/4 October produced active conditions visible at Banff on the Moray Firth. The global magnetic records indicated that stormy magnetic conditions prevailed on 18, 19, 22 and 23 October with lesser magnetic disturbances on 9 October, 14 November and 10 December.

We appear to have passed sunspot minimum and small sunspots relating to the next cycle are being observed in the sun's mid-latitudes. The year 1996 provided the lowest number of auroral events, as measured in central Scotland, since my records began in 1952. Bob Evans, Director of the Royal New Zealand Astronomical Society's Solar and Auroral Section, has likewise commented upon a marked reduction in the number of mid-latitude auroral sightings made in New Zealand and the Southern Hemisphere generally. Similarly, there has been a low level in the frequency of magnetic disturbances and as such measurements are independent of tropospheric weather conditions likely to obscure auroral activity, this is a good indication that 1996 has been a poor year for aurora watchers.

Now that the next sunspot cycle is getting under way, it is reasonable to suppose from past records that in the next four years we should see a marked increase in auroral activity and in its expansion equatorwards in both hemispheres to enable it to be seen in mid-latitudes by mariners and land observers alike. A recent analysis of the past four sunspot cycles suggests that aurorae are of a form more readily detected and observed at a given latitude for a given level of magnetic activity during the rise from sunspot minimum to maximum than in the declining years from maximum to minimum. This may well reflect the type of activity on the sun that generates the auroral response at the Earth. In the declining years of the sunspot cycle, many of the aurorae are quiet events, relatively speaking, when the coronal hole activity is at its maximum.

LETTERS TO THE EDITOR

Phosphorescent wheels

13 October 1996. At 2217 UTC the Officer On Watch (Mr W.E.A. Fares, 2nd Officer) was advised by Lookout (Able Seaman R. Jumang-It) of an uncommon light off the starboard bow; on investigating he observed a series of flashing lights having the appearance of phosphorescence but different, and called the Master as this was something he had not come across before. On arrival on the bridge, the sight was somewhat awesome; flashing lights were observed on the starboard side for about a half a mile. Further observation revealed that the light was emanating from a single point and radiating outwards in a series of equally-spaced rings (phased), with the rings expanding in width with distance from the source. Flashing was evident within the rings.

The rings travelled out for about 500 m and then disappeared. Another ring system was observed in the form of spokes, again sourced from the same point and forming an arc the further from the source the spoke travelled. The rotation was clockwise and the spokes disappeared with new ones evolving. As the ship progressed, another ring system was observed but was not as spectacular as the first one; the rings gave the impression of waves and a rough sea. A search-light was played onto the rings and had the effect of making them fade, the search-light being quite powerful. I had the distinct impression that the rings were above the sea surface.

As the vessel was in the Jaz-Ye-Tanbe TSS zone of the Arabian Gulf [26° 15′ N, 54° 52′ E] I felt it imprudent to switch off radar and reduce engine speed. An Indian vessel, the *Shraven*, was 8 n mile astern steaming on the same track, and advised of the phenomenon, he reported that he had seen it and sounded rather frightened. Another vessel, *Sea Drive*, confirmed a sighting a little later.

The Marine Observer's Handbook was consulted and I was relieved to see a reference to this phenomenon, as the effect is rather bewildering, bordering on the fantastic. On passing the final ring system, the light faded to a soft glow. All navigation instruments, magnetic compass, etc., were all observed to behave normally, and Doppler log soundings agreed with the charted ones.

I have been at sea for 35 years and have never seen the like of this display before, and feel delighted to have witnessed such a rare event. I am only sorry that the vessel was in a situation that rendered further investigation, as suggested in the 'handbook', impracticable, but I hope this report will be of some value.

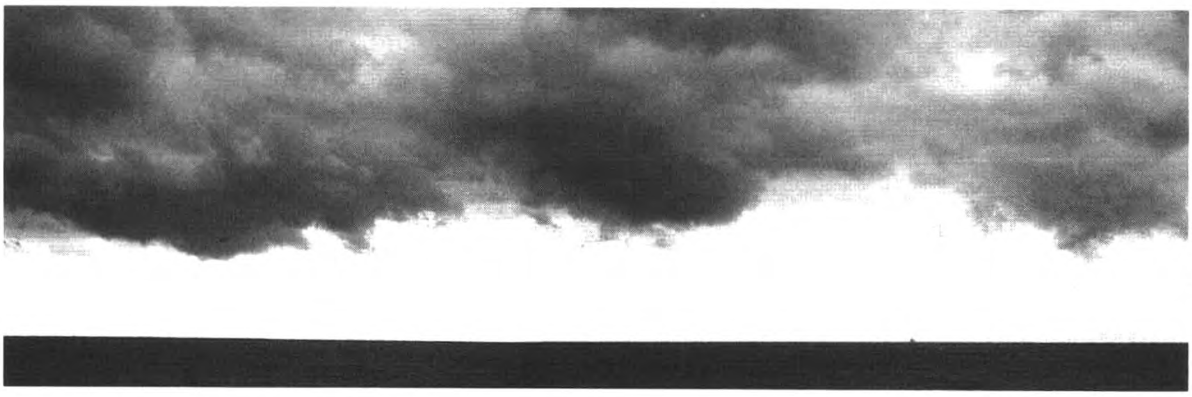
From Captain D.R. Kent, Master of the *Arabiyah* (Kuwait Oil Tanker Co. S.A.K.)

Note. This account was passed to Dr Peter Herring, of the Southampton Oceanography Centre, to add to his records. He commented that "this is a fascinating account of the most spectacular (and rare) bioluminescent phenomenon known (I have a record of some 250 reports in the last 100 years). These wheels/rings only occur in relatively shallow water and are most frequently encountered in the Arabian Gulf and Bay of Bengal. There is no agreed cause, though some scientists have suggested seismic disturbances on the sea floor may be responsible. I wish I could have been there to see it!"

Passage of front

The enclosed two photographs may be of interest to you; they are of a front off the Japanese coast that passed over the vessel I was in command of late last year.

Date:	13 November 1996.
UTC:	0330
Lat./Long.:	34° 22′ N, 138° 34′ E
Air temp.:	13°
Wet bulb:	11°
Pressure:	1007.5 mb, rising 1 mb in three hours.


Captain C.J. Ryden

We had sailed from Yokohama first thing that morning, 2100 UTC on the 12th, and were bound for Osaka.

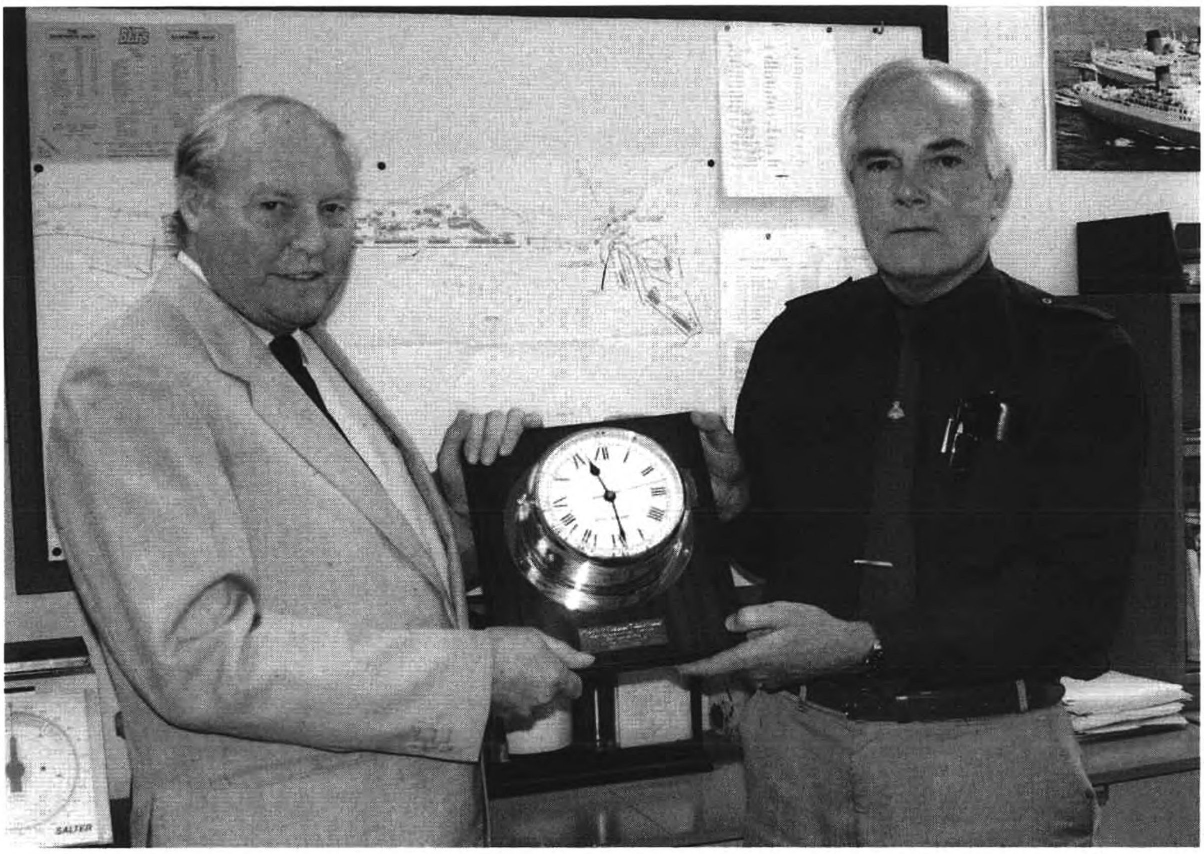
Typhoon 'Dale' was moving east with increasing speed and was, at the time of this, about 360 n mile south, and a strong high pressure area was developing over the Japan Sea.

We had strong winds as we left Tokyo Bay, and by the lunch time, as the front passed, it had calmed down but then within an hour we had a full-blown northerly gale over the sea area to the south of the flat land to the east of Nagoya. With very little fetch, the waves were not developing too much but the wind only moderated once in the lee of the Kii Peninsula.

The vessel, the *Poyang*, is a Hong Kong Observing vessel, having been previously named *Micronesian Pride*.

From Captain C.J. Ryden, Master of the *Poyang*.

PERSONALITIES



Captain G.V. Mackie

Captain Douglas R. McWhan (Right), retiring UK Port Met. Officer for South-west England, receives an inscribed marine clock from Captain Stuart M. Norwell, Marine Superintendent, on 29 April 1997, at the Southampton Port Met. Office. (See the April 1997 edition of this journal.)

BOOK REVIEW

Introduction to Naval Architecture, formerly Muckle's Naval Architecture for Marine Engineers, 3rd Edition by Eric Tupper. 155 mm × 233 mm, *illus.*, ix+361 pp., including index. Published by Butterworth Heineman, Linacre House, Jordan Hill, Oxford OX2 8DP. ISBN: 0 7506 2529 5. Price: £25.00, paperback.

There are few prefaces I have read which lend inspiration to the following book. However, this book starts with such an enlightening and encouraging opening that the need to read it has been founded at the start.

Naval Architecture is easy to use, follow and, being only a little larger than A5 paperback, easy to handle. My background is at the 'user ' rather than the 'design' end but I found the book both interesting, enlightening, and, in the instance of vibration, enthralling.

The book is aimed at the mariner, established or in training, and is well laid out and easy to follow. Many of the formulae are specific to design and construction but well over half the book has usable information for the mariner. As an interest book, it is stimulating reading rather than enjoyable, although I did find myself looking forward to getting back to certain parts, specifically manoeuvring, which turned out to be far more involved than I had been led to believe. There is far more to it than just turning the ship's wheel; and if anyone wants to know why the bridge never stops vibrating, then this is the book for you!

The text involves all aspects of naval architecture, including submarines, and although targeted at marine engineers, has much of interest for all sea-going staff, both qualified and studying.

In addition to the points already mentioned, I liked the ease with which chapters and specific items could be found and also the references for further reading at the end of each chapter; there are also wide page margins where personal notes can be made.

There is nothing much to dislike about the book except perhaps the smallish diagrams but that should be expected with this size of publication. It is also heavy going in some places but there again, given the subject, that is what might also be expected.

Overall, it is an excellent book and very well laid out — surely a 'must' for all ships as there is much good and useful information for both Deck and Engine personnel.

Captain Austin Maytham
UK Port Met. Officer, Bristol Channel

The Marine Observer distribution

Our thanks to all those who, following the request in the previous edition of this journal, have taken the trouble to notify us of changes to their addresses and postal details. We would be pleased to hear of any other changes to addressees' details in the future.

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