THE JOURNAL OF AGRICULTURAL SCIENCE

EDITED BY

- G. D. H. BELL, B.SC., PH.D., Plant Breeding Institute, Cambridge
- R. E. EVANS, M.SC., PH.D., School of Agriculture, 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., 72 Eaton Square, London, S.W.1
- SIR E. JOHN RUSSELL, D.SC., F.R.S., Campsfield Wood, Woodstock, Oxon.
- E. W. RUSSELL, M.A., PH.D., F.INST.P., East African Agriculture and Forestry Research Organisation, P.O. Box 21, Kikuyu, Kenya
- R. K. SCHOFIELD, D.SC., F.INST.P., Department of Agriculture, Oxford
- F. YATES, Sc.D., F.R.S., Rothamsted Experimental Station, Harpenden

VOLUME LI 1958

CAMBRIDGE
AT THE UNIVERSITY PRESS
1958

Printed in Great Britain at the University Press, Cambridge
(Brooke Crutchley, University Printer)
and published by the Cambridge University Press
Bentley House, 200 Euston Road, London, N.W. 1
American Branch: 32 East 57th Street, New York 22, N.Y.
Agent in Canada: The Macmillan Company of Canada Limited

CONTENTS

Part 1 (August 1958)

,	PAGE
Hallsworth, E. G. and Wilkinson, G. K. The contribution of clay and organic matter to the cation exchange capacity of the soil. (With One Text-figure)	1
WILSON, P. N. The effect of plane of nutrition on the growth and development of the East African dwarf goat. Part II. Age changes in the carcass composition of female kids. (With Plates 1 and 2 and Four Text-figures)	4
Bremner, J. M. and Shaw, K. Denitrification in soil. I. Methods of investigation. (With Six Text-figures)	22
Bremner, J. M. and Shaw, K. Denitrification in soil. II. Factors affecting denitrification. (With Ten Text-figures)	40
WIDDOWSON, F. V. and COOKE, G. W. Comparisons between placing and broadcasting of nitrogen, phosphorus and potassium fertilizers for potatoes, peas, beans, kale and maize. (With Plate 3)	53
CAMPLING, R. C., MACLUSKY, D. S. and Holmes, W. Studies in grazing management. VI. The influence of free- and strip-grazing and of nitrogenous fertilizers on production from dairy cows	62
Shalash, M. R. Reproduction in the buffalo-cow: pH of the vaginal secretions	70
WALKER, D. M. and Offord, E. C. Quality tests on hen eggs produced in laying batteries and in fold units	72
GORDON, JOHN G. The relationship between fineness of grinding of food and rumination .	78
GORDON, JOHN G. The effect of time of feeding upon rumination	81
YEATES, N. T. M. Foetal dwarfism in sheep—an effect of high atmospheric temperature during gestation. (With Plate 4 and Two Text-figures)	84
Brown, W. O. and Baskett, R. G. Vitamin B ₁₂ and protein utilization in the chick	90
CORBETT, J. L. and BOYNE, A. W. The effects of a low-protein food supplement on the yield and composition of milk from grazing dairy cows and on the composition of their diet.	95
Lewis, D. and McDonald, I. W. The inter-relationships of individual proteins and carbohydrates during fermentation in the rumen of the sheep. I. The fermentation of casein in the presence of starch or other carbohydrate materials. (With Twelve Text-figures) .	108
WALKER, C. A. Studies in the environmental physiology of cattle in Northern Rhodesia. I. The relation between the changes in the haemoglobin index with age and the development of the heat toleration coefficient.	119
WALKER, C. A. Studies on the cattle of Northern Rhodesia. II. The carcass characters of steers from normal veld grazing and supplemented with salt and protein	123
Part 2 (October 1958)	
HUNTER, G. L., BISHOP, G. P. and BROWN, D. L. The induction of coincident superovulation and oestrus in the anoestrous ewe.	129
OWEN, P. C. The growth of sugar beet under different water regimes. (With One Text-figure)	133
FOWLER, RUTH E. The growth and carcass composition of strains of mice selected for large and small body size. (With Eleven Text-figures)	137

iv Contents

	PAGE
EL-Shazly, K. Studies on the nutritive value of some common Egyptian feedingstuffs. I. Nitrogen retention and ruminal ammonia curves. (With Four Text-figures)	149
AKKADA, A. R. ABOU and EL-SHAZLY, K. Studies on the nutritive value of some common Egyptian feedingstuffs. II. Effect of concentrates rich in proteins on cellulose and drymatter digestion. (With Four Text-figures)	157
LAKSESVELA, B. Protein value and amino-acid balance of condensed herring solubles and spontaneously heated herring meal. Chick experiments. (With Four Text-figures) .	164
HUTCHINSON, SIR JOSEPH, MANNING, H. L. and FARBROTHER, H. G. Crop water requirements of cotton. (With Five Text-figures)	177
ROOK, J. A. F., BALCH, C. C. and LINE, C. Magnesium metabolism in the dairy cow. I. Metabolism on stall rations	189
ROOK, J. A. F. and Balch, C. C. Magnesium metabolism in the dairy cow. II. Metabolism during the spring grazing season. (With Two Text-figures)	199
Braude, R., Townsend, M. Jill, Harrington, G. and Rowell, J. G. A large-scale test of the effects of food restriction on the performance of fattening pigs	208
Reith, J. W. S. and Inkson, R. H. E. Effects of fertilizers and dung on potatoes	218
Lawrie, R. A. Some observations on the relation between objective measurement and visual grading of beef carcasses in Queensland	225
Jarvis, R. H., Hanley, F. and Ridgman, W. J. The effect of leys on soil fertility. II. The effect of undersowing with grasses and legumes on the yield of a barley nurse crop .	229
CAMPBELL, R. C. and PATERSON, H. The effect of supplementary heating on the rearing of pigs	234
TYLER, C. Some water and dry-matter relationships in the food and droppings of laying hens	237
TYLER, C. The influence of the zero hour and length of the time unit on the variation of drymatter excretion in balance experiments with poultry	243
Arnold, G. W. and Holmes, W. Studies in grazing management. VII. The influence of strip grazing versus controlled free grazing on milk yield, milk composition, and pasture utilization	248
Part 3 (December 1958)	
PILKINGTON, J. M. and PURSER, A. F. Fibre medullation in Blackface lambs and hoggs .	257
Kirton, A. H. and Barton, R. A. Live weight loss and its components in Romney ewes subjected to L-thyroxine therapy and a low plane of nutrition. I. Effects on live weight, carcass weight and carcass composition. (With Two Text-figures)	265
Kirton, A. H. and Barton, R. A. Live weight loss and its components in Romney ewes subjected to L-thyroxine therapy and a low plane of nutrition. II. Effects on some non-carcass components of live weight	282
GLOVER, J. and DUTHIE, D. W. The apparent digestibility of crude protein by non-ruminants and ruminants. (With Three Text-figures)	289
FREE, J. B. The drifting of honev-bees. (With Five Text-figures)	294

Contents

	PAGE
WILDMAN, A. B. Food-intake level in some Romney Marsh ewes and follicle-group development in their progeny	307
GATHERUM, D. P. Deformation during curing of the longissimus dorsi muscle of the pig. (With One Text-figure)	317
BIANCA, W. The relation between respiratory rate and heart rate in the calf subjected to severe heat stress. (With Four Text-figures)	321
JOUBERT, D. M. and HAMMOND, J. A. A crossbreeding experiment with cattle, with special reference to the maternal effect in South Devon-Dexter crosses. (With Plates 5 and 6 and Five Text-figures)	325
KING, J. W. B., EVANS, J. V., HARRIS, H. and WARREN, F. L. The performance of sheep with differing haemoglobin and potassium blood types.	342
LANGER, R. H. M. A study of growth in swards of timothy and meadow fescue. I. Uninterrupted growth. (With Four Text-figures)	347
LINE, C., HEAD, M. J., ROOK, J. A. F., FOOT, A. S. and ROWLAND, S. J. Investigations into the use of supplements for the control of hypomagnesaemia in dairy cows during the spring grazing period. (With Two Text-figures)	353
Callow, E. H. Comparative studies of meat. VI. Factors effecting the iodine number of fat from the fatty and muscular tissues of lambs	361
MORGAN, J. T., GREEN, F. R., COSTAIN, R. A. and WILLIAMS, E. F. The effect of hexoestrol implantation on growth, efficiency of food utilization and carcass quality in pigs. (With Plate 7)	37 0
BIRCH, H. F. The relationship between the digestibility and decomposibility of some animal feeds. (With Three Text-figures)	377

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 techniques.

Vol. XXVI. No. 104

CONTENTS

October 1958

H. A. ROBERTS: A Review of the Use of Herbicides in British Vegetable Production.—T. A. Jones: Land-Use in the Caribbean: Advances during the Last Twenty-five Years Towards a Scientific Policy.—J. G. Ross: A Classification of Zebu Cattle Types in Teso District, Eastern Province, Uganda. With Plates 8, 9, 10.—N. G. Gokhale and N. G. Bhattacharya: Effect of Prolonged Ammonium Sulphate Treatment on the Calcium Status of a Tea Soil.—A. A. El-Itriby and A. A. Asker: Some Production Characteristics of Native Cattle, Friesian, Shorthern, and their Crosses in Egypt.—R. S. Edwards: Studies of the Growth of Cereals on Seed-beds Prepared by Dry-Sieving of the Soil. III.—T. G. Boaz, K. G. Towers and B. Frankland: Observations on the Eruption of Central Permanent Incisor Teeth in Sheep.—A. S. B. Wilson and T. J. Lansbury: Centrosema Pubescens: Ground Cover and Forage Crop in Cleared Rain Forest in Ghana.—G. H. Caswell and H. T. Clifford: The Effect of Ethylene Dichloride and Carbon Tetrachloride on the Germination and Early Growth of Maize.—S. G. Willimott and K. R. M. Anthony: The Response of Eleusine to Different Forms of Nitrogen Fertilizer—L. A. Willey and J. W. Dent: Note on a Method for Sampling Green Crops for Dry-matter Determination. With Plates 11, 12.

Royal 8vo. 14s. net. Annual subscription (four numbers) 45s. post free.

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

Full particulars of the

JOURNALS

published by the CAMBRIDGE

may be had from

UNIVERSITY PRESS

The Manager

Cambridge University Press

Bentley House, 200 Euston Road

London, N.W. 1

AGRONOMY JOURNAL

Agronomists throughout the world have found the Agronomy Journal, monthly publication and official organ of the American Society of Agronomy, a source of up-to-date reports on agronomic research. Workers in the fields of forages and pastures, small grain improvement, corn, fibre crops and legumes, cultural practices, and soil fertility, as well as closely allied fields of investigation find articles of lasting interest in the Agronomy Journal. Publication is open to members of the American Society of Agronomy.

Non-member subscriptions: \$14.00 per year, U.S. and Canada. \$15.00 per year elsewhere.

American Society of Agronomy 2702 Monroe Street Madison 5, Wisconsin

CONTENTS

PILKINGTON, J. M. and PURSER, A. F. Fibre medullation in Blackface lambs and hoggs	PAGE 257
Kirton, A. H. and Barton, R. A. Live weight loss and its components in Romney ewes subjected to L-thyroxine therapy and a low plane of nutrition. I. Effects on live weight, carcass weight and carcass composition. (With Two Text-figures)	265
Kirton, A. H. and Barton, R. A. Live weight loss and its components in Romney ewes subjected to L-thyroxine therapy and a low plane of nutrition. II. Effects on some	203
non-carcass components of live weight	282
GLOVER, J. and DUTHIE, D. W. The apparent digestibility of crude protein by non-ruminants and ruminants. (With Three Text-figures)	289
FREE, J. B. The drifting of honey-bees. (With Five Text-figures)	294
WILDMAN, A. B. Food-intake level in some Romney Marsh ewes and follicle-group development in their progeny	307
GATHERUM, D. P. Deformation during curing of the longissimus dorsi muscle of the pig. (With One Text-figure)	317
BIANCA, W. The relation between respiratory rate and heart rate in the calf subjected to severe heat stress. (With Four Text-figures).	321
JOUBERT, D. M. and HAMMOND, J. A crossbreeding experiment with cattle, with special reference to the maternal effect in South Devon-Dexter crosses. (With Plates 5 and 6 and Five Text-figures)	325
KING, J. W. B., EVANS, J. V., HARRIS, H. and WARREN, F. L. The performance of sheep with differing haemoglobin and potassium blood types.	342
LANGER, R. H. M. A study of growth in swards of timothy and meadow fescue. I. Uninterrupted growth. (With Four Text-figures)	347
LINE, C., HEAD, M. J., ROOK, J. A. F., FOOT, A. S. and ROWLAND, S. J. Investigations into the use of supplements for the control of hypomagnesaemia in dairy cows during the spring grazing period. (With Two Text-figures)	353
CALLOW, E. H. Comparative studies of meat. VI. Factors affecting the iodine number of fat from the fatty and muscular tissues of lambs	361
MORGAN, J. T., GREEN, F. R., COSTAIN, R. A. and WILLIAMS, E. F. The effect of hexoestrol implantation on growth, efficiency of food utilization and carcass quality in pigs. (With Plate 7)	370
BIRCH, H. F. The relationship between the digestibility and decomposibility of some animal feeds. (With Three Text-figures)	377

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

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

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 page 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 25s. 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 \$10.00 per volume; single number \$4.25. Enquiries should be addressed to the Cambridge University Press, American Branch, 32 East 57th Street, New York 22, N.Y.

Printed in Great Britain at the University Press, Cambridge (Brooke Crutchley, University Printer)