THE JOURNAL OF AGRICULTURAL SCIENCE

EDITED BY

- G. D. H. BELL, B.SC., PH.D., Plant Breeding Institute, Cambridge
- J. HAMMOND, C.B.E., M.A., D.SC., F.R.S., School of Agriculture, Cambridge
- H. HUNTER, M.A., D.SC., Keys Cottage, Meldreth, nr. Royston, Herts.
- SIR BERNARD KEEN, D.Sc., F.R.S., 25 Thackeray Court, Elystan Place, London, S.W.3
- SIR E. JOHN RUSSELL, D.SC., F.R.S., Campsfield Wood, Woodstock, Oxon.
- R. K. SCHOFIELD, D.SC., F.INST.P., Rothamsted Experimental Station, Harpenden
- H. E. WOODMAN, M.A., PH.D., D.SC., School of Agriculture, Cambridge
- F. YATES, sc.D. F.R.S., Rothamsted Experimental Station, Harpenden

VOLUME XLVI 1955

CAMBRIDGE
AT THE UNIVERSITY PRESS
1955

Printed in Great Britain at the University Press, Cambridge
(Brooke Crutchley, University Printer)
and published by the Cambridge University Press
London: Bentley House, N.W.1
American Branch: New York
Agents for Canada, India, and Pakistan: Macmillan

CONTENTS

Part 1 (June 1955)	PAGE
HEMINGWAY, G. R. Soil-sampling errors and advisory analyses. (With Seven Text-figures)	1
HAFEZ, E. S. E. and KAMAR, G. A. R. Sexual maturity and related phenomena in the domestic fowl. (With Five Text-figures)	9
HAFEZ, E. S. E., BADRELDIN, A. L. and SHAFEI, M. M. Skin structure of Egyptian buffaloes and cattle with particular reference to sweat glands. (With Plate 1 and Eight Text-figures)	19
BARBER, R. S., BRAUDE, R. and MITCHELL, K. G. The value of electrically warmed floors for fattening pigs. (With Two Text-figures)	31
ROBINSON, T. J. Endocrine relationships in the induction of oestrus and ovulation in the anoestrous ewe	37
CAMPBELL, R. C. and Edwards, J. The effect on conception rates of semen diluents containing citrate or phosphate buffer, with all combinations of sulphanilamide, streptomycin and penicillin	44
Lucas, I. A. M. and Calder, A. F. C. The interaction between environment and level of feeding for pigs from weaning to bacon weight. (With Eight Text-figures and Seven Appendix Figures)	56
LEECH, F. B., EGDELL, J. W., HESKIN, P. and THOMAS, S. B. Methods of milk production: some results of a survey in four areas of England and Wales	78
Sellers, K. C. and Leech, F. B. Survey of losses associated with pregnancy and parturition in Yorkshire sheep. (With One Text-figure)	90
BARBER, R. S., BRAUDE, R. and MITCHELL, K. G. Studies on milk production of Large White pigs. (With Six Text-figures)	97
Bolton, W. The digestibility of the carbohydrate complex of barley, wheat and maize by adult fowls	119
ROLLINSON, D. H. L., HARKER, K. W. and TAYLOR, J. I. Studies on the habits of Zebu cattle. III. Water consumption of Zebu cattle	123
Part 2 (August 1955)	
MUNRO, JOAN. Studies on the milk yields of Scottish Blackface ewes. (With Three Text-figures)	131
HAFEZ, E. S. E. Puberty in the buffalo-cow. (With Two Text-figures)	137
HUNTER, G. L., ADAMS, C. E. and Rowson, L. E. Inter-breed ovum transfer in sheep. (With Plates 2-4 and One Text-figure)	143
Burton, W. G., Mann, G. and Wager, H. G. The storage of ware potatoes in permanent buildings. II. The temperature of unventilated stacks of potatoes. (With Five Text-figures).	150
Ahmed, S. I. Effect of glycine on storage of ram semen. (With Three Text-figures)	164

iv Contents

	PAGI
Ahmed, S. I. The effect of testosterone and pregnant mare serum on semen production of rams of low libido	168
HARRINGTON, G. and TAYLOR, J. H. The effect of antibiotic dietary supplements on the carcass measurements and dressing percentage of bacon pigs. (With Two Text-figures)	173
FRANKLAND, HELGA M. T. The influence of age of sire on quality of progeny in Swaledale sheep	180
JOSHI, A. B. and HOWARD, H. W. Meiotic irregularities in hexaploid oats. IV. Hybrids between <i>Avena sativa</i> (spring and winter varieties), <i>A. fatua</i> , <i>A. sterilis</i> , <i>A. byzantina</i> and <i>A. nuda</i>	185
Coles, R. and Cumber, F. Observations on the relationship between riboflavin, hatchability and clubbed down. (With Two Text-figures)	191
Bell, G. D. H., Lupton, Mary and Riley, Ralph. Investigations in the Triticinae. III. The morphology and field behaviour of the A_2 generation of interspecific and intergeneric amphidiploids. (With Plates 5–7 and Seven Text-figures)	199
Bell, G. D. H. and Lupton, F. G. H. Investigations in the Triticinae. IV. Disease reactions of species of <i>Triticum</i> and <i>Aegilops</i> and of amphidiploids between them	232
BREMNER, J. M. Studies on soil humic acids. I. The chemical nature of humic nitrogen. (With One Text-figure)	247
FERGUSON, W. S. and TERRY, R. A. Bloat investigations	257
Part 3 (October 1955) Holmes, W. and MacLusky, D. S. The intensive production of herbage for crop-drying. VI.	
A study of the effect of intensive nitrogen fertilizer treatment on species and strains of grass, grown alone and with white clover. (With Five Text-figures)	267
Lewis, A. H. Field experiments with nitrophosphates	287
BLAXTER, K. L. and GRAHAM, N. McC. Plane of nutrition and starch equivalents. (With Eight Text-figures)	292
Lucas, I. A. M. and Calder, A. F. C. The growth of pigs kept to one level of feeding in two environments, and fed diets with and without an antibiotic. (With Five Text-figures)	307
Bremner, J. M. and Shaw, K. Determination of ammonia and nitrate in soil. (With Three Text-figures)	320
EVANS, R. E. Nutrition of the bacon pig. XVIII. The influence of dietary penicillin on the growth rate, efficiency of food conversion and the nitrogen retention of the bacon pig	329
BARKER, M. G., HANLEY, F. and RIDGMAN, W. J. Studies on lucerne and lucerne-grass leys. I. Summer and autumn management of a lucerne-grass mixture grown on heavy land. (With Plate 8 and One Text-figure)	362
RILEY, RALPH. The cytogenetics of the differences between some Secale species. (With Plates 9 and 10)	377
Worden, Alastair N., Bunyan, J., Davies, A. W. and Kleissner, M. The experimental production of 'green yolks' by the oral administration of sodium copper chlorophyllin	384

Contents

Part 4 (November 1955)	PAGE
GLOVER, J., ROBINSON, P. and TAYLOR, J. Assessing the reliability of rainfall if monthly falls are not independent	387
Burns, Marca. Observations on Merino × Herdwick hybrid sheep with special reference to the fleece. (With Plates 11-15 and Two Text-figures)	389
Salt, G. A. Effects of nitrogen applied at different dates, and of other cultural treatments on eyespot, lodging and yield of winter wheat. Field experiment 1952. (With Plate 16 and Seven Text-figures)	407
Bosselaar, C. A., Spronk, N. and Dam, G. C. van. An apparatus for measuring the motility of sperm cells. (With Three Text-figures)	417
Bolton, W. The digestibility of the carbohydrate complex by birds of different ages .	420
Benzie, D., Boyne, A. W., Dalgarno, A. C., Duckworth, J., Hill, R. and Walker, D. M. Studies of the skeleton of the sheep. I. The effect of different levels of dietary calcium during pregnancy and lactation on individual bones. (With Plates 17–20 and One Text-figure)	425
RIDGMAN, W. J., HANLEY, F. and BARKER, M. G. Studies on lucerne and lucerne-grass leys. II. The nitrogenous manuring of a lucerne-cocksfoot ley	441
THORNE, GILLIAN N. and WATSON, D. J. The effect on yield and leaf area of wheat of applying nitrogen as a top-dressing in April or in sprays at ear emergence. (With Five Text-figures)	449

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 live stock, cultivation and manuring of crops, trial of farm machinery, agricultural economics, and experimental technique.

Vol. XXIII. No. 90

CONTENTS

April 1955

- V. A. OYENUGA: The Composition and Nutritive Value of Certain Feedingstuffs in Nigeria. I. Roots, Tubers, and Green Leaves.
- N. G. GOKHALE: Estimating the Decrease in Yield on Ceasing to Manure Unshaded Tea.
- BRYNMOR THOMAS, W. B. HOLMES and J. L. CLAPPERTON: A Study of Meadow Hays from the Cockle Park Plots. Part II. Ash Constituents.
- A. S. FOOT, J. C. MURDOCH and S. J. ROWLAND: Marrowstem Kale Silage.
- R. KNIGHT and H. H. ROGERS: Recent Introductions to West Africa of *Theobroma cacao* and Related Species. Part I. A Review of the First Ten Years.
- ELIZABETH CARLISLE and MARGARET RYLE: The Influence of Nitrogen, Phosphate, Potash, and Lime on the Secretion of Nectar by Red Clover in the Field.
- J. L. HENDERSON and R. O. DAVIES: The Yield and Composition of Mixed Cereal-Legume Crops at Different Stages of Growth. Part I.

Royal 8vo. 11s. net. Annual subscription (four numbers) 34s. post free.

OXFORD UNIVERSITY PRESS, Amen House, LONDON, E.C.4

FULL PARTICULARS OF THE

JOURNALS

PUBLISHED BY THE

CAMBRIDGE UNIVERSITY PRESS

MAY BE HAD FROM

THE MANAGER, CAMBRIDGE UNIVERSITY PRESS
BENTLEY HOUSE, 200 EUSTON ROAD
LONDON, N.W.1

CONTENTS

	PAGE
GLOVER, J., ROBINSON, P. and TAYLOR, J. Assessing the reliability of rainfall if monthly falls are not independent	387
Burns, Marca. Observations on Merino \times Herdwick hybrid sheep with special reference to the fleece. (With Plates 11–15 and Two Textfigures)	389
SALT, G. A. Effects of nitrogen applied at different dates, and of other cultural treatments on eyespot, lodging and yield of winter wheat. Field experiment 1952. (With Plate 16 and Seven Text-figures).	407
Bosselaar, C. A., Spronk, N. and Dam, G. C. van. An apparatus for measuring the motility of sperm cells. (With Three Text-figures)	417
BOLTON, W. The digestibility of the carbohydrate complex by birds of different ages	420
BENZIE, D., BOYNE, A. W., DALGARNO, A. C., DUCKWORTH, J., HILL, R. and WALKER, D. M. Studies of the skeleton of the sheep. I. The effect of different levels of dietary calcium during pregnancy and lactation on individual bones. (With Plates 17–20 and One Text-figure)	425
RIDGMAN, W. J., HANLEY, F. and BARKER, M. G. Studies on lucerne and lucerne-grass leys. II. The nitrogenous manuring of a lucerne-cocksfoot ley	441
THORNE, GILLIAN N. and WATSON, D. J. The effect on yield and leaf area of wheat of applying nitrogen as a top-dressing in April or in sprays at ear emergence. (With Five Text-figures)	449

The Journal of Agricultural Science is issued every other month in parts of about 120 pages with plates and figures, four parts constituting a volume.

Quotations for available back volumes and parts may be obtained on application to the Cambridge University Press.

Papers for publication should be typewritten or written in a very legible hand, and may be sent to Dr J. Hammond, School of Agriculture, Cambridge, or to the associate Editors. Other communications should be addressed to the University Press, Cambridge.

If Plates in excess of one per 24 pages of text or coloured plates are submitted the author may be asked to bear the cost of such Plates.

Bibliography should be given under the heading of 'References' in the following form:

Surname of authors (in alphabetical order), initials, date of publication (in brackets), title of Journal (abbreviated according to the *World List of Scientific Periodicals*), volume and pages of reference. In the text a reference should be quoted by the author's name and date (in brackets).

All names of Journals and books should be in italics.

Contributors will receive twenty-five copies of their papers free.

The subscription price, payable in advance, is 60s. net per volume (post free); single numbers 20s. net. Subscriptions may be sent to any bookseller, or to The Cambridge University Press, Bentley House, 200 Euston Road, London, N.W. 1.

Subscription price in the U.S.A. is \$10.50 per volume: single number \$3.50. Enquiries should be addressed to the Cambridge University Press American Branch, 32 East 57th Street, New York, 22.