

**QUARTERLY  
REVIEWS**

# THE CHEMICAL SOCIETY

## PATRON :

HER MAJESTY THE QUEEN

## President :

C. K. INGOLD, D.Sc., F.R.I.C., F.R.S.

## Vice-Presidents

who have filled the office of President :

|   |  |
|---|--|
| F. G. DONNAN, C.B.E., D.Sc., LL.D.,<br>F.R.S.     | W. H. MILLS, M.A., Sc.D., F.R.S.                   |
| SIR IAN HEILBRON, D.S.O., D.Sc.,<br>LL.D., F.R.S. | SIR ERIC RIDEAL, M.B.E., M.A.,<br>D.Sc., F.R.S.    |
| SIR CYRIL HINSHELWOOD, M.A.,<br>Sc.D., F.R.S.     | SIR ROBERT ROBINSON, O.M., D.Sc.,<br>LL.D., F.R.S. |

## Vice-Presidents :

|                                     |   |
|-------------------------------------|---|
| G. R. CLEMO, D.Phil., D.Sc., F.R.S. | SIR JOHN SIMONSEN, D.Sc., F.R.I.C.,<br>F.R.S. |
| R. D. HAWORTH, D.Sc., Ph.D., F.R.S. | M. STACEY, Ph.D., D.Sc., F.R.S.               |
| D. H. HEY, Ph.D., D.Sc., F.R.I.C.   |   |
| E. L. HIRST, D.Sc., LL.D., F.R.S.   |   |

## Treasurer :

SIR WALLACE AKERS, C.B.E., D.C.L., D.Sc., F.R.S.

## Secretaries :

|                                     |                                       |
|-------------------------------------|---------------------------------------|
| H. BURTON, Ph.D., D.Sc., F.R.I.C.   | E. D. HUGHES, D.Sc., F.R.I.C., F.R.S. |
| L. E. SUTTON, M.A., D.Phil., F.R.S. |                                       |

## Ordinary Members of Council :

|  |  |
|--|--|
| G. BADDELEY, M.Sc., Ph.D., D.Sc.           | F. B. KIPPING, M.A., Ph.D.                     |
| WILSON BAKER, M.A., D.Sc., F.R.S.          | E. A. MOELWYN-HUGHES, D.Phil.,<br>D.Sc., Sc.D. |
| D. H. R. BARTON, Ph.D., D.Sc.,<br>F.R.I.C. | H. M. POWELL, M.A., B.Sc., F.R.S.              |
| J. BELL, D.Sc., Ph.D., F.R.I.C.            | A. ROBERTSON, M.A., Ph.D., F.R.S.              |
| R. P. BELL, M.A., B.Sc., F.R.S.            | M. A. T. ROGERS, B.Sc., Ph.D.,<br>A.R.I.C.     |
| F. BERGEL, D.Phil.Nat., D.Sc.,<br>F.R.I.C. | C. W. SHOPPEE, D.Sc., D.Phil.,<br>F.R.I.C.     |
| NEIL CAMPBELL, D.Sc., Ph.D.                | J. W. SMITH, Ph.D., D.Sc., F.R.I.C.            |
| J. CHATT, M.A., Ph.D., F.R.I.C.            | T. S. STEVENS, B.Sc., D.Phil.,<br>A.R.I.C.     |
| M. J. S. DEWAR, M.A., D.Phil.              | A. R. J. P. UBBELOHDE, M.A., D.Sc.,<br>F.R.S.  |
| I. J. FAULKNER, B.Sc., Ph.D.,<br>F.R.I.C.  | A. I. VOGEL, D.Sc., D.I.C., F.R.I.C.           |
| S. J. GREGG, Ph.D., A.R.C.S.,<br>F.R.I.C.  |  |
| BRYNMOR JONES, Sc.D., Ph.D.,<br>F.R.I.C.   |  |

## Ex-Officio Members of Council :

A. FINDLAY, C.B.E., D.Sc., LL.D., F.R.I.C. (*Chairman of the Chemical Council*)  
W. WARDLAW, C.B.E., D.Sc., F.R.I.C. (*Chairman of the Joint Library Com-  
mittee*)

## General Secretary :

J. R. RUCK KEENE, M.B.E., T.D., B.A.

## Librarian :

A. E. CUMMINS.

*Telephone Numbers :* Regent 0675/6

# QUARTERLY REVIEWS

VOL. VII, 1953

## Committee of Publication :

*Chairman :* SIR CYRIL HINSHELWOOD, M.A., Sc.D., F.R.S.

|   |  |
|---|--|
| SIR WALLACE AKERS, C.B.E., D.C.L.,<br>D.Sc., F.R.S. | C. K. INGOLD, D.Sc., F.R.I.C., F.R.S.          |
| J. S. ANDERSON, M.Sc., Ph.D., F.R.S.                | H. M. N. H. IRVING, M.A., D.Phil.,<br>F.R.I.C. |
| D. H. R. BARTON, Ph.D., D.Sc.,<br>F.R.I.C.          | F. G. MANN, Sc.D., F.R.I.C., F.R.S.            |
| C. E. H. BAWN, B.Sc., Ph.D., F.R.S.                 | R. A. MORTON, D.Sc., Ph.D., F.R.S.             |
| D. J. BELL, Sc.D., Ph.D.                            | L. N. OWEN, Ph.D., D.Sc., F.R.I.C.             |
| R. P. BELL, M.A., B.Sc., F.R.S.                     | J. M. ROBERTSON, M.A., D.Sc.,<br>F.R.S.        |
| E. J. BOWEN, M.A., D.Sc., F.R.S.                    | H. N. RYDON, D.Sc., D.Phil., F.R.I.C.          |
| H. BURTON, Ph.D., D.Sc., F.R.I.C.                   | N. SHEPPARD, M.A., Ph.D.                       |
| A. H. COOK, D.Sc., F.R.I.C., F.R.S.                 | C. W. SHOPPEE, D.Sc., D.Phil.,<br>F.R.I.C.     |
| C. A. COULSON, M.A., D.Sc., F.R.S.                  | W. F. SHORT, D.Sc., M.Sc.                      |
| F. S. DAINTON, M.A., Ph.D.                          | R. SPENCE, C.B., Ph.D., D.Sc.,<br>F.R.I.C.     |
| C. W. DAVIES, D.Sc., F.R.I.C.                       | M. STACEY, Ph.D., D.Sc., F.R.S.                |
| H. J. EMELÉUS, D.Sc., A.R.C.S.,<br>F.R.S.           | L. E. SUTTON, M.A., D.Phil., F.R.S.            |
| F. FAIRBROTHER, D.Sc.                               | J. WALKER, Ph.D., D.Phil., D.Sc.               |
| R. D. HAWORTH, D.Sc., Ph.D., F.R.S.                 | W. A. WATERS, M.A., Sc.D., F.R.I.C.            |
| E. D. HUGHES, D.Sc., F.R.I.C.,<br>F.R.S.            | T. S. WHEELER, Ph.D., D.Sc.,<br>F.R.I.C.       |
| H. R. ING, M.A., D.Phil., F.R.S.                    |  |

## Editor :

R. S. CAHN, M.A., D.Phil.Nat., F.R.I.C.

## Assistant Editors :

A. D. MITCHELL, D.Sc., F.R.I.C.   L. C. CROSS, Ph.D., A.R.C.S., F.R.I.C.  
A. E. SOMERFIELD, B.A., B.Sc.

LONDON :

THE CHEMICAL SOCIETY

# CONTENTS

|  | PAGE |
|--|------|
| THE DETERMINATION OF GEOLOGICAL AGE BY MEANS OF RADIOACTIVITY. By S. C. CURRAN . . . . .   | 1    |
| THE INFRA-RED AND RAMAN SPECTRA OF HYDROCARBONS. PART II. PARAFFINS. By NORMAN SHEPPARD and DELIA M. SIMPSON . . . . .   | 19   |
| ENZYMIC SYNTHESIS OF POLYSACCHARIDES. By S. A. BARKER and E. J. BOURNE . . . . .   | 56   |
| THE EFFECTS OF ULTRASONIC WAVES ON ELECTROLYTES AND ELECTRODE PROCESSES. By S. BARNARTT . . . . .  | 84   |
| COMMENTS ON THE THERMOCHEMISTRY OF THE ELEMENTS OF GROUPS IVB AND IV. By E. C. BAUGHAN . . . . .   | 103  |
| THE HEATS OF FORMATION OF SIMPLE INORGANIC COMPOUNDS. By L. H. LONG . . . . .  | 134  |
| RECENT DEVELOPMENTS IN THE PREPARATION OF NATURAL AND SYNTHETIC STRAIGHT-CHAIN FATTY ACIDS. By F. D. GUNSTONE . . . . .  | 175  |
| THE REACTIONS OF METHYL RADICALS. By A. F. TROTMAN-DICKENSON . . . . .   | 198  |
| STEREOCHEMISTRY OF <i>cyclo</i> HEXANE. By O. HASSEL . . . . .   | 221  |
| STEROIDAL ALKALOIDS. By JAMES MCKENNA . . . . .  | 231  |
| THE ASSOCIATION OF CARBOXYLIC ACIDS. By G. ALLEN and E. F. CALDIN . . . . .  | 255  |
| NUCLEAR MAGNETIC RESONANCE ABSORPTION. By J. A. S. SMITH . . . . .   | 279  |
| INORGANIC CHROMATOGRAPHY. By R. A. WELLS . . . . .   | 307  |
| MOLECULAR STRUCTURE DETERMINATION BY X-RAY CRYSTAL ANALYSIS: MODERN METHODS AND THEIR ACCURACY. By G. A. JEFFREY and D. W. J. CRUICKSHANK. (With a Preface by E. G. Cox) . . . . . | 335  |
| MAGNETISM AND INORGANIC CHEMISTRY. By R. S. NYHOLM . . . . .   | 377  |
| THE SYNTHESIS OF ISOTOPICALLY LABELLED ORGANIC COMPOUNDS. By S. L. THOMAS and H. S. TURNER . . . . .   | 407  |