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THE MARINE OBSERVER

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

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COVER PHOTOGRAPH: Fogbow in Yakutat Bay (59° 52'N, 139° 42'W) on 28 August 1990. Photographed from the bridge of m.v. *Pacific Princess* by Captain R. Tyzack.

Letters to the Editor, and books for review, should be sent to the Editor, The Marine Observer, Meteorological Office, Eastern Road, Bracknell, Berkshire RG12 2UR

LONDON: HMSO

EXCELLENT AWARDS 1990

A continuous programme of quality control and assessment of the 977 meteorological logbooks received from Selected Ships and Platforms during 1990 was carried out as usual. Sixty-two voyage logs were also received from the 9 ships participating in the special VSOP-NA project up to its cessation in the middle of the year. Those logs considered to be of a suitably good standard, taking into account all the operational conditions and restrictions, were given an 'Excellent' marking and the 100 best Masters, Principal Observers and Radio Officers were then nominated for Excellent Awards, as shown in the lists following. Those assisting in the VSOP-NA project are also to be rewarded for their efforts in compiling special logs. Rigs and platforms keeping Selected Ship records with appropriate care are presented with Certificates of Merit signed by the Chief Executive.

The ships with the highest markings in the year in question were as follows:

1. m.v. *Asifi*, Knud L. Larsen/Bolton Maritime Management, Captain G.W. Wostenholme, Principal Observer R.I. Sime and Radio Officer D. Tucker.
R.R.S. *John Biscoe*, British Antarctic Survey, Captain C.R. Elliott, Principal Observer J.R. Harper and Radio Officer C.A. Waddicor.
m.v. *Pacific Crane*, James Fisher & Sons plc, Captain P.G.H. Hobson and Principal Observer B. Elston.
2. m.v. *Cardigan Bay*, P.& O. Containers Ltd. Captain P.J. Clark.
m.v. *British Resource*, BP Shipping Ltd, Captain J. Bovaird.
m.v. *Mairangi Bay*, P.& O. Containers Ltd, Captain I.W. Collister.
3. m.v. *Jostelle*, Souter Shipping Ltd, Captain B.G. Longley.
m.v. *Tokyo Bay*, P.& O. Containers Ltd, Captain M.J.R. Godbehear.
m.v. *Strathbrora*, P.& O. Containers Ltd, Captain B. Cushman.
m.v. *Peninsular Bay*, P.& O. Containers Ltd, Captain J.W. Hutson.
4. m.v. *Liverpool Star*, Blue Star Ship Management Ltd, Captain P.E.T. Robinson.
m.v. *Kagoro*, Acomarit (U.K.) Ltd, Captain E.D. Somes.
m.v. *Oriental Bay*, P.& O. Containers Ltd, Captain L.E. Howell.

Photographs of the first three ships listed are shown opposite page 112. The chosen books to be presented as awards this year are *Whales, Dolphins and Porpoises*, compiled by Sir Richard Harrison and Dr M.M. Bryden, Cassell's *Concise English Dictionary* and *Collins Atlas of the World*.

Letters have already been despatched to all nominees, but anyone seeing his name listed below who has not yet received advice may contact Bracknell with name, Discharge Book or Seaman's Book number and forwarding address for their book: some parcels sent to addresses supplied have in the past been returned due to there being no-one to take delivery. The following awards are still unclaimed for 1989: Captains A. Chamberlain, C.A. Cleverley, M.A.M. Gater, J.H. Lowe, T.R. Mishra, A. Ottosson, C.A. Sheffield, G.D. Younger; Principal Observing Officers M.A. Afghani, R.M. Bradley, D. Friberg, S. Mehta, B. Standerline, E.K. Andoh-Wilson; and Radio Officers R.M. Crozier, R. Dolby, C. Moors, M. Moynihan, N.A. Orpe, D.S. Ray, J.C.H. Ride and A. Robertson. Acquaintances and employers of any of these individuals are asked to notify us of their whereabouts.

J.F.T.H

EXCELLENT AWARDS (Year ended 31 December 1990)

CAPTAIN		COMPANY		CAPTAIN		COMPANY	
K. Anderson	...	Barber Ship Management Ltd	...	C.R. Elliott	...	British Antarctic Survey	...
K.O. Avery	...	Natural Environment Research Council	...	A.J. Fee	...	P. & O. Containers Ltd	...
W.N. Barker	...	CAM Shipping Ltd	...	C.J. Flanagan	...	Geest Line Ltd	...
N.J. Barr	...	Concordia Marine Co Ltd	...	P.A. Furneaux	...	P. & O. Containers Ltd	...
A.D.G. Bell	...	A/S Havtor Management	...	A. Gatt	...	Jebsens Ship Management Ltd	...
D.L. Beveridge	...	Dept of Ag. & Fish. for Scotland	...	J.S. Gavin	...	Bibby Line Ltd	...
P.J.S. Bishop	...	Denholm (I.O.M.) Ltd	...	M.J.R. Godbehear	...	P. & O. Containers Ltd	...
I.T. Blackley	...	P. & O. Ship Management Ltd	...	M.R. Godfrey	...	P. & O. Ferries Ltd	...
J.C.E. Bovaird	...	B.P. Shipping Ltd	...	H.G. Gray	...	Ben Line Steamers Ltd	...
M.B. Bradley	...	Ropner Management Ltd	...	D.V. Harradine	...	P. & O. Containers Ltd	...
R. Brinkworth	...	P. & O. Containers Ltd	...	P.E. Harwood	...	E. & F. Ship Management Ltd	...
J.A. Buchanan	...	B.P. Shipping Ltd	...	J.P. Hasselle	...	A.B.C. Containerline N.V.	...
A.J. Cheshire	...	Blue Star Ship Management Ltd	...	T.H. Henderson	...	Dept of Ag. & Fish. for Scotland	...
B.V. Chipperfield	...	P. & O. Containers Ltd	...	R.M. Herring	...	Denholm (I.O.M.) Ltd	...
A.J. Chivers	...	Blue Star Ship Management Ltd	...	M.A. Hill	...	P. & O. Ship Management Ltd	...
P.J. Clark	...	P. & O. Containers Ltd	...	P.G.H. Hobson	...	James Fisher plc	...
A.J. Clarke	...	Zapata International Services Ltd	...	F.I. Hogg	...	Ben Line Steamers Ltd	...
W.J.C. Clarke	...	P. & O. Ferries Ltd	...	L.E. Howell	...	P. & O. Containers Ltd	...
M.J. Cole	...	British Antarctic Survey	...	J.H. Hutson	...	P. & O. Containers Ltd	...
R.A. Cole	...	Geest Line Ltd	...	C. Jackson	...	Blue Star Ship Management Ltd	...
I.W. Collister	...	P. & O. Containers Ltd	...	A.C. Jenkins	...	Geest Line Ltd	...
D.R. Cripps	...	Andrew Weir Co. Ltd	...	P.D. Kelly	...	Mobil Shipping Co Ltd	...
B. Cushman	...	P. & O. Containers Ltd	...	R.J. Kendall	...	C.I. Shipping Ltd	...
K.H. Davie	...	P. & O. Containers Ltd	...	M.C. Kichenside	...	Astrid Trust	...
P.D. Davies	...	P. & O. Containers Ltd	...	M.J. Knight	...	Bibby Line Ltd	...
D.A. Dornom	...	P. & O. Containers Ltd	...	C.B. Kulkarni	...	Barber Ship Management Ltd	...
G.E. Drewery	...	CAM Shipping Ltd	...	S.J. Lawrence	...	British Antarctic Survey	...
A.F. Drury	...	Acomarit (U.K.) Ltd	...	A.J. Leslie	...	P. & O. Containers Ltd	...
P.C. Dyer	...	Zapata International Services Ltd	...	B.G. Longley	...	Souter Shipping Ltd	...
M. Edwards	...	P. & O. Ferries Ltd	...	M.R. Lovibond	...	E. & F. Ship Management Ltd	...
R.A.F. Edwards	...	Bibby Line Ltd	...	J.Y. MacAlpine	...	B.P. Shipping Ltd	...

Excellent Awards (contd)

CAPTAIN		COMPANY		CAPTAIN		COMPANY	
D.R. MacKillop	...	Blue Star Ship Management Ltd	...	K.M.R. Skinner	...	Geest Line Ltd	...
P.J.R. Manson	...	P. & O. Containers Ltd	...	A.M. Smart	...	Jebsens Ship Management Ltd	...
A.C. McCulloch	...	P. & O. Containers Ltd	...	J. Smith	...	B.P. Shipping Ltd	...
I.F. McRae	...	B.P. Petroleum Dev. Ltd	...	R.J. Smith	...	Denholm (I.O.M.) Ltd	...
R. McVeigh	...	B.P. Shipping Ltd	...	E.D. Somes	...	Acomarit (U.K.) Ltd	...
E.J. Maxwell	...	Denholm (I.O.M.) Ltd	...	W. Spence	...	B.P. Petroleum Dev. Ltd	...
B.L. Mullenger	...	Andrew Weir Co. Ltd	...	K.F. Steven	...	Denholm (I.O.M.) Ltd	...
C.R. Mundy	...	Concordia Marine Co. Ltd	...	T.M. Stones	...	B.P. Shipping Ltd	...
A.M. O'Neill	...	Jebsens Ship Management Ltd	...	J.W. Sutton	...	Buries Markes (Ship Man'y) Ltd	...
J.A. Oscroft	...	Cunard Ellerman Shipping Co. Ltd	...	D.W. Temple	...	Dept of Ag. & Fish. for Scotland	...
K.J. Owen	...	P. & O. Containers Ltd	...	G.W.H. Tennant	...	Dept of Ag. & Fish. for Scotland	...
J.L. Peterson	...	P. & O. Containers Ltd	...	G. Thompson	...	Acomarit (U.K.) Ltd	...
E.M.S. Phelps	...	British Antarctic Survey	...	P.C. Thompson	...	Ben Line Steamers Ltd	...
D.L. Rattray	...	Dept of Ag. & Fish. for Scotland	...	J.D. Thomson	...	P. & O. Containers Ltd	...
E.T. Rees	...	Andrew Weir Co. Ltd	...	J.S. Thorpe	...	P. & O. Containers Ltd	...
D.J. Robertson	...	P. & O. Containers Ltd	...	D. Tobin	...	B.P. Shipping Ltd	...
P.E.T. Robinson	...	Denholm (I.O.M) Ltd	...	N. Vause	...	British (I.O.M.) Ltd	...
P.F. Robinson	...	B.P. Shipping Ltd	...	B. Walmsley	...	Furness Withy (Shipping) Ltd	...
D.M. Rundle	...	B.P. Shipping Ltd	...	M. Watts	...	P. & O. Containers Ltd	...
R.G. Savage	...	Shell Ship Management Ltd	...	M.J. Willcock	...	Dept of Ag. & Fish. for Scotland	...
A.L. Selmer	...	A/S Havtor Management	...	A.R. Wilkinson	...	B.P. Shipping Ltd	...
G. Sinclair	...	Minst. of Agriculture, Fisheries & Food	...	G.W. Wostenholme	...	Bolton Maritime Management Ltd	...

PRINCIPAL OBSERVING OFFICER		COMPANY	PRINCIPAL OBSERVING OFFICER		COMPANY
R. Adams	...	P. & O. Ferries Ltd	A.R. Farthing	...	Jebsens Ship Management Ltd
A.J. Anderton	...	Mobil Shipping Co. Ltd	G.J. Gardiner	...	B.P. Shipping Ltd
D.P. Andrew	...	Blue Star Ship Management	N.E. Gardiner	...	P. & O. Containers Ltd
A.T. Aportadeira	...	A/S Havtor Management	R.D.M. Gilchrist	...	Shell Ship Management Ltd
R.M. Atkinson	...	Natural Environment Research Council	T.P. Gunanayagan	...	Buries Markes (Ship Man't) Ltd
D.J. Ayling	...	Jebsens Ship Management Ltd	J.C. Hague	...	Denholm (I.O.M.) Ltd
B.G. Ball	...	P. & O. Containers Ltd	G.N. Hale	...	P. & O. Containers Ltd
R.H. Barker	...	Andrew Weir Co. Ltd	S.J. Hamer	...	Denholm (I.O.M.) Ltd
J.C. Barton	...	Dept of Ag. & Fish. for Scotland	J.R. Harper	...	British Antarctic Survey
E.T. Bibby	...	Blue Star Ship Management Ltd	P. Hilbert	...	Blue Star Ship Management Ltd
K. Bimpeh	...	E. & F. Ship Management Ltd	G.T. Hobbs	...	British Antarctic Survey
M. Blowers	...	B.P. Petroleum Dev. Ltd	P.W. Holliday	...	Ropner Management Ltd
E.S. Boye	...	Acomarit (U.K.) Ltd	S. Horsburgh	...	Dept of Ag. & Fish. for Scotland
K. Bradshaw	...	P. & O. Containers Ltd	F.N. Hudson	...	Astrid Trust
F.N. Cambra	...	P. & O. Containers Ltd	C. Jackson	...	Furness Withy (Shipping) Ltd
B.A. Chapman	...	Minst. of Agriculture, Fisheries & Food	R. Jackson	...	British Antarctic Survey
Q.N. Cox	...	B.P. Shipping Ltd	B.K. Jha	...	Barber Ship Management Ltd
R. Cox	...	B.P. Petroleum Dev. Ltd	M.H.F. Kenny	...	Geest Line Ltd
C.N. Curran	...	B.P. Shipping Ltd	D. King	...	Denholm (I.O.M.) Ltd
M.J. D'Silva	...	Barber Ship Management Ltd	M.E. Lacey	...	Britship (I.O.M.) Ltd
C.G.M. Dale	...	Dept of Ag. & Fish. for Scotland	M. Langit	...	Concordia Marine Co. Ltd
K.S. Dastour	...	B.P. Petroleum Dev. Ltd	T.T. Latto	...	B.P. Shipping Ltd
P.W.R. Davidson	...	P. & O. Containers Ltd	F.M. Leahy	...	P. & O. Containers Ltd
J.V. Dilley	...	Cunard Ellerman Shipping Co. Ltd	A. MacCallum	...	Dept of Ag. & Fish. for Scotland
J.F. Dobson	...	Concordia Marine Co. Ltd	P.C. MacKay	...	Jebsens Ship Management Ltd
D.L. Dodsworth	...	P. & O. Containers Ltd	H.C. MacKenzie	...	Geest Line Ltd
K.M. Duncan	...	Bibby Line Ltd	C.I. MacLeod	...	P. & O. Containers Ltd
M.R. Dunn	...	Andrew Weir Co. Ltd	I.A. MacDonald	...	Zapata International Services Ltd
N.P. Dunn	...	Andrew Weir Co. Ltd	R.W. Madden	...	P. & O. Ferries Ltd
A. Edwards	...	CAM Shipping Ltd	M.A. Magee	...	Geest Line Ltd
M.K. Elson	...	P. & O. Containers Ltd	J.S. Martinez	...	B.P. Petroleum Dev. Ltd
B. Elston	...	James Fisher plc	V.A. McAdam	...	B.P. Shipping Ltd
R.J. Faithful	...	P. & O. Containers Ltd	C.R. Merry	...	P. & O. Containers Ltd

Excellent Awards (contd)

PRINCIPAL OBSERVING OFFICER		COMPANY	PRINCIPAL OBSERVING OFFICER		COMPANY
K.I. Milton	...	B.P. Petroleum Dev. Ltd	N. Sheard	...	Zapata International Services Ltd
E. Monserate	...	Acomarit (U.K.) Ltd	J. Sheridan	...	Blue Star Ship Management Ltd
I.F. Muir	...	Dept of Ag. & Fish. for Scotland	R.I. Sime	...	Bolton Maritime Management Ltd
B.P. Murphy	...	Denholm (I.O.M.) Ltd	J.Y. Simpson	...	B.P. Shipping Ltd
Hafiz Nazmul	...	C.I. Shipping Ltd	W. Singh	...	Bibby Line Ltd
R.G.C. Noble	...	Ben Line Steamers Ltd	B.V. Sladovich	...	B.P. Shipping Ltd
G.D. Owen	...	Dept of Ag. & Fish. for Scotland	D.A. Smith	...	Dept of Ag. & Fish. for Scotland
S.R. Paine	...	P. & O. Containers Ltd	M.C.P. Sutcliffe	...	P. & O. Containers Ltd
N.A. Patel	...	P. & O. Ship Management Ltd	B.R.G. Tasker	...	Denholm (I.O.M.) Ltd
S. Paul	...	P. & O. Ship Management Ltd	M. Taylor	...	Ben Line Steamers Ltd
M.W.F. Phillips	...	Dept of Ag. & Fish. for Scotland	R. Taylor	...	Dept of Ag. & Fish for Scotland
A.W. Pitcher	...	P. & O. Containers Ltd	R. Tejada	...	Acomarit (U.K.) Ltd
A.A.I. Priscott	...	Zapata International Services Ltd	J.M. Till	...	Souter Shipping Ltd
G. Reaich	...	Denholm (I.O.M.) Ltd	N.A. Voss	...	P. & O. Containers Ltd
T. Rettig	...	Bibby Line Ltd	P.C. Waiton	...	Dept of Ag. & Fish for Scotland Ltd
D. Rogers	...	P. & O. Containers Ltd	M. Walgraeve	...	A.B.C. Containerline N.V.
R.J. Ross	...	P. & O. Ferries Ltd	P.D. Walker	...	B.P. Shipping Ltd
S.K. Saggi	...	E. & F. Ship Management Ltd	D.C. Collins-Williams	...	P. & O. Containers Ltd
D.C. Selley	...	Jebsens Ship Management Ltd	D.J. Williams	...	B.P. Shipping Ltd
J.W. Sellick	...	B.P. Petroleum Dev. Ltd	J.D. Williams	...	Geest Line Ltd

RADIO OFFICER		COMPANY	RADIO OFFICER		COMPANY
T. Adrian	...	Buries Marques (Ship Man'y) Ltd	D.E. Grief	...	Zapata International Services Ltd
I.F. Alexander	...	London & Overseas Freighters Ltd	J.S. Hallam	...	Ben Line Steamers Ltd
J. Allen	...	Ben Line Streamers Ltd	C.W. Hodgson	...	P. & O. Containers Ltd
K.M. Amoa	...	E. & F. Ship Management Ltd	S.H. Hollingsworth	...	S.T.C. International Marine

A. Agyeman Armah	E. & F. Ship Management Ltd	P.A. Hughes	Radio & Electronic Services
W.T. Ashlet	S.T.C. International Marine	G.P. Hunt	E.B. Communications (G.B.) Ltd
J.G.L. Baker	Natural Environment Research Council	D. Hurren	Denholm (I.O.M.) Ltd
J. Baldwin	B.P. Shipping Ltd	A. Hutching	Marconi International Marine Co. Ltd
R.O. Ball	B.P. Shipping Ltd	A.D. Hutchinson	P. & O. Containers Ltd
A.B. Balog	Frigomar Shipping	R.S. Irani	Barber Ship Management Ltd
R.M. Banzon	Frigomar Shipping	P.W. Jackson*	Denholm (I.O.M.) Ltd
P. Bartlett*	CAM Shipping Ltd	B.E.N. Joseph	Bibby Line Ltd
R. Baty	Minst. of Agriculture, Fisheries & Food	D.S. Kapadia	Barber Ship Management Ltd
A.S.T. Beveridge*	Dept of Ag. & Fish. for Scotland	D.J. Kelly	Beta Maritime Ltd
P. Birt	Marconi International Marine Co. Ltd	D.A. Kelsall	P. & O. Containers Ltd
S.J. Bradshaw	P. & O. Containers Ltd	K. Kielthy	B.P. Shipping Ltd
R.J. Bridge	P. & O. Containers Ltd	R.A.M. Lynn	Marconi International Marine Co. Ltd
R.A. Browne	P. & O. Containers Ltd	B.W. Matten	P. & O. Containers Ltd
B. Cameron	B.P. Shipping Ltd	G. McDanielson*	Marconi International Marine Co. Ltd
I.J. Cameron	E.B. Communications (G.B.) Ltd	M.I. McGregor	Geest Line Ltd
J.A. Cardownie	C.I. Shipping Ltd	R.A.S. McMeikan	Jebsens Ship Management Ltd
S.R. Cloutte	P. & O. Containers Ltd	R.J. McMurtry	J. Swire & Sons Ltd
J.J. Cooney	Cunard Ellerman Shipping Co. Ltd	S.J. Mee	British Antarctic Survey
P.A. Lindley-Curtis	Geest Line Ltd	J.T. Miller	Furness Withy (Shipping) Ltd
A.R. Davidson*	Dept of Ag. & Fish. for Scotland	R.W. Moloney	Shell Ship Management Ltd
P.E. Davies	Wallem Shipmanagement (I.O.M.) Ltd	H.G. Moran	S.T.C. International Marine
C.E. Dequilla	Graig Shipping Co. plc	P. Murphy	P. & O. Containers Ltd
J.L. Donnan	Geest Line Ltd	S. Nablea	Rederiet H.R. Myhre A/S
M.P. Donnelly*	Dept of Ag. & Fish. for Scotland	F.A. Noronha	V-Ships (U.K.) Ltd
J. Ebby	Dept of Ag. & Fish. for Scotland	O.Q. Palao	Graig Shipping Co. plc
G.A. Evans	Marconi International Marine Co. Ltd	M.D. Pike*	B.P. Pet. Dev. Ltd
R.J. Evans	S.T.C. International Marine	P.R. Prophet	Geest Line Ltd
I.G.C. Ferguson	Zapata International Services Ltd	B. Puno	Acomarit (U.K.) Ltd
P.W. Ferguson	P. & O. Containers Ltd	V. Ramakrishna	Barber Ship Management Ltd
N.C. French	P. & O. Containers Ltd	R.B. Redhead	P. & O. Containers Ltd
D. Fry	Shell Ship Management Ltd	A.S. Reuben	Barber Ship Management Ltd
P.G. Furnmston	Shell Ship Management Ltd	D.A. Richards	B.P. Shipping Ltd
T. Gilmour	S.T.C. International Marine	S.E. Sam	E. & F. Ship Management Ltd
R.E. Goring	P. & O. Containers Ltd	M. Saunders	B.P. Shipping Ltd
V.A. Gorny	P. & O. Containers Ltd	T.J. Seeman*	P. & O. Ferries Ltd
A.N. Grant	Wallem Shipmanagement I.O.M.	G.N. Shaw	S.T.C. International Marine

Excellent Awards (contd)

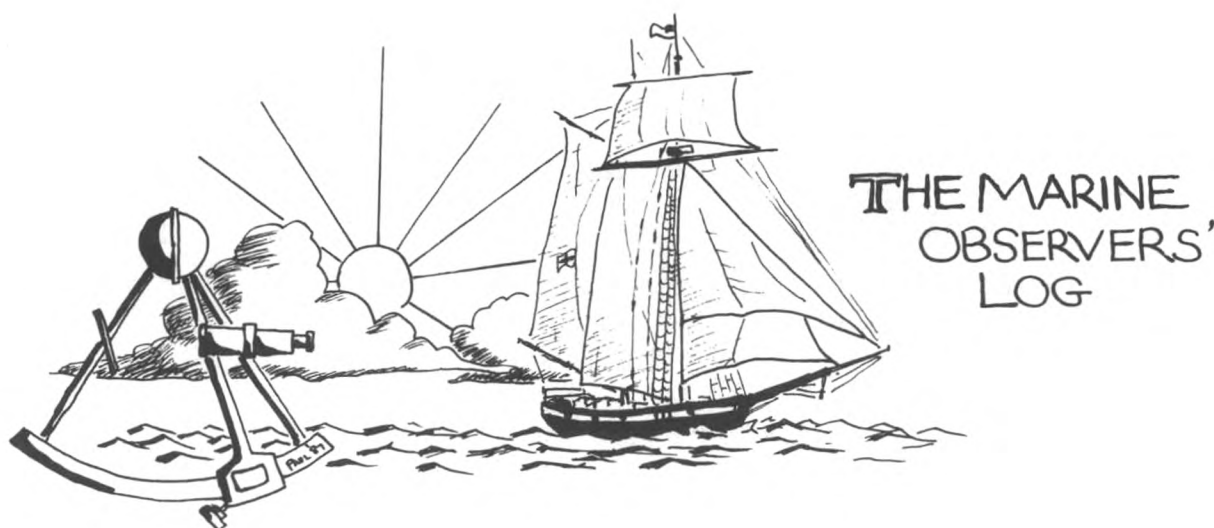
RADIO OFFICER		COMPANY	RADIO OFFICER		COMPANY
R.J. Sheldon*	...	Dept of Ag. & Fish. for Scotland	A.G. Thomson	...	Bibby Line Ltd
D. Sherwood	...	Ocean Tramping Ltd	J.A. Tomlinson	...	P. & O. Containers Ltd
R. Shirley*	...	CAM Shipping Ltd	D.W. Torr*	...	Andrew Weir Co. Ltd
L.T. Simpson*	...	P. & O. Ferries Ltd	D.W. Tucker*	...	Bolton Marine Management Ltd
E.L. Smith	...	P. & O. Ferries Ltd	R. Villarin	...	Rederiet H.R. Myhre A/S
J.G. Smith	...	B.P. Shipping Ltd	A.S. Virk	...	Seascot Ship Trading Ltd
T.J. Smith	...	P. & O. Containers Ltd	C.A. Waddicor	...	British Antarctic Survey
J.H. Speakman	...	British Antarctic Survey	J.J. Walsh	...	Denholm (I.O.M.) Ltd
E.B. Stephenson	...	P. & O. Containers Ltd	C.K.M. Warriner	...	Marconi International Marine Co. Ltd
R.J. Stevens	...	Marconi International Marine Co. Ltd	B.G. Wilkinson	...	P. & O. Containers Ltd
P.S. Stewart	...	B.P. Petroleum Dev. Ltd	R.A. Wilson	...	Curnow Shipping Ltd
A. Thomson	...	B.P. Shipping Ltd	D.P. Wood	...	P. & O. Containers Ltd

'MARID' SHIPS†

CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	COMPANY
K.G. Blacker R.W. Hemming N. Powell	W.G. Patterson T. Williams B. Wilson	N.H. Gralka* A.J. Muscat N. Paine*	Rowbotham Tankships Ltd United Dredging Marine Ltd Esso Petroleum Co. Ltd

* Deck Officer.

† Vessels recruited for the purpose of observing and transmitting sea temperatures with non-instrumental observations in the North Sea.



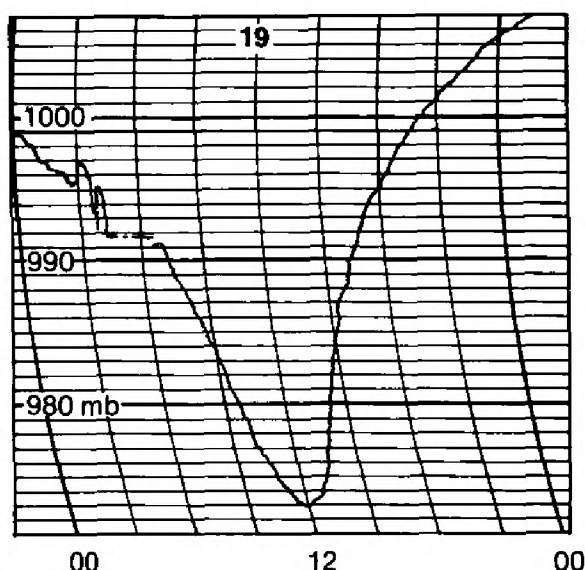
July, August, September

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

TYPHOON 'FLO' Western North Pacific

m.v. *Gas Enterprise*. Captain G.M. Hopkins. At anchor off Sakai. Observers: the Master, Mr L.N. Paul, 2nd Officer and ship's company.

19–20 September 1990. Whilst the ship was at anchor the observers were watching the movement of typhoon Flo. After it had recurved, the first indication was that it was going to pass to the north of Sakai/Osaka, but further reports from Hong Kong Weather showed that it could also pass directly over that area. On the 18th, Sakai harbour authorities decided that all vessels would be moved to a safe anchorage the next day, and the following weather observations were made after the vessel was re-anchored (see barograph trace).



Date and time (UTC)	Wind Dir'n	Force	Pressure (mb)	Remarks
19th 0300	NE	5	1000.2	
0400	Variable	5-6	997.9	Passing front. Very heavy rain.
0600	NE×N	8	994.5	
0900	NE×N	8	986.1	Heavy rain.
1200	N×W	10-11	974.9	Lowest pressure. Wind gusts to 65+ knots. Very heavy rain.
1500	NW×N	10	986.2	
1800	WNW	8	998.5	
2100	NW×W	5	1004.8	

The vessel was moved back to the inner anchorage on the 20th, and it was later learned from the local watchman that the typhoon was the worst to hit Osaka Bay for 30 years.

Position of ship: approximately 34° 36'N, 135° 18'E.

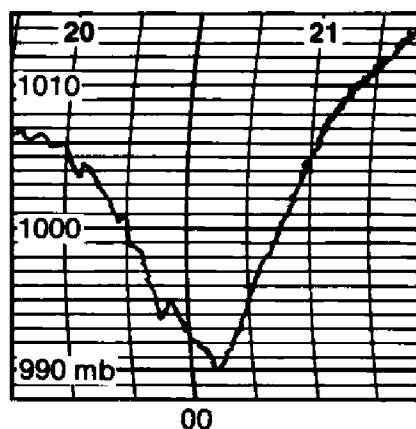
Western North Pacific

c.s. *Cable Venture*. Captain S. Merritt. Portland, Oregon to Yokohama. Observers: the Master and ship's company.

20-21 September 1990. Reports had been received from Japan that typhoon Flo, moving in a north-easterly direction at 38 knots, had a barometric pressure of 984 mb and reports from the United States Coast Guard at Guam stated that the winds were gusting to 130 knots.

The progress of the typhoon was plotted and it became apparent that despite the varying positions reported, it was on a collision course with the ship. Realising the situation looked somewhat less than favourable, the Master instructed an alteration of course to the north. Soon afterwards came another update indicating that the typhoon would pass to the south. With this in mind the vessel resumed her charted course, and the following observations were made, while the barograph chart shows the pressure changes experienced at the ship.

Date and time (UTC)	Wind Dir'n	Force	Pressure (mb)
20th 0600	Light airs		1006.1
0800	ENE	2	1003.3
1000	E	4	999.8
1200	NE×E	7	994.4
1400	NE×E	10	991.0
1600	NNE	8	993.5
1800	N×W	7	998.6
2000	NW	8	1006.7
2200	NW	7	1010.6



Leading up to the typhoon's approach were light winds and a calm sea; as the wind began to increase, heavy rain and sheet lightning were observed. At 1600 UTC the typhoon was about 100 n. mile away to the south and was estimated to be at its closest

to the ship. The seas were generally astern of the ship which had a relatively comfortable passage, and by 1000 on the 21st life had resumed to normal.

Position of ship: approximately 45° 00'N, 153° 00'E.

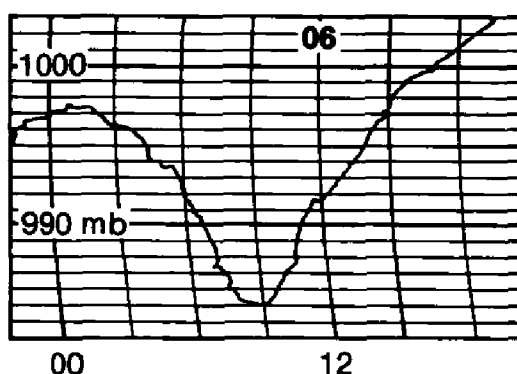
EX-HURRICANE 'GUSTAV'

North Minch

f.p.v. *Vigilant*. Captain D.L. Rattray. Patrol duties in Scottish waters. Observers: the Master, Mr R.J. Sheldon 2nd Officer and ship's company.

5-6 September 1990. Having heard five days earlier that ex-hurricane Gustav was trundling across the North Atlantic, the vessel had plenty of time in which to find a suitably sheltered hideaway, and for two days as the storm neared, its progress was followed and forecasts noted while the pressure dropped steadily.

On the 5th the wind backed from SW'ly to SE'ly over the first 12 hours and shelter was found in North Minch in the lee of the Scottish mainland. As the wind veered from SE'ly to SW'ly so the vessel continued down the minch and sheltered off the north-east coast of Skye. By this time, 0200 UTC on the 6th, the pressure was falling like a stone, see barograph trace. At 0500, expecting the wind to veer more to W'ly, the vessel



coasted up the eastern side of the Outer Hebrides, and at 0740 the pressure 'bottomed out' at 987.2 mb shortly before starting to rise again as quickly as it had fallen. At this time the wind was SW'ly, force 9 but decreased very quickly to force 4 as it slowly veered to W'ly. The wind veered to N'ly, force 4-5 at 1030 followed at 1036 by a sudden swing to E'ly while increasing to gale force. It was concluded that the vessel was in the eye of the storm.

At 1215 the wind was N'ly, force 7-8 and the pressure had risen to 994.2 mb and by 1900 there were heavy rain squalls with winds of NW'ly, force 7 while the pressure was 1005.9 mb.

Position of ship at 0200 on the 6th: approximately 57° 30'N, 06° 15'W.

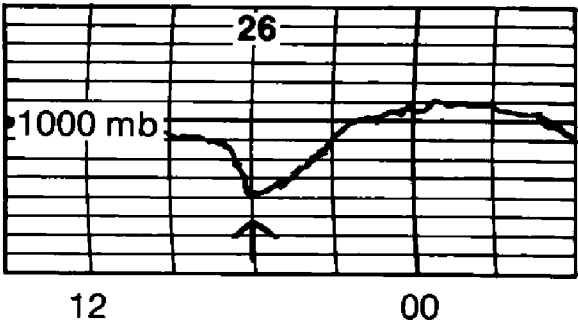
TROPICAL DEPRESSION 'TASHA'

South China Sea

m.v. *Moraybank*. Captain E.T. Rees. Kimbe to Hong Kong. Observers: the Master and ship's company.

26-29 July 1990. On the 26th the observers witnessed the birth of a tropical depression. Whilst making the 1800 UTC observation a fall of 3 mb was recorded (see barograph trace) during a period when no tropical depressions were forecast for the

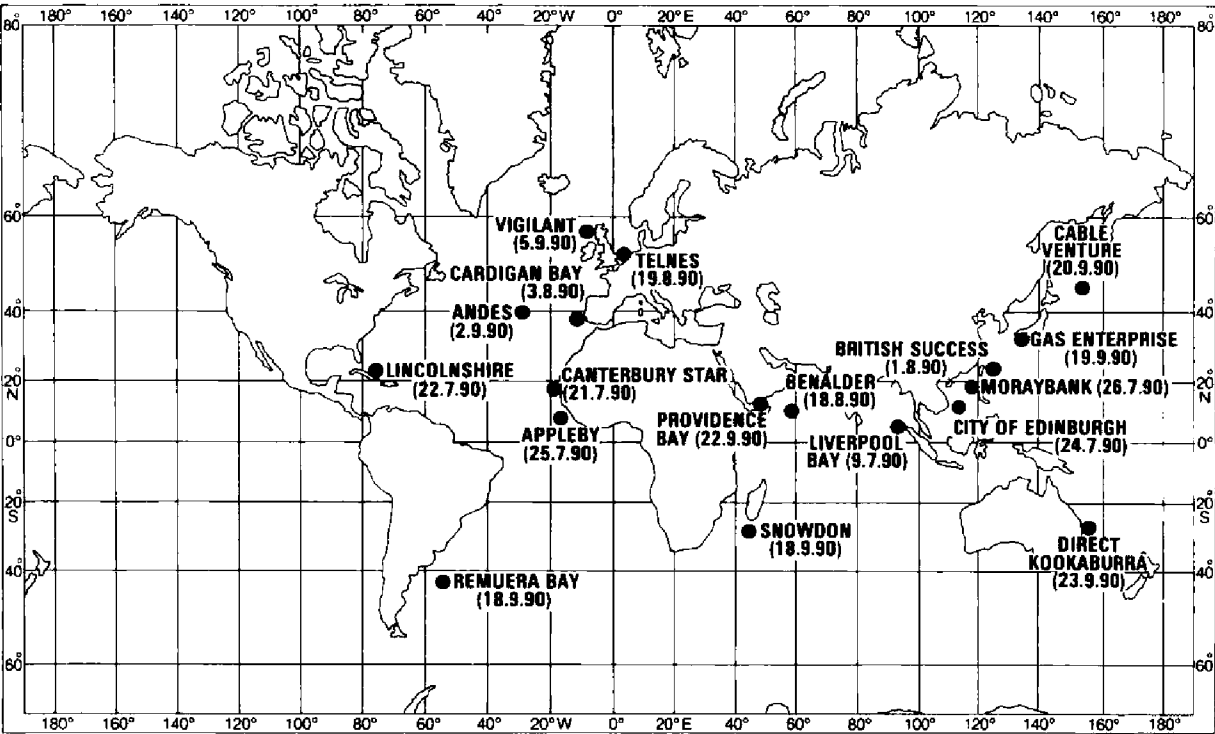
area. When the next report was sent in, the forecast received at about the same time described a tropical depression in the area, becoming well formed. This was later given the number 9009 and named tropical cyclone Tasha.



The vessel was in Hong Kong on the 27th and 28th, but on leaving for Pasir Gudang the next day, three-hourly storm reports were sent in until 1800 when the vessel was clear of the centre of influence. The minimum pressure reached at the ship during this day was 995.5 mb, recorded at 0900.

Other variables at 0900 were: air temperature 26.0°, wet bulb 25.8°, sea 29.1°, wind WNW'ly, force 6.

Position of ship at 1800 UTC on the 26th: 19° 42'N, 119° 24'E.



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

CURRENT
South China Sea

m.v. *City of Edinburgh*. Captain H.G. Gray. Kaohsiung to Singapore. Observers: Mr D. Bathgate, 1st Officer, Mr R.G.C. Noble, 2nd Officer and Mr G.W. Maitland, 3rd Officer.

24 July 1990. At 0242 UTC a strong easterly set was experienced of a mean rate of 2 knots, but estimated to have attained 2.5 knots. The average set was 072° × 2

knots. The wind was SW'ly, force 4 with a moderate sea and swell also coming from the south-west. There was no evidence of surface disturbances to indicate unusual current activity.

The general consensus of opinion on board was that this set was probably due to the outflow from the Mekong River although it was appreciated by the observers that the vessel was over 300 n.mile from the mouths of the river and that there was no discolouration or debris normally associated with the effluence of a large river.

Position of ship at 0242 UTC: 12° 24'N, 112° 48'E.

Note. The following are extracts from the *China Sea Pilot* (NP 30):

'In June the SW Monsoon extends over the whole South China Sea and from then until September, sets between N and E predominate over the area ... An inflow of water from the Java Sea sets N and then NE, S of Vietnam, and finally curves E or even SE to leave the area between 5° N and 15° N. The mean rate of this broad and fairly constant flow is about ½ knot ...'

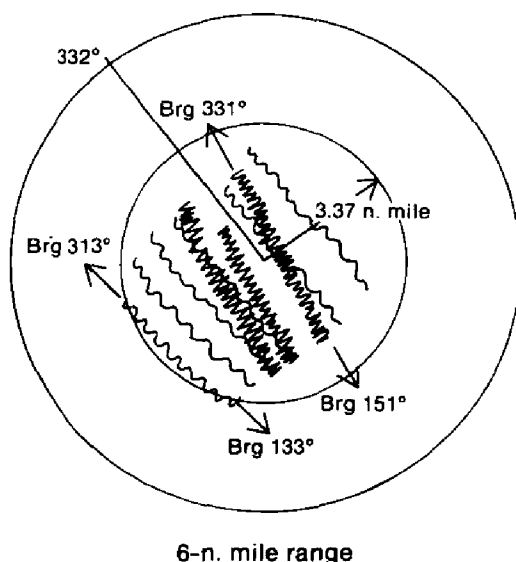
In July and August '... the main axis of the NE-going current S of Vietnam is transferred a degree or so S and mean rates increase to ¾ to 1¼ knots. Currents in excess of 3 knots have been reported between 10° N and 15° N after strong SW winds.'

DISTURBED WATER

Eastern North Atlantic

m.v. *Appleby*. Captain C.R. Bamford. Saldanha Bay to Hunterston. Observers: the Master, Mr A. Crofts, Chief Officer and Mr G. Addison, 3rd Engineer Officer.

25 July 1990. At 1612 UTC the vessel entered an area of disturbed water, clearly discernible both visually and by radar, and the vessel then began to shear 5° either side of the course line of 322° and apply corrective helm. A series of sea temperature readings was then started, but results varied little with a maximum of 27.6 °C and a minimum of 27.3° being obtained.



As indicated in the sketch, the radar display showed two distinct sets of parallel echoes, each 'ridge' being about 0.3 n.mile wide. Distances between the ridges

varied, and visual observations showed these not to be second or third trace echoes. The wind force and direction remained SW'ly, force 3 throughout the observation.

At 1718 a satellite position fix indicated that the vessel had made good a course of 319° and speed of 10.72 knots throughout the period. The phenomenon became less and less apparent at this time.

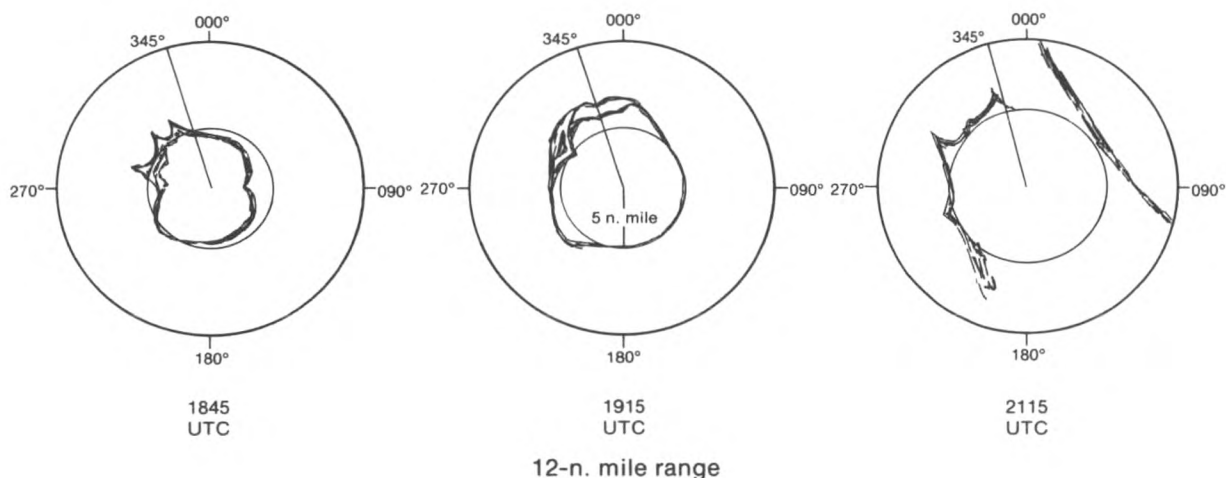
Position of ship: 07° 50'N, 15° 36'W.

RADAR ECHOES

Eastern North Atlantic

m.v. *Cardigan Bay*. Captain A.J. Leslie. Port Said to Rotterdam. Observers: the Master, Mr C.I. Macleod, 3rd Officer and Mr J.A. Tomlinson, Radio Officer.

3 August 1990. During the evening watch, at about 1830 UTC, a strange echo was observed on the ship's Kelvin Hughes 3-cm radar set. The shape of the echo was continually changing and its form at 1845 and 1915 is shown in the first two sketches. The third sketch shows the echo breaking up at 2115 and it faded away shortly afterwards.



During the period the visibility was 6 n.mile and weather conditions were: air temperature 23.5 °C, wet bulb 20.5°, pressure 1022.2 mb, wind NE'ly, force 3.

Position of ship at 1800 UTC: 38° 18'N, 09° 35'W.

CETACEA

Eastern North Atlantic

m.v. *Canterbury Star*. Captain N.D.T. Johnson. Vado Ligure to Durban. Observer: Mr R.G. Pressler, 2nd Officer.

21 July 1990. At 1100 UTC a long, slim-looking whale was seen surfacing frequently as it swam quickly north-east just below the water's surface. The whale seemed quite oblivious to the vessel's passing as it closed on the starboard side and swam through the wake about 70 m astern. It had a white head which was long and slim and appeared to terminate in some kind of 'snout' although it was noted that the animal was blowing through the usual blowhole located on the forehead, see sketches.



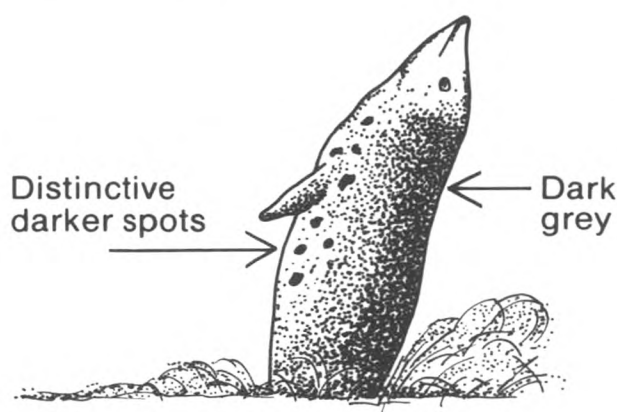
The white head blended into an orange/yellow/brown body which appeared to be mottled, possibly through some kind of growth (it gave the appearance of being two-thirds covered by barnacles across the back). A small dorsal fin which was darker than the body was located between one-half and two-thirds of the way down the whale's back and the beast was estimated to be 8–10 m long. The surfacing sequence is shown in the sketches, no flukes were seen although the tail was not of large proportions judging by what could be seen through the water.

Position of ship at 0940 UTC: 17° 15'N, 17° 51'W.

Western North Atlantic

m.v. *Lincolnshire*. Captain M.M. Reeves. Point Lisas to Tampa. Observers: Mr M. Warsnop, 2nd Officer, Mr D.C. Mohammed, Extra 2nd Officer and members of ship's company.

22 July 1990. At 1600 UTC two Cuvier's Whales (*Ziphius cavirostris*) were sighted at approximately 500 m on the starboard bow, leaping clear of the water, see sketch. They were initially thought to be dolphins, but on closer inspection it was decided that they were too large, having an estimated length of 8 m. The head and underside was light grey in colour with very distinctive darker spots whereas the back was dark grey with no markings.



The ship then had to alter course for the whales in an effort to keep clear of them and at the point of closest approach they were about 25 m from the starboard beam. Later, on consulting *Whales of the World* by Lyall Watson, they were positively identified as Cuvier's Whales although some questions were raised, for the book stated that they are shy of ships and have been found difficult to observe and approach.

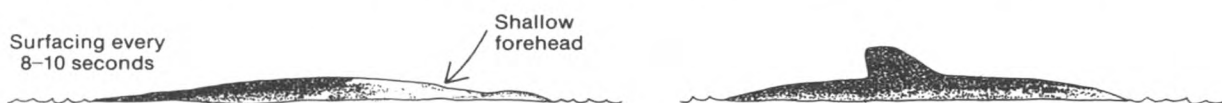
Position of ship: 21° 22'N, 75° 58'W.

North Atlantic Ocean

m.v. *Andes*. Captain B. Walmsley. Le Havre to Cristobal. Observer: Mr J.N. Balkwill, 2nd Officer.

2 September 1990. Shortly after sighting an adult Sperm Whale, the ship passed close to a pair of beaked whales at 1412 UTC. They were 5–6 m long, swimming close to each other, surfacing and blowing at intervals of about 8 seconds.

Whale 'A' (thought to be female) was dark slate-grey in colour over all; however, whale 'B' (presumed to be male and shown in the sketch) had a distinct



creamy-pink head and beak. Behind the head, this unusual colouring became speckled until blending completely with the slate-grey of the whale's back. Several white, criss-crossed scars could be seen on this whale's back. Both individuals raised their beaks clear of the water at each blow, no teeth were seen.

Weather conditions at the time were: dry bulb 22.4 °C, sea 23.2°, pressure 1028.8 mb, wind SW'ly, force 2.

Position of ship: 38° 40'N, 29° 12'W.

Note. Mr D.A. McBrearty, of the Dolphin Survey Project, comments:

'The description given by the *Canterbury Star* follows closely, in all but estimated length, that of Cuvier's Whale (*Ziphius cavirostris*). They are a fairly cosmopolitan species and have been reported from many areas around the world. The maximum length for each sex is said to be 7.0 m for males and 6.7 m for females. The females are more uniform in colour, but old males of the species do have the cream-coloured head and also scars and scratches, many of which are inflicted by rival males during bouts of sexual and hierarchical dominance. If the distance between the parallel scratch lines could be measured, it would match the average distance between the teeth in the lower jaw.

'The observers on the *Lincolnshire* also sighted this species in the Caribbean where they are relatively common and perhaps not quite so shy of shipping or as difficult to approach as they are in some other sea areas.

'The male and female of the pair seen from the *Andes* seem to have been correctly identified, sexual maturity being reached at a minimum length of 5.5 m. The body colour of Cuvier's Whale has been described as varying from light-tan to black, therefore, colour alone is not to be relied on as a key to identification. The observer mentions teeth; usually, only one pair is found at the tip of the lower jaw and these, when erupted, are visible when the mouth is closed i.e., the lower jaw extends beyond the upper jaw. Furthermore, teeth erupt only in mature males, not in females and the young.'

Tasman Sea

m.v., *Direct Kookaburra*. Captain P.D. Davies. Botany Bay to Brisbane. Observers: the Master, ship's company and the Brisbane Pilot.

23 September 1990. During the ship's approach to Brisbane a blow was seen about 2.5 n.mile off on the port bow (the vessel was about 4 n.mile off the beaches south of Caloundra Head). Just after the blow, a cow and calf whale were seen on the surface where they more or less maintained their position throughout the sighting.

The adult brought her tail up out of the water and began to slap the surface repeatedly with it, to which the calf responded by doing the same while always



Photo by Skyfotos Ltd

Asifi as Anne Sif (Knud L. Larsen/Bolton Maritime Management)
Captain G.W. Wostenholme



Photo courtesy of British Antarctic Survey

R.R.S. *John Biscoe* (British Antarctic Survey)
Captain C.R. Elliott



Photo courtesy of British Nuclear Fuels plc

Pacific Crane (James Fisher & Sons plc)
Captain P.G.H. Hobson

**THREE OF THE SHIPS WHICH GAINED THE HIGHEST MARKS FOR
THEIR METEOROLOGICAL LOGBOOKS DURING 1990. (See page 98.)**



Above: Orographic cloud over Dublin on 24 October 1989 photographed from m.v. *Liverpool Star*.

Below: Juvenile Red-backed Shrike on board m.v. *Liverpool Star* west of Cyprus on 7 June 1990.



Photos by P.W. Jackson

remaining close to the head area of the parent. The adult then began rolling about its longitudinal axis, spending approximately 20 seconds with its large, white belly exposed above the surface and bringing its fins up out of the water and 'clapping' them before rolling about into a normal position and blowing again. This performance was repeated several times and was still going on long after the vessel had passed; all the while the calf was slapping the water with its tail.

The ship's route took the observers to within 2–3 cables of the whales but they showed no sign of concern such as diving away or sinking below the surface, it was almost as if they were unaware of anything else. In the distance another whale's tail was seen, also slapping the water. After consulting *A Natural History of Whales and Dolphins* by P.G.H. Evans, those sighted were identified as Humpback Whales but the observers had no explanation as to what they were doing. However, further reading revealed a passage describing play behaviour in which the calf learns important actions used later in life, and it was considered that what had been witnessed was an 'education session' between the mother and calf.

General weather conditions gave a fine, sunny day with calm seas and a long, low easterly swell.

Position of ship: 26° 46'S, 153° 12'E

South Atlantic Ocean

m.v. *Remuera Bay*. Captain P.A. Furneaux. Dunedin to Lisbon. Observers: the Master and ship's company.

18 September 1990. At 1400 UTC whilst the ship was stopped, a disturbance in the water was sighted and, in addition, was automatically acquired by the ship's ARPA. As the disturbance moved closer it was seen to be caused by a large number of dolphins swimming and leaping from the water. Amongst the dolphins was a group of small, slow-swimming whales.

The large group of dolphins stayed at some distance from the vessel and their identification was not helped; however, they were dark grey in colour with white undersides and were roughly 1.8 m long. From their behaviour, jumping clear of the water, spinning and belly-splashing back down again, it was concluded that they were spinner dolphins. The number in the group was conservatively estimated at 170 and all appeared to be adult.

Accompanying the dolphins were about 52 small whales, and after a short time, two groups each of approximately eight individuals, cautiously approached the ship. When about 15 m away one group dived, apparently to swim under it and was not seen again; the other group lay off the stern about 30 m away, but by this time positive identification of Short-finned Pilot Whales had been made. Each was dark in colour and was about 6 m long, many had the distinctive white saddle mark directly behind the dorsal fin.

Two whales, one of which seemed particularly larger than the rest, ventured nearer, swimming very close to each other. When directly opposite the bridge wing they stopped and the larger one 'stood on its tail' so that only its bulky head appeared out of the water. This behaviour pattern was repeated twice more in the next 45 minutes and attracted quite an audience. The whales later rejoined the main group and the ship's passage was resumed.

From the distribution maps contained in *The Seafarer's Guide to Marine Life* by P.V. Horsman, it seemed that both species were further south than normally expected but the sea temperature had rapidly risen from 9.0 °C to 14.5° over the last 10 hours and may have had some influence.

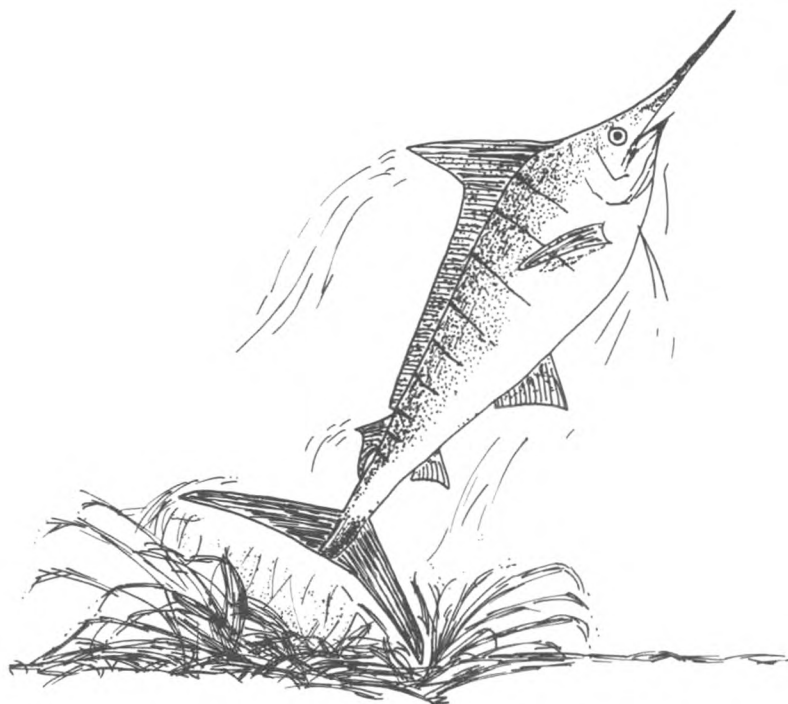
Position of ship: 42° 08'S, 54° 15'W.

FISH

Gulf of Aden

m.v. *Providence Bay*. Captain J.L. Peterson. Fujairah to Suez. Observer: Mr B.G. Ball, 3rd Officer.

22 September 1990. At 0740 UTC a large fish was seen to jump clear of the water, repeating this performance a number of times as the ship drew closer. The fish, see sketch, was about 2.5 m long and had an unmistakable long, cylindrical 'spear' protruding from its head. Its dorsal fin extended back from the head for two-thirds of its body length and it had a sharp, forked tail.



The underside was a silvery-white colour with light, vertical bands along the length of the body. As the vessel drew abeam of it, the fish jumped for the last time, at a distance of approximately 30 m from the side, before disappearing. It was thought that the fish was a Striped Marlin.

Position of ship: 12° 52'N, 45° 55'E.

Note. Dr F. Evans, of the Dove Marine Laboratory, University of Newcastle upon Tyne, comments:

'The lively and graphic picture is of a marlin as the observer states. It is clearly so and not a swordfish from the possession of pectoral fins (absent in swordfish) and from the accompanying statement describing the spear as "cylindrical". There are several species of marlin; this one may well be the Striped Marlin, which is known from the area, although the Blue Marlin also has some striping. They are all powerful, carnivorous fish, growing to 3 m or more in length. The power is exemplified here in the clean jumps from the water of a fish of around 200 kg.'

BIRDS

East China Sea

m.v. *British Success*. Captain A.R. Wilkinson. Dumai to Kiire. Observer: Mr S. Allen, 3rd Officer.

1 August 1990. A booby (see sketch) was seen at 2340 UTC riding the air currents around the ship and then diving for food from a height of about 100 feet. Using the ship's updraught to gain height without too much effort it was able to see fish more clearly and dive with no warning. Although it was not possible to determine the depth of each dive, the time elapsed between the bird entering the water and surfacing again was roughly 5 seconds after which, having mainly missed a catch, it would take off and soar over the bow.



After 20 minutes of its visit the bird rested on the water, gently buffeted by the moderate swell, it may perhaps have caught a fish. Remaining with the ship for about 30 minutes, the booby appeared to be on its own, but its carefully planned routine made fascinating watching until lost from sight.

Position of ship: 23° 48'N, 122° 55'E.

Southern North Sea

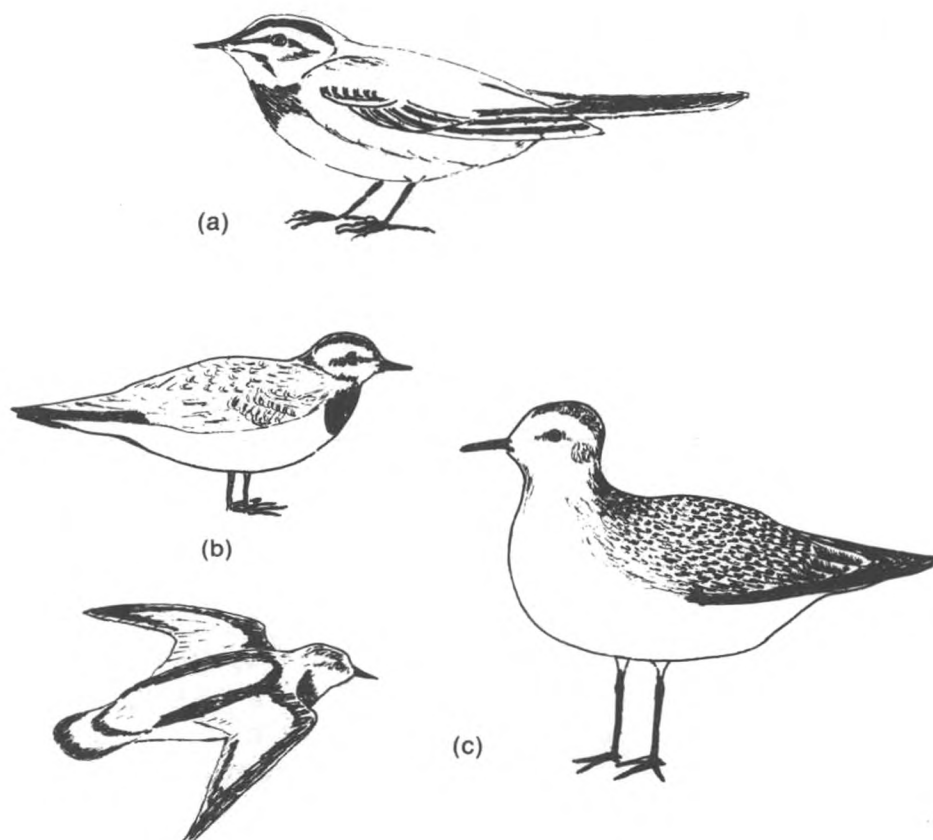
m.v. *Telnes*. Captain A. Gatt. North European coastal voyage. Observers: the Master and Mr D.J. Ayling, 2nd Officer.

19–26 August 1990. While crossing from Rotterdam to Tilbury on the 19th a wagtail landed on the forward hatches at 1100 UTC, it was believed to be a juvenile Pied Wagtail. It landed where adult and juvenile Lesser Black-backed Gulls were resting but did not appear concerned despite the difference in sizes. Venturing to within 30 cm of them it was 'picking' off the hatch top and as it walked its tail moved up and down in common with other wagtails. Due to the strong SW'ly wind it occasionally lost its balance and eventually sought refuge under the winches.

As shown in sketch (a) its tail was long and black with a white edge while its head had two distinct black bands, one on either side above the eyes; the top being brownish in colour. A lighter, greyish band went through the eye, and the throat was light brown with a flash of black. At the top of its breast was a black bib, its belly was white whereas the rest of the body was varying shades of brown and the wings appeared to have white edges. Its legs were black.

Five days later, when on passage from Zeebrugge to Tilbury a pair of birds landed on one aft hatch and spent the next 20 minutes preening before flying off. They appeared rather nervous and easily startled and were identified as

Turnstones, see sketch (b). The head was small and mainly a light, mottled-brown colour with a dark-grey band across the eye. There was a white throat, a black bib on the breast, a white belly, orange legs and black beak. With folded wings, the back was mottled light and dark brown with black edges to the wings, but in flight there was a very distinct pattern of black bands on an otherwise white back.



On the 26th what was believed to be a juvenile Grey Plover, see sketch (c), landed while the ship was on passage from Tilbury to Zeebrugge. It stayed with the ship for the duration of the crossing and when passing through the locks, eventually leaving when the ship berthed. It had a slight, greyish band through the eye with an almost circular spot behind the eye itself, a whitish head apart from a dark-grey band over the forehead, and a freckled, greyish-black back which became darker at the base of the neck and towards the leading edge of the wings. Apart from a light-grey throat the underside of the body was white. The bird was not observed in flight.

Position of ship on the 19th: 52° 15'N, 02° 41'E.

Note. Commander M.B. Casement, of the Royal Naval Birdwatching Society, comments:

'I congratulate the observer for his excellent sketches. The wagtail is probably the continental form or White Wagtail (*Motacilla alba*). This species does migrate south-westwards in Europe, many birds cross to north Africa and are regularly reported aboard ships in the Mediterranean Sea.

'Turnstones have been correctly identified, they frequently rest on ships during migration. The birds seen on the 26th were probably Grey Plovers, black underwings which would have been observable in flight would have been diagnostic. Grey Plovers regularly occur on board ships in the North Atlantic and Pacific, but to stay for a complete passage is unusual.'

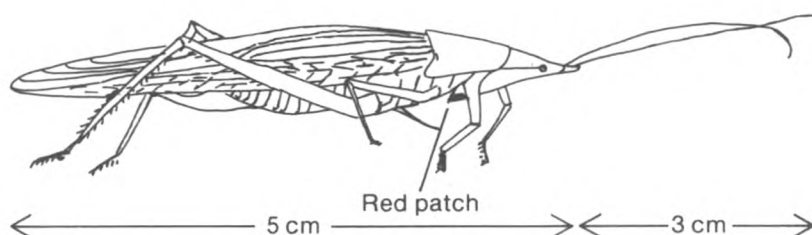
INSECT

Indian Ocean

m.v. *Liverpool Bay*. Captain A.J. Palmer. Singapore to Jeddah. Observers: the Master, Mr K. MacCorquodale, 1st Officer, Mr J. Townsend, 2nd Officer, Mr A.J. Skingley, 3rd Officer and Mrs MacCorquodale.

9–12 July 1990. On departure from Singapore the illustrated insect was found to be inhabiting the bridge; its favourite position appeared to be on the starboard side just above a bridge front window (this provided the most light).

As shown in the sketch the length overall was about 8 cm of which 3 cm was accounted for by the antennae. The rearmost pair of legs was greatly enlarged



and wings were closed over the insect's back. There was a red patch on the underside of the head but otherwise the insect's colour was a shocking lime-green. It emitted no noises and was virtually inactive throughout its stay; it did not even respond when torchlights were shone directly at it. Attempts were made to feed it with lettuce leaves but these remained untouched. However, water was introduced and this appeared to be taken, but on the morning of the 12th it was found dead.

Having no literature on board covering insects, it was assumed that the visitor was a type of locust or grasshopper, it was the only one found.

Position of ship on the 10th at 1200 UTC: 05° 35'N, 96° 24'E.

BIOLUMINESCENCE

Indian Ocean

m.v. *Benalder*. Captain F.G.J. Anderson. Singapore to Jeddah. Observers: the Master, Mr S. Polson, 1st Officer, Mr R.J. Shepherd, Radio Officer and Mr D. Walker, SG1A.

18 August 1990. At 1640 UTC the sea surface was noticed to have a white appearance which at first was thought to be low-lying fog. This theory was disproved when shining a light to the water gave no noticeable increase in luminant.

The phenomenon extended to the horizon in all directions and was bright enough to make the ship's foredeck and the sky appear much darker than the sea. Its appearance and disappearance was gradual apart from an area of normal sea which was passed about five minutes before the phenomenon faded away at 1725.

With reference to the *Marine Observer's Handbook* it was identified as 'milky sea' which few crew members had seen before.

Weather conditions were: air temperature 26.2 °C, wet bulb 24.8°, sea 26.2°, pressure 1009.4 mb, wind WSW'ly, force 6. There was a clear, moonless sky and the sea was rough with a moderate swell.

Position of ship: 10° 13'N, 59° 56'E.

Note. Dr P.J. Herring, of the Institute of Oceanographic Sciences, Deacon Laboratory, comments:

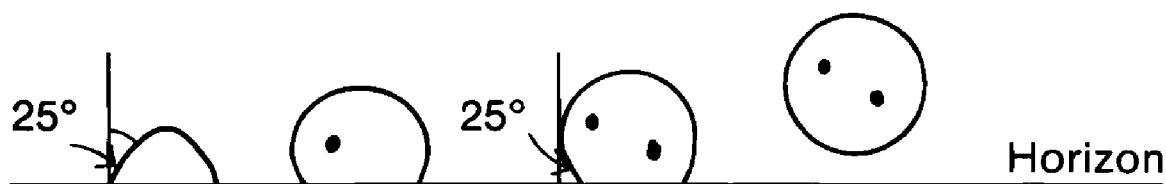
'This is a classical description of "milky sea", as the observers so rightly recognise. This phenomenon is best known from the Arabian Sea area and is most common during the SW Monsoon period, so this report conforms to expectations. The appearance is probably produced by luminous bacteria growing on a surface scum, but this has not yet been proved incontrovertibly.'

REFRACTION

Indian Ocean

m.v. *Snowdon*. Captain M.A. Hill. Richards Bay to Kashima. Observer: Mr J.H. Lacey, 1st Officer.

18 September 1990. At dawn the sun's appearance changed from the time of breaching the horizon until it was in full view. As shown in the first sketch, there was a distinct point in the sun's left limb, making an angle of 25° to the vertical. The sun became normally shaped for a short while, but as it was about to clear the horizon it developed almost straight sides which converged towards the lower limb, producing a similar angle as in the initial view. Two sunspots were also observed on the sun's disc.



Weather conditions were: air temperature 23.1 °C, wet bulb 22.1°, pressure 1014.7 mb. There was a narrow band of stratus just above the horizon and the visibility was good.

Position of ship: 27° 15'S, 43° 22'E.

Scientific Assessment of Climate Change*

EXECUTIVE SUMMARY

We are certain of the following:

- there is a natural greenhouse effect which already keeps the Earth warmer than it would otherwise be.
- emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases: carbon dioxide, methane, chlorofluorocarbons (CFCs) and nitrous oxide. These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface. The main greenhouse gas, water vapour, will increase in response to global warming and further enhance it.

We calculate with confidence that:

- some gases are potentially more effective than others at changing climate, and their relative effectiveness can be estimated. Carbon dioxide has been responsible for over half the enhanced greenhouse effect in the past, and is likely to remain so in the future.
- atmospheric concentrations of the long-lived gases (carbon dioxide, nitrous oxide and the CFCs) adjust only slowly to changes in emissions. Continued emissions of these gases at present rates would commit us to increased concentrations for centuries ahead. The longer emissions continue to increase at present-day rates, the greater reductions would have to be for concentrations to stabilize at a given level.
- the long-lived gases would require immediate reductions in emissions from human activities of over 60% to stabilize their concentrations at today's levels; methane would require a 15–20% reduction.

Based on current model results, we predict:

- under the IPCC Business-as-Usual (Scenario A) emissions of greenhouse gases, a rate of increase of global mean temperature during the next century of about 0.3 °C per decade (with an uncertainty range of 0.2 °C to 0.5 °C per decade); this is greater than that seen over the past 10,000 years. This will result in a likely increase in global mean temperature of about 1 °C above the present value by 2025 and 3 °C before the end of the next century. The rise will not be steady because of the influence of other factors.
- under the other IPCC emission scenarios which assume progressively increasing levels of controls, rates of increase in global mean temperature of about 0.2 °C per decade (Scenario B), just above 0.1 °C per decade (Scenario C) and about 0.1 °C per decade (Scenario D).

* Extracts from *Scientific Assessment of Climate Change*, WMO/UNEP Intergovernmental Panel on Climate Change; Geneva (1990). Also published as: *Climate Change: The IPCC Scientific Assessment*; Houghton J.T., G.J. Jenkins and J.J. Ephraums (Editors), Cambridge University Press, Cambridge, 1990.

- that land surfaces warm more rapidly than the ocean, and high northern latitudes warm more than the global mean in winter.
- regional climate changes different from the global mean, although our confidence in the prediction of the detail of regional changes is low. For example, temperature increases in southern Europe and central North America are predicted to be higher than the global mean, accompanied on average by reduced summer precipitation and soil moisture. There are less consistent predictions for the tropics and the southern hemisphere.
- under the IPCC Business-as-Usual emissions scenario, an average rate of global mean sea level rise of about 6 cm per decade over the next century (with an uncertainty range of 3–10 cm per decade), mainly due to thermal expansion of the oceans and the melting of some land ice. The predicted rise is about 20 cm in global mean sea level by 2030, and 65 cm by the end of the next century. There will be significant regional variations.

There are many uncertainties in our predictions particularly with regard to the timing, magnitude and regional patterns of climate change, due to our incomplete understanding of:

- sources and sinks of greenhouse gases, which affect predictions of future concentrations.
- clouds, which strongly influence the magnitude of climate change.
- oceans, which influence the timing and patterns of climate change.
- polar ice sheets which affect predictions of sea level rise.

These processes are already partially understood, and we are confident that the uncertainties can be reduced by further research. However, the complexity of the system means that we cannot rule out surprises.

Our judgement is that:

Global mean surface air temperature has increased by 0.3 °C to 0.6 °C over the last 100 years, with the five global mean warmest years being in the 1980s. Over the same period global sea level has increased by 10–20 cm. These increases have not been smooth with time, nor uniform over the globe.

The size of this warming is broadly consistent with predictions of climate models, but it is also of the same magnitude as natural climate variability. Thus the observed increase could be largely due to this natural variability; alternatively this variability and other human factors could have offset a still larger human-induced greenhouse warming. The unequivocal detection of the enhanced greenhouse effect from observations is not likely for a decade or more.

- There is no firm evidence that climate has become more variable over the last few decades. However, with an increase in the mean temperature, episodes of high temperatures will most likely become more frequent in the future, and cold episodes less frequent.
- Ecosystems affect climate, and will be affected by a changing climate and by increasing carbon dioxide concentrations. Rapid changes in climate will change the composition of ecosystems; some species will benefit while others will be unable to migrate or adapt fast enough and may become extinct. Enhanced levels of carbon dioxide may increase productivity and efficiency

of water use by vegetation. The effect of warming on biological processes, although poorly understood, may increase the atmospheric concentrations of natural greenhouse gases.

To improve our predictive capability, we need:

- to *understand* better the various climate-related processes, particularly those associated with clouds, oceans and the carbon cycle.
- to *improve* the systematic observation of climate-related variables on a global basis, and further investigate changes which took place in the past.
- to *develop* improved models of the Earth's climate system.
- to *increase* support for national and international climate research activities, especially in developing countries.
- to *facilitate* international exchange of climate data.

What natural factors are important?

The driving energy for weather and climate comes from the Sun. The Earth intercepts solar radiation (including that in the short-wave, visible, part of the spectrum); about a third of it is reflected, the rest is absorbed by the different components (atmosphere, ocean, ice, land and biota) of the climate system. The energy absorbed from solar radiation is balanced (in the long term) by outgoing radiation from the Earth and atmosphere; this terrestrial radiation takes the form of long-wave invisible infra-red energy, and its magnitude is determined by the temperature of the Earth-atmosphere system.

There are several natural factors which can change the balance between the energy absorbed by the Earth and that emitted by it in the form of long-wave infra-red radiation; these factors cause the *radiative forcing* on climate. The most obvious of these is a change in the output of energy from the Sun. There is direct evidence of such variability over the 11-year solar cycle, and longer-period changes may also occur. Slow variations in the Earth's orbit affect the seasonal and latitudinal distribution of solar radiation; these were probably responsible for initiating the ice ages.

One of the most important factors is the *greenhouse effect*, Figure 1, a simplified explanation of which is as follows. Short-wave solar radiation can pass through the clear atmosphere relatively unimpeded. But long-wave terrestrial radiation emitted by the warm surface of the Earth is partially absorbed and then re-emitted by a number of trace gases in the cooler atmosphere above. Since, on average, the outgoing long-wave radiation balances the incoming solar radiation, both the atmosphere and the surface will be warmer than they would be without the greenhouse gases.

The main natural greenhouse gases are not the major constituents, nitrogen and oxygen, but water vapour (the biggest contributor), carbon dioxide, methane, nitrous oxide, and ozone in the troposphere (the lowest 10–15 km of the atmosphere) and stratosphere.

Aerosols (small particles) in the atmosphere can also affect climate because they can reflect and absorb radiation. The most important natural perturbations result from explosive volcanic eruptions which affect concentrations in the lower stratosphere. Lastly, the climate has its own *natural variability* on all time-scales and changes occur without any external influence.

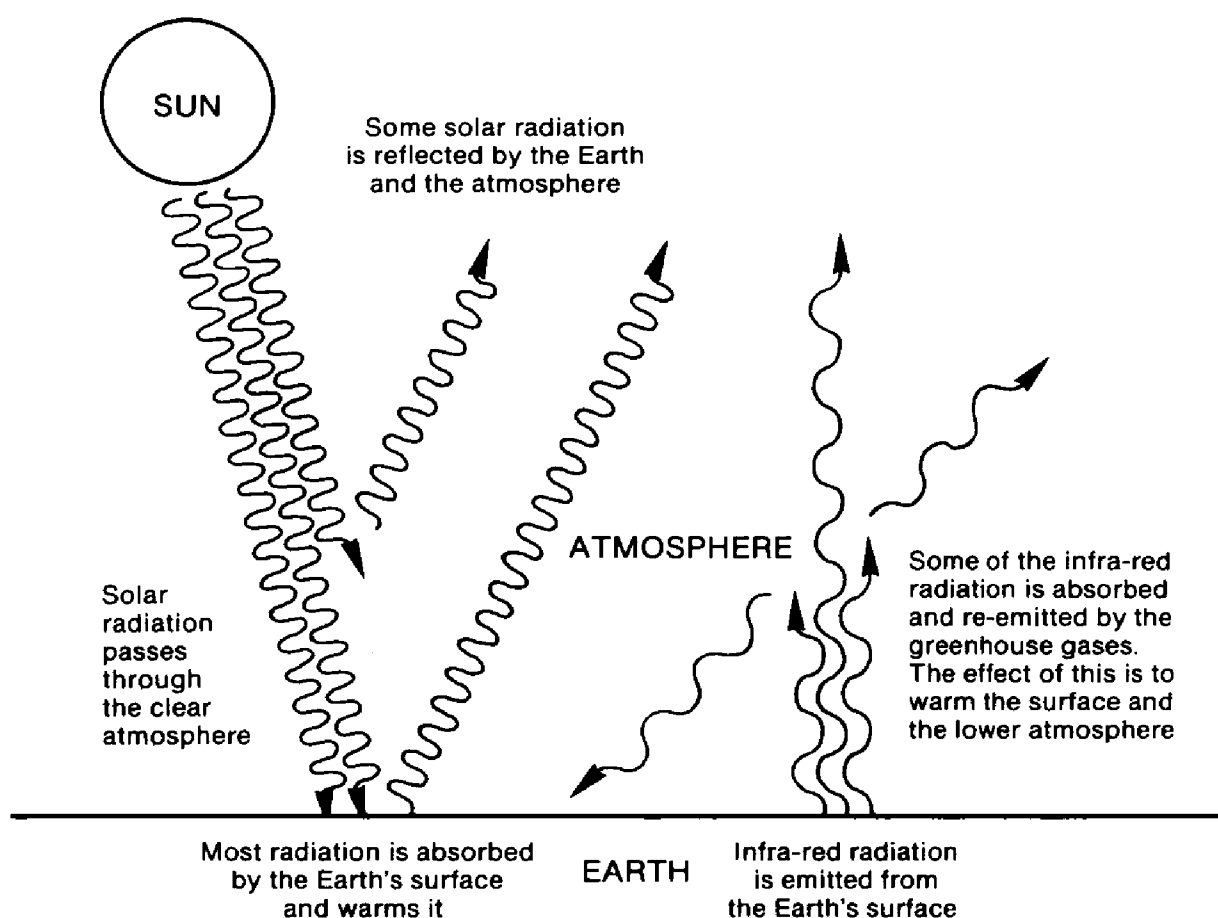


Figure 1. A simplified diagram illustrating the greenhouse effect.

Will storms increase in a warmer world?

Storms can have a major impact on society. Will their frequency, intensity or location increase in a warmer world?

Tropical storms, such as typhoons and hurricanes, only develop at present over seas that are warmer than about 26 °C. Although the area of sea having temperatures over this critical value will increase as the globe warms, the critical temperature itself may increase in a warmer world. Although the theoretical maximum intensity is expected to increase with temperature, climate models give no consistent indication whether tropical storms will increase or decrease in frequency or intensity as climate changes; neither is there any evidence that this has occurred over the past few decades.

Mid-latitude storms, such as those which track across the North Atlantic and North Pacific, are driven by the equator-to-pole temperature contrast. As this contrast will probably be weakened in a warmer world (at least in the northern hemisphere), it might be argued that mid-latitude storms will also weaken or change their tracks, and there is some indication of a general reduction in day-to-day variability in the mid-latitude storm tracks in winter in model simulations, though the patterns of changes vary from model to model. Present models do not resolve smaller-scale disturbances, so it will not be possible to assess changes in storminess until results from higher-resolution models become available in the next few years.

Has man already begun to change the global climate?

The instrumental record of surface temperature is fragmentary until the mid-nineteenth century, after which it slowly improves. Because of different methods of measurement, historical records have to be harmonized with modern observations, introducing some uncertainty. Despite these problems we believe that a real warming of the globe of 0.3 to 0.6 °C has taken place over the last century; any bias due to urbanization is likely to be less than 0.05 °C.

Moreover, since 1900 similar temperature increases are seen in three independent data sets: one collected over land and two over the oceans. Figure 2 shows current estimates of smoothed global mean surface temperature over land and ocean since 1860. Confidence in the record has been increased by their similarity to recent satellite measurements of mid-tropospheric temperatures.

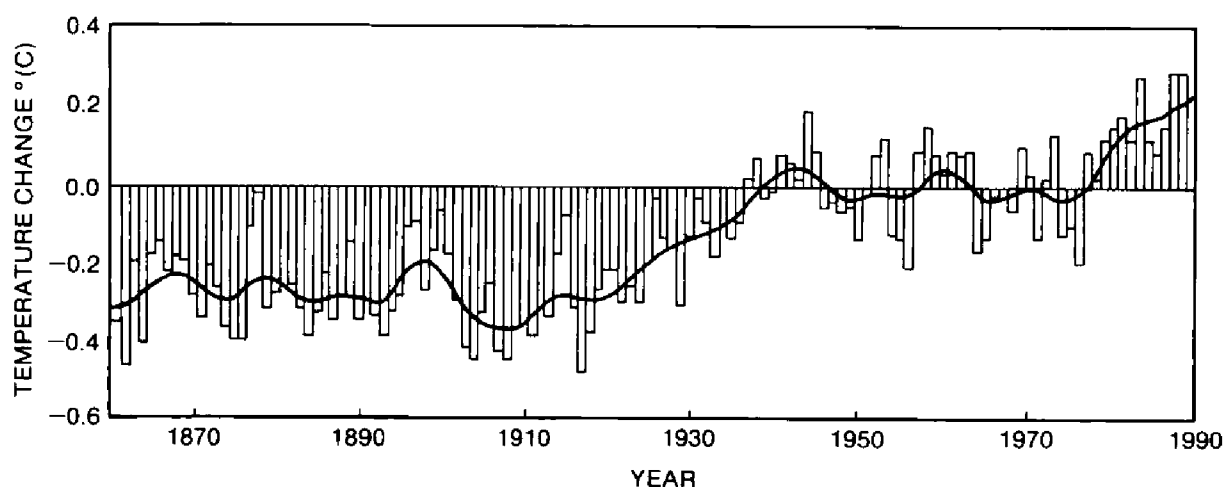


Figure 2. Annual deviation of global mean combined land-air and sea-surface temperatures for the period 1861–1989 (shown by bars), relative to the average for 1951–1980. The curve shows the results of a smoothing filter applied to the annual values.

Although the overall temperature rise has been broadly similar in both hemispheres, it has not been steady, and differences in their rates of warming have sometimes persisted for decades. Much of the warming since 1900 has been concentrated in two periods, the first between about 1910 and 1940 and the other since 1975; the five warmest years on record have all been in the 1980s. The northern hemisphere cooled between the 1940s and the early 1970s when southern hemisphere temperatures stayed nearly constant. The pattern of global warming since 1975 has been uneven with some regions, mainly in the northern hemisphere, continuing to cool until recently. This regional diversity indicates that future regional temperature changes are likely to differ considerably from a global average.

The conclusion that global temperature has been rising is strongly supported by the retreat of most *mountain glaciers* of the world since the end of the nineteenth century and the fact that global *sea level* has risen over the same period by an average of 1 to 2 mm per year. Estimates of thermal expansion of the oceans, and of increased melting of mountain glaciers and the ice margin in west Greenland over the last century, show that the major part of the sea level rise appears to be related to the observed global warming. This apparent connection between observed sea level rise and global warming provides grounds for believing that future warming will lead to an acceleration in sea level rise.

The size of the warming over the last century is broadly consistent with the predictions of climate models, but is also of the same magnitude as natural climate variability. If the sole cause of the observed warming were the man-made greenhouse effect, then the implied climate sensitivity would be near the lower end of the range inferred from the models. The observed increase could be largely due to natural variability; alternatively this variability and other man-made factors could have offset a still larger man-made greenhouse warming. The unequivocal detection of the enhanced greenhouse effect from observations is not likely for a decade or more, when the commitment to future climate change will then be considerably larger than it is today.

Global-mean temperature alone is an inadequate indicator of greenhouse-gas-induced climatic change. Identifying the causes of any global mean temperature change requires examination of other aspects of the changing climate, particularly its spatial and temporal characteristics — the man-made climate change “signal”. Patterns of climate change from models such as the northern hemisphere warming faster than the southern hemisphere, and surface air warming faster over land than over oceans, are not apparent in observations to date. However, we do not yet know what the detailed “signal” looks like because we have limited confidence in our predictions of climate change patterns. Furthermore, any changes to date could be masked by natural variability and other (possibly man-made) factors, and we do not have a clear picture of these.

How much will sea level rise?

Simple models were used to calculate the rise in sea level to the year 2100; the results are illustrated here. The calculations necessarily ignore any long-term changes, unrelated to greenhouse forcing, that may be occurring but cannot be detected from the present data on land-ice and the ocean. The sea level rise expected from 1990–2100 under the IPCC Business-as-Usual emissions scenario is shown in Figure 3; an average rate of global mean sea level rise of about 5 cm per decade over the next century (with an uncertainty range of 3–10 cm per decade). The predicted rise is about 20 cm in global mean sea level by 2030, and 65 cm by the end of the next century.

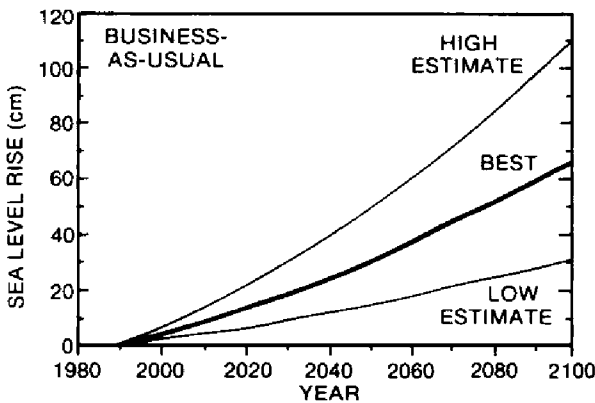


Figure 3. Sea level rise predicted to result from Business-as-usual emissions, showing the best-estimate and range.

The best estimate in each case is made up mainly of positive contributions from thermal expansion of the oceans and the melting of glaciers. Although, over the next 100 years, the effect of the Antarctic and Greenland ice sheets is expected to be small, they make a major contribution to the uncertainty in predictions.

Even if greenhouse forcing increased no further, there would still be a commitment to a continuing sea level rise for many decades and even centuries, due to delays in climate, ocean and ice mass responses. As an illustration, if the increases in greenhouse gas concentrations were to suddenly stop in 2030, sea level would go on rising from 2030 to 2100, by as much again as from 1990–2030, as shown in Figure 4.

Predicted sea level rises due to the other three emissions scenarios are shown in Figure 5, with the Business-as-Usual case for comparison; only best-estimate calculations are shown.

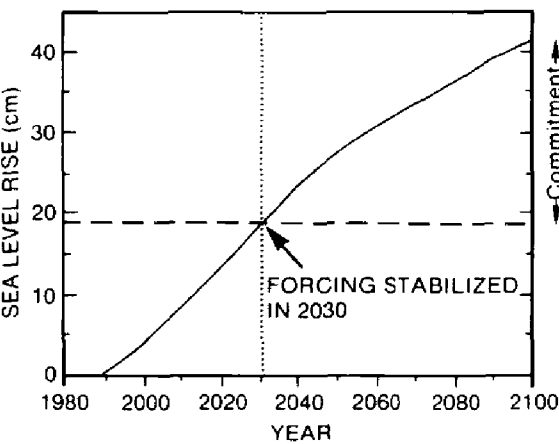


Figure 4. Commitment to sea level rise in the year 2030. The curve shows the sea level rise due to Business-as-usual emissions to 2030, with the additional rise that would occur in the remainder of the century even if climate forcing was stabilized in 2030.

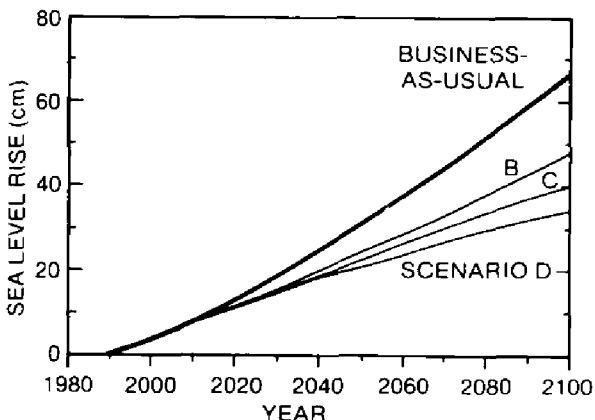


Figure 5. Model estimates of sea level rise from 1990 to 2100 due to all four emissions scenarios.

The West Antarctic Ice Sheet is of special concern. A large portion of it, containing an amount of ice equivalent to about 5 m of global sea level, is grounded far below sea level. There have been suggestions that a sudden outflow of ice might result from global warming and raise sea level quickly and substantially. Recent studies have shown that individual ice streams are changing rapidly on a decade-to-century time-scale; however, this is not necessarily related to climate change. Within the next century, it is not likely that there will be a major outflow of ice from West Antarctica due directly to global warming.

Any rise in sea level is not expected to be uniform over the globe. Thermal expansion, changes in ocean circulation, and surface air pressure will vary from region to region as the world warms, but in an as yet unknown way. Such regional details await further development of more realistic coupled ocean atmosphere models. In addition, vertical land movements can be as large or even larger than changes in global mean sea level; these movements have to be taken into account when predicting local change in sea level relative to land.

The most severe effects of sea level rise are likely to result from extreme events (for example, storm surges) the incidence of which may be affected by climatic change.

The offshore industry and weather forecasts *

By C.K. GRANT

(BP Engineering, London)

All readers will be familiar with the weather forecasts published in the newspapers and shown nightly on the television. All sailors, whether professional mariners or amateur enthusiasts, will be users of the shipping forecasts routinely broadcast. The offshore industry (for present purposes defined as that concerned with the exploration for, and production of, oil and gas) is a major user of forecasts. However, the nature of the offshore business means that the forecasts are very specialised and the details will not be familiar to the average reader.

The aim of this review of offshore forecasts is to highlight some of the differences from routine shipping forecasts, describe some of the uses to which these forecasts are put, and to discuss the developments we expect in the next few years.

Offshore forecasts

The key parameters in offshore forecasts are winds and waves. Visibility and cloud conditions are important for certain operations (e.g. helicopter flights) but, unlike the man in the street, the presence or absence of sun or rain is normally of little consequence offshore.

The offshore industry purchases its forecast services either from a government or national meteorological agency, or from one of the numerous commercial forecast companies which specialise in the provision of offshore forecasts. In certain instances the provision of more than one forecast service is sought. A recent World Meteorological Organization (1990) publication provides details of the offshore forecast services available from government agencies world-wide. This publication was prepared following an initiative from the offshore operators' Exploration and Production Forum (E. & P. Forum).

Depending on the area and specific requirements of the operator, a range of services may be required. However, for most parts of the world, and especially in the North Sea, routine forecasts are issued twice per day. The period that the forecast covers is usually 3 days ahead, with an outlook in general terms for days 4 and 5. Details are given for the first 12 hours, the second 12 hours, 24–28 hours and 48–72 hours. A typical example would include the following sections:

Synoptic situation.

Gale warnings and remarks.

Winds (mean and gust speed and direction at 10 and 50 metres).

Significant wave height and period.

Maximum wave height and period.

Swell direction, height and period.

Weather.

Visibility.

Cloud.

Temperature.

As the forecast period extends, the level of detail is reduced. Some points of interest are worthy of note.

Winds are referenced to both 10- and 50-metre heights. This is to cover both vessel activities (such as diving and supply boats) and the rig or platform activities (helicopters and cranes) at much higher elevations.

* Reproduced from *Weather*, 45, November 1990, by kind permission of the Editor.

It is apparent that much of the emphasis is on the forecast wave conditions. These are the most important parameters for the majority of offshore operations. The definitions used will be familiar to many readers but are briefly described as follows. Significant waves are a measure of the 'average' sea conditions, the maximum wave is the most likely highest single wave in the forecast period, and swell refers to waves generated by the local wind conditions.

Weather, visibility, cloud and temperature are mainly used for helicopter operations. Although of secondary importance for most activities, fog can be very important for the offshore crews, especially if its occurrence coincides with shift change-over day and the relief operators from the shore cannot be flown out!

In other operating areas of the world, additional parameters are necessary. For example, in areas such as the Gulf of Mexico and the South China Sea, the warning of the approach of tropical cyclones to rigs and platforms is vital. In many areas, personnel are evacuated from the rigs and platforms if the tropical cyclone is forecast to approach within a predetermined range.

In cold regions, such as the east coast of Canada and the Barents Sea to the north of Norway, the forecast service requirements will be expanded to include warnings of atmospheric icing and sea-ice occurrence, as well as the likelihood of iceberg impact.

The usual forecast style is categorical and the format is textual, essentially geared to the traditional mode of communication — the telex. Increasingly, more sophisticated presentations are being offered to operators, including tabulated and graphically presented products, all aided by improvements in computer and communication technology.

Notwithstanding these advances, a common feature of forecast services to the offshore industry is the close contact maintained between the duty forecaster and the client. This frequently takes the form of daily, personal briefings where information on the weather and the company's forthcoming operations are exchanged.

For some fields, and during certain critical operations, the service of a dedicated forecaster is provided. These forecasters work offshore, alongside the operators' personnel.

Applications

A number of forecast applications have already been alluded to. A selection of further examples is given below, together with a case-study of a recent BP jacket installation in the North Sea.

Initial studies of the hydrocarbon-bearing potential of the world's sedimentary basins rely on information gathered during seismic surveys. Typically a vessel tows astern a long 'streamer', which contains hydrophones, while crossing the area of interest in a predetermined sampling pattern. These operations are very dependent on sea state, especially swell conditions.

If prospects are encouraging, a drilling programme may be initiated. In shallow water (typically 50 metres or less) this will involve the use of jack-up rigs, whose legs penetrate the sea bed. In deeper waters (up to 2000 metres or more) semi-submersible rigs or drill ships are used. These are either anchored or freely floating, the latter type maintaining station over the well using dynamic positioning systems. All drilling programmes are sensitive to sea state. Indeed, in certain areas there are approximately defined seasons or 'windows' when drilling usually takes place. For example, drilling occurs year round in the North Sea, but only from around April to October in the area to the west of the Shetlands and the Hebrides.

Should a commercial prospect result from a drilling programme, it is possible that a jacket structure will be installed to support the topsides equipment and

accommodation facilities required to extract the hydrocarbons. The combination of jacket and topsides is termed a platform, and there are many hundreds installed throughout the world (nearly 3500 in the Gulf of Mexico alone).

The tow-out and installation of the jacket is one of the most crucial phases in an offshore field's life, and also one of the most weather-sensitive. Accurate forecasts are essential. Indeed it is very common for a forecaster to be specifically assigned to the tow and installation and travel with the jacket on one of the installation vessels.

Case-study — Gyda jacket installation

The Gyda Field is in the Norwegian sector of the central North Sea (some 275 km south-west of Stavanger). The jacket designed for the field is six-legged, weighs approximately 8400 tonnes and stands some 80 metres high in a water depth of 66 metres. The jacket was constructed vertically in Verdal, near Trondheim. The tow of the barge-mounted jacket to the site, lift and installation were made in the vertical mode (see Harris and Stone 1990 for a detailed discussion).

Installation time was scheduled for late September, potentially a month when the weather could cause severe problems during the delicate lifting and installation operations. The design sea state for the installation was 2 metres (significant), hence accurate forecasts were vital to enable planning of the various operations to go ahead.

A forecaster was present throughout the tow and installation phases to liaise and advise the operator's personnel. The tow of the jacket from Verdal to the field was delayed by one week when shelter had to be sought in a fjord. As conditions abated, the tow continued. A forecast of 3 to 5 days' 'good' weather meant that activities quickly moved ahead once the tow reached the field.

The heavy-lift vessel *Micoperi M7000* was used for the lifting and installation work. A tandem lift, using both the vessel's cranes, was performed successfully on 25 September 1989. The operation took around 12 hours. This was the time taken from lifting the jacket off the barge (see photograph opposite page 128) to its installation on the sea bed. The lift was made despite the sea state nearly reaching the 2-metre limit and with winds around 10 ms^{-1} . The forecast conditions over the time period were crucial to the success of the project. The total lifted weight, at 8768 tonnes, set a world record for lifts offshore.

Later in the season, the topside modules were successfully installed. Again the *Micoperi M7000* was used in lifts of up to 5000 tonnes.

Future developments

As noted above, offshore forecasts are of the categorical type. Recently, through the E. & P. Forum, a study has commenced to examine the utility of probability-based forecasts. These have been used by certain meteorological agencies for a number of years, chiefly for land-based forecasts. In the U.S.A., for example, it is common for forecasts of precipitation to be discussed in terms of probabilities. To the author's knowledge, probability-based forecasts are not yet in use in the offshore industry on a routine basis.

It should be stressed here that it is envisaged that probability-based forecasts will complement rather than replace the range of existing forecast products provided to offshore users.

Typically, a probability forecast will focus on key parameters (such as wind speeds, wave heights and fog occurrences) and significant thresholds for operations of helicopters, supply boats, etc. For the relevant parameter and threshold, the probability of exceeding the threshold in selected forecast periods is estimated by the forecaster.



Photo courtesy of BP International

Heavy-lift vessel *Micoperi M7000* used for lifting and installation work in the Gyda Field in the North Sea. (See page 126.)



Rainbow photographed from m.v. *Thorshavn* by Captain T.S. Nurcombe during December 1989.



Photo by Borowski Photography Ltd

Platform AH001 in the North Sea. (See page 130.)

One advantage of the probability-based method is that it is possible to quantify the accuracy of the forecasts, provided measurements of the key parameters are available at the site. A number of indices or 'scores' can be calculated, including those related to bias, accuracy and skill. These scores can be used for a number of purposes.

- (i) To check how well the forecasters are performing when compared with numerical model outputs or forecasts based on persistence.
- (ii) To determine the decrease in accuracy of forecasts as the forecast period increases.
- (iii) To allow the forecaster to examine those parameters and synoptic situations where there are particularly low scores, with the main aim being to improve these forecasts as experience is gained.
- (iv) To allow operators to compare the performance of different forecasting services on an objective basis.
- (v) To enable the operator to build risk-type calculations into his operational planning.

An interesting and successful trial of such a scheme was performed at BP's Buchan platform last winter [1989/90] and further trials are planned.

Plans are under way to improve the resolution of atmospheric models at a number of forecasting centres (see Hopkins 1990). These improvements are in the horizontal and vertical, and the increased resolution should lead to increased detail in the low-level wind fields which are vital for offshore forecasts. A further benefit will be the improved performance of operational wave forecast models.

Development of wave models has been taking place for a number of years. Improvement in the third-generation model by the WAM Group are continuing (see Hasselmann *et al.* 1988), but even second-generation models provide useful forecast products in many circumstances. The difference between the second- and third-generation models is that the latter make no *a priori* assumptions about the wave spectral shape.

The major use of third-generation wave models will be to provide a properly formulated global wave model, based on fundamental physics, to enable maximum benefits to be gained from the forthcoming oceanographic data provided by the next generation of satellites, such as ERS-1.

In addition, wave models will be required for extended data-assimilation schemes. These will be used in conjunction with atmospheric models to provide integrated models for forecasting and climate research purposes.

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Extreme wave at platform *AH001*

By I.J. HENDRY

(Offshore Adviser, Aberdeen)

The *AH001* (see photograph opposite page 129) was converted from a SEDCO 700 series semi-submersible vessel in order to produce oil and gas from the Ivanhoe and Rob Roy Fields in the North Sea, approximately 100 miles north-east of Aberdeen in position 58° 11'N, 00° 06'E. The *AH001* has been a Selected Ship since June 1990 and, in addition to the normal supply of Met. Office instruments, it has its own sophisticated environmental and motion monitoring equipment. This includes an infra-red wave height monitor linked to the installation's advisory computer.

During 19 September 1990 a deep depression centred at 0001 UTC near 62°N, 8°W, moved eastwards to 63°N, 5°E by 0001 on the 20th. A strong W'ly to NW'ly airflow resulted in an average severe gale force 9 being experienced for 24 hours. (Figures 1 and 2).

The following print-outs were obtained from the on-board computer:

1. Wind speed for the 24-hour period ending at 20/0642

Wind SW'ly, force 7 to gale force 8 during the 18th began to veer W'ly and increased to severe gale force 9 shortly after 19/0600 and was sustained until 20/0100. Gusts of up to 63 knots were common and several gusts of up to 70 knots were recorded. The maximum recorded gust was 76 knots near midnight. Anemometer height is 37 m at normal operating draft. (Figure 3).

2. The air gap for the 24-hour period ending 20/0639

Seas began to increase after 18/1800 until by the afternoon of the 19th the underdeck was almost being slapped. The installation altered its ballast to give almost 14 m of air gap. Nevertheless, during the late evening of the 19th and until about 20/0100 several waves either hit the under deck or came to very close to doing so. (Figure 4).

3. Wave height for the 24-hour period ending 20/0532

A 5-m significant wave and 9-m maximum wave were well established by 19/0600 and gradually increased during the day. This culminated in an extreme wave of 24.9 m being recorded shortly after midnight on the 20th. Wind speed decreased soon after this time, as did the sea height although this was still 5–6 m at 20/1800. (Figure 5).

Forecasts issued by Aberdeen Weather Centre based on the 18/1200 analysis were largely accurate as to wind speeds, significant wave and maximum wave heights. Latter issues showed the storm peaking at 60–65 knots with gusts to 85 knots, and significant wave heights rising from 6–7 m to 11 m. The maximum forecast was 16.5 m before wind and seas decreased. As well as the observations received from *AH001*, Aberdeen Weather Centre receives observations from other installations in the area, including *Tartan A*, *Buchan A* and *Forties B*, the two latter also having wave measuring devices available.

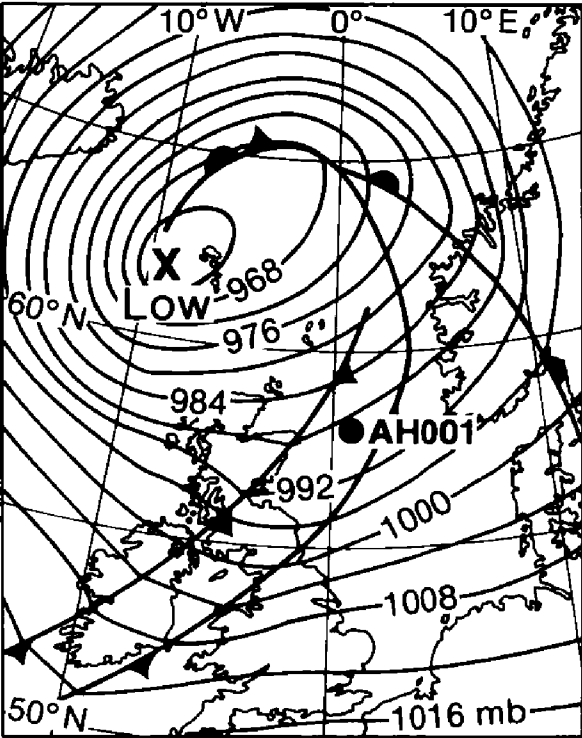


Figure 1. Synoptic situation at 0001 UTC on 19 September 1990.

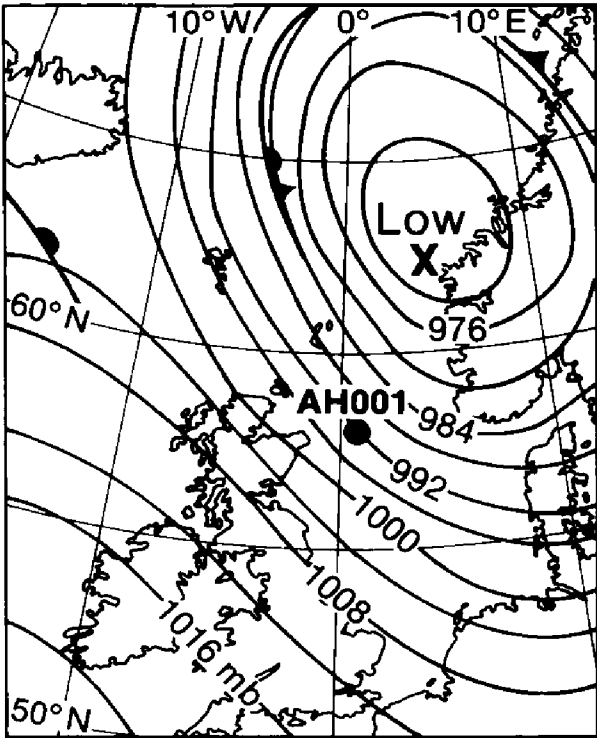


Figure 2. Synoptic situation at 0001 UTC on 20 September 1990.

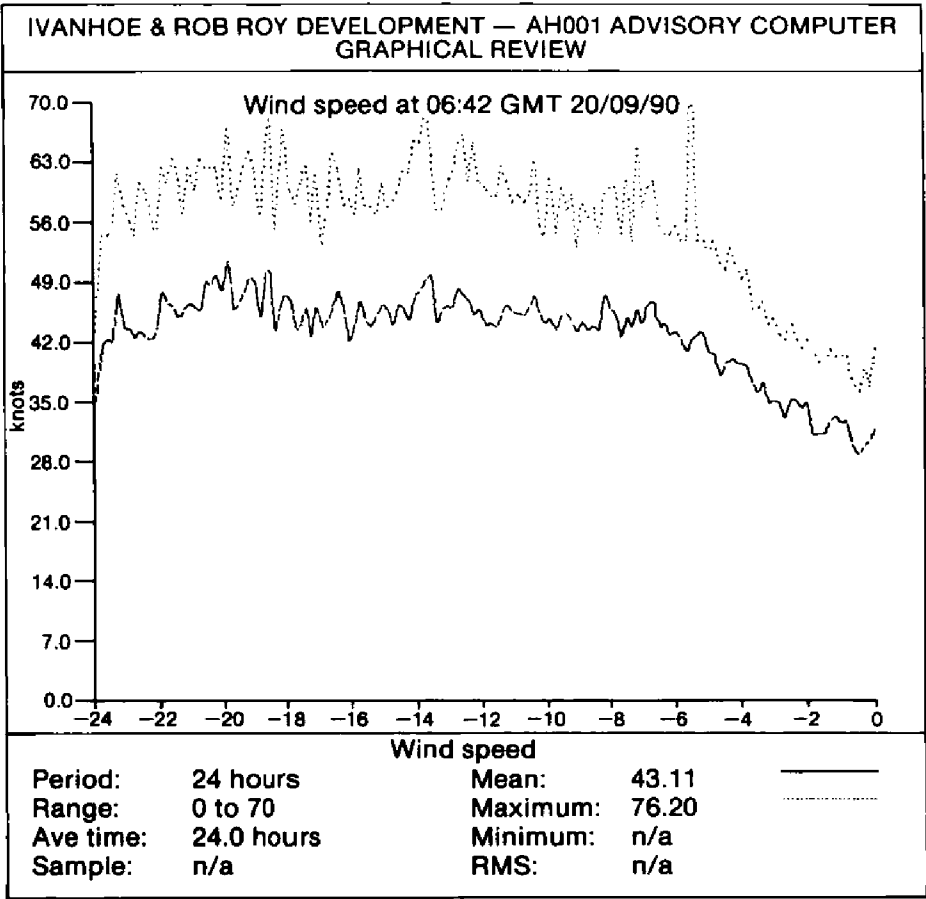


Figure 3. Wind speed for the 24-hour period ending 0642 UTC on 20 September.

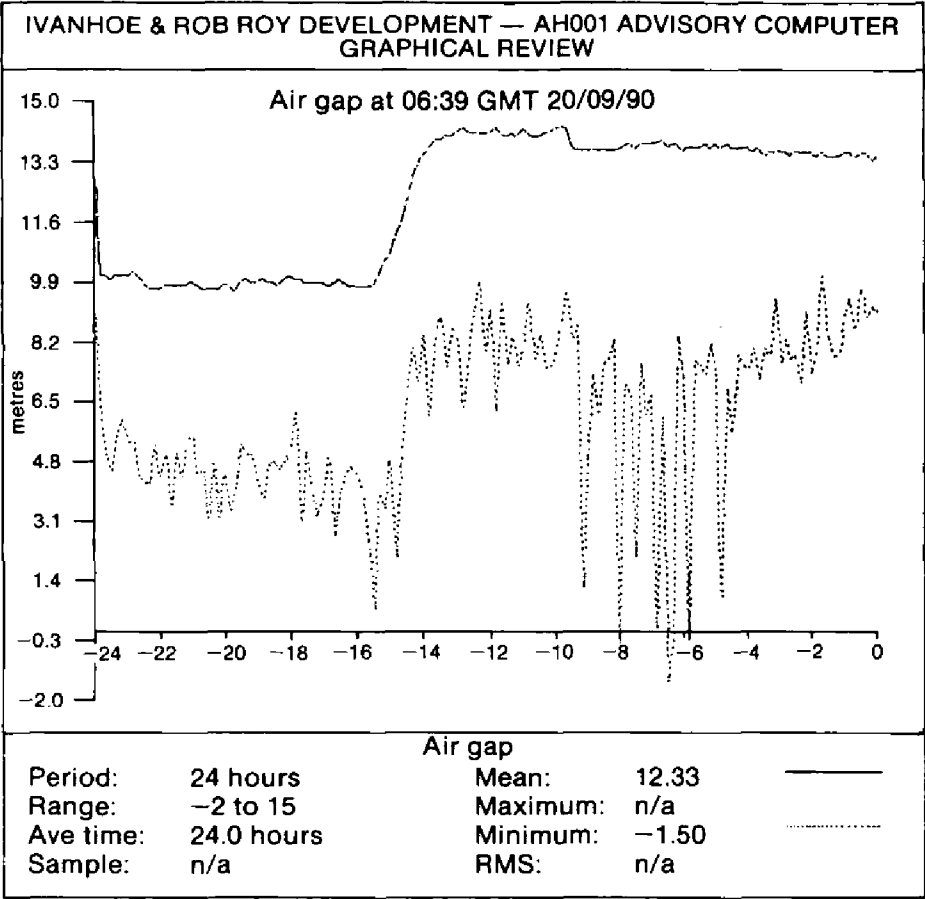


Figure 4. Air gap for the 24-hour period ending 0639 UTC on 20 September.

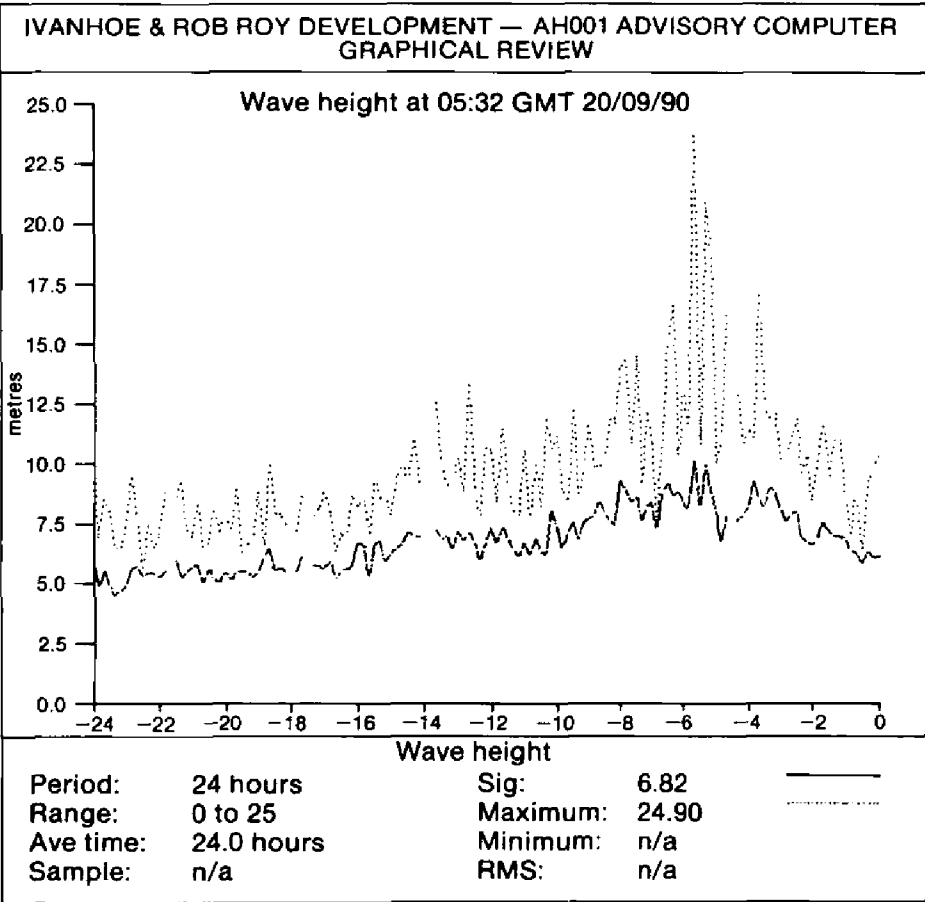


Figure 5. Wave height for the 24-hour period ending 0532 UTC on 20 September

AURORA NOTES JULY TO SEPTEMBER 1990

By R.J. LIVESEY

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

In Table 1 are listed the observations received to date from ships during the period under review, which saw a flurry of magnetic and auroral activity that died out completely by the end of 1990.

Table 1 — Marine Aurora Observations July to September 1990

DATE	SHIP	GEOGRAPHIC POSITION	TIME (GMT)	FORMS IN SEQUENCE
21/22 Aug. ..	<i>OOCL Challenge</i>	53° 20'N, 37° 27'W	0005-0152	RA.mp.RB.p ₁ R ₁ R
22/23 ..	<i>OOCL Challenge</i>	52° 59'N, 25° 08'W	2320	HG
8/9 Sept. ..	<i>Society Explorer</i>	66° 35'N, 52° 50'W	2230	N
11/12 ..	<i>Society Explorer</i>	60° 44'N, 46° 29'W	0030-0115	mA.mRB.G ½ sky
13/14 ..	<i>Society Explorer</i>	? ?	0030	HG
16/17 ..	<i>Sulisker</i>	60° 24'N, 00° 36'W	0000-0300	G

KEY: mA = multiple arcs, mP = multiple patches, p₁R₁R = pulsating small rays, HG = homogeneous glow, N = unspecified form, RA = rayed arc, RB = rayed band.

In contrast to the aurora of 12/13 June that was poorly observed, probably due to summer twilight and cloud cover in the United Kingdom in particular, the aurora of 28/29 July was widely reported in North America and north-west Europe. Coronal structures were observed from Dakota northwards into Canada and from northern England polewards into the Norwegian Sea. Active forms were visible northwards from the English Channel. The storm of 21/22 August, observed in mid-Atlantic by the *OOCL Challenge* was coronal in Dakota and northern Scotland and seen as rays in southern Scotland. The lesser storm of 22/23 August, also observed by the *OOCL Challenge*, was coronal in Dakota but relatively quiet in the latitude of Orkney, appearing as a quiet arc. It is not unusual for a major storm to be followed in successive nights by progressively weaker storms as the Earth's magnetic field returns to normal conditions.

We are always glad to receive observations from marine sources not connected with the VOF. The three reports from the Davis Strait and the southern tip of Greenland sent in from the *Society Explorer* are examples of the polar aurora seen in the area of the auroral zone that in the Northern Hemisphere curves round from the North Cape and Lofoten Islands to Iceland, Labrador and James Bay. The auroral zone is the region of the Earth where the aurora is seen on practically every night when there is no cloud cover, while the Earth rotates beneath the auroral oval in the upper atmosphere. There are occasions when the oval temporarily disappears while the aurora can, on the other hand, provide a brilliant display when really active.

No aurora observation is ever wasted, no matter how long it may take to reach the BAA. We have recently received a report on the great aurora of 13/14 March 1989 from the *Havkong*; this was the 117th observation of the aurora received and was the 25th from a marine source, tying in nicely with other observations in the Southern Hemisphere made in the waters around South Africa and Madagascar.

Dr David Gavine has provided an updated list of noctilucent cloud (NLC) apparitions for the summer of 1990, and a summary is given in Table 2. There have been fewer active nights than in the last year or so but this is not unexpected in view of the proximity to sunspot maximum in 1989. Dr Gadsden, of Aberdeen University, confirms that there is a secular increase in the frequency of these events together with a tendency for them to come further equatorwards than in earlier years; the secular increase is modulated inversely by the sunspot cycle.

Table 2 — Observations of NLC: types and locations, 1990

DATE	TIME (UTC)	VEILS AND WHIRLS	BANDS	BILLOWS	PATCHES
22/23 May	2100–2310		S. England	Netherlands	Denmark
23/24	2229–2300				Denmark
25/26	2345–0130	Denmark			Netherlands
17/18 Jun.	2240		Denmark		
19/20	2140–0230	All U.K.	All U.K.	All U.K.	All U.K.
23/24	2130–0115		N. England		N. England
24/25	0020–0115		S. Scotland N. England		
27/28	0005–0130		S. England	S. Scotland	
28/29	0100–0200		mid-Scotland		
29/30	2200–2330		Denmark	Denmark	
30 Jun./ 1/Jul.	2100–2130		Netherlands	Netherlands	
2/3	2300		mid-Scotland		
3/4	2315–0000		Denmark		
8/9	2330–0130		N. England Denmark		
10/11	2130–0145	Netherlands Denmark All U.K.	Netherlands Denmark All U.K.	Netherlands Denmark All U.K.	Netherlands Denmark All U.K.
11/12	2156		Denmark		
14/15	2350				mid-Scotland
16/17	2240–0205		Scotland	Scotland	Scotland
17/18	2200–0320	Scotland N. England	Scotland N. England	Scotland N. England	Scotland N. England
19/20	2200–0200	N. England	Denmark	Denmark	
21/22	2115–2245	Scotland N. England	N. England		Scotland N. England
23/24	2025–2215	Finland	Finland		
24/25	2300	N. Scotland	Finland		
25/26	2130–2330	Denmark	Denmark	Denmark	
26/27	2145–0250	Scotland	Baltic Denmark		
31 Jul./ 1 Aug.	2055–2325	Denmark	Denmark	Denmark	

From time to time we receive reports of NLC in the Northern Hemisphere outwith the period of mid-May to the beginning of August when they are seen. These reports are sometimes misidentified with aurorae or with tropospheric clouds lit up by an undefined source. Searches for these clouds at other times of the year when the sun is at the appropriate angle below the horizon, have proved negative so far. At present, observations of NLC are of scientific importance, so, if observers are sailing between latitudes 56° and 65° (north or south) in summer, they are asked to look for them.

LETTERS TO THE EDITOR

Mandatory weather routeing?

I feel it is time for IMO to discuss, and introduce as soon as possible, mandatory weather routeing and weather facsimile receivers for all ships except those which obviously do not require such aids to navigation.

Increasing the number of lifebuoys on vessels does contribute something to the saving of lives, although in almost 40 years at sea I have only seen one lifebuoy used for life-saving. The introduction of legislation for weather routeing and facsimile could, however, save more lives than extra lifebuoys.

The cost of weather routeing for, say, a voyage across the North Atlantic, can probably be recovered by the saving of one hour in steaming time for a 140,000 dwt ship. When one considers that some vessels when crossing the North Atlantic in winter, for example, may arrive three days late, then the saving would pay for a facsimile receiver. However, we should not be discussing such relatively small costs when we are talking of saving lives.

Captain T.S. Nurcombe, Master, m.v. *Ambra Hunter*.

Following discussions on weather routeing, IMO issued Resolution A528 of November 1983, recommending Member Governments to encourage owners and charterers to have their ships weather routed by commercial undertakings, such as the Met. Office's METROUTE service. No further recommendations or mandatory resolutions on weather routeing have been issued by IMO since then.

Personalities

(Readers are invited to notify the Editor of observing officers retiring from the Navigating and Radio Departments.)

RETIREMENT — CAPTAIN R.J. BLAND retired in September 1989 but the news that he had 'swallowed the anchor' did not come to us until recently.

Raymond Joseph Bland was born on 29 September 1929 and educated at Clee Grammar School, Cleethorpes, followed by pre-sea training at Grimsby Nautical School and School of Navigation, Southampton. He joined Royal Mail Lines in January 1947 and made his first voyage in their ship *Samphill*. He obtained his Masters Certificate in December 1956; ten years later, whilst serving as Chief Officer of the *Durango*, his ship was transferred to Shaw Savill & Albion ownership and renamed *Ruthenic*. The following year, in March 1967, he was promoted to command of that ship. During his time in Shaw Savill he became acquainted with Captain Downes, now our senior Port Met. Officer, based at Grays near Tilbury Dock.

Captain Bland joined Overseas Containers in August 1977 and commanded many ships in both Shaw Savill, OCL and P & OCL, including his final six years at sea in command of *Cardigan Bay*. His weather observing experience commenced on Royal Mail's *Alcantara* in December 1951 when the Met. Office received the first of his 58 meteorological logbooks compiled in 31 observing years. Twenty-six of these logs were assessed 'Excellent' and for this singular dedication to the cause Captain Bland was awarded a long-service barograph in 1981, which was presented to him at Bracknell by the Director-General in 1983.

He is a Younger Brother of both London Trinity House and The Hull Trinity House. He says that his retirement marks the end of exactly 100 years of continuous family seafaring, both his father and grandfather having been trawler skippers. He has also enjoyed his association with the Met. Office and found articles in *The Marine Observer* most interesting.

Our thanks to Captain Bland for his encouraging words and good wishes to him for a fruitful and happy retirement.

RETIREMENT — His successor in command of m.v. *Valdivia* alerted us to the retirement of CAPTAIN N.C. KERR last year; Captain J.J. Dickinson says:

‘I write to advise you that Captain Norman Campbell Kerr, regular Master of *Valdivia* since her maiden voyage in 1981, retired at the end of October 1990 at the age of 59. As your records may show, Captain Kerr’s name was first included in one of your logbooks when he was Fourth Officer of a Royal Mail passenger ship around 1950, I do not know the name of the ship. Captain Kerr also served with J. & J. Denholm of Glasgow prior to joining the Head Line of Belfast, where he attained his first command. After a short spell working around the Irish Sea and in Belfast Harbour, Captain Kerr joined Harrisons (Clyde) Ltd of Glasgow in May 1962. In a very active career in this company he has commanded large Ro-Ros, bulk carriers, a tanker, a supply vessel and a submarine cable-recovery vessel. He has extensive ice experience gained over many years trading to the St Lawrence, both with Head Line and Harrisons (Clyde).

‘Captain Kerr, a very professional and popular figure, will be much missed on this ship now that he has returned to his home in Bangor, County Down, there to sit on the sea wall and relate salty tales to his grandchildren.’

Captain Kerr’s first meteorological log came from Royal Mail’s *Alcantara* in May 1954 and in 26 observing years he sent in a total of 51 logs, seven of which were marked ‘Excellent’. He received an Excellent Award in 1955 and carried out weather observing in ships of all his four companies. Our thanks to Captain Dickinson and his Principal Observer on *Valdivia*, Mr G. Shaw, for their information, and our best wishes, coupled with thanks for his many years of co-operation, to Captain Norman Kerr for a happy retirement.

RETIREMENT — CAPTAIN H.K. DYER retired on 28 October 1990, his sixtieth birthday, after serving the whole of his 42 years at sea with Blue Star Line.

Hugh Kingston Dyer was born in Cardiff and educated at Marlborough Road Elementary School and Cardiff High from 1935 to 1946; his seamanship training was undertaken at H.M.S. *Worcester*, Greenhithe, between 1946 and 1948, the writer having been a fellow cadet during those years. He joined Blue Star Line Ltd in November 1948 and first sailed on 9 January 1949 on m.v. *New Zealand Star*. After being promoted through the various ranks to Chief Officer, he obtained his Master’s Certificate on 28 May 1958; in April 1969 he was appointed to his first command, *Halifax Star*.

Captain Dyer’s first weather records were received in a log from *Columbia*

Star in August 1951; he followed it with 69 further logs compiled in 30 years of observing. Fifteen of his logs were judged to be 'Excellent' and he received an Excellent Award in 1986.

Captain Dyer tells us that he was Master of *Avelona Star* in June 1982 when the ship loaded a cargo at Portsmouth for the South Atlantic: he was repatriated on sick leave by air from Port Stanley in October of that year. During the intervening period he ensured the provision of several excellent meteorological logs from his command.

It was our pleasure to welcome Captain Dyer to the Met. Office in April for the presentation to him of a barograph, bearing a plate inscribed with his name and relevant period of weather observing service up to 1989. His award speaks for us all in terms of thanks and congratulations for an auspicious career and hopes for a happy and fulfilling retirement.

RETIREMENT — MISS J.G. CAUDRELIER retired on 12 March last after almost 35 years service as Scientific Officer to the Met. Office Marine Branch.

Jackie Caudrelier was the mainstay to three Marine Superintendents and countless other staff and Port Met. Officers for technical and historical aspects of the running of the Marine Division, as it was known when she joined the Office as Assistant Scientific Officer at Dunstable in October 1955. After attending the ten-week induction course at the Met. Office Training College at Stanmore and working with the research team for some months she moved to the main office at Harrow to work with the VOF team. As a result of attending a one-week sail training course on the 90-ton spritsail ketch *Pas de Loup*, in early November 1957 she sailed from Brixham on the ship, calling *en route* at Lisbon for 8 days to repair the rudder damaged in Bay of Biscay gales, finally arriving at Antigua the worse for wear on New Year's Eve. This appears to be her only ship visit during her time in the Office, and although few ships' staff will have heard of her, except perhaps from her regular appearances in photographs of Port Met. Officer conferences, she was the back-bone support to the Marine Superintendent in many matters and in the supply of equipment, information and knowledge to Port Met. Officers, particularly from 1974 onwards when she was promoted to Scientific Officer. She had moved with the rest of the staff in 1961 to the office at Bracknell and transferred with the Marine Branch to the Eastern Road annexe in 1965.

Jackie became a keen horsewoman early in life after taking a Horsemanship course at Porlock Vale Riding School, spending time working with horses and later keeping her own. Following an accident in December 1981, when she severely twisted her left knee whilst running up the hill in a paddock at her Crowthorne home, she had the knee cartilage removed in November 1982, but unfortunately from then on she suffered with painful leg trouble. Even before she took early retirement eight months prior to her sixtieth birthday she was forced to use crutches continuously.

She will be greatly missed by all her colleagues at Bracknell for her valuable support and knowledge of present and past ways, and we can do no more than wish her enjoyment in retirement despite her handicap, which she has never allowed to prevent her from following her normal daily activities.

Book Reviews

Mariners are Warned! John Lort Stokes and H.M.S. Beagle in Australia 1837–1843 by Marsden Hordern. 160 mm × 245 mm, 359 pp., illus. Melbourne University Press, Carlton, Victoria 3053. Price: Australia \$44.95.

John Lort Stokes joined H.M.S. *Beagle* as a 14-year-old Midshipman in 1825 at Woolwich, and left her at the same place as her Captain, on return from surveys in Australia in 1843. In 1831 Stokes was reappointed to the *Beagle* as mate and assistant surveyor for a continuance of the South American survey under Commander Robert FitzRoy — the voyage that was to become renowned for its association with Charles Darwin. On it Stokes and Darwin formed a close and enduring friendship.

During the long reign of Queen Victoria, the Hydrographic Service of the Admiralty assumed great and important responsibilities as Britain's expanding trade demanded safer highways for her shipping. Much of the credit for the Hydrographic Service's achievements during these years is due to Sir Francis Beaufort, Hydrographer from 1829 to 1855. Thus two great names associated with meteorology and the early years of the Met. Office feature in this long book which connects the threads of exploration and survey around Australia, from James Cook via Bligh, Flinders and Lieutenant Philip Parker King to Stokes.

The author, who tells the full story of *Beagle's* activities, served in the Royal Australian Navy in World War II and has taken an active part in ocean racing. This experience and his feeling for history makes him well suited to describe the adventures experienced by Stokes and *Beagle's* men one hundred and fifty years ago. Stokes was senior assistant surveyor and later took over command from Commander J.C. Wickham, FitzRoy's first lieutenant in earlier years, when the latter was invalided in Sydney in 1841. During the six years in Australian waters, Wickham and Stokes made four major surveying cruises, to the North West Coast, Bass Strait, Torres Strait and Northern Australia, extending the work initiated by Flinders and King.

The notes to each chapter only partially reflect the large amount of research the author necessarily carried out to produce this lengthy book. There are many interesting letters exchanged between the parties already mentioned and the author's sea experience enables him to describe vividly the many emergencies in which the ship was involved during great storms, tidal streams and hitherto uncharted waters. The illustrations are of a high standard and the text is very readable throughout.

Coasters in Focus by Bernard McCall. 210 mm × 295 mm, 80 pp., illus., paperback. Published by the author at 120 Pontypridd Road, Barry, South Glamorgan CF6 8LT. Price: £7.95 retail, plus 80p postage direct from the author.

This handy little book, by the marine author who writes for *Ships Monthly*, *Sea Breezes* and such like magazines about ships, was produced in response to the many requests which he continually received since the publication of *Coasters around Britain*. It contains 158 photographs, two to the A4-size page, including ten colour prints, two of which are on front and back covers although these two ships do not appear in the index. The author took most of the

photographs himself, of British and North European coastal ships, but states that it was not possible to include photographs of ships in Irish ports, the Channel Islands or the Isle of Wight.

The photographs are arranged under random headings ranging from 'British Shipowners' through 'Goddesses', 'Cereals' and 'Who is She?' to 'Russian Ships', providing an interesting picture gallery for those responding to the author's obvious enthusiasm for his subject. Each photograph is provided with up to six lines of description, former names and other detail. The fact that he has been known to travel 500 miles and overcome numerous physical and bureaucratic hurdles to obtain one ship portrait is a tribute to his determination to continue in his unique trade and to share his knowledge with other enthusiasts in this presentable book.

The Encircled Sea. The Mediterranean maritime civilisation by Sarah Arenson. 170 mm × 240 mm, 205 pp., *illus.* Constable & Company Ltd, 3 The Lanchesters, 162 Fulham Palace Road, London W6 9ER. Price: £14.95.

The sea in the midst of the earth was the heart of the old world, with Asia, Africa and Europe converging upon its shores. *The Encircled Sea* is the book which describes some of the creation myths and the earliest encounters of man and sea in the Mediterranean basin. Sarah Arenson is co-director of the Man and Sea Society and lives and works in Israel. She makes excellent use of the latest detailed research in maritime history, archaeology, marine engineering and other skills to explore the unique contribution this sea has made to today's world.

Twelve chapters embrace the study of early civilisations, fishing and coastal industries, ship construction and port engineering, trade, naval warfare, piracy and law of the sea. The chapters dealing with life on board, early navigation and sea trade are of particular interest to seafarers. Four useful appendices deal with the Mediterranean Action Plan, initiated at Barcelona in 1975 under the auspices of UNEP, underwater archaeology, maritime legislation and diving and related disciplines. Together with a varied and very interesting selection of colour and monochrome photographs, maps and sketches the subject is well covered and clearly described, making this the ideal accompaniment to the recent ten-part television series networked on Britain's Channel Four.

Chasing the Monsoon by Alexander Frater. 160 mm × 240 mm, 273 pp. Published by Penguin Books Ltd (Viking), 27 Wrights Lane, London W8 5TZ. Price: £14.99 hardback, £4.99 paperback.

Being born of a Church of Scotland missionary doctor on the same day that 2 inches of rain fell within seven hours on the island of his birth in the New Hebrides, was one of many strange and unrelated incidents which led the author on his remarkable journey. There was the picture on his childhood wall of a distant place in India called Cherrapunji, where 35 inches of rain could flood down in a day. It was originally his father's ambition to travel to this 'wettest place on Earth', inspired by a fellow missionary who had worked there; but his

desire was overtaken by war matters in the Far East and instead, a bizarre chain of events finally lead Alex Frater himself towards Cherrapunji via the monsoon path in place of his father.

He finds himself in a London hospital in the autumn of 1986, with loss of feeling spreading from his feet upwards at an alarming rate, following a body-shaking return journey along the road across the top of the world, the Karakoram Highway joining northern Pakistan and Kashmir. Visiting hospital outpatients during convalescence from his mysterious affliction, he meets a charming woman and her convalescent husband from Bombay, who together talk of the rich traditions brought on by the monsoon's passage across the sub-continent, inspiring him to travel to India and experience for himself the excitement which accompanies the arrival of the monsoon in the south of the country at Trivandrum. He follows the phenomenon through Cochin, Goa, Bombay, Delhi and Calcutta to 'Cherra'. These points are identified in the one illustration, a double-page map of the region at the beginning of the book.

Frater arrives in India in June 1987 and follows the monsoon all the way up the sub-continent on a truly ambitious and exotic pilgrimage. Although I elected to review this book as it had a title indicating a mainly meteorological book suitable for our general readership, I soon became totally immersed with the delights of this wonderfully entertaining travel work by the author of the much-acclaimed *Beyond the Blue Horizon*. On his route he investigates local monsoon cures, copes with scorchingly hot curries and mixes with wealthy Goan socialites at wild monsoon parties. He discovers how the expectancy of the life-sustaining rain, often accompanied by sweltering heat, brings together the rich and poor, increases conception and murder rates and can also cause at one and the same time a re-birth of the fertility of the earth and destruction of crops, homes and lives by the million.

Alex Frater writes in his most endearing way in this travel book, and encapsulates the true essence of all-India on every page, including the charming metaphor in the vernacular so beloved of the Indian in the way that English is spoken there. Whether one is familiar with the fascinating country or merely enjoys travelling in the imagination, this is a highly entertaining and ever absorbing account by the chief travel correspondent of the *Observer* newspaper. Alexander Frater has also made a BBC film of *Chasing the Monsoon*, due to be televised in 1991.

J.F.T.H.

Notices to Marine Observers

AUSTRALIAN INMARSAT BROADCASTS

Further to the notice in our April edition concerning the commissioning of INMARSAT Earth Stations in Australia, we have now received further detail of the forecasts and warnings that the Australian Bureau of Meteorology started broadcasting by EGC SAFETYNET over the Pacific Ocean Satellite as from 18 February 1991.

Forecasts will be addressed to Navarea X and will be issued for the following sub-areas at the approximate UTCs given:

North-west	10° S to 30° S, 90° E to 125° E	1030, 2300
South-west	30° S to 50° S, 90° E to 129° E	1030, 2300
South-east	28° S to 50° S, 129° E to 170° E	0915, 2345
North-east	00 to 28° S, 142° E to 170° E	0800, 2300
Northern	00 to Aust. coast, 125° E to 142° E	} 0400, 1000
	00 to 10° S, 100° E to 125° E	

Warnings are issued every six hours as required within the area 10° S to 50° S, 90° E to 160° E. Warnings are addressed to circular areas extending at least 180 n.mile outside the area of applicability of the warning. Warnings are broadcast with a six minute echo.

APPOINTMENT OF PORT METEOROLOGICAL OFFICER

Captain R.B. Jones has been appointed to the Port Met. Office in Hull in succession to Captain G. Hindmarch.

Captain Ronald Jones served his apprenticeship with J. & C. Harrison Ltd of London. After obtaining his Second Mate's Certificate in 1958 he joined China Navigation Co. and served in the Far East for about four years during which he had his first taste of weather observing. From 1963 until gaining his Master's Certificate in 1968 he served with several shipping companies, then joining Canadian Pacific Steamships, from whence he sent his first met. log in November 1970, from m.v. *Lord Strathcona*.

He was promoted to command in 1974 and served in all types of ships in the CP fleet, but mainly in tankers. Up to 1989 when he transferred to coasting employment he had provided a total of 23 met. logs.

TWO TIMERS WANTED

Our third edition of the year seems to have become the place where we repeat our plea to Principal Observing Officers to ensure that UTC is entered in meteorological logbooks twice. Many ships have already started entering the time in the 'GMT' column at the beginning of the right hand page of the log, as well as in the left. Observers should ignore the note in the column immediately before Section Indicator 222, 'For Office use only', and enter UTC for a second time themselves. This will greatly assist the office when it comes to monitoring your log entries and computer keying data from the one thousand or so logs received annually. This request is for the third time of asking in *The Marine Observer*.

Fleet Lists

GREAT BRITAIN (Information dated 12.3.91)

The following is a list of British ships which have been equipped with instruments and which voluntarily co-operate with the Marine Division of the Meteorological Office. The names of the Masters, Observing Officers and Senior Radio Officers are given as ascertained from the last written returns received. The date of receipt of the last return is given in the second column. An asterisk indicates a new recruitment who has not yet sent in a logbook.

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

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

Excellent Awards are made at the end of each calendar year. The names of the Masters, Principal Observing Officers and Radio Officers gaining these awards are published each July in *The Marine Observer*.

It is requested that prior notification of changes of service, probable periods of lay-up, transfer of Master or other circumstances which may prevent the continuance of voluntary meteorological service at sea, may be made to a Port Meteorological Officer or to the Marine Superintendent of the Meteorological Office at Bracknell.

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

Selected and Supplementary Ships

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Abbe</i>	28.12.90	I. Middleton	P. Newman, R. Zapanta, D. B. Beramo	K.R. Rao	Furness Withy (Shipping) Ltd
<i>ACT 1</i>	22.11.90	A.J. Chivers	L.M. Colam, J.G. Ewart, P. Hilbert	T. Gilmour	Blue Star Ship Management Ltd
<i>ACT 2</i>	8.10.90	J.A. Ocroft	M.J. Macalpine-Downie, P. Squance, I. Percival	B. Miller	Cunard Ellerman Shipping Services Ltd
<i>ACT 6</i>	2.11.90	D.M. Kissane	G.J.H. Peaston, N.R. Broomhall, C.D. Farmer	N. Matthews	Cunard Ellerman Shipping Services Ltd
<i>ACT 7</i>	28.12.90	A.J. Cheshire	D.P. Andrew, M.J. McMahon, G.J. Rawding	A.J. Pampling	Blue Star Ship Management Ltd
<i>Adviser</i>	6.11.90	R.J. Smith	G.A. Walter, A. Dunning, S.J. Harner	C. Moors	J. & T. Harrison Ltd
<i>Al Shamiah</i>	23.10.78	T. Williams	P. Walley		United Arab Shipping Co. (S.A.G.)
<i>Aldrington</i>	4.1.91	D. Patrickson	A.S. Reed, C.V. Adams, S.C. Dixon		Stephenson Clarke Shipping Ltd
<i>Alert</i>	15.5.90	R. Walter	I. Smallshaw	D. Vowles	British Telecom International
<i>Alex</i>	25.1.89	A. Mendonca	J.S. Rathaur, V. Vij	J.R. Jesia	B.C.P. Ship Management Ltd
<i>Alliance</i>	19.2.91	J.A. Holst	S. Hamer, A. Hutchison, K. Maclean	J. Dick	Denholm Offshore Ltd
<i>Almeda Star</i>	21.12.90	S. Mortimer	A. Tibbott, L. Razo, V. Aseniero	R. Baltazar	Concordia Marine Ltd
<i>Ambra Baleen</i>	25.2.91	E. Radovan	D. Russinwick, C. Lyndon, T.F. Fernandes	P. Lazarus	Wallem Ship Management (H.K.) Ltd
<i>Ambra Blue</i>	18.5.90	B.F. Satur	R. Campos, A.B. Chopra, F.A. Ajoc	A. Basy	A/S Ambra
<i>Ambra Grey</i>	*	N.A. Porter	C. Devistruto, R. Neven, D.S. Hall, M. Mosot	V. Koothur	Wallem Ship Management (H.K.) Ltd
<i>Andes</i>	11.1.91	R.A. Whistler	J.R. Hollamby, D. Bowman, T. Ruth	K.R. Grattan	Furness Withy (Shipping) Ltd
<i>Anro Adelaide</i>	8.3.91	Liang Kok Beng		Min Thu Ra	Neptune Orient Lines Ltd
<i>Antwerpen</i>	22.2.91	J.P. Hasselle	A. Dubetz, J. Walgraave, M. Depave	M. Dewilder	Antwerp Bulk Carriers N.V.
<i>Appleby</i>	10.12.90	S.J. Honey	A. Crofts, G.A. Odch, S. Ding	K.S. Woodley	Ropner Ship Management Ltd
<i>Arctic Corsair</i>	12.12.89	P. Wheelodon		A. Spence	Boyd Line Ltd
<i>Arctic Ranger</i>	*	A.W. Walker	A.L. Jennings	J.D. Lester	Boyd Line Ltd
<i>Arctic Universal</i>	23.7.90	C.E.W. Ramsden	P.C.J. Ellaby, P.M. Cornish, J.A. Jbutnande	S. Kodikara	Matheson Shipping Services Ltd

<i>Arma</i>	8.3.91	C.B. Kulkarni	B.K. Jha, S. Bhasin, N.L. Jayakody	D.S. Kapadia	B.C.P. Ship Management Ltd
<i>Asifi</i>	22.1.91	I. Woodier	P. Milton, M. Rippon .....	.....	Bolton Maritime Management Ltd
<i>Astrid</i>	17.9.90	M.C. Kichenside	F.N. Hudson	F.A. Dunn	Astrid Trust
<i>Atlantic Conveyor</i>	5.3.91	C.D. Croall	S.G. Millar, V. Des Landes, G.P. Watts .....	.....	Cunard Ellerman Shipping Services Ltd
<i>Atlantic Senator</i>	30.7.90	Lu Pie Ya	L.S. Pan, Yu Chien Shun	Hsien Wen Chin	Furness Withy (Shipping) Ltd
<i>Atlantic Universal</i>	8.10.90	M.S. Cavaghan	A.N. Mudalige, E.G. Quimada, B.J. Copland	M.S. Irfan	Blue Star Ship Management Ltd
<i>Auckland Star</i>	6.7.90	P. Mathews	T. Burtleton, S. Rathbone, W.P. Mitchell	P.M. Haslam	Blue Star Ship Management Ltd
<i>Author</i>	17.1.91	G.S. Laird	I.T. Davies, J.W. Graham, G. Ritchie	J. Gellatly	T. & J. Harrison Ltd
<i>Avalon</i>	21.11.90	R.H. Wyatt	R. Hone, M. Bray, J.F. Harrison	R.A. Wilson	Curnow Shipping Ltd
<i>Aya II</i>	*	G.P. Eyles .....	.....	.....	Cardiff Ship Management Ltd
<i>B.P. Admiral</i> .....	.....	.....	.....	.....	B.P. Shipping Ltd
<i>B.P. Advocate</i>	5.3.91	J.L. Atkins	M.A. Watson, R. Baslian, W. Chmielowiec	E. Ackwonu	B.P. Shipping Ltd
<i>B.P. Architect</i>	6.3.91	J.M. Ronald	W.A.J. Cameron, W. Kulawczyk, L. Jampas	I. Dobruchowski	B.P. Shipping Ltd
<i>B.P. Argosy</i> .....	.....	.....	.....	.....	B.P. Shipping Ltd
<i>B.P. Humber</i>	10.1.91	J.E. Perry	R. Mead, R. Maclean, C.G. Osoyos	J. Kubiszyn	B.P. Shipping Ltd
<i>BT Nautilus</i>	30.6.89	T.J.E. Fitzearle	W. Hughes, N. Senapati, S.J. Reed	J. Walsh	Bulk Tanker Management Ltd
<i>BT Navarin</i>	6.4.90	P. Garnham	N.H. Paddle, S.T. Cardozo, A.K. Bhorla	J. D'Sa	Bulk Tanker Management Ltd
<i>BT Navigator</i>	10.11.89	N.A.J. Lowe	W.R. Donaldson, P.J. Tyson, C.F. Robinson	W. Bennett	Bulk Tanker Management Ltd
<i>BT Nestor</i>	13.6.90	C. Bland	S.J. Allen, J. Braganza, E. Carvajal	A.B. Deshmukh	Bulk Tanker Management Ltd
<i>BT Nimrod</i>	9.10.89	M.S. Allen	R. Cordon, G.W. Bell, B.T. Sheridan	D.J. Minthant	Bulk Tanker Management Ltd
<i>Bahia Express</i> .....	.....	.....	.....	.....	V-Ships (U.K.) Ltd
<i>Baltic Eagle</i>	22.1.91	P. Anthony	J.D.R. Ghest, S. Williamson, A.W. Robertson	N. Marwood	Andrew Weir Shipping Ltd
<i>Baltic Ferry</i>	*	J.M. Gower	A.M. Smith, I. Morrison, W. Langton, T. Hammond	P. Taylor	P. & O. European Ferries Ltd
<i>Baltic Progress</i>	26.2.91	P. Hyde	A.J. Whitehead, I.J. Minns, S.J. Alletson	G.S. Thomson	Andrew Weir Shipping Ltd
<i>Baltic Tern</i>	27.11.90	B.L. Mullenger	R. Barker, M. Dunn, D. Torr .....	.....	Andrew Weir Shipping Ltd
<i>Baltic Universal</i>	19.6.90	S. Venner	H. Apuyan	P. Sathyamurthy	Matheson Shipping Services Ltd
<i>Barbara-E</i>	18.12.90	R.J. Hemmings	D.W. Tucker, S. Hill .....	.....	Bolton Maritime Management Ltd
<i>Barra Head</i>	26.10.90	R. Phillips	A.T. Allan, S. Ohene	T.H. Phillips	Jebsons Ship Management Ltd
<i>Ben Ocean Lancer</i>	13.2.90	A.I. MacFeate	A.H. Glen, T.V. Roberts, G.J. Livingston	S.M. McFaul	Odeco Ltd
<i>Benvalder</i>	5.3.91	D.D. Sutherland	D.J. Rennie, I.A. Marshall, P.D. Gauld	C.D. McNeilly	Ben Line Steamers Ltd
<i>Benavon</i>	22.2.91	P.C. Thomsson	M.N. Sherwood, A.R. Rendle, R.G.C. Noble	F.J. Curran	Ben Line Containers Ltd
<i>Blue Flame I</i>	23.5.90	F. Powdrill	B. Grint, H. Blake .....	.....	Boston Putford Ltd
<i>Bluesream</i>	9.7.90	J.E. Sturgess	D.R. Atrill, Meraj Ali, J.G. Serrao	E.O. Boateng	E. & F. Shipping Management Ltd
<i>Bora Universal</i>	26.2.91	D.M. Rae	D.A. Jackson, M.S. Islam, T. Elam	C.A.J. Lyon	C.I. Shipping Ltd
<i>Bransfield</i>	5.6.90	S.J. Lawrence	J.B. Marshall, G.T. Hobbs, R. Jackson	S.J. Mee	British Antarctic Survey
<i>Bridgeman</i>	6.1.87	F. Craske	M.J. McGhee, P.S. Wright, M.D. Kerr	R.I. Gow	Rowbotham Tankships Ltd
<i>British Beech</i>	20.11.90	A.J. Lockwood	R.K. Harding, D.J. Williams, C. Beaton	N.P. Hill-Heaton	B.P. Shipping Ltd
<i>British Esk</i>	11.4.89	J.E. Perry	I.C. Massey, N.K. Price, M. McDiarmid	D.W. Bone	B.P. Shipping Ltd
<i>British Forth</i>	23.10.90	R.G. Smith	J. Tawakley, P.K. Sinha, K.B. Sinha	J.D. Fryer	B.P. Shipping Ltd
<i>British Ranger</i>	27.11.90	M.C. Roberts	S.M. Duncan, J.G. Coull, H. Hammer	M.D. Smyth	B.P. Shipping Ltd
<i>British Reliance</i>	29.11.90	M. Pocklington	A.J. Atkins, K.M. McGregor, A.P. Erikson	P.J.J. Gould	B.P. Shipping Ltd
<i>British Renown</i>	14.12.90	R. Standing	W. Oloman	D.W. Bone	B.P. Shipping Ltd
<i>British Resolution</i>	13.11.90	T.M. Stones	S. Allibone, L.M. McEwan, A.B. Sedge	A. Thomson	B.P. Shipping Ltd
<i>British Resource</i>	9.11.90	J. Smith	T.T. Latto, V.O. Langseth, N.D. Osthus	P. Williams	B.P. Shipping Ltd
<i>British Respect</i>	20.12.90	J.Y. Macalpine	P. Anderson, Q. Cox, I. Davies	P. Davies	B.P. Shipping Ltd
<i>British Skill</i>	24.1.90	G.M. Hopkins	R. Chadbourne, Q. Cox, R.K. Harding	R. Ball	B.P. Shipping Ltd
<i>British Spirit</i>	4.2.91	N.E. Hannam	G.P. Spence, R.J. Atkins, A. Parkinson	C. Taylor	B.P. Shipping Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
British Steel	5.2.91	P.J. Creber	J.C. Tabada	M. Kamruzzaman	Furness Withy (Shipping) Ltd
British Success	3.12.90	J. Buchanan	N.C. Curran, D. Mulhern, A.M. Webb	M. Spencer	B.P. Shipping Ltd
British Tamar	25.6.90	J.L. Atkins	E. Nicolaysen, V. Williams, R. Torsensen	J. Smith	B.P. Shipping Ltd
British Tay	17.4.90	M. Pocklington	S. Petty, J.M. Cleugh, A. Fitch	D.W. Bone	B.P. Shipping Ltd
British Trent	5.11.90	A.R. Wilkinson	A. Hilliard, M. Thorley, T.E. Ryan	P.K. Kielthy	B.P. Shipping Ltd
British Wye	18.9.90	S.R. Montague	R.J. Chadbourn, R.C. Stewart, B. Jolly	G.A. Bird	B.P. Shipping Ltd
Broompark	8.2.89	S.H. Barker	M.J. Murzello, G.P. D'Souza, P.F. Arsiwala	R. Monteiro	Denholm Ship Management Ltd
Brussel	23.1.91	R. Maquestiau	F. Driesen, J. Depypere, E. Gilon	N. Gunawardena	Antwerp Bulk Carriers N.V.
Buffalo	8.1.91	J.D. McCann	C.S. Collard, S.C. Formstone, J.R. Murray	W.D. Mullen	P. & O. Ferries Ltd
CAM Defender	23.3.90	M. Lightfoot	M. Lightfoot		CAM Shipping Ltd
CAM Retriever	27.11.90	G.E. Drewery	A. Edwards, R. Shirley		CAM Shipping Ltd
CAM Supporter	13.9.90	P. Bartlett	S. Upcraft		CAM Shipping Ltd
CMB Ebony	*	I.G. Juvale	R. Jamdar, K. D'Essa, S. Vellangi	V.D. Vats	CanPac Maritime Ltd
CMB Mallet	15.11.90	M.I.C. Kempston	D.R. Trivedi, R.K. D'Souza, B.J. Silva	V.D. Vats	CanPac Maritime Ltd
CMB Memling	28.2.91	J. Bertin	A. Hoffman, P. Denutte, A. Knepper	P. Van Damme	CanPac Maritime Ltd
CMB Plantin	*	H. Demeure	D. Vastersaegher, S. Platteau, M. Nuytemans	W. Verstrepen	CanPac Maritime Ltd
C.S. Lancer	13.2.90	R. Shaw			Ben Line Ltd
Cable Protector	20.9.89	W. Marr	B.K. Goodsir, M. Barrass, P.D. Hey	S.O.J. Broady	Cable & Wireless plc
Cable Venture	6.4.90	E.J. Turner	M. Barrass, M. Jubb	M. Joniec	Cable & Wireless plc
Cableman	10.10.89	R.D. Andrews	H.A. Williams, R.D.M. Low, D.J. Podger		Rowbotham Tankships Ltd
Canberra	26.7.90	I. Tomkins	J.L. Mitchell, D.J. Pritchard, M. Arif		OOCL Ltd
Canmar Ambassador	8.10.90	A.G. Moat	S. Plummer, M. Drake		P. & O. Ship Management Ltd
Canmar Europe	29.1.91	W. Marien	P. Bland, H. Perera		B.C.P. Ship Management Ltd
Canmar Triumph	8.2.91	K. Millar	A. Hoffman, F. Gielis, W. Van Renterghem	C. Singh	OOCL Ltd
Canmar Venture	21.8.89	H.A. Ross	M.A. Cully, R.K. D'Souza, Sah Pankaj	X. Gorts	CanPac Maritime Ltd
Canmar Victory	21.9.90	K. Anderson	I.S. Donaldson, D.C. Mariadas, A.S.D. Weerasinha	D.S. Abraham	B.C.P. Ship Management Ltd
Canterbury Star	19.10.90	C. Jackson	D. Singh, P. Kohli	N.V. Rajagopalan	CanPac Maritime Ltd
Cardigan Bay	11.12.90	A.J. Leslie	M. Power, S. Pridmore, S.T. Balfour	K. Chakravorty	Blue Star Ship Management Ltd
Cardigena	20.12.90	D.S. Ritchie	M.D. Moore, C.R. Merry, M. Grimshaw	R.J. Evans	P. & O. Containers Ltd
Cavendish	19.5.89	J. Jubb	Z.A. Usero, P.I. Ramos, C.S. Reyes	G.H. Adran	Dole Fresh Fruit Co.
Celtic Challenger	3.7.90	H.J. Norton	C.A. Cleverley, S.J. Gregory, S.J. Fant	K. Nair	Furness Withy (Shipping) Ltd
Celtic Voyager	8.3.91	G.W. Ralph	V.F.R. Moorman, A.R. Anning, A.P. Maclean		C.M. Willie & Co. (Shipping) Ltd
Challenger	23.1.90	G. Long	J.M.S. Lethbridge, M.A. Khan		C.M. Willie & Co. (Shipping) Ltd
Charles Darwin	10.12.90	M.A. Harding	C.M. Leather, J.T. Morse, S. Sanderson		Natural Environment Research Council
Cheryl-C	15.2.91	S. Smith	A.R. Louch, S. Sykes, R.M. Atkinson	J.G.L. Baker	Natural Environment Research Council
Cheshire	*	B. Desmet			Carisbrooke Shipping Ltd
Chiquita Bara	8.10.90	C.A. Hare	K. Grootjans, R. Grymonprez, G. Callebaut	M. Strobbe	Bibby Line Ltd
Chiquita Bocas	9.8.90	P.G. Pinkerton	C.R. Darnley, S.A. Jaitapakar, Y. Omane	V.A. Monteiro	E. & F. Shipping Management Ltd
	3.12.90		C.F. Campbell, J. Khan, M. Nazor	C. Adjet-Twum	E. & F. Shipping Management Ltd

<i>Churchill</i>	22.11.90	J.F. Rowe	R.A. Morrison, D.G. Robbie, C.W. Watson	D. Tucker	Blue Star Ship Management Ltd
<i>Cirolana</i>	21.9.90	B.A. Chapman	R. Taylor	R. Baly	Ministry of Agriculture, Fisheries & Food
<i>City of Durban</i>	14.11.90	L.R. Bell	A.F. Hamilton, D.A.K. Bamford, G.J. Simpson	C.S. Carver	Denholm (I.O.M.) Ltd
<i>City of Edinburgh</i>	5.2.91	W. Mason	S. Polson, J.H. Clark, G.W. Maitland	J.S. Hallam	Ben Line Containers Ltd
<i>City of Plymouth</i>	11.1.91	P.J.S. Bishop	N.M. Crowther, G.A. Whitaker	W. Adams	Denholm (I.O.M.) Ltd
<i>Claymore</i>	7.6.89	J. Campbell	M.B. Scott, C.D. McCurdy, I.F. Scarr	J.C. Yates	Caledonian MacBrayne Ltd
<i>Clydebank</i>	2.11.90	D. Stewart	B. Surling, K.P. Mowat, A.W. Blance	S.J. Bradshaw	Andrew Weir Shipping Ltd
<i>Conship Spain</i>	22.11.89	D. Tracey	T.G. Whittaker, T. Ayre, M.K. Elson	B.N. Iyengar	P. & O. Containers Ltd
<i>Coppename</i>	14.1.91	J. Chalmers	J.P. Hughes, R. Gopal, J. Mascarenhas	P. Bidmead	Wallem Shipmanagement (I.O.M.) Ltd
<i>Cordoba</i>	28.12.90	J. Pearsall	B.R. Perez, S. Salas, D.E.H. Morales	D.H. Hibbert	Cardiff Ship Management Ltd
<i>Cormorant Arrow</i>	11.1.89	J.M. Stanaway	E.W. Inkster, W. Daniel	J. Singh	Gearbulk Ltd
<i>Cornelis Verolme</i>	8.2.91	A. Van Hees	P. Van Deuren, S. Laloux, M. Mestdach	Sea Lanes N.V.	
<i>Corystes</i>	7.8.90	J.R. French	B.A. Chapman	Ministry of Agriculture Fisheries & Food	
<i>Cotinga</i>	21.8.90	A.G. Brand	R. Macnab, J. Mackie, D.E. Charles, P.J. Heasman	F.T. Everard & Sons Ltd	
<i>Cristilla</i>	*	J. Nichols	A. Somerton, W. Wilson	J. Marr & Son Ltd	
<i>Dallington</i>	31.1.90	P. Squance	A.S. Reed, J. Halliwell, M.B. Wdowikowski	Stephenson Clarke Shipping Ltd	
<i>Dana Anglia</i>	31.1.91	J.S. Jensen	J. Rohde	DFDS Ltd	
<i>Dawn Shore</i>	3.1.91	S. McClane	F. Nottingham, W.A.E. Smith	Boston Putford Ltd	
<i>De Loris</i>	23.11.90	L. Isselee	J. Langbeen, P. Wesel, B. Van Assche	Antwerp Bulk Carriers	
<i>Direct Kea</i>	23.11.90	D. Tracey	A. Wellis, G.R. Matthews, T.D. Roberts	P. & O. Containers Ltd	
<i>Direct Kookaburra</i>	23.11.90	P.D. Davies	P.M. Reid	P. & O. Containers Ltd	
<i>Discovery</i>	8.10.90	M.A. Harding	P.A. Burridge, R.A. Bourne, P.T. Oldfield	Natural Environment Research Council	
<i>Discovery</i>	*	P. Leroy	H. Merbis, K. de Waele	British Telecom International	
<i>Donnington</i>	22.11.90	W. Venning	C. Lewis, R. Spooner	Stephenson Clarke Shipping Ltd	
<i>Drupa</i>	17.1.91	D.R. Lake	D.C. Rands, F. Hussain, S. de Jonge	Shell Ship Management Ltd	
<i>Durrington</i>	9.6.89	P.R. Thompson	J. Awdiej, P. McManaway	Stephenson Clarke Shipping Ltd	
<i>Eastella</i>	17.7.90	G.J. Tully	G. Strachan, R.P. Harrison, M. Porteous	J. Marr & Son Ltd	
<i>Eastray</i>	14.4.88	M. Izar-Ul-Haque	A. Sattar, A.H. Zubair, M.A. Ullah	Gulf (Shipowners) Ltd	
<i>Eastray Trust</i>	*			Marine Nav. Co. Ltd	
<i>Ebalina</i>	12.4.90	R.M. Linley-Munro	J.J. Hudson, C. Snape, J. Wilson	Shell Ship Management Ltd	
<i>Eburna</i>	5.9.89	P.N. Bowden	M.G. Fennell, J.R. Evans, J. Wibberley	Shell Ship Management Ltd	
<i>Echoman</i>	6.5.87	I. Storie	M. Thomason, G.H. Beaumont, J.W. Wilson	Rowbotham Tankships Ltd	
<i>Edinburgh Frigid</i>	7.2.91	H.G. Gray	J. Phillips, A.K. Bhorla, S.K. Maini	Bibby Line Ltd	
<i>Edinburgh Savannah</i>	*			Bibby Line Ltd	
<i>Edno</i>	28.1.91	H.R. Sukalakar	H.M. Mauskar, N. Murdeshwar, B. Anantharaman	B.C.P. Ship Management Ltd	
<i>Elk</i>	6.9.90	N.M. Hardy	R.W. Madden, P. Brookes, K.J. Wilson	P. & O. Ferries Ltd	
<i>Ellen Hudig</i>	31.12.90	J.F. Stokes	Y. Schnabel, G. Somers, P.H. Reinkin	ABC Container Line	
<i>Encounter Bay</i>	23.1.91	K.P. Byrne	K. Worthington, J.G. Swindlehurst, T. Oliver	P. & O. Containers Ltd	
<i>Endavour</i>	19.10.90	G. Cuthbert	P.A. Helm, P. Thompson, S.M.W. Davison	Souter Shipping Ltd	
<i>English Star</i>	9.11.89	I. MacKillop	D.R. Johnston, D.G. Robbie, C.A. Bates	Blue Star Ship Management Ltd	
<i>Entalina</i>	24.1.90	B.S. Rennison	T. Scott, J. East, C.F. Humphreys	Shell Ship Management Ltd	
<i>Enterprise</i>	28.12.90	D.J. Rouse	K. Henderson, M.D. O'Dell, M.E. Stronge	Souter Shipping Ltd	
<i>Equinox</i>	14.11.89	G.D. Sandercock	A.D. Helm, I. Robertson, G.I. Hamer	Souter Shipping Ltd	
<i>Ervillea</i>	11.12.87	J. Rafferty	A.D. Lowrey, J.G. Tarling, A.W. Batten	Shell Ship Management Ltd	
<i>Espanade</i>	21.8.90	T. Robinson	P.C. Harris, N.E. Blythe	Souter Shipping Ltd	
<i>Esso Aberdeen</i>	23.1.90	G.T. Rymer	J.H. Donaldson, A.G. Pompa, P.Q. Rees	Esso Petroleum Co. Ltd	
<i>Esso Demetia</i>	25.10.89	S. Clements	R.G. Allan, I.G. Swales	Esso Petroleum Co. Ltd	
<i>Esso Fife</i>	10.1.91	K. Hebdon	K.H. Milne, A. Hodgson, M. Hustwith	Esso Petroleum Co. Ltd	

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Esso Tyne</i>	*	K.J. Lightbody	T. Lester, N. Fineman, J. Holmes	I. Wilson	Esso Petroleum Co. Ltd
<i>Euplecta</i>	13.4.88	J. Brown	I. Shields, C.S. Bull, N.G. Mushet	M. Adams	Shell Ship Management Ltd
<i>Europa Point</i>	6.12.88	I.C. Dorse	A.A. Shah, M. Gulzar, M. Zakir	Azizul-Haq	Acomarit (U.K.) Ltd
<i>Eye of the Wind</i>	12.1.83	R.S. Groro			Adventure under Sail
<i>Falcon Arrow</i>	8.2.91	C.H.C. Knight	H.D. Ragas, F.V. Ayap, A. Maranon	A.B. Tanan	Jardine Ship Management Ltd
<i>Falklands Desire</i>	11.10.89	M. Paterson	P. Musgrave, T. Smith	D.R. Legge	J. Marr & Son Ltd
<i>Falklands Protector</i> ..	28.1.91	A.A. Jagger	J.G. Wood, J. Laird		J. Marr & Son Ltd
<i>Falklands Right</i>	11.1.91	I.H. Leggatt	J.W. Dunne	J. Magee	J. Marr & Son Ltd
<i>Farnella</i>	18.6.90	J.D. Cannan	A.W. Fuller, D.M. Shaw	P.J. Appleyard	J. Marr & Son Ltd
<i>Flinders Bay</i>	25.2.91	J.K. Williamson	D.J. Baily, M. Grimshaw, R.J. Faithful	B.W. Matten	P. & O. Containers Ltd
<i>Forthbank</i>	31.12.90	A.T. McGregor	E.M. Pallister, S.J. Cole, W. Mather	T. Kucharski	Andrew Weir Shipping Ltd
<i>Francis Drake</i>	26.4.90	G. Fairhurst	P. Dennis, T. Coates, J.E. Fearnside		Ocean Youth Club
<i>Freeres</i>	27.11.90	D. Johnstone	N.P. Shrewsbury, J.A. Cook, N.K. Anders	R.R. Hughes	Jebsens Ship Management Ltd
<i>Fulnes</i>	3.10.89	B.C. Dalanon	D. Lacquiao, E.L. Aquino, P. Ilao	A. Urbiztondo	Jebsens Ship Management Ltd
<i>Gu Chau</i>	19.10.90	J. Correa	S. Agrawal, M. Perwez, R.A. Lambay	T. Chacko	Denholm Ship Management Ltd
<i>Gardline Locater</i>	5.1.90	H.F. Monckton	J. Hanley, I. Newsome, S.K. Jones		Gardline Shipping Ltd
<i>Garth</i>	21.8.90	G. Watson-Wood	J.I. Delgado, J. Charlton, L.G. Sarmiento	B. Ilkor	Graig Shipping plc
<i>Gas Enterprise</i>	17.1.91	P.D. Seaman	J.L. Patterson, L.N. Paul, C. Billing	A.D. Moore	B.P. Shipping Ltd
<i>Geestbay</i>	31.12.90	R. Coombs	P.G. Schoneveld, D. Buckingham, D. Roberts, D. McLaren	T. Sutton	Geest Line Ltd
<i>Geesthaven</i>	6.3.91	G. de F. Foster	J.D. Williams, A.J. Gladman, R.M. Eaton	M. Morgan	Geest Line Ltd
<i>Geestport</i>	27.11.90	K.M.R. Skinner	R. Coombs, P. Rafferty, N. Anders	S. Hollingworth	Geest Line Ltd
<i>Gold Varda</i>	19.12.89	M.J. Davis	T. Hogg, C. Roe, T.E. Evans	J. Donnan	Geest Line Ltd
<i>Golden Fleece</i>	30.10.85	R.M. Mitchell	R. Borkowski, S.J. Windle, R. Ross	D.H. Logie	Haverton Shipping Ltd
<i>Graiglas</i>	21.3.88	A. Mair	C.S. Swarnakar, S.R. Sukhrani, R. Kapuria	P. Srikan	Ugland Bros. Ltd
<i>Graigwerdd</i>	22.2.91	C. Berkley	S.G. Fraser, F.J. Nichol, C.M. Bragg	O.Q. Palao	Graig Shipping plc
<i>Greater Manchester</i> ..	25.1.91	J.A. Coffin	M.R. Gover, P.I. Anderson, R.A.H. Vanner	J.A. Laplana	Graig Shipping plc
<i>Challenge</i>	18.5.90	L. Parker			Ocean Youth Club
<i>Greenpeace</i>	15.9.88	R.A. Graham	M. Gotz, K. Ballard, B. Clark	W.J. Strafford	Greenpeace Marine Division
<i>Greta-C</i>	24.4.87	L.A. Davis	B.R.F. Cox	S. Chakraborty	Carisbrooke Shipping Ltd
<i>Gulf Speed</i>	26.7.90	N. Passey	S.S. Hasnat, A.S.J. Mhatye	Man-Piu Ip	Cunard Ellerman Shipping Services Ltd
<i>Gulf Spirit</i>	12.7.90	F.R. Coutinho	N.C. Tewari, S. Sarkar, G.F. Kanjanapilly		Cunard Ellerman Shipping Services Ltd
<i>H.V. Fox</i>	*	E. Chapman	V. Mitchell, R. Harris	W.K. Salandy	J. Marr & Son Ltd
<i>Harold La Borde</i>	18.12.90	P.J. Duff	B.E.N. Joseph	S. Lanuza	Bibby Line Ltd
<i>Havdrott</i>	19.12.90	R. Tanguy	C. Payton, R.G. Valentine, C. Ragas	K.S. O'Sullivan	A/S Havtor Management
<i>Havjarl</i>	31.1.89	P.R. Malarky	P.J. Tyson, I. Tagab, M.G. Dalman		A/S Havtor Management
<i>Havkong</i>	11.12.90	A.D.G. Bell	H.G. Poilard, C.M.J. Payton, R.G. Valentine	M.J. Sheldon	Caledonian MacBrayne Ltd
<i>Hebridean Isles</i>	21.8.90	A.J. Morrison	W. Skivington, N.N. Mackay, C.M. Campbell	L. Lim	Rederiet H.R. Myhre A/S
<i>Hekabe</i>	27.2.91	N. Mushin	M.J. Duncan, A. Brown, B. Lelis		

<i>Helen</i>	11.191	T. de Oliveira Pinto	T. Moons, P. Corveyn, B. Basyn	B. McGeehan	Sea Lanes N.V.
<i>Helikon</i>	8.191	P. Beresford	A.S. Tennant, K.P. Ratcliffe, A.L. Fajardo	R.B. Villarín	Rederiet H.R. Myhre A/S
<i>Hemera</i>	29.191	G.J. Pearson	T.H. Goldsmith, D.P. Gomez, F.H. Gloria	N.H. Torre	Rederiet H.R. Myhre A/S
<i>Hemina</i>	27.690	C.S. Robinson	D.T. Simpson, K. Ratcliffe, E. Broce	A. Endonila	Rederiet H.R. Myhre A/S
<i>Hermod</i>	22.190	P.R. Dew	S. White, M.A. Youel, R. Lavilla	F. Beronio	Rederiet H.R. Myhre A/S
<i>Hesiod</i>	17.890	G.W. McInnes	T.N. Ferguson, J.D.C. Martin, E.E. Enguerra	P. Gacayan	Rederiet H.R. Myhre A/S
<i>Highland Reel</i>	8.487	C. Green	D. McIntyre, G. Collier, D.J. Cowie	D. Gavin	Ugland Marine Ltd
<i>Hill Cove</i>	14.388	T. Doyle	M. Wainman		J. Marr & Son Ltd
<i>Hoegh Duke</i>	19.1090	C.V. Farrant	N.J. Elks, R.S. Coelho, J. Haider	C.L. D'Souza	Leif Høegh (U.K.) Ltd
<i>Hook Head</i>	18.191	K. Whittaker	A. MacPherson, H.G. Hanna, A. Soupe	R.A.S. Macmeikan	Jebsens Ship Management Ltd
<i>Hudson River</i>	*	F.R.F. Martin	O. Domingo, G. Williams, F. Tilano	M. De La Torre	Enron Arbross Ship Management Co
<i>Humanist</i>	15.390	M.J. Feltham	N.R. Francis, S. Sekandar, M.A. Kadir	D. Sherwood	Ocean Tramping Ltd
<i>Ibn Abdoun</i>	15.1287	A. Gupta	H.S. Sant, P. Verma, N. Jarrar	S.K. Datta	United Arab Shipping Co. S.A.G.
<i>Indiana I</i>	1.1190	I.H. Leggett	A.V. Robinson, R. Birch, M. White	J.C. Wadsworth	J. Marr & Son Ltd
<i>Isalair</i>	13.291	M.P. Easton	C.M. Grimmer, H.A. Watson, F.J. Routledge	J. Vaughan	B.P. Shipping Ltd
<i>Iris</i>	8.191	G.W.T. Holmes	M. Bartle, W. Cortez, C. Virtudazo	K.A. Changezi	British Telecom International
<i>Ironbridge</i>	11.1290	T.R. Barton	A.J.T. Gray, L. Ward, J.J.M. Beggs		Furness Withy (Shipping) Ltd
<i>Isle of Arran</i>	1.1190	S. Findlay	D. Macdonald, J. Still, A.H. Colqhoun		Caledonian MacBrayne Ltd
<i>Isle of Mull</i>	21.1190	J. Campbell	S. Gallaway, P.C. McManaway, R.S. Payne	D.H. Parkes	Shell Ship Management Ltd
<i>Isocardia</i>	15.890	J.G. Ruffell	S.S. Zadziuk, T.P. Doherty, C. Dodds	J.G. Lytle	Shell Ship Management Ltd
<i>Isomeria</i>	13.291	J.P. Bateman	D.E. Ginder, D.T. Wells, R.W. Wright	R.B. Fuller	Andrew Weir Shipping Ltd
<i>Ivorybank</i>	22.191	D.L. Jones	S.A. Hasan, M. Tirkey, M.K. Singh	P.S. Phanse	Wallem Shipmanagement Ltd
<i>Jahre Spray</i>	*	L.A. Lobo	H.B. Patel, P.J. Milton, C.P.M. Narayan	S.C. John	Wallem (I.O.M.) Ltd
<i>Jarikaba</i>	16.1090	R.B. Hughes	G.F. Lack, T.S. Moseley		Stephenson Clarke Shipping Ltd
<i>Jervington</i>	17.1287	L.G. Relton	W.J. Pearn, M.J.S. Burgan, J.R. Harper	C.A. Waddicor	British Antarctic Survey
<i>John Biscoe</i>	1.590	E.M.S. Phelps	W. McCann, A. Lee, A.P. Miles	R. Stevens	Souter Shipping Ltd
<i>Jostelle</i>	26.291	T. Robinson	M.A. Wilde, A. Andag, E. Boye	J. Junio	Acomarit (U.K.) Ltd
<i>Kagoro</i>	18.1290	E.D. Somes	R. Anyadi, B. Asembi, K. Wutch	A. Kasraku	Black Star Line Ltd
<i>Keta Lagoon</i>	11.191	P.Y. Hevi	H.C. McWilliam, E.W. Casson, R. Borkowski	S. Price	James Fisher & Sons Ltd
<i>Kingsnorth Fisher</i>	14.488	J. Sharples	N. Acot, D. Peralta, N. Basilio	R. Bebit	Jardine Ship Management Ltd
<i>Kiwi Arrow</i>	*	K.M. Lines			Hays Ship Ltd
<i>Kommandor Sub Sea</i>	12.690	I.E. Grant	R.A. Kenchington, M.J. Trafford, M.P. Willis	R.B. Redhead	P. & O. Containers Ltd
<i>Kowloon Bay</i>	19.1190	C.B. Walgate	J. Owusu-Koranteng, J.P. Tyson, K. Torto-Rockson	D.V. Gonzaga	Acomarit (U.K.) Ltd
<i>Kukawa</i>	14.1290	B.N. Jones	I.C. Gravatt, J.A. Petersen, S. Molek	K. Ostric	Ropner Ship Management Ltd
<i>Lackenby</i>	23.1090	F. Stuart	O.K. Buckle, P. White		Isle of Man Steam Packet Ltd
<i>Lady of Mann</i>	*	—, Bridson	W.D. Russell	P.F.J. Kelly	Jebsens Ship Management Ltd
<i>Lakenes</i>	20.289	T.A. Smith	M. Khalid, S. Dunbar, T.H. Scott	R.F. Gaul	Shell Ship Management Ltd
<i>Lampas</i>	11.291	D.M. Brogan	R.M. Librando, G.A. Severino, J.J. Dionio	M.C. Manganoni	Cory Bros Shipping Ltd
<i>Lanka Amila</i>	3.990	F. Rasael	M. Makabenta, R. Tina, D. Macatubel	D. Carceler	Cory Bros Shipping Ltd
<i>Lanka Asuha</i>	8.1090	F. Martin	J. Meador, Chy Samsuddin, S.R. Lasker	K.A. Desai	K.G. Jebsens Skiperideri A/S
<i>Lantau Trader</i>	9.1190	N. Fillingham		D.E. Shotton	Beta Maritime Services Ltd
<i>Lavender</i>	11.990	T.K. Dawson	W.J. Trafford, P. Bayliss, C.J. Blane	B. Ryan	F.T. Everard & Sons Ltd
<i>Leicesterbrook</i>	7.1189	R. Firth	C. Bull, J. Wilson, C. Kendall	K.H. Sellar	Shell Ship Management Ltd
<i>Leonia</i>	11.790	J.R. Staines	R.A. Davalos, R.O. Guzman		Cardiff S.M.S. Ltd
<i>Lerna</i>	16.1090	J.D. Burr	I.D. Spence, C.S. Finlay, M.A. Magee		Seacot Ship Trading Ltd
<i>Leslie Gauli</i>	14.390	D.J. Conway	C.S. Bull, R.D.S. Arthur, D.H. Thomas	A.B. Stewart	Shell Ship Management Ltd
<i>Lima</i>	26.291				

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Lincoln Universal</i>	15.2.91	J.B. Woombie	J.M. Collis, M.R. Yakoub, R.L. de la Cruz	B.V. Garcia	Matheson Shipping Services Ltd
<i>Lincolnshire</i>	19.2.91	R.J. Court	J. James, D.C. Mohammed, G.R. Cobb	B.J. Foley	Bibby Line Ltd
<i>Liverpool Bay</i>	7.3.91	J.W. Welch	W. Stoker, R. Jolliffe, P.J. Laity	R. Browne	P. & O. Containers Ltd
<i>Liverpool Star</i>	23.1.91	R. Lyall	P.W. Jackson, J.C. Hague	G. De Bontridder	Denholm (I.O.M.) Ltd
<i>London Express</i>	21.9.90	J. Hiroux	P. Debra, W. Vanreterghem, J. Vereecken	I.F. Alexander	CMB N.V. S.A.
<i>London Spirit</i>	26.2.91	R.B. Tarbuck	D.S. Wylie, C.A. Cornish, P.F. Albury	D. Jakobauderstroht	London & Overseas Freighters plc
<i>London Victory</i>	4.7.90	A.C. McNab	C.D. Bailey, R. Fullager, M.A. Pearce		Jubilee Sailing Trust Ltd
<i>Lord Nelson</i>	11.4.89	H.M. Munro	P.J. Wilkes, R.J. Bridge, D.J. Neale		Caledonian MacBrayne Ltd
<i>Lord of the Isles</i>	*	K. Gunn	R. Sneedon, M. Scott, C. MacCurdy, J. Robertson		Heyn Engineering & Shipping Services
<i>Lough Foyle</i>	*	A. Niblock	M.R. Pickles, S.R. Wahley, M.B. Bulteel, E.J. Tyler	D. Kelly	Lowline Ltd
<i>Lowland Lancer</i>	*	R.C. Osola	B.A. Argent, I.G. Travis, J. Chappell	H.O.C. Grattan	Cunard Ellerman Shipping Services Ltd
<i>Lumiere</i>	5.2.91	D.S. Hughan	H.J. Everington, H.J. Pugh		Crescent Shipping Co. Ltd
<i>Luminence</i>	24.4.87	B.D. Fern	P.R. Kaye, I. Travis, J.H. Smith	C.B. Hardie	Cunard Ellerman Shipping Services Ltd
<i>Luminella</i>	13.12.89	D.S. Hughan	V.G. Unnikrishnan, N. Hasan, G.L.S. Pinto	S.K. Srivastava	B.C.P. Ship Management Ltd
<i>Maclé</i>	13.6.89	C.B. Kulkarni	W. Munro, C. Deasy, N. Jenkins	G. Smith	Maersk Co. Ltd
<i>Maersk Cadet</i>	29.1.91	N. Vause	F.A. Kinanguka, C.A.P. Saldanha, J.A. Whelan	T.F. Scott	Maersk Co. Ltd
<i>Maersk Captain</i>	5.3.91	R.M. Banton	K.A. Earl, J.M. Wright, B.T. Sheridan	T.C. White	Maersk Co. Ltd
<i>Maersk Commander</i>	29.11.90	A.K. Froggatt	I.F. Finlayson, N.G. Barratt, D.M. Tee	P. Sharp	Maersk Co. Ltd
<i>Maersk Gannet</i>	19.9.90	I.M. Brown	A. Mathieson, L.E.A. Martin, A. Howard	G. Smith	Maersk Co. Ltd
<i>Maersk Harrier</i>	7.3.90	S.J. Bracewell	D. Osborne, P. White, D. Hiddelston, W. Elliott	M. McCormack	Maersk Co. Ltd
<i>Maersk Javelin</i>	*	A.B. Waller	M. Tyler, J.R. Payne, R. Smith	D. Minihane	Maersk Co. Ltd
<i>Maersk Jupiter</i>	2.8.90	B. Graham	L. Johnson, K. Ireland, D.L. Dodsworth	J. Bridge	P. & O. Containers Ltd
<i>Mairangi Bay</i>	19.2.91	P. Tomaszewski	L. Wasilewski, J. Chachulski		Britanmar Shipping
<i>Mamora</i>	*	S. Smith	M. Hawkes		Carisbrooke Shipping Ltd
<i>Mark-C</i>	15.7.88	P. Crabtree	B. Douglas, P. Ganley, A.W. Bissaker		Mobil Shipping Co. Ltd
<i>Matco Avon</i>	8.1.91	I.D. McKenzie	D.J. O'Keefe, D. Macmillan, A.D. Stratton		Mobil Shipping Co. Ltd
<i>Matco Clyde</i>	6.4.90	R. Dixon-Carter	J. Horgan, J. Sapsford, S. Proctor		Mobil Shipping Co. Ltd
<i>Matco Thames</i>	6.12.90	G. Bates	R.G. Flynn, G.P. Farrell, P. Hilbert	C.P. Brockbank	James Fisher & Sons plc
<i>Mediterranean</i>	13.3.90	B.M. King	L. Hodgson, T.J. Conway, M.N. Islam	C. Mannion	C.I. Shipping Ltd
<i>Shearwater</i>	26.2.91	D. Petty	N.F.H. Printer, Vinay Pandey, M.A. Paala	L. Joseph	V-Ships (U.K.) Ltd
<i>Meltem</i>	30.10.90	J.R. Taylor	R. Kumar, A. Chatterjee, B. Kumar	F.A. Noronha	V-Ships (U.K.) Ltd
<i>Merchant Pioneer</i>	4.7.90	C.R. Thomas	J.P. Ilarde, K.A. Bajpai, A.K. Verma	S.V.N. Potty	V-Ships (U.K.) Ltd
<i>Merchant Premier</i>	*	R.W. Cotter	K. Sandeep, I. Joel, S. Davinder	C. Ranchmod	V-Ships (U.K.) Ltd
<i>Merchant Prince</i>	3.8.90	J.R. Taylor	V.P. Singh, A. Akbar, P. Sriram	A.V. Gomes	V-Ships (U.K.) Ltd
<i>Merchant Princess</i>	14.12.89	D.C.J. Still	D. Freeman, A. Pelson	W.N. Greene	V-Ships (U.K.) Ltd
<i>Merchant Principal</i>	*	J.E. Dingle	A. Courtman, K.M. Chester, R.T. Villafuerte	R. Lucas	Shell Ship Management Ltd
<i>Merchant Promise</i>	27.2.90				C.I. Shipping Ltd
<i>Methane Princess</i>	6.9.90				
<i>Mistral</i>					

<i>Mobil Arne</i>	6.12.90	D.C. Kettley	I.C. Maclean, C.G. Oliver, P. Earley	J.C. Percival	Mobil Shipping Co. Ltd
<i>Mobil Falcon</i>	23.1.91	S. Woodward	M.D. Jones, C.R. Booker, S. Sourbutts	J. Fitzgerald	Mobil Shipping Co. Ltd
<i>Mobil Perrel</i>	23.11.90	P.D. Kelly	K.P. Doyle, C.W. Blacker, A.D. Lott	C.R. Kettlewell	Mobil Shipping Co. Ltd
<i>Monarch</i>	14.3.89	R.J. Walter	G. Digby, M. Hammond, M.R. Swaffield	K. Woodley	British Telecom International
<i>Monas Queen</i>	*	— Kinley	T. Harrison, N. Rainford, O.K. Buckle	P. Davis	Isle of Man Steam Packet Ltd
<i>Munmouth</i>	*	P.J. Burden	J. Shea, A. Appiah	Runwave Ltd	Runwave Ltd
<i>Montarik</i>	12.10.90	J. McFarland Binmie	S.R. Kulkarni, R. Jawed, M.D. Irfan	J.A. Khan	Acomarit (U.K.) Ltd
<i>Moraybank</i>	28.11.90	E.T. Rees	A. Sawyers, S. Leake, M. Causon	J.B. Carter	Andrew Weir Shipping Ltd
<i>Mulbera</i>	8.10.90	J.H. Mockett	A. Frost, P.C. Sinha, S. Panner	N.S. D'Souza	Blue Star Ship Management Ltd
<i>Napier Star</i>	3.1.91	T.C. Black	R.E. Lough, J.N. Matheson, D. Yen	K.C. Daruwalla	Blue Star Ship Management Ltd
<i>Natacha-C</i>	*	S. Smith	F.S. Lobaton	E.A. Gravador	Carisbrooke Shipping Ltd
<i>Natal</i>	5.2.91	T. Haxell	S.S. Rumde, M. Karan, A. Duggal	Z.A. Mulla	Acomarit (U.K.) Ltd
<i>Navious Unique</i>	27.10.89	M. Kalia	L. Nelson, T. Ayre, A.J. Skingley	B. Matten	Unique Shipping Agencies Ltd
<i>Nedlloyd Tasman</i>	24.4.90	S.D. Smith	M. Nicholson, D. Bell, B.A. Sutcliffe	K. Dolan	P. & O. Containers Ltd
<i>New Generation</i>	30.7.90	D.A. Maclean	A.B.F. Ferrao, S.K. Akkineni, N. Murdeshwar	J.K. Wadhwa	James Fisher & Sons Ltd
<i>Nickerie</i>	3.1.90	C.J.B. Trnick	H. Iele, O. Panapa, A. Tapeva	Wallem Shipmanagement (I.O.M.) Ltd	B.C.P. Ship Management Ltd
<i>Nike</i>	30.1.90	R.P.T. D'Souza	J.J. Coyle, T. Collins, I.A. Craig	Government of Tuvalu	Government of Tuvalu
<i>Nivaga II</i>	6.7.88	P. Stone	I. Marshall, R. Irvine, P. Kelly	Dept of Agr. & Fish. for Scotland	Dept of Agr. & Fish. for Scotland
<i>Norra</i>	21.2.91	B.A. Hall	M. Topping, K. Appleton, P. May, D. Collins	Shell Ship Management Ltd	Shell Ship Management Ltd
<i>Norrissa</i>	6.11.90	B. Cosgrove	P. Kohli Rajender, P. Malone, D.B. Firdaus	North Sea Ferries Ltd	North Sea Ferries Ltd
<i>Norsea</i>	*	D. Wharton	A. Somerton, E.W. Casson	Silver Line Ltd	Silver Line Ltd
<i>Nortank Fighter</i>	*	B. Firth	P. Garner, A. Fuller	J. Marr & Son Ltd	J. Marr & Son Ltd
<i>Northella</i>	*	P. Ramsey	M.P. Jones, A.T. Cross, P.E.P. Roche	J. Marr & Son Ltd	J. Marr & Son Ltd
<i>Northern Horizon</i>	*	P. Taylor	V. Sten	Shell Ship Management Ltd	Shell Ship Management Ltd
<i>Northia</i>	18.1.91	H.J. Tibbs	G. Zacharakis, V. Ploumaris, K. Plavolkos	Capt. D.A. Church	Capt. D.A. Church
<i>Ocean Goose</i>	3.8.88	D.A. Church	L. Elms	Ship-Link (U.K.) Ltd	Ship-Link (U.K.) Ltd
<i>Ocean Link</i>	14.12.90	B. Hapsson	W.R. Howell, Kung U. Wung, Ng Kwai Hon	Ocean Cruise Lines (U.K.) Ltd	Ocean Cruise Lines (U.K.) Ltd
<i>Ocean Princess</i>	*	P. Markopolus	Ng Kwai Hon, Chua Seng Hock	Ocean Incheape Ltd	Ocean Incheape Ltd
<i>Oil Husler</i>	*	N. Brown	D. Prichard, N.A. Edjah, J. Greenspan	OOCL Ltd	OOCL Ltd
<i>OOCL Assurance</i>	11.7.90	G.C. Claye	K.L. Lo, P.T. Galea, Leu Kun Man	OOCL Ltd	OOCL Ltd
<i>OOCL Bravery</i>	20.2.91	S.J. Ivey	D. Slade, J.D. Elsdon, P.K. Thakur	OOCL Ltd	OOCL Ltd
<i>OOCL Challenge</i>	11.2.91	T.N. O'Driscoll	S.J. Edge, G.R. Jackson, P.W.R. Davidson	Beta Maritime Services Ltd	Beta Maritime Services Ltd
<i>OOCL Charger</i>	11.1.91	F.G. Dagger	R.J.P. Knowles, P.R. Jayavant, R.K. Verma	Europe Cruise Line Ltd	Europe Cruise Line Ltd
<i>OOCL Dynasty</i>	22.11.90	P.E. Jackson	M. Henderyckx, A. Pels, Y. Feyerick	P. & O. Containers Ltd	P. & O. Containers Ltd
<i>Orchid B</i>	14.3.89	M.R. Rutter	D.L. Batchelor, P.J. Flanagan, D.E. Foster	P. & O. Ship Management Ltd	P. & O. Ship Management Ltd
<i>Orient Express</i>	*	L.E. Howell	P.M. Frost, P.J. Wilkes, D.S. Sime	CMB N.V. S.A.	CMB N.V. S.A.
<i>Oriental Bay</i>	5.2.91	N.J. Adams	D. Ilderton, A.J. Howlett, W.R. Durrans	P. & O. Containers Ltd	P. & O. Containers Ltd
<i>Ormond</i>	19.2.91	J. Bermimolin	J.A. Tollady, W. Marr	James Fisher & Sons plc	James Fisher & Sons plc
<i>Orielius</i>	14.1.91	W.F. McCarthy	G. Nowell, R. Boughen	Cable & Wireless plc	Cable & Wireless plc
<i>Osaka Bay</i>	29.1.91	N. Kelly	P.A. Ellis, J.B. Appleby, R.M. Watt	J. Marr & Son Ltd	J. Marr & Son Ltd
<i>Pacheco</i>	26.10.90	D. Marr	R. Davidson, P.A. Booker, E.J. Dumazel	James Fisher & Sons plc	James Fisher & Sons plc
<i>Pacific Crane</i>	22.1.91	P.R. Shaw	T.C.R. Riley	A. Watt	A. Watt
<i>Pacific Guardian</i>	31.7.85	S. Morrell			
<i>Pacific Horizon</i>	*	E.W. Griffin			
<i>Pacific Pintail</i>	19.12.90	G. Dodsworth			
<i>Pacific Sandpiper</i>	24.9.90	A.G. Lacey			
<i>Pacific Swan</i>	26.2.91				

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Pacific Teal</i>	13.2.91	P.G. Hobson	B. Miller, B. Elston, C.A. Bates.	P.G. Golson	James Fisher & Sons plc
<i>Pacific Universal</i>	4.3.91	D.S. Winser	P.W. Hickery, A.W. Barr, M.M. Silvestre	E. Seradov	Matheson Shipping Services Ltd
<i>Paqaita</i>	28.3.88	I. Lawson	P. Crowle	K. Kalodimos	Sanders Stevens & Co. Ltd
<i>Pegasus</i>	20.6.86	A. Kaloudis	G. Kossenas	D.W. Ray	Kappa (Maritime) Ltd
<i>Peninsular Bay</i>	18.2.91	J.H. Hutson	R.A. Kenchington, A.C.W. Lipscombe, B.G. Ball	D.A.C. Macrae	P. & O. Containers Ltd
<i>Persesus</i>	4.12.90	T.D. Faithful	G.E.M. Steven, D.J. King, D. Clavering		Kappa (Maritime) Ltd
<i>Pholas</i>	19.6.89	K. MacDonald	P.J. Wilkinson, R.D.M. Low, S.M. Fitzgerald		Coe-Metcalf Shipping Ltd
<i>Pointman</i>	3.1.79	N. Morrison	W. Tullock, A.B. Welch		Rowbotham Tankships Ltd
<i>Pole Star</i>	27.9.90	C.E. Walford	R.L. Hellier, J.W. Trickett, T. Seeman		Northern Lighthouse Board
<i>Pride of Cherbourg</i>	5.11.90	R.A. Shopland	J.M. Webster, A.E. Wooliam, D. Ray		P. & O. Ferries Ltd
<i>Pride of Hampshire</i>	10.12.90	D. Pearce	D.A. Sheridon, S.D. Bell, W.J. Dallimore		P. & O. Ferries Ltd
<i>Pride of Le Havre</i>	4.1.91	P.J. Jarvis	A. King, G. Lewis, C.P. Douglass	P. Irwin	P. & O. Ferries Ltd
<i>Pride of Winchester</i>					
<i>Prince of Scandinavia</i>	5.1.89	M. Paulein	I. Olsen, T. Nielsen, M. Kundun	L. Andersen	DFDS Ltd
<i>Profiler</i>	21.2.91	H.J. Morrell	M. Pountain, R.C. Turner, M. Maines	R. Redhead	Gardline Shipping Ltd
<i>Providence Bay</i>	9.10.90	R. Tracey	A.E. Spencer, D.J. Hinson, A.B. Millar	N.D. Kulkarni	P. & O. Containers Ltd
<i>Puerto Cortes</i>	18.7.90	I.G.R. Griffith	R.J. Smith, R. Krishnan, L.J. Rodrigues	D. Brooks	Sea Containers Ltd
<i>Puma</i>	19.6.90	I.T. Blackley	D.S. Holme, K.N. Metcalfe, D.W. Eccles	S. Venkatesan	P. & O. Ferries Ltd
<i>Pythley</i>	20.12.90	R.W. Warwick	S.B. Tudor, R. Kaushal, R. Kumar	D. Gracias	P. & O. Ship Management Ltd
<i>Queen Elizabeth 2</i>	8.6.89	M.J. Paine	T. Leighton, J. Bennetts	P.G. Furnston	Cunard S.S. Co. Ltd
<i>Rafnes</i>	23.10.90	R.J.A. Copeland	S. Rogers, G. Harrison	I. Wilson	Jebsens Ship Management Ltd
<i>Rapana</i>	9.10.90	M.S. Polson	I. Wemyss, D.L. Coe, T. Jensenover	B.M.M. Magdalene	Shell Ship Management Ltd
<i>Ravensraig</i>	28.6.88	J. Hutton	C.J. Ghee, M. Durgade, — Kotharisa	Aye Maung Yin	Ropner Ship Management Ltd
<i>Reef Jambu</i>	23.11.90	A.J. Wilson	K. Kristansen, Wang Zhi Song, Su Wei Shun	C.L. Kwang	Sembawang Shipping Co. (Pte) Ltd
<i>Reef Manggis</i>	28.12.90	K. Jayakumar	J. Ghosh, A. Ang, M.M. Recto	C.F. Godinho	Sembawang Shipping Co. (Pte) Ltd
<i>Reef Nangka</i>	18.1.91	A.J. Fee	S. Markan, R.R. Das, D.R. Mulato	M.J. McKenny	Egon Oldendorff (H.K.) Ltd
<i>Regina Oldendorff</i>	14.4.88	C.M. Satapathy	K.D. Campbell, P.A. Neville, A.J. Skingley	P.K. Basu	P. & O. Containers Ltd
<i>Remuera Bay</i>	21.5.87	L.M. Wignmore	M.K. Patel, P.D. Nair, L.C. Rodrigues	S.J. Bradshaw	Ocean Transportation S.A.
<i>Resolution</i>	27.2.91	R.T. Wood	J.W. Renson, A.J. Rawlinson	D. Steel	Gardline Shipping Ltd
<i>Revolution Bay</i>	24.5.83	A. Venables	N.E. Lehmann-Taylor, I.S. Norris, P.B. Loughran	P.G. Furnston	P. & O. Containers Ltd
<i>Retriever</i>	28.12.90	K.A.G. Biscoe	P.M. Swan, R.C. Phillips, J. Creagh	D. O'Shaughnessy	Cable & Wireless plc
<i>Rimula</i>	6.12.90	J.H. Lowe	A.E. Darlington, R.D. Gernon, V.C. Dockerty	P.L. Sequerra	Shell Ship Management Ltd
<i>Risnes</i>	22.3.88	X.C. Gomez	G. Lowi, T. Nyunt, P. Hillier	D. MacNeil	Jebsens Ship Management Ltd
<i>Rizun Atlantic</i>	18.5.88	A. Falconer	S. Tiwari, A.K. Ghatak, A.S. Chabra	M. Ryan	Wisebrough Shipping Co. Ltd
<i>Rocknes</i>	22.12.89	A. Falconer	D. Cowell, C.S. Tnlay, J. Chapman	W.J. Smith	Jebsens Ship Management Ltd
<i>Rollnes</i>	25.2.85	J.R. Young	M. D'Arcy, D.W. Wale, J. Enderby		Jebsens Ship Management Ltd
<i>Royal Princess</i>			N.P. Jenkins, J.A. Smith, J.A. Croft		P. & O. Ship Management Ltd

<i>Rozel</i>	3.12.90	N.R. Vardy.....	H. Roberts, C.J. Coleman, R.G. Daley.....	H.G. Pask.....	C.I.F. Management Ltd
<i>Safco Endeavour</i>	16.7.90	L.J.R. Rouse.....	H.R. Beisly, R. Volante.....	R.J. Nummey.....	South Atlantic Fishing Co. Ltd
<i>Sagacity</i>	23.11.84	W.M. Shireff.....	D. Wheeler, J. Duncan, G. Gove.....	N.M. Abbott.....	F.T. Everard & Sons Ltd
<i>St Clair</i>	21.12.90	J. Cowie.....	D.N.R. Roberts, R.I.J. Young, M. Minter-Kemp	N.R. Wadia.....	P. & O. Ferries Ltd
<i>St Helena</i>	15.5.90	M.L.M. Smith.....	P.K. Mishra, A.K. Majumder, R.R. Sharma.....	J. Malaki.....	Curnow Shipping Ltd
<i>San Lorenzo</i>	16.7.90	P. Moore.....	N. Pimentel, C.R. Tingay, C.B. Montenegro.....	C. Crook.....	B.C.P. Ship Management Ltd
<i>Santa Maria</i>	7.9.89	D.S. Ritchie.....	S.W. Turner, J.S. Chapman.....	J. Mitten.....	Denholm Ship Management Ltd
<i>Santos Express</i>	7.6.89	C. Bufton.....	I. Love, R.E.D. Liley, H. Nazmul.....	J.A. Cardownie.....	V-Ships (U.K.) Ltd
<i>Santos Star</i>	8.3.91	R.J. Kendall.....	J.E. Bannister, W.H. Laws, D. Dixon.....	P.M. Haslam.....	Blue Star Ship Management Ltd
<i>Satucket</i>	11.12.90	G.M. Coull.....	F.S. Greenfield, S. West, A. Hayward.....	G. Chapman.....	Mobil Shipping Co. Ltd
<i>Scirocco Universal</i>	3.3.82	R.K. Bilton.....	K. Scott, J.A. Foster.....	C. Thompson.....	C.I. Shipping Ltd
<i>Scotia</i>	10.12.90	S.W. Townsend.....	R. Crawford, A.F. Vincent, A.G. Maclean.....	A. Gurney.....	Dept. of Agr. & Fish. for Scotland
<i>Sea Princess</i>	13.1.88	I.W. Crane.....	D.J. MacLellan, F.W. Wilson, D.J. Massey.....		Blue Star Ship Management Ltd
<i>Sea Searcher</i>	3.11.89	J. Gillies.....	J.C. Coull, R.M. Maclean, I.C. Strachan.....		P. & O. Ship Management Ltd
<i>Seaboard Illustrious</i>	6.11.84	J.R. Brooks.....	I. Galenby, M. Walsh.....		Gardline Shipping Ltd
<i>Seaboard Invincible</i>	24.4.87	P.J. Cooper.....	M. Davies, J.W. Sellick, G. Macleod.....		Seaboard Offshore Ltd
<i>Sealion Columbia</i>	28.12.90	A. Morrice.....	G.C. Harwood, P. Coulson.....		Seaboard Offshore Ltd
<i>Seilean</i>	8.1.91	D. Tobin.....	M.J.G. Garner, J. Ashby, M. Dale.....		Sealion Ltd
<i>Selectivity</i>	2.8.90	T.L. Jeffrey.....	D.E. Grief, N. Sheard, I.G.C. Ferguson.....		B.P. Shipping (SWOP) Ltd
<i>Semac 1</i>	28.8.80	J. Dobson.....	P.J. Gallie, B.P. Telang, B.A. Ryan.....		F.T. Everard & Sons Ltd
<i>Shell Explorer</i>	22.1.91	P. Johnson.....	P. Bland, S. Datta, K.P. Mendonsa.....		Semac Services
<i>Shelland Service</i>	10.12.90	A.J. Clarke.....	M.A. Farn, P.M. Swan, A. Rudge.....		Shell (U.K.) Ltd
<i>Silver Tower</i>	12.2.91	A.I. Scott.....	E.R.C. Bruce, E.K. Dickson, R.A. D'Costa.....		Zapata Offshore Marine Ltd
<i>Singapore Senator</i>	5.7.89	A.G. Moat.....	G.A.W. Fink, L.B. Arroyo, E.B. Borres.....		Wallem Shipmanagement (I.O.M.) Ltd
<i>Sir Eric Sharp</i>	2.4.90	A.A. Porter.....	D.M. Jacobs, E.L. Francis, D.C. Orcules.....		B.C.P. Ship Management Ltd
<i>Sky Clipper</i>	26.10.90	D.R. Mountford.....	M.J. Williams, J.L. Aguilar, A.D. Tan.....		Cable & Wireless plc
<i>Snow Crystal</i>	4.3.91	B. Yelland.....	N.A. Patel, J.H. Lacey, B.A. Singh.....		E. & F. Shipping Management Ltd
<i>Snow Drift</i>	21.12.90	G.W. Weaver.....	A.W.R. Gibbons, B.A. McInally.....		Frigomar Shipping GMBH
<i>Snow Flower</i>	3.1.91	B. Yelland.....	F. Smith.....		Frigomar Shipping GMBH
<i>Snowdon</i>	28.12.90	L.K. Hesketh.....	A. Frost, K. Subramaniam, D. Tokalau.....		P. & O. Ship Management Ltd
<i>Sociality</i>	5.8.88	T.L. Hooper.....	M.W.J. Cossar, P.F. Bayliss.....		F.T. Everard & Sons Ltd
<i>Sonia-M</i>	27.2.90	M.W. Slayman.....	J. Camerson, C.P. Brabban.....		Cardiff Ship Management Ltd
<i>Southella</i>	13.11.90	A. Barkworth.....	G. Watson, M.M. Macleod, I.G. Macneil.....		J. Marr & Son Ltd
<i>Southland Star</i>	21.2.91	D. Craddock.....	A.K. Soe, K.S. Aulakh, M.A. Saderai.....		Blue Star Ship Management Ltd
<i>Speciality</i>	13.6.89	R.G. Davis.....	D.S. Sadler, G.R. Snow, E.J. Cameron.....		F.T. Everard & Sons Ltd
<i>Stability</i>	2.4.90	A.J.A. Richards.....	P.R. Hughes, G.R. Snow, E.C. Neal.....		F.T. Everard & Sons Ltd
<i>Staffordshire</i>	6.3.91	C.O. Thomas.....	M.S. Chabira, J.W. Mampilly.....		Bibby Line Ltd
<i>Star Jasmine</i>	20.6.88	R.V. Crasto.....	D.R.P. Williams, C.M. Lawton.....		Univan Ship Management Ltd
<i>Star Westminster</i>	17.8.89	M.T. Hutton.....	H.W. Ramsey, L.O. Roskell, D. Coombs.....		Texaco Overseas Tankships Ltd
<i>Star Windsor</i>	30.7.90	K.H. Thorne.....	S.G. Beadle, M.V. Dolan, A.F. Ure.....		Texaco Overseas Tankships Ltd
<i>Stainless Spray</i>	20.3.89	M.R. Brown.....			Seamartin Shipping Ltd
<i>Stena Felicity</i>	27.9.88	B.C. Dennis.....			Sealink British Ferries
<i>Stena Normandy</i>	7.8.88	M.A. Whittle.....			Sealink (U.K.) Ltd
<i>Stena Seawell</i>					Stena Ltd
<i>Stolt Birchwood</i>					Stolt Nielsen Inc.

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Stoli Cedarwood</i>	29.9.89	C. Price	S.G. Beadle		Stolt Nielsen Inc.
<i>Stoli Falda</i>	•	—, Mannes	—, Clemens, — Nieto, — Curano		Stolt Nielsen Inc.
<i>Stoli Oakwood</i>	26.6.89	E.R.T. Little	S. James, A. Fennimore, R.T. Watson	M.M. Fahy	Stolt Nielsen Inc.
<i>Strider Isis</i>	17.8.90	G.P. Mandage	C.P. Vegas, W.A. Santos, J.B. Rodrigues	B. Singh	V-Ships (U.K.) Ltd
<i>Strider Juno</i>	22.12.89	A.F. Drury	E.R. Entenza, R.G. Zamora, R.A. Lora	E.G. Santos	V-Ships (U.K.) Ltd
<i>Suilven</i>	19.9.90	J.N. Macdonald	M.J. Buchanan, G. Williamson, T.G. Moore	J.S. Mathers	Caledonian MacBrayne Ltd
<i>Sulsker</i>	10.1.91	T.H. Henderson	M.W.F. Phillips, S. Horsbrough, J.C. Barton		Ministry of Agriculture, Fisheries & Food
<i>Sun Suma</i>	29.2.88	D. MacKinnon	S. Prabhakar, L.T. Richards, Chan Ping Fai	M.L. Kershaw	Vermilion Overseas Management Ltd
<i>Swan Bay</i>	4.5.90	B.V. Stroem	O.K. Johansson, V.F. Arcay, A.H. Doromal	P.C. Penaranda	Swan Shipping A/S
<i>Swan River</i>	17.1.90	R. Bjorkman		L. Eblamo	Swan Shipping A/S
<i>Swift Trader</i>	14.12.88	W.C. Service			International Chartering plc
<i>Tamathai</i>	19.6.90	I. Woodier	D.T. Pingel, R.J. Taylor	G.A. Coutts	Seacot Ship Trading Ltd
<i>Tankerman</i>	16.7.90	R.G. Burnet	S.K. Mitra, A.P. Minocherhomiyi, M.H. Kabir		Rowbotham Tankships Ltd
<i>Tasman Universal</i>	14.8.90	I. Farquharson	C.R. Ford, J. Whitford, H.J. Pearce	S. Bahecrathan	Matheson Shipping Services
<i>Telnes</i>	11.2.91	A. Smart	A.W. Barr, L. Domantay	I.J. Cameron	Jebsens Ship Management Ltd
<i>Toisa Lynx</i>	12.4.88	A. Alexander	M. Bingham, D.J. Ayling		Sealion Ltd
<i>Toisa Puma</i>	21.11.90	C.R. Ungood-Thomas	A.J. Rawlinson, F. Brearley, M. Foster		Dundee, Perth & London Shipping Co.
<i>Toisa Sentinel</i>	20.2.91	W.S. Spence	A. Hooper, J. Martinez, F. Ahmed	M. Pike	B.P. Petroleum Dev. Ltd
<i>Tokyo Bay</i>	8.1.91	C.R. Short	A.W. Lewington, R.J. McLarty, B.L. Brierly	B.G.J. Hughes	P. & O. Containers Ltd
<i>Tolaga Bay</i>	25.1.91	K.H. Davie	I.M. Hill, D.J. Newnes, M.P. Murrison	C.R. Brooks	P. & O. Containers Ltd
<i>Tor Bay</i>	18.1.91	P.A.E. Sambrook	A.P. Talbot, N.R. Hart, I.D. Hebborn	W.H. Coventry	P. & O. Containers Ltd
<i>Tor Scandinavia</i>	15.6.90	H. Zachariassen	H.O. Frederiksen, K. Jeppesen, B. Poulsen		DFDS Ltd
<i>Tribulus</i>	14.6.89	D.J. Conway	J. Cornwall, C.S. Bull, A. Pelson	D. Dalton	Shell Ship Management Ltd
<i>Tricula</i>	4.1.91	C.G. Pogue	J.W. Dickie, A. Murray, G. Harrison	J.M. Philpott	Shell Ship Management Ltd
<i>Trident Bond</i>	8.4.87	P.W. Roberts	A. Suddaby, H. Almajali, M.A.K. Ibrahim	M. Patten	United Arab Shipping Co. (S.A.G.)
<i>Trinidad and Tobago</i> ..	9.10.90	J.S. Gavin	P.J. Harrison, P.B. Solomon, K.M. Duncan	A.G. Thomson	Bibby Line Ltd
<i>Trimity Explorer</i>	29.8.90	E.M. Scott	K.A.M. Molloy, P. Taylor	F. Forde	Trinity House Marine Resources Ltd
<i>Ulan Trader</i>	19.9.90	P. Manilal	V.K. Sood, K.P. Mendonsa, D.P.H.C. Dias	A. Nicholas	B.C.P. Ship Management Ltd
<i>Ullswater</i>	21.2.91	B.J. Kirkley	D.A.M. Williams, N.R. Bahnan, S.L. Pradhan	K. Sridhar	P. & O. Ship Management Ltd
<i>Valdivia</i>	10.12.90	J.D. Dickinson	S.A. Francis, O.E. Daniloff, G. Shaw	D.H. Logie	Harrison (Clyde) Ltd
<i>Venassa</i>	24.10.89	D.S. Leppard	B. Blythe, P. Jeffery, A. Harrison	B. Ryan	Shell Ship Management Ltd
<i>Vic Bilh</i>	8.3.91	G.J. Stevens	W. Dickinson, U.S. Weling, E.B. Quinones	R.C. McCormick	Fairfield Maxwell Services Ltd
<i>Vigilant</i>	8.3.91	D.W. Temple	D.A. Smith, P.C. Waiton, A. McCallum		Dept of Agriculture & Fisheries for Scotland
<i>Vine</i>	•	R.B. Reid	K. Govindarajan, R.J. Gains, R. Srivastava	J. Crasto	P. & O. Ship Management Ltd
<i>Washington</i>	12.10.89	W.G. McNaughton	P.I.E. Quance, M.S. Ahmad	A. Lloyd	Stephenson Clarke Shipping Ltd
<i>Wellington Star</i>	22.11.90	P. Hutchinson	J. Vollmer, O. Tati, J. Tekaraba	P. Clerly	Blue Star Ship Management Ltd
<i>West Moor</i>	23.1.91	D.J. Lloyd	N.C. Horner, E.A. Antolino		Ambra Shipmanagement Ltd
<i>Westra</i>	15.2.91	D.L. Beveridge	A.S.T. Beveridge, I. Beaton		Dept of Agr. & Fish. for Scotland

<i>Wheelsman</i>	17.11.86	P.J. Jameson	J. Whitford	A.F. Clifford	Rowbotham Tankships Ltd
<i>Wiltshire</i>	11.2.91	C.H. Marsh	R.B. Gillett, I.D. Howard, C.D. Dockerty	D.J. O'Leary	Bibby Line Ltd
<i>Woermann Ubangi</i>	*	R.C. Avenin	P. Simbu, H. Shekhar, D. Dias	D.D. Joshi	V-Ships (U.K.) Ltd
<i>World Spear</i>	*	C.M.R. Lloyd	A. Sinha, Y. Singh, M.D. Sawant	D.S. Watwalker	Marine Nav. Co. Ltd
<i>Zenatia</i>	3.4.89	F. Hugo	R.J. Payne, A.D. Watson, R.D.S. Arthur	A.R. Tomkins	Shell Ship Management Ltd
<i>Zidona</i>	27.6.90	D.C.J. Still	M. Stoddart, W.M.H. Crowther, M.J. Gooderham	K. Scargill	Shell Ship Management Ltd

‘Marid’ Ships

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

NAME OF VESSEL	MASTER	OWNERS/ MANAGER
<i>Arco Thames</i>	J. Owens	A.R.C. (Marine) Ltd
<i>Ashington</i>	E. Gaffney	Stephenson Clarke Shipping Ltd
<i>Authenticity</i>	J.L. Taylor	F.T. Everard & Sons Ltd
<i>B. P. Joustier</i>	J. Samson	B.P. Oil Ltd
<i>B. P. Warrior</i>	W.S. Schuller	B.P. Oil Ltd
<i>Beckenham</i>	R. Moody	Bowker & King Ltd
<i>Briarthorn</i>	D.J. Flynn	James Fisher & Sons plc
<i>Bude</i>	P. Gibson	Bowker & King Ltd
<i>City of Swansea</i>	H.R. Pope	United Marine Dredgers Ltd
<i>Devonia</i>	M. Elton	Runwave Ltd
<i>Eastgate</i>	C.M. Tate	Rowbotham Tankships Ltd
<i>Emerald</i>	B. Reed	Stephenson Clarke Shipping Ltd
<i>Esso Avon</i>	F. Clayton	Esso Petroleum Co. Ltd
<i>Esso Clyde</i>	M.G. King	Esso Petroleum Co. Ltd
<i>Esso Fawley</i>	R.W. Noakes	Esso Petroleum Co. Ltd
<i>Esso Mersey</i>	J.H. Smith	Esso Petroleum Co. Ltd
<i>Esso Milford Haven</i>	D. Ling	Esso Petroleum Co. Ltd
<i>Esso Tenby</i>	N. Powell	Esso Petroleum Co. Ltd
<i>Frederick-M</i>	R.G. Vine	Coe-Metcalf Shipping Ltd
<i>Gladonia</i>	K. Melville	Runwave Ltd
<i>Guidesman</i>	J.A. Suter	Rowbotham Tankships Ltd
<i>Harting</i>	J.M. McCuaig	Stephenson Clarke Shipping Ltd
<i>Helen-C</i>	A. Harold	Carisbrooke Shipping Ltd
<i>Helmsman</i>	N.R. Williams	Rowbotham Tankships Ltd
<i>Irishgate</i>	T. Frith	Rowbotham Tankships Ltd
<i>Jubilece</i>	J. Coates	Crescent Shipping Ltd
<i>Malling</i>	C. Tomey	Stephenson Clarke Shipping Ltd
<i>Militence</i>	D. Jeffreys	Crescent Shipping Ltd
<i>Northgate</i>	B. Wilson	Rowbotham Tankships Ltd
<i>Oilman</i>	D. White	Rowbotham Tankships Ltd
<i>Orionman</i>	F.C. Craske	Rowbotham Tankships Ltd
<i>Pride of Portsmouth</i>	B. Hayball	Sealink (U.K.) Ltd
<i>River Trader</i>	G. O'Brien	F.T. Everard & Sons Ltd
<i>Rora Head</i>	J.A. Pretswell	Jebsens Ship Mgmt Ltd
<i>St Columba</i>	J.F. Sinnott	Sealink (U.K.) Ltd
<i>Shell Craftsman</i>	G. Wright	Shell (U.K.) Ltd
<i>Stolt Colina</i>	P. Hill	Stolt Neilsen
<i>Stolt Hacienda</i>	Q. Breggherton	Stolt Neilsen
<i>Stolt Predera</i>	R.R. Black	Stolt Neilsen
<i>Storrington</i>	D. Patrickson	Stephenson Clarke Shipping Ltd
<i>Tillerman</i>	I. Storie	Rowbotham Tankships Ltd
<i>Vibrence</i>	P. Mills	Crescent Shipping Ltd
<i>Welsh Piper</i>	D.J. Jones	British Dredging Aggregate Ltd
<i>Westgate</i>	B. Petch	Rowbotham Tankships Ltd

Light-tower

NAME	MASTER
<i>Royal Sovereign</i>	V.S. Pearce, P. Stafford

Oil Rigs and Platforms

NAME OF RIG OR PLATFORM	OWNERS/OPERATORS
<i>AH001</i>	Amerada Hess Ltd
<i>Beatrice A</i>	B.P. Pet. Development Ltd
<i>Benlomond</i>	Atlantic Drilling Co. Ltd
<i>Benreoch</i>	Atlantic Drilling Co. Ltd
<i>Benvrackie</i>	Atlantic Drilling Co. Ltd
<i>Beryl A</i>	Mobil North Sea Ltd
<i>Beryl B</i>	Mobil North Sea Ltd
<i>Buchan A</i>	B.P. Pet. Development Ltd
<i>Clyde A</i>	B.P. Pet. Development Ltd
<i>Dan Baroness</i>	Lauritzen Offshore
<i>Dan Countess</i>	Midland & Scottish Resources
<i>Deep Sea Pioneer</i>	Hamilton Brothers Oil & Gas Ltd
<i>Dunlin A</i>	Shell U.K. Exploration & Production Ltd
<i>F.G. McClintock</i>	Reading & Bates Ltd
<i>Glomar Arctic 3</i>	Global Marine Ltd
<i>Heather A</i>	Unocal (U.K.) Ltd
<i>John Shaw</i>	Sonat Offshore Ltd
<i>M.G. Hulme Jnr</i>	Reading & Bates Ltd
<i>Montrose A</i>	Amoco (U.K.) Exploration Ltd
<i>Morecombe Bay (API)</i>	Hydrocarbons (G.B.) Ltd
<i>North Sea Pioneer</i>	Hamilton Bros. Oil & Gas Ltd
<i>Ocean Alliance</i>	ODECO (U.K.) Ltd
<i>Ocean Ben Loyal</i>	Atlantic Drilling Co. Ltd
<i>Santa Fe 135</i>	Santa Fe (U.K.) Ltd
<i>Santa Fe 140</i>	Santa Fe (U.K.) Ltd
<i>Sea Explorer</i>	B.P. Pet. Development Ltd
<i>Sedneth 701</i>	Sedco-Forax
<i>Sonat DF 96</i>	Sonat Offshore Ltd
<i>Sonat DF 97</i>	Sonat Offshore Ltd
<i>Sonat Rather</i>	Sonat Offshore Ltd
<i>Thistle A</i>	B.P. Pet. Development Ltd
<i>Viking BD</i>	Conoco (U.K.) Ltd
<i>Western Pacesetter IV</i>	Western Oceanic (U.K.) Ltd

BRITISH COMMONWEALTH

The following lists give the names of Selected and Supplementary Ships, and the number of Auxiliary Ships where known (i.e., those which only report in 'sparse areas'), which voluntarily co-operate with meteorological services of the British Commonwealth. Information for these lists is required by 31 March each year. Information for the January corrective lists is required by 30 September each year.

AUSTRALIA (Information dated 1.2.91)

NAMES OF VESSELS		
Selected Ships:	Selected Ships (contd)	Selected Ships (contd)
<i>Abel Tasman</i>	<i>Flamingo Bay</i>	<i>Maria Bonita</i>
<i>Al Khaleej</i>	<i>Frank Konecny</i>	<i>Mary Durack</i>
<i>Al Qurain</i>	<i>Franklin</i>	<i>Mawashi Al-Gasseem</i>
<i>Al Rayyan</i>	<i>Fua Kavenga</i>	<i>Mawashi Tabuk</i>
<i>Al Shuwaikh</i>	<i>Hanne Bakke II</i>	<i>Mobil Flinders</i>
<i>Anro Australia</i>	<i>Highland Chief</i>	<i>Nivosa</i>
<i>Anro Melbourne</i>	<i>Howard Smith</i>	<i>Ormiston</i>
<i>Arafura</i>	<i>Icebird</i>	<i>Pathfinder II</i>
<i>Ariake</i>	<i>Iron Arnhem</i>	<i>Portland</i>
<i>Arwa</i>	<i>Iron Baron</i>	<i>Rig Seismic</i>
<i>Aurora Australia</i>	<i>Iron Capricorn</i>	<i>River Boyne</i>
<i>Australian Advance</i>	<i>Iron Gippsland</i>	<i>River Embley</i>
<i>Australian Spirit</i>	<i>Iron Kembla</i>	<i>River Torrens</i>
<i>Australian Trader</i>	<i>Iron Kirby</i>	<i>Roberta Jull</i>
<i>Australian Venture</i>	<i>Iron Newcastle</i>	<i>Sedco B.P. 471</i>
<i>B.P. Achiever</i>	<i>Iron Pacific</i>	<i>Southern Surveyor</i>
<i>Bass Trader</i>	<i>Iron Prince</i>	<i>Swan Reefer</i>
<i>Brahman Express</i>	<i>Iron Shortland</i>	<i>TNT Altrans</i>
<i>Buffalo Express</i>	<i>Iron Sturt</i>	<i>TNT Capricornia</i>
<i>C.Y. O'Connor</i>	<i>Iron Whyalla</i>	<i>TNT Carpentaria</i>
<i>Canopus</i>	<i>Island Gas</i>	<i>Tranztas Trader</i>
<i>Capitaine Quiros</i>	<i>Island Seaway</i>	<i>Uniceb</i>
<i>Chekiang</i>	<i>Jabiru Venture</i>	<i>Wyuna</i>
<i>Coral Chief</i>	<i>Joana Bonita</i>	<i>Zincmaster</i>
<i>Danny F</i>	<i>Karina Bonita</i>	
<i>Eigamoiya</i>	<i>Kelvin</i>	Supplementary Ships:
<i>El Cordero</i>	<i>Klang Reefer</i>	<i>Iron Carpentaria</i>
<i>Energy Searcher</i>	<i>Kowulka</i>	<i>Iron Curtis</i>
<i>Fairstar</i>	<i>Lindesay Clark</i>	<i>Iron Monarch</i>
<i>Fernanda F</i>	<i>Mahsuri</i>	<i>Iron Spencer</i>

Auxiliary Ships:

Australia has 4 Auxiliary Ships currently reporting.

CANADA (Information dated 1.1.91)

NAMES OF VESSELS		
Selected Ships	Selected Ships (contd)	Selected Ships (contd)
<i>ASL Cygnus</i>	<i>Arko</i>	<i>Bunga Kantan</i>
<i>Advent</i>	<i>Baffin</i>	<i>C.S.L. Innovator</i>
<i>Alberni Dawn</i>	<i>Bayfield</i>	<i>Calga</i>
<i>Alert</i>	<i>Beiner</i>	<i>Cape Brier</i>
<i>Algobay</i>	<i>Bergen Arrow</i>	<i>Cape Roger</i>
<i>Algoport</i>	<i>Bibi</i>	<i>Chebucto</i>
<i>Ann Harvey</i>	<i>Bluenose</i>	<i>Chennai Nermai</i>
<i>Arctic</i>	<i>Brierfield</i>	<i>Chennai Okkam</i>

Canada (contd)

NAMES OF VESSELS		
Selected Ships (contd)	Selected Ships (contd)	Selected Ships (contd)
<i>Chennai Polivu</i>	<i>James Douglas</i>	<i>Rimba Maranti</i>
<i>Citadel Hill</i>	<i>James Sinclair</i>	<i>Rowan Gorilla III</i>
<i>Copper Yale</i>	<i>John A. Macdonald</i>	<i>Royal Princess</i>
<i>Crane Arrow</i>	<i>John Cabot</i>	<i>Samuel Risley</i>
<i>Cygnus</i>	<i>John P. Tulley</i>	<i>Sauniere</i>
<i>Dawson</i>	<i>Kemano Saga</i>	<i>Sea Princess</i>
<i>Des Groseillers</i>	<i>Leonard J. Cowley</i>	<i>Simon Fraser</i>
<i>Earl Gray</i>	<i>Limnos</i>	<i>Sir Humphrey Gilbert</i>
<i>Eastern Maid</i>	<i>Loftnes</i>	<i>Sir James Douglas</i>
<i>Edward Cornwallis</i>	<i>Louis M. Lauzier</i>	<i>Sir John Franklin</i>
<i>Elso</i>	<i>Louis S. St Laurent</i>	<i>Sir Wilfred Grenfell</i>
<i>Emerald Coast</i>	<i>Louisburg</i>	<i>Sir Wilfred Laurier</i>
<i>F.C.G. Smith</i>	<i>Lucien Paquin</i>	<i>Sir William Alexander</i>
<i>F.P. Clipper</i>	<i>Majuro</i>	<i>Skeena</i>
<i>Federal Maas</i>	<i>Maris Villander</i>	<i>Sky Princess</i>
<i>Fort Kamloops</i>	<i>Martha L. Black</i>	<i>Star Dover</i>
<i>G.B. Reed</i>	<i>Mary Hichens</i>	<i>Star Everwin</i>
<i>George E. Darby</i>	<i>Maxwell</i>	<i>Star Florida</i>
<i>George R. Pearkes</i>	<i>Nahidik</i>	<i>Star Fraser</i>
<i>Goldensari Indah</i>	<i>Namao</i>	<i>Star Hong Kong</i>
<i>Great Jade</i>	<i>Nandu Arrow</i>	<i>Star Magnate</i>
<i>Great Pearl</i>	<i>New Zealand Alliance</i>	<i>Star of New York</i>
<i>Great Prize</i>	<i>Nomadic Mermaid</i>	<i>Star Sulu</i>
<i>Grena</i>	<i>Nordglimt</i>	<i>Summerfield</i>
<i>Grenfell</i>	<i>Nordkyn</i>	<i>Sun Princess</i>
<i>Harmac Dawn</i>	<i>Norman McLeod Rogers</i>	<i>Thor I</i>
<i>Helena Oldendorff</i>	<i>Pacific Princess</i>	<i>Thorscape</i>
<i>Henry Larsen</i>	<i>Pandora II</i>	<i>Trudy</i>
<i>Hudson</i>	<i>Panther</i>	<i>Tupper</i>
<i>Irving Arctic</i>	<i>Parizeau</i>	<i>United Approach</i>
<i>Irving Canada</i>	<i>Peterfield</i>	<i>Vector</i>
<i>Irving Eskimo</i>	<i>Pierre Radisson</i>	<i>W.E. Ricker</i>
<i>Irving Ocean</i>	<i>Portland Carrier</i>	<i>W.M. Vacyash</i>
<i>Island Princess</i>	<i>Practician</i>	<i>Wilfred Templeman</i>
<i>J.C. Phillips</i>	<i>Princess of Acadia</i>	<i>Yankee Clipper</i>
<i>J.E. Bernier</i>	<i>Quedoc</i>	
<i>Jackman</i>	<i>Raven Arrow</i>	

Auxiliary Ships:

Canada has 191 ocean-going Auxiliary Ships and 106 Auxiliary Ships operating on the Great Lakes and inland waters.

HONG KONG (Information dated 31.3.91)

NAMES OF VESSELS		
Selected Ships:	Selected Ships (contd)	Selected Ships (contd)
<i>Anna</i>	<i>C.D. Abidjan</i>	<i>General Tirona</i>
<i>Asian Jade</i>	<i>C.D. Pointe Noire</i>	<i>Gonosan</i>
<i>Asian Pearl</i>	<i>Delmas Bougainville</i>	<i>Halldor</i>
<i>Boonkrong II</i>	<i>Eastern Harmony</i>	<i>Hawk Arrow</i>
<i>Brooklyn Bridge</i>	<i>Eriskay</i>	<i>Jutlandia</i>
<i>Bunga Kantan</i>	<i>Fair Bridge</i>	<i>Kamaleverett</i>
<i>Bunga Suria</i>	<i>Gallantry</i>	<i>Kwangtung</i>

Hong Kong (contd)

NAMES OF VESSELS

Selected Ships (contd)	Selected Ships (contd)	Selected Ships (contd)
<i>Kweilin</i>	<i>OOCL Fair</i>	<i>Shensi</i>
<i>Maersk Semakau</i>	<i>OOCL Faith</i>	<i>Talabot</i>
<i>Mah IV</i>	<i>OOCL Fortune</i>	<i>Tampa</i>
<i>Maritime Alliance</i>	<i>OOCL Freedom</i>	<i>Willine Orient</i>
<i>Maritime Champion</i>	<i>OOCL Honour</i>	
<i>Maritime Express</i>	<i>OOCL Hope</i>	Supplementary Ships:
<i>Maritime Goliath</i>	<i>Ocean Centaurus</i>	<i>General Delgabo</i>
<i>Maritime Grace</i>	<i>Ocean Competence</i>	<i>General Villa</i>
<i>Maritime Hibiscus</i>	<i>Ocean Elite</i>	<i>Maersk Tauro</i>
<i>Maritime Joy</i>	<i>Ocean Pearl</i>	<i>Maritime Faith</i>
<i>Maritime Loyalty</i>	<i>Ocean Sincerity</i>	<i>Maritime Triumph</i>
<i>Maritime Noble</i>	<i>Ocean Sirius</i>	<i>Maritime Victory</i>
<i>Maritime Success</i>	<i>Ocean Strength</i>	<i>Oriental Knight</i>
<i>Musing</i>	<i>Oriental Expert</i>	<i>Oriental Patriot</i>
<i>New Oasis</i>	<i>Oriental Explorer</i>	<i>Roseeverett</i>
<i>OOCL Advance</i>	<i>Osprey Arrow</i>	<i>Seamaster I</i>
<i>OOCL Alliance</i>	<i>R.R. Ratna</i>	<i>Shaplaeverett</i>
<i>OOCL Ambition</i>	<i>Raya Happiness</i>	<i>Silver Clipper</i>
<i>OOCL Charity</i>	<i>Red Sea Pioneer</i>	<i>Success Bulker</i>
<i>OOCL Executive</i>	<i>Sea Architect</i>	<i>Thomaseverett</i>
<i>OOCL Exporter</i>	<i>Selandia</i>	<i>World Ranger</i>

Auxiliary Ships:

Hong Kong also has 1 Auxiliary Ship currently reporting.

INDIA (Information dated 1.1.91)

NAMES OF VESSELS

Selected Ships:	Supplementary Ships:	Supplementary Ships (contd)
<i>Akbar</i>	<i>A.B. Tarapore</i>	<i>Chennai Polivu</i>
<i>Andamans</i>	<i>APJ Anand</i>	<i>Chennai Valarchi</i>
<i>Arunachal Pradesh</i>	<i>APJ Angad</i>	<i>Chennai Veeram</i>
<i>B.R. Ambedkar</i>	<i>APJ Anjali</i>	<i>Chhatrapati Shivaji</i>
<i>Bharatendu</i>	<i>APJ Priti</i>	<i>Dadabhai Naoroji</i>
<i>Bhavbhuti</i>	<i>APJ Priya</i>	<i>Dakshineswar</i>
<i>Harshavardhan</i>	<i>APJ Shalin</i>	<i>Diglipur</i>
<i>Jala Jyoti</i>	<i>APJ Sushma</i>	<i>Dweep Setu</i>
<i>Jala Yamini</i>	<i>Aditya Usha</i>	<i>FONJ Shekon PVC</i>
<i>Lokmanya Tilak</i>	<i>Alakanda</i>	<i>Ganga Sagar</i>
<i>Ratna Nandini</i>	<i>Lt Arun Khetrapal PVC</i>	<i>Guru Bachhan Singh Salaria</i>
<i>Sagar Kanya</i>	<i>Aurobindo</i>	<i>Hardwar</i>
<i>Sagar Sampada</i>	<i>Bhagat Singh</i>	<i>Harkishan</i>
<i>Samudra Manthan</i>	<i>Bharat Seema</i>	<i>Har Govind</i>
<i>State of Andhra Pradesh</i>	<i>Chandidas</i>	<i>Har Rai</i>
<i>State of Nagaland</i>	<i>Chennai Muyarchi</i>	<i>Havildar Abdul Hamid</i>
<i>Vishnu Sagar</i>	<i>Chennai Perumai</i>	<i>Homi Bhabha</i>

INDIA (Contd)

NAMES OF VESSELS

Supplementary Ships (contd)	Supplementary Ships (contd)	Supplementary Ships (contd)
<i>Indian Endurance</i>	<i>Kabirdas</i>	<i>Sagar Deep</i>
<i>Indian Explorer</i>	<i>Kalidas</i>	<i>Sagar Samrat</i>
<i>Indian Faith</i>	<i>Kanchan Junga</i>	<i>Sai Nanak</i>
<i>Indian Fame</i>	<i>Kanpur</i>	<i>Samarat Ashok</i>
<i>Indian Fraternity</i>	<i>Kolandia</i>	<i>Samudra Jyoti</i>
<i>Indian Freedom</i>	<i>Lance Naik Albert Ekka</i>	<i>Sarojini Naidu</i>
<i>Indian Goodwill</i>	<i>Lok Maheshwari</i>	<i>Satya Murti</i>
<i>Indian Grace</i>	<i>Lok Prakash</i>	<i>Skandy Surveyor</i>
<i>Indian Industry</i>	<i>Lok Pratima</i>	<i>State of Gujarat</i>
<i>Indian Progress</i>	<i>Lok Preeti</i>	<i>State of Haryana</i>
<i>Indian Prosperity</i>	<i>Lok Rajeshwari</i>	<i>State of Madhya Pradesh</i>
<i>Indian Reliance</i>	<i>Lok Vikas</i>	<i>State of Manipur</i>
<i>Indian Resource</i>	<i>Lok Vinya</i>	<i>State of Orissa</i>
<i>Indian Renown</i>	<i>Lok Vivek</i>	<i>Subhedar Joginder Singh</i>
<i>Indian Triumph</i>	<i>MMP Wealth</i>	<i>Teesta</i>
<i>Indian Valour</i>	<i>Maharshi Dayanand</i>	<i>Tulsidas</i>
<i>Indian Venture</i>	<i>Maharshi Karve</i>	<i>Unibaksh</i>
<i>INS Kripan</i>	<i>Major Dhansingh Thapa PVC</i>	<i>Uttar Kashi</i>
<i>Jag Anjali</i>	<i>Mandakini</i>	<i>Vallabhbhai Patel</i>
<i>Jag Dharma</i>	<i>Maratha Elegance</i>	<i>Varanasi</i>
<i>Jag Doot</i>	<i>Maratha Melody</i>	<i>Varuna Adhar</i>
<i>Jag Jeevan</i>	<i>Maratha Prudence</i>	<i>Vishva Abha</i>
<i>Jag Manek</i>	<i>Meghdoot</i>	<i>Vishva Ajay</i>
<i>Jag Pari</i>	<i>Meghrab</i>	<i>Vishva Ambar</i>
<i>Jag Prabhat</i>	<i>Mizoram</i>	<i>Vishva Asha</i>
<i>Jag Prakesh</i>	<i>Motilal Nehru</i>	<i>Vishva Bandhan</i>
<i>Jag Preeti</i>	<i>Murshidabad</i>	<i>Vishva Karuna</i>
<i>Jag Rekha</i>	<i>Naik Jadunath Singh PVC</i>	<i>Vishva Kaumudi</i>
<i>Jag Skakti</i>	<i>Nand Hari</i>	<i>Vishva Madhuri</i>
<i>Jag Shanti</i>	<i>Nand Kala</i>	<i>Vishva Manta</i>
<i>Jag Vijay</i>	<i>Nand Kavita</i>	<i>Vishva Mohini</i>
<i>Jag Vivek</i>	<i>Nand Kishore</i>	<i>Vishva Nandini</i>
<i>Jagat Samrat</i>	<i>Nand Nidhi</i>	<i>Vishva Nayak</i>
<i>Jagat Swamini/ Priyamvada</i>	<i>Nand Rati</i>	<i>Vishva Pallav</i>
<i>Jagat Vijeta</i>	<i>Nand Srishti</i>	<i>Vishva Pankaj</i>
<i>Jala Bala</i>	<i>Netaji Subhash Bose</i>	<i>Vishva Parag</i>
<i>Jala Gauri</i>	<i>Nirvan Vishnu</i>	<i>Vishva Parijat</i>
<i>Jala Godavari</i>	<i>Nitya Amar</i>	<i>Vishva Parimal</i>
<i>Jala Mohan</i>	<i>Onge</i>	<i>Vishva Shakti</i>
<i>Jala Mokambi</i>	<i>Patliputra</i>	<i>Vishva Shobha</i>
<i>Jala Mudra</i>	<i>Prabhu Das</i>	<i>Vishva Siddhi</i>
<i>Jala Murugan</i>	<i>Prabhu Daya</i>	<i>Vishva Tarang</i>
<i>Jala Tapi</i>	<i>Prabhu Gopal</i>	<i>Vishva Umang</i>
<i>Jala Vallabh</i>	<i>Prabhu Puni</i>	<i>Vishva Vikram</i>
<i>Jala Vijaya</i>	<i>Prabhu Satram</i>	<i>Vishva Yash</i>
<i>Jameela</i>	<i>Rafi Ahmed Kidwai</i>	<i>Vishwesharayya</i>
<i>Jay Ambika</i>	<i>Ramdas</i>	<i>Vivekananda</i>
<i>Jay Laxmi</i>	<i>Ratna Vandana</i>	<i>Yerawa</i>
<i>Jay Narayan Vyas</i>	<i>Ravidas</i>	<i>Zakir Hussain</i>

Auxiliary Ships:

India also has a fleet of 35 Auxiliary Ships currently reporting.

NEW ZEALAND (Information dated 1.2.91)

NAMES OF VESSELS		
Selected Ships:	Selected Ships (<i>contd</i>)	Selected Ships (<i>contd</i>)
<i>ACT 3</i>	<i>James Cook</i>	<i>Tarahiko</i>
<i>ACT 4</i>	<i>Kaharoa</i>	<i>Tasman Enterprise</i>
<i>ACT 5</i>	<i>Kotuku</i>	<i>Tasman Venture</i>
<i>Amokura</i>	<i>Kuaka</i>	<i>Tui Cakau III</i>
<i>Aotea</i>	<i>Mandama</i>	<i>Union Auckland</i>
<i>Auckland Express</i>	<i>New Zealand Mariner</i>	<i>Union Endeavour</i>
<i>California Star</i>	<i>New Zealand Pacific</i>	<i>Union Rotoiti</i>
<i>Canterbury Express</i>	<i>Pacific Ariki</i>	<i>Union Rotorua</i>
<i>Capitaine Tasman</i>	<i>Pioneer Tween</i>	<i>World Spring</i>
<i>Cotswold Prince</i>	<i>Polynesian Link</i>	
<i>Forum New Zealand II</i>	<i>Rapuhia</i>	Supplementary Ships:
<i>Foraum Papua New Guinea</i>	<i>Spirit of Competition</i>	<i>Arahanga</i>
<i>Forum Samoa</i>	<i>Spirit of Freedom</i>	<i>Arahura</i>
<i>Golden Bay</i>	<i>Swan Tide</i>	<i>Aratika</i>
<i>Gondwana</i>	<i>Taiko</i>	

Auxiliary Ships:

New Zealand has a fleet of 13 Auxiliary Ships currently reporting.



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