

CONTENTS

| | <i>Page</i> |
|---|-------------|
| Effects of urbanization on long-term changes of winter temperature in the London region. E. N. Lawrence ... | 1 |
| Clear-air turbulence over the North Atlantic; some notably turbulent periods. J. C. Lennie | 9 |
| The comparison of subjective and objective upper air forecasts for aviation (Part I). I. H. Chuter | 19 |
| Reviews | |
| Kinetics of phase transitions of water in the atmosphere. L. G. Kachurin and V. G. Morachevskii. <i>J. T. Bartlett</i> | 28 |
| Measurement and estimation of evaporation and evapotranspiration. WMO Tech. Note No. 83. <i>J. B. Stewart</i> | 29 |
| Notes and news | |
| Kew Observatory | 30 |
| Lightning strike at RAF Chivenor, Devon | 31 |
| Weather watch in the Arctic | 31 |
| Obituary | 31 |
| Corrigendum | 31 |

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, 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|--|-------------|
| Forecasting rainfall for the summer season in England and Wales. R. A. S. Ratcliffe and P. Collison | 33 |
| Studies of temperature in the forest of Thetford Chase — Spring 1967. G. W. Hurst | 39 |
| The comparison of subjective and objective upper air forecasts for aviation. (Part II). I. H. Chuter | 49 |
| Some observations of night minimum road temperatures. J. S. Hay | 55 |
| Awards L. G. Groves Memorial Prizes and Awards | 59 |
| Review Formation of precipitation and modification of hail processes. G. K. Sulakvelidze, N. Sh. Bibilashvili and V. F. Lapcheva. <i>K. A. Browning</i> | 61 |

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, 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|--|-------------|
| Some aircraft reports of high-level turbulence. W. T. Roach | 65 |
| The variability, with time and location, of spring and summer temperatures in the United Kingdom. G. W. Hurst ... | 78 |
| A short investigation into the relationship between the duration of sunshine and total cloud amount. F. B. Webster | 87 |
| A further note on the heavy rainfall of 10 July 1968. P. R. S. Salter | 92 |
| International Conference on Cloud Physics, Toronto, August 1968. J. Drake | 94 |
| Official publication | 95 |

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, 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

Dd. 137770 K16 3/69

SBN 11 400060 3

CONTENTS

| | <i>Page</i> |
|---|-------------|
| Diurnal variation of the incidence of monsoon rainfall over the Sudan (Part I). D. E. Pedgley | 97 |
| Accuracy of forecasting night minimum air temperatures by the method due to Saunders. L. P. Steele, P. A. J. Stroud and S. E. Virgo, O.B.E. | 107 |
| Rain, wind and the aerodynamic characteristics of rain-gauges. A. C. Robinson and J. C. Rodda | 113 |
| Thirteenth Radar Meteorology Conference. K. A. Browning | 120 |
| Reviews | |
| A note on climatological normals, WMO Tech. Note No. 84. <i>E. N. Lawrence</i> | 122 |
| The encyclopedia of atmospheric sciences and astrogeology. Rhodes W. Fairbridge. <i>E. Knighting</i> | 123 |
| Meteorology and atomic energy 1968. Edited by David H. Slade. <i>F. B. Smith</i> | 124 |
| Letters to the Editor | 126 |
| Honours | 127 |
| Obituary | 127 |
| Official publication | 127 |

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, 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|---|-------------|
| Diurnal variation of the incidence of monsoon rainfall over the Sudan (Part II). D. E. Pedgley | 129 |
| Visibility variations at London/Heathrow Airport. J. Briggs | 135 |
| A relationship between minimum air temperatures and duration of frost in late spring. J. Cochrane | 138 |
| Prediction of monthly rainfall over England and Wales from 15-day and monthly mean troughs at 500 mb. R. Murray | 141 |
| The onset of the Indian south-west monsoon and extra-tropical 500-mb trough and ridge patterns over Europe and Asia. P. D. de la Mothe and P. B. Wright | 145 |
| Reviews | |
| The antarctic atmosphere: Climatology of the troposphere and lower stratosphere, Folio 4, and Climatology of the surface environment, Folio 8. Edited by Vivian C. Bushnell. <i>D. W. S. Limbert</i> | 156 |
| Air pollution. R. S. Scorer. <i>F. Pasquill</i> | 157 |
| Environmental study. J. B. Rigg. <i>F. R. Dobson</i> | 158 |
| Obituaries | 159 |

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, 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.

All inquiries relating to the insertion of advertisements in the *Meteorological Magazine* should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|--|-------------|
| Foreword. The Director-General of the Meteorological Office ... | 161 |
| The 200-years' story of Kew Observatory. L. Jacobs ... | 162 |
| Kew Observatory and the National Physical Laboratory. H. Barrell | 171 |
| Some reminiscences of Kew Observatory in the twenties. F. J. Scrase | 180 |
| The British radiosonde : its debt to Kew. D. N. Harrison | 186 |
| Air-land interaction, fog, atmospheric opacity — a miscellany. G. D. Robinson | 190 |
| Development of rocket and satellite experiments at Kew Observatory, 1959-61. K. H. Stewart | 195 |
| Reviews | |
| Die Wissenschaft vom Wetter. H. Reuter. <i>G. A. Bull</i> ... | 197 |
| Der Aufbau der Erdatmosphäre. H. Faust. <i>M. K. Miles</i> ... | 197 |
| Seasonable weather. L. P. Smith. <i>E. J. Gilbert</i> | 199 |
| Correction | 199 |

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, 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|--|-------------|
| The summer weather of 1968: related atmospheric circulation and sea temperature patterns. R. Murray and R. A. S. Ratcliffe | 201 |
| Noctilucent clouds over western Europe during 1968. J. Paton | 219 |
| Kew — the National Radiation Centre. R. H. Collingbourne | 223 |
| Review | |
| Graphical rational patterns, a new approach to graphical presentation of statistics. Roberto Bachi. <i>J. M. Craddock</i> | 231 |
| Obituary | 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, 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|--|-------------|
| The lag of the humidity sensor in the British radiosonde. J. F. R. McIlveen and F. H. Ludlam | 233 |
| Estimates of the duration of short-period rainfall rates based on clock-hour values. J. Briggs and J. A. Harker ... | 246 |
| Distribution of precipitation and the variation of visibility in precipitation. W. D. Summersby | 252 |
| Notes and news | |
| Cloud physics research in Czechoslovakia. P. R. Jonas ... | 259 |
| Reviews | |
| The measurement of environmental factors in terrestrial ecology. Edited by R. M. Wadsworth. <i>R. W. Gloyne</i> | 260 |
| Exploring the atmosphere. Second edition. G. M. B. Dobson. <i>R. A. Hamilton</i> | 261 |
| Statistics in the computer age. J. M. Craddock. <i>G. A. Bull</i> | 262 |
| Award | 263 |
| Corrections | 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|---|-------------|
| Sunshine and solar radiation in Singapore. Chia Lin Sien | 265 |
| Some relationships between the 100-millibar chart and surface weather. N. E. Davis | 274 |
| Minimum road temperatures. G. E. Parrey | 286 |
| Forecasting night minimum air temperature by a regression equation. J. Gordon, J. D. Perry and S. E. Virgo ... | 290 |
| Honours | 292 |
| Notes and news | |
| Retirement of Commander C. E. N. Frankcom, O.B.E. ... | 293 |
| Reviews | |
| The weather business. Bruce W. Atkinson. <i>S. E. Virgo</i> ... | 294 |
| Climate and weather. Hermann Flohn. <i>R. A. Murray</i> ... | 295 |
| Correction | 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|---|-------------|
| Night minimum temperatures at or near various surfaces W. G. Ritchie | 297 |
| A determination of the albedo of Morecambe Bay north of a line from Aldingham to Bare. V. C. Bendelow | 305 |
| Forecasting the movement of isallobars into eastern England J. M. Nicholls and G. A. Corfield | 309 |
| Meteorological rocket soundings from Gan. R. J. Shearman | 318 |
| Obituaries | 324 |

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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. monthly

Annual subscription £2 7s. including postage

CONTENTS

| | <i>Page</i> |
|---|-------------|
| Forecasting large 24-hour rainfall totals in the Dee and Clwyd River Authority Area from March to August. C. A. S. Lowndes | 325 |
| An empirical approach to forecasting grass minimum temperatures and the probability of grass minima below 0°C in eastern England. L. P. Steele, P. A. J. Stroud and S. E. Virgo, O.B.E. | 340 |
| An investigation into the depression of the grass minimum temperature below the air minimum temperature at Cottesmore. A. G. Sills | 348 |
| The variation of very low cloud base with time and distance and with height. N. E. Davis | 351 |
| Correction | 356 |

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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. [17½p] monthly

Annual subscription £2 7s. [£2·35] including postage

CONTENTS

| | <i>Page</i> |
|--|-------------|
| An analysis of monthly mean pressure patterns near the British Isles, with possible applications to seasonal forecasting. R. F. M. Hay | 357 |
| The record-breaking rainfall in south-west England on 28-29 July 1969. G. C. Bridge | 364 |
| The Shelton regulator clock at Edinburgh Meteorological Office. W. K. Young | 370 |
| A method of deriving representative temperature profiles, including the tropopause, from the three-level forecast model. W. R. Brady | 373 |
| Letter to the Editor | 386 |
| Notes and news | |
| Snow rollers at Kirkwall, Orkney | 387 |
| Review | |
| Catalog of meteorological instruments in the Museum of History and Technology. W. E. Knowles Middleton. <i>N. E. Rider</i> | 388 |
| Official publication | 388 |
| 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.

All inquiries relating to the insertion of advertisements in the Meteorological Magazine should be addressed to the Director of Publications, H.M. Stationery Office, Atlantic House, Holborn Viaduct, London E.C.1. (Telephone: CITY 9876, extn 6098).

The Government accepts no responsibility for any of the statements in the advertisements appearing in this publication, and the inclusion of any particular advertisement is no guarantee that the goods advertised therein have received official approval.

© Crown Copyright 1969

Printed in England by The Bourne Press, Bournemouth, Hants.

and published by

HER MAJESTY'S STATIONERY OFFICE

3s. 6d. [17½p] monthly

Annual subscription £2 7s. [£2.35] including postage