Vol. 63. Part 2 October, 1964

# JOURNAL OF AGRICULTURAL SCIENCE

#### EDITED BY

G. D. H. BELL, B.SC., PH.D., Plant Breeding Institute, Cambridge

G. W. COOKE, Ph.D., F.R.I.C., Rothamsted Experimental Station, Harpenden

R. E. EVANS, M.SC., PH.D., Glyndwr, Dolau, Llandre, Cardigan

♣ SIR JOHN HAMMOND, C.B.E., D.SC., F.R.S., School of Agriculture, Cambridge

PROF. SIR J. B. HUTCHINSON, C.M.G., SC.D., F.R.S., School of Agriculture, Cambridge

SIR BERNARD KEEN, D.SC., F.R.S., 72 Eaton Square, London, S.W. 1

H. L. PENMAN, O.B.E., PH.D., F.R.S., Rothamsted Experimental Station, Harpenden

SIR E. JOHN RUSSELL, D.SC., F.R.S., Woodstock House, Woodstock, Oxon.

E. W. RUSSELL, C.M.G., PH.D., F.INST.P., Department of Soil Science, University of Reading

F. YATES, C.B.E., SC.D., F.R.S., Rothamsted Experimental Station, Harpenden



#### CAMBRIDGE UNIVERSITY PRESS

BENTLEY HOUSE, 200 EUSTON ROAD, LONDON, N.W. I
AMERICAN BRANCH: 32 EAST 57TH STREET, NEW YORK 22, N.Y.

Price 27s. 6d. net (U.S.A. \$4.75)

#### MICHROME STAINS

and Reagents for Biology OVER 3000 available

Magneson II Aquamount Brilliant Cresvl Blue Lipid Crimson Thiofluorescein Sudan Black Matamount

Bromelain Matamount Laktoseal Trifalgic acid

Urease, etc.

104-page catalogue on request

New books by Edward Gurr

STAINING ANIMAL TISSUES, 637 pages, 84/-ENCYCLOPAEDIA OF MICROSCOPIC STAINS, 500 pages, price 95/-

Ready shortly: "Rational Use of Dyes in Biology & General Staining Methods", about 450 pages, price about 80/-.

### EDWARD GURR LTD.

42 UPPER RICHMOND RD. WEST, LONDON, S.W.14

Telegrams: Micromlabs, London, S.W. 14 Telephones: PROspect 8228 and 8229

#### AGRONOMY JOURNAL

This official organ of the American Society of Agronomy is a bimonthly publication of up-to-date reports of general agronomic research. Workers in the fields of forages and pastures, crop improvement, cultural practices, soil fertility, and allied areas of investigation will find articles of lasting interest in Agronomy Journal. Publication is open to members of the American Society of Agronomy.

\$14.00 per year in U.S. and Canada. \$15.00 per year elsewhere

American Society of Agronomy 677 S. Segoe Rd. Madison 11, Wisconsin

## Other Cambridge Journals

#### ANNALS OF APPLIED BIOLOGY

Includes original papers and book reviews on the application of biology to agriculture, forestry, horticulture, and other subjects. Published bi-monthly. Subscription £3. 15s. per volume of 3 parts, Single parts 30s.

## BRITISH JOURNAL OF NUTRITION AND

#### PROCEEDINGS OF THE NUTRITION SOCIETY

The Journal contains accounts of original work in all branches of nutrition, including medical and agricultural. The Proceedings reports discussions on several topics of interest to nutrition scientists. Combined subscription rate is £7 for 4 parts of the Journal, and two parts of the Proceedings. Single parts of either 35s.

#### JOURNAL OF DAIRY RESEARCH

Publishes the results of original research in dairy science and cognate subjects. The Journal is issued three times a year. Annual subscription 80s. Single parts 30s.

Copies of these and other Cambridge Journals may be ordered through your Bookseller or direct from the Cambridge University Press, Bentley House, 200 Euston Road, London, N.W. 1.

# JOURNAL OF REPRODUCTION AND FERTILITY

The Journal publishes original papers, abstracts of Proceedings, and occasionally reviews and bibliographies, dealing with the morphology, physiology, biochemistry and pathology of reproduction in man and animals, and with the biological, medical and veterinary problems of fertility and lactation. Numbers are issued bimonthly to give two volumes a year.

#### Papers to appear during 1964 include:

- K. T. KIRTON, H. D. HAFS and A. G. HUNTER. Levels of some normal constituents of bull semen during repetitive ejaculation.
- J. C. Wallace and R. G. Wales. Effect of ions on the metabolism of ejaculated and epididymal ram spermatozoa.
- J. C. WALLACE and A. K. LASCELLES. Composition of testicular and epididymal lymph in the ram.
- A. G. Hunter and H. D. Hafs. Some physicochemical properties of saline-soluble proteins in bovine spermatozoa.
- T. H. Brinsfield, H. W. Hawk and H. F. Righter. Interaction of progesterone and oestradiol on induced leucocytic emigration in the sheep.
- R. D. Baker, M. L. VanDemark, C. N. Graves and H. W. Norton. Effects of pilocarpine and atropine on copulatory behaviour, ejaculation and semen composition in the bull.
- F. K. Kristjansson. Transferrin types and reproductive performance in the pig.
- R. E. Mancini, A. Alonso, J. Barquet, B. Alvarez and M. Nemirovsky. Histoimmunological localization of hyaluronidase in the bull testis.
- G. M. H. WAITES and B. P. SETCHELL. Effect of local heating on blood flow and metabolism in the testis of the conscious ram.
- B. C. WENTWORTH and W. J. MELLEN. Active immunity induced and spermatogenesis suppressed by testicular antigen in the male Japanese quail.
- N. Kovačić. Biological characteristics of pituitary and placental hormones.

Editorial correspondence should be sent to Dr C. R. Austin, Physiological Laboratory, Downing Street, Cambridge, England, and business correspondence to the publishers.

The subscription rate for 1965 is £6 per volume or £12 per year (two volumes). U.S.A. and Canada \$20.00 per volume or \$40.00 per year

# BLACKWELL SCIENTIFIC PUBLICATIONS OXFORD

# THE EMPIRE JOURNAL OF EXPERIMENTAL AGRICULTURE

THIS JOURNAL offers agricultural research workers a medium for disseminating the records and results of their investigations on the feeding and management of livestock, cultivation and manuring of crops, trial of farm machinery, agricultural economics, and experimental techniques.

Vol. XXXII, No. 127

CONTENTS

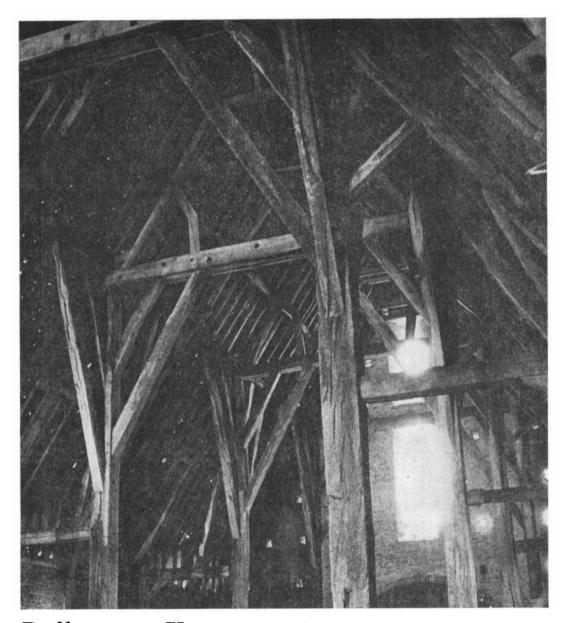
**July 1964** 

A Tribute to the Work of H. J. Page.

- R. Rose Innes and G. L. Mabey: Studies on Browse Plants in Ghana. III. Browse/Grass Ingestion Ratios. (a) Determination of the Free-Choice Griffonia/Grass Ingestion Ratio for West African Shorthorn Cattle on the Accra Plains using the 'Simulated Shrub' Technique. With Plates.
- J. C. TAYLER: The Relationship between Growth and Carcass Quality in Cattle and Sheep. A Review.
- Ambika Sinch: Effect of Long-term Application of Organic and Inorganic Sources of Nitrogen on the Yield of Sugar Cane, and on Soil Fertility.
- W. M. Tahir: Sorghum Improvement for Mechanized Production in the Central Rainlands of the Sudan.
- W. M. TAHIR: Sesame Improvement for Mechanized Production in the Central Rainlands of the Sudan.
- J. T. SWARBRICK: A Note on the Rooting of Kola (Cola Spp.) Cuttings. With Plate.
- B. A. C. Envi: Note on the Effect of Levels of Potassium and Nitrogen Supply on the Growth of an Upland Rice Variety.
- P. R. Goldsworthy. Methods of Applying Superphosphate to Ground-nuts in Northern Nigeria.
- I. THORNTON: The Effect of Fertilizers on the Uptake of Nitrogen, Phosphorus, and Potassium by the Groundnut.
- E. W. Bolle-Jones: Incidence of Sulphur Deficiency in Africa. A Review.
- R. W. Smith: The Establishment of Cocoa under Different Soil-moisture Régimes.
- P. R. GOLDSWORTHY and R. HEATHCOTE: Fertilizer Trials with Soya Beans in Northern Nigeria.

Royal 8vo. 20s. net. Annual subscription (four numbers) 60s. (\$9.00) post free.

OXFORD UNIVERSITY PRESS AMEN HOUSE, LONDON, E.C.4



## Built 1250-Vapona 1964... insects controlled easily at last!

Vapona is Shell's latest insecticide. It vaporises. Permeates every insect concealing crevice up to one hundred feet from release. Easily handled. DDVP based Vapona can be simply applied by sprinkling; or can be fogged, sprayed or metered. Effective. Vapona kills even resistant strains; and there is no reported resistance build-up to DDVP. Versatile. Vapona clears insects from food stores, dairies, live-stock, airplanes, warehouses, ships, beaches,

rubbish dumps. In fact from almost anywhere.

Yet it breaks down quickly, leaving no taint, no odour. Vapona is just one of Shell's comprehensive group of insecticides, which between them provide an effective answer to insect problems in every continent.



For further information and details of Shell's technical service please consult your Shell company.

Starting with Volume 64 in 1965, issues of the *Journal of Agricultural Science* will be increased in extent, and the subscription price raised to £3. 15s. (U.S.A. \$13.50) a volume including postage. Single parts will be £1. 12s. 6d. (U.S.A. \$5.50) postage extra.

Two volumes each of three parts are published yearly.

# THE SYNDICS OF THE CAMBRIDGE UNIVERSITY PRESS ANNOUNCE WITH REGRET THE DEATH OF SIR JOHN HAMMOND. F.R.S.

EDITOR OF THE JOURNAL SINCE 1948

AND A MEMBER OF THE EDITORIAL BOARD

SINCE 1943