

CONTENTS

	<i>Page</i>
Drought classifications and a study of droughts at Kew. R. C. Tabony ..	1
Satellite infra-red nephanalyses. E. C. Barrett and R. Harris	11
Some aspects of satellite analysis at CFO. F. Singleton	25
The occurrence of falling snow over the United Kingdom. M. C. Jackson	26
Appointment	39
Notes and news	
Retirement of Mr G. R. R. Benwell	39
Halley Lecture	40
Obituary	40
Corrections	40

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of *Meteorological Magazine* beginning with Volume 54 are now available in microfilm form from University Microfilms Ltd, St Johns Road, Tylers Green, High Wycombe, Buckinghamshire, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, NW1 7DX, London, England.

Issues in microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 290748 K16 1/77

ISBN 0 11 724707 3

CONTENTS

	<i>Page</i>
Retirement of Mr N. Bradbury	41
Information on the thermal structure of the atmospheric boundary layer from acoustic sounding. B. A. Crease, S. J. Caughey and D. T. Tribble	42
The annual course of some indices of the zonal and meridional circulation in middle latitudes of the northern hemisphere. M. K. Miles	52
Reviews	
Radioisotopes and global transport in the atmosphere. I. L. Karol', <i>A. F. Tuck</i>	66
Correction	67

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms Ltd, St Johns Road, Tylers Green, High Wycombe, Buckinghamshire, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, NW1 7DX, London, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 290748 K16 2/77

ISBN 0 11 724708 1

CONTENTS

	<i>Page</i>
The contribution of a weather radar network to forecasting frontal precipitation—a case study. F. F. Hill, K. W. Whyte and K. A. Browning	69
The Meteorological Magazine 1866–1977	89
Awards	
L. G. Groves Memorial Prizes and Awards	91
Meteorological Office awards to captains and navigators of civil airlines	93
Review	
Topics in applied physics, Volume 12—Turbulence. P. Bradshaw (editor). <i>P. J. Mason</i>	93
Letter to the Editor	94
Obituary	96
Corrections	96

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of *Meteorological Magazine* beginning with Volume 54 are now available in microfilm form from University Microfilms Ltd, St Johns Road, Tylers Green, High Wycombe, Buckinghamshire, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24–28 Oval Road, NW1 7DX, London, England.

Issues in microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge

and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 290748 K16 3/77

ISBN 0 11 724709 X

CONTENTS

	<i>Page</i>
Monthly rainfall totals representing the east Midlands for the years 1726 to 1975. J. M. Craddock and B. G. Wales-Smith	97
Agrometeorological use of the synoptic data bank in plant disease warning services. R. J. Adams and Judith M. Seager	112
Rainfall criteria for urban drainage design. J. F. Keers	117
Reviews	
The weather almanac (first edition). J. A. Ruffner and F. E. Blair (editors). <i>P. G. F. Caton</i>	126
British weather disasters. Ingrid Holford. <i>J. S. Hopkins</i>	127
The physics of atmospheric ozone. A. Kh. Khrgian. <i>E. L. Simmons</i> ..	127
Obituaries	128

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K16 4/77

ISBN 0 11 724710 3

CONTENTS

	<i>Page</i>
The 1975/76 drought over the United Kingdom—hydrometeorological aspects. R. Murray	129
A synoptic climatologist's viewpoint of the 1975/76 drought. R. A. S. Ratcliffe	145
Atmospheric circulation during the severe drought of 1975/76. M. K. Miles	154
Honour	164
Notes and news	
Upper-air observations at St Helena	164
North Atlantic Ocean Stations	164

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K16 5/77

ISBN 0 11 724711 1

CONTENTS

	<i>Page</i>
A further comparison of 50-millibar geopotentials obtained from satellite infra-red spectrometer soundings and analysed charts. V. Bailey ..	165
A numerical index to monitor the Afro-Asian monsoon during the northern summers. J. Findlater	170
Noctilucent clouds over western Europe and the Atlantic during 1976. D. H. McIntosh and Mary Hallissey	181
Evaluating the probability of heavy rain. M. C. Jackson	185
Reviews	
The measurement of airborne particles. R. D. Cadle. <i>A. C. Chamberlain</i>	193
Physical principles of micrometeorological measurements, Developments in Atmospheric Science, 6. P. Schwerdtfeger, <i>N. Thompson</i>	193
Notes and news	
Retirement of Mr. R. Murray	194

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K16 6/77

ISBN 0 11 724712 X

CONTENTS

	<i>Page</i>
The magnitude of the horizontal divergence and the vertical component of vorticity in the surface wind field over the ocean. W. V. Burt, T. Cummings and C. A. Paulson	197
The Meteorological Office digital anemograph logging equipment (DALE). A. E. Burtonshaw and N. Munro	204
The relationship between the strength of the quasi-biennial oscillation in the equatorial stratosphere and the mean anomaly of the monthly mean maximum screen temperature at Oxford. J. D. Perry	212
Maximum summer temperatures recorded in Glaisher stands and Stevenson screens. Joyce Laing	220
Organization of the COST 72 Technical Conference and Exhibition at the University of Reading, September 1976. K. J. T. Sands	228
Review	
Statistical fluid mechanics: mechanics of turbulence, Volume 2. A. S. Monin and A. M. Yaglom. <i>F. B. Smith</i>	230
Notes and news	
Retirement of Mr R. A. S. Ratcliffe	231

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K16 7/77

ISBN 0 11 724713 8

CONTENTS

	<i>Page</i>
The use of wet-bulb potential temperature charts. T. A. M. Bradbury ..	233
Some experiments to control the buoyancy of extensible balloons in the stratosphere. J. S. Foot, E. L. Simmons and A. E. Whittaker ..	251
The contribution of extratropical severe storms to the stratospheric water-vapour budget. S. R. Mattingly	256
Notes and news	
Seychelles joins WMO	262
Meteorological services for civil aviation in Cyprus	262
The meteorological office at Salālah	262
New posts in agricultural meteorology	263
Improved system for estimation of evaporation and soil moisture deficits	263
Warnings of synoptic developments for the Central Electricity Generating Board	263
Stratospheric air sampler	263
GATE data from the Meteorological Research Flight	263
Low-level measurements of turbulence over the sea	263
Reception of VHRR pictures at Lasham	264
European Centre for Medium-range Weather Forecasts	264

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K16 8/77

ISBN 0 11 724714 6
ISSN 0026-1149

CONTENTS

	<i>Page</i>
Sir Graham Sutton, C.B.E., F.R.S.	265
A homogeneous record of monthly rainfall totals for Norwich for the years 1836 to 1976. J. M. Craddock	267
The spatial variability of daily temperatures and sunshine over uniform terrain. J. S. Hopkins	278
Reviews	
The climate of the British Isles. T. J. Chandler and S. Gregory (editors). <i>K. J. Bignell</i>	292
Radiative processes in meteorology and climatology, <i>Developments in Atmospheric Science</i> , 5. G. W. Paltridge and C. M. R. Platt. <i>G. E. Hunt</i>	293
The climate of Japan, <i>Developments in Atmospheric Science</i> , 8. E. Fukui (editor). <i>P. A. Smithson</i>	295
Award	296
Notes and news	
Secondment of Dr G. E. Hunt	296
Announcement	296
Obituary	296

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K16 9/77

ISSN 0 11 724715 4
ISSN 0026-1149

CONTENTS

	<i>Page</i>
An analysis of monthly potential evaporation totals representative of Kew from 1698 to 1976. B. G. Wales-Smith	297
A statistical study of the likely causative factors in the climatic fluctuations of the last 100 years. M. K. Miles and P. B. Gildersleeves	314
Reviews	
Optics of the atmosphere—scattering by molecules and particles. E. J. McCartney. <i>G. E. Hunt</i>	322
Climates of the Soviet Union, World Survey of Climatology, Volume 7. P. E. Lydolph. <i>J. G. Lockwood</i>	323
Light scattering in planetary atmospheres. V. V. Sobolev. <i>G. E. Hunt</i>	324
Tree rings and climate. H. C. Fritts. <i>J. M. Craddock</i>	326
Frank Henry Ludlam, D.Sc., D.I.C.	327

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K15 10/77

ISBN 0 11 724716 2
ISSN 0026-1149

CONTENTS

	<i>Page</i>
The exceptional heat-wave of 27 June to 8 July 1976. M. S. Shaw	329
Marked backing of westerly and north-westerly winds over the Irish Sea due to differential heating over land and sea. A. K. Kemp	347
The World Meteorological Organization Technical Conference on Instruments and methods of observation (TECIMO), Hamburg, Federal Republic of Germany, 27-30 July 1977. D. N. Axford	356
Reviews	
The physics of atmospheres. J. T. Houghton. <i>P. R. Jonas</i>	358
Stratocumulus undulatus at St Mawgan	360
Obituary	360

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© *Crown copyright* 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Annual subscription £10.68 including postage

Dd. 497684 K15 11/77

ISBN 0 11 724717 0

ISSN 0026-1149

CONTENTS

	<i>Page</i>
Rainfall at Oxford from 1767 to 1814, estimated from the records of Dr Thomas Hornsby and others. J. M. Craddock and Eveline Craddock ..	361
An unusual lightning incident in Singapore. J. E. Pakiam and A. Rajaratnam	372
Rainfall recording in the British Isles 1677-1977. R. P. W. Lewis ..	378
Silver Jubilee Exhibition at the Royal Society, London. F. R. Hayes ..	380
Reviews	
Introduction to meteorology (second edition). F. W. Cole. <i>P. D. Borrett</i>	381
Annual Report of the Central Water Planning Unit for the year ending 31st March 1976. Central Water Planning Unit. <i>B. G. Wales-Smith</i>	382
Ministry of Agriculture, Fisheries and Food Technical Bulletin 35, The Agricultural Climate of England and Wales (Areal Averages 1941-70). L. P. Smith. <i>J. P. Hudson</i>	382
Earth, the living planet. M. Bradshaw. <i>J. R. Starr</i>	384
Meteorological Magazine: price increase	385
Notes and news	
International comparison of Dobson ozone spectrophotometers ..	385
Association of British Climatologists	386
Retirement of Mr W. D. S. McCaffery	386
Obituary	387
Correction	388

NOTICES

It is requested that all books for review and communications for the Editor be addressed to the Director-General, Meteorological Office, London Road, Bracknell, Berkshire, RG12 2SZ, and marked 'For Meteorological Magazine'.

The responsibility for facts and opinions expressed in the signed articles and letters published in this magazine rests with their respective authors.

Complete volumes of 'Meteorological Magazine' beginning with Volume 54 are now available in microfilm form from University Microfilms International, 18 Bedford Row, London WC1R 4EJ, England.

Full size reprints of out-of-print issues are obtainable from Johnson Reprint Co. Ltd, 24-28 Oval Road, London NW1 7DX, England.

Issues in Microfiche starting with Volume 58 may be obtained from Johnson Associates Inc., P.O. Box 1017, Greenwich, Conn. 06830, U.S.A.

© Crown copyright 1977

Printed in England by Heffers Printers Ltd, Cambridge
and published by

HER MAJESTY'S STATIONERY OFFICE

80p monthly

Dd. 497684 K15 12/77

Annual subscription £10.68 including postage

ISBN 0 11 724718 9
ISSN 0026-1149