ANIMAL PRODUCTION

JOURNAL OF THE BRITISH SOCIETY OF ANIMAL PRODUCTION



OLIVER & BOYD LTD.
EDINBURGH AND LONDON

SEPTEMBER 1959

VOL. 1 PART 2

INFORMATION FOR CONTRIBUTORS TO ANIMAL PRODUCTION

Animal Production publishes papers on original research provided that they have not been, and will not be, published elsewhere in whole, or in part, without the Editors' written permission. Contributions may be in the field of animal production, or in any related scientific field. Papers presented at meetings of the British Society of Animal Production, if submitted to the Editors, will be given equal consideration with other papers.

Animal Production is published not less than twice a year, each number consisting of about 96 pages. Annual subscription for every 2 numbers is 30s. (or \$5.00 in the U.S.A. and Canada) and the price for a single number is 17s. 6d. (or \$2.75).

Length of papers should not normally exceed the equivalent of 6,000 words, inclusive of tables, text figures and references.

Manuscripts should be typed in double spacing and the ribbon copy sent to one of the Editors at the addresses given below. Manuscripts are not returned with the proofs; authors should therefore retain copies.

Illustrations (figures and plates) should be simple and few, otherwise a charge may have to be made to authors. Legends should be typed on a separate sheet.

- (a) Diagrams should be drawn in Indian ink, about twice the size of the finished block, on Bristol board or stout tracing paper. Photographed diagrams are also accepted. Lettering inside the framework of the diagram should be inserted in Indian ink. Marginal lettering may, if preferred, be inserted lightly in pencil. Costs of touching-up diagrams found to be incomplete or unsuitable for line-block reproduction will be charged to authors.
- (b) Photographs intended for half-tone reproduction should be on glossy paper. They will be accepted only if found necessary by the Editors. Part of their cost may have to be borne by authors.
- (c) Colour plates will not be accepted unless the author bears the cost.

[Continued on inside back cover

Single number, 17s. 6d. or \$2.75 net. Annual subscription, 30s. or \$5.00

BRITISH SOCIETY OF ANIMAL PRODUCTION

	List of the Society's Publications	
2nd Meeting, 1944.	The British Sheep Industry and Animal Behaviour	5s. net
3rd Meeting, 1945. 4th Meeting, 1945.	Meat British Pig Production	5s. net
5th Meeting, 1946.	Breeding Methods in Livestock Improvement and Artificial Insemination	5s. net
6th Meeting, 1946.	The Collection, Interpretation and use of Milk and Butterfat Records	5s. net
7th Meeting, 1947.	Inbreeding and Outbreeding in Farm Livestock	
8th Meeting, 1947.	The Inter-Relation of Hill Grazing Improvement and Animal Production	5s. net
9th Meeting, 1948.	Animals and Grass	5s. net
10th Meeting, 1948.	The Livestock of the South-west of England	5s. net
11th Meeting, 1949.	Increasing Beef Production in Britain	5s. net
13th Meeting, 1950. 14th Meeting, 1950.	Reproductive Behaviour in Cattle Livestock Farming in the Lowlands of Scotland	10s. net
Proceedings, 1951.	The Incidence and Control of Bovine Mastitis Livestock Production from Grassland in the West Midlands	10s. net
Proceedings, 1953.	Progeny Testing Current Research in Scotland	12s. 6d. net
Proceedings, 1954.	Current Research in Animal Production	15s. net
Proceedings, 1955.	Papers on Animal Production	15s. net
Proceedings, 1956.	Papers on Animal Production	15s. net
Proceedings, 1957.	Papers on Animal Production	15s. net
Proceedings, 1958.	Papers on Animal Production	15s. net

The new journal "Animal Production" is a continuation and expansion of the above "Proceedings," copies of which may be obtained from

OLIVER AND BOYD LTD.

TWEEDDALE COURT, 14 HIGH STREET, EDINBURGH 1

Do YOU know the developments taking place in the world's dairying centres?

DAIRY SCIENCE ABSTRACTS

compiled from world literature by the

COMMONWEALTH BUREAU OF DAIRY SCIENCE AND TECHNOLOGY SHINFIELD · READING · ENGLAND

brings that knowledge to the dairy scientist and technologist. Every month in its review articles and its abstracts will be found information on research and development reported in all branches of dairying throughout the world.

Annual Subscription 70s.

Order it through your bookseller or direct from

COMMONWEALTH AGRICULTURAL BUREAUX
CENTRAL SALES BRANCH
FARNHAM ROYAL · SLOUGH · ENGLAND

Some publications of

THE COMMONWEALTH BUREAU OF ANIMAL HEALTH, WEYBRIDGE

Periodicals:

The Veterinary Bulletin (monthly) Annual Subscription 70s. (\$9.80) Veterinary Reviews and Annotations (half-yearly)

Annual Subscription 25s. (\$3.50)

Books:

Fungal Diseases of Animals by G. C. Ainsworth and P. K. C. Austwick (1959). Price 20s. (\$3.00)

Salmonellosis in Animals by A. Buxton (1957). Price 25s. (\$3.80)

Orders through any major bookseller or direct to:

COMMONWEALTH AGRICULTURAL BUREAUX FARNHAM ROYAL, BUCKS

COMMONWEALTH BUREAU OF ANIMAL BREEDING AND GENETICS

ANIMAL BREEDING ABSTRACTS

will keep you up to date with world research in all aspects of livestock breeding and genetics.

Issued quarterly in March, June, September and December at 65s. per annum

T. C. No. 11. Dairy Cattle Breeding in the Tropics

by P. Mahadevan

(Livestock Research Officer, Ceylon)

This is the first review to cover all genetical aspects of the variation in performance of tropical cattle. The author has assembled and interpreted the widely scattered evidence and reports on the breeding of dairy cattle in the tropics.

Demy 8vo. Illustrated xiv + 88 pp. Price 15/-

T. C. No. 12. Pig Carcass Evaluation

by G. Harrington

(A.R.C. Statistics Group, Cambridge)

A review dealing with the estimation of carcass composition in the live and dead pig, and the determination of fat and lean quality. Contains a bibliography of 370 references.

Demy 8vo. With 4 line drawings xii + 107 pp. Price 15/-

Orders and subscriptions can be placed with any major bookseller or sent to:

COMMONWEALTH AGRICULTURAL BUREAUX CENTRAL SALES BRANCH FARNHAM ROYAL BUCKS. ENGLAND

The British Veterinary Journal

A MONTHLY REVIEW OF VETERINARY SCIENCE

Volume 115

Number 9

September 1959

Contents Include

- H. V. HUGHES and J. W. DRANSFIELD. The Blood Supply to the Skin of the Dog.
- P. B. BLACKBURN. Botryomcosis of the Udder.
- R. W. L. CHESNEY. Migram in Sheep.
- W. M. McKAY. A Clinical Study of Bovine Tuberculosis on Banffshire. The Pathological Lesions. (Part 1.)
- G. N. HENDERSON. Review of Literature on Canine Virus Hepatitis.
- I. A. SCHIPPER. Mastitis Prevention and Therapy.
- B. DENNY. Short-Wave Radio Therapy in Veterinary Practice.

Annual subscription 42s.

U.S.A. & Canada \$8.00

Post free

BAILLIÈRE, TINDALL & COX

7 & 8 HENRIETTA STREET, LONDON W.C.2

ANIMAL BEHAVIOUR

Volume VII

Numbers 3 & 4

July-October 1959

CONTENTS INCLUDE

- DENNISTON, ROLLIN H.: Escape and Avoidance Learning as a Function of Emotionality Level in the Wyoming Ground Squirrel—Citellus richardsonii elegans.
- GOY, ROBERT W. and JAKWAY, JACQUELINE S.: The Inheritance of Patterns in Sexual Behavior in Female Guinea Pigs.
- SALZEN, E. A. and SLUCKIN, W.: The Incidence of the following Responses and the Duration of Responsiveness in Domestic Fowl.
- DAVIS, DAVID E .: Territorial Rank in Starlings.
- JAKWAY, JACQUELINES.: Inheritance of Patterns of Mating behavior in the Male Guinea Pig.
- GRAUE, L. C. and PRATT, J. G.: Directional Differences in Pigeon Homing in Sacramento, California and Cedar Rapids, Iowa.
- ALLEN, DELIA M.: The "Shaking" of Worker Honeybees by Other Workers.
- FOREMAN, DARHL and ALLEE, W. C.: A Correlation between Posture, Stance and Outcome in Paired Contests of Domestic Hens.
- FREE, J. B. and BUTLER, C. G.: Bumblebees.
- WARREN, ROSLYN P. and HINDE, R. A.: The Effect of Oestrogen and Progesterone on the Nest-Building of Domesticated Canaries.
- ROSS, S., SCOTT, J. P., CHERNER, MARIA and DENENBERG, V. H.: Effects of Restraint and Isolation on Yelping Behavior in Puppies.
- Published twice yearly. Annual Subscription 50s. U.S.A. & Canada \$8.00 Post free

Baillière, Tindall & Cox

7 & 8 HENRIETTA STREET, LONDON W.C.2

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 technique.

Vol. XXVII. No. 107

CONTENTS

July, 1959

- G. W. COOKE and R. G. WARREN: Manuring Experiments on Flax
- E. M. HUTTON and S. G. GRAY: Problems in Adapting Leucaena glauca as a Forage for the Australian Tropics
- P. H. LE MARE: Soil Fertility Studies in Three Areas of Tanganyika
- P. H. ROSHER: The Spacing of Swamp Rice in Trinidad
- S. RAVIKOVITCH and M. MARGOLIN: The Effect of Barium Chloride and Calcium Sulphate in Hindering Selenium Absorption by Lucerne
- R. T. Ellis: Note on the Layout of Maize Field Trials
- H. H. MANN: Field Studies in Green Manuring. II.
- T. BONADONNA and D. CAMICI: Buffalo Keeping in Barns, and Mechanical Milking in the Salerno District

Royal 8vo.

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

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

The Journal of Dairy Research

CONTENTS OF VOL. 26, No. 3. OCTOBER 1959

Original Articles

- An analysis of the performance of an ultra-high-temperature milk sterilising Plant. IV. Comparison of experimental and calculated sporicidal effects for a strain of Bacillus stearothermophilus. H. Burton, J. G. Franklin, D. J. Williams, Helen R. Chapman, A. Jean, W. Harrison and L. F. L. Clegg.
- Some observations on slow and fast acid-producing variants of strains of Streptococcus cremoris and Streptococcus lactis used as cheese starters. ELLEN I. GARVIE.
- A comparison of dried skim-milk and white fish meal as protein supplements for fattening pigs. IV. Further studies with pigs fed unrestricted amounts of whey under commercial conditions. R. BRAUDE, K. G. MITCHELL, A. S. CRAY, A. FRANKE and P. H. SEDGWICK.
- Viscosity changes in concentrated skim-milk treated with alkali, urea and calcium-complexing agents.

 I. The importance of the casein micelle. R. Beeby and K. Kumetat. II. The influence of concentration, temperature and rate of shear. R. Beeby and J. W. Lee.
- Some volatile compounds in New Zealand Cheddar cheese and their possible significance in flavour formation. I. Identification of the volatile carbonyl fraction. J. R. L. Walker and R. J. Harvey. II. Volatile compounds of sulphur. J. R. L. Walker.
- Partition of riboflavin in cow's milk. V. V. Modi, E. C. Owen and R. A. DARROCH.
- The use of an oxidation-reduction indicator to compare the oxygen permeabilities of films for rindless cheese. R. M. Dolby.

Established in 1929 as a medium for the publication of the results of original research in dairy science and cognate subjects. Subscription 60/- per volume of three parts, payable in advance. Single copies 25/- each. Subscriptions may be sent to any bookseller or direct to the publishers.

Cambridge University Press, Bentley House, 200 Euston Road, London, N.W.1

THE JOURNAL OF AGRICULTURAL SCIENCE

Vol. LII, Part 4, August 1959. 25s. net

- FREE, J. B. The effect of moving colonies of honeybees o new sites on their subsequent foraging behaviour.
- WIDDOWSON, F. V., PENNY, A., WILLIAMS, R. J. B. and COOKE, G. W. Comparisons between combine-drilling and broadcasting muriate of potash for spring barley.
- WIDDOWSON, F. V. The effects of nitrogen upon three stiff-strawed winter wheat varieties.
- OYENUGA, V. A. Effect of frequency of cutting on the yield and composition of some fodder grasses in Nigeria (Pennisetum purpurem Schum.).
- ANNISON, E. F., LEWIS, D. and LINDSAY, D. B. The metabolic changes which occur in sheep transferred to lush spring grass. I. Changes in blood and rumen constituents. II. Changes in the acid-base balance of the whole animal.
- COOKE, G. W. and Widdowson, F. V. Field experiments on phosphate fertilisers: a joint investigation.
- HARRINGTON, G. and POMEROY, R. W. The yields of wholesale cuts from carcasses of Aberdeen-Angus crosses fattened on grass and in yards.
- BROOKES, A. J. and HODGES, JOHN. Studies in beef production. I. The effect of level of feeding and of breed on the growth and fattening of Spring born cattle.
- LARGE, R. V., ALDER, F. E. and SPEDDING, C. R. W. Winter feeding of the in-lamb ewe.
- MOUNIB, M. S. and EVANS, J. V. The effect of potassium type and breed on the dry-matter percentage and specific gravity of the red blood cells and plasma of sheep.
- Lucas, I. A. M., Calder, A. F. C. and Smith, H. The early weaning of pigs. IV. Comparisons of levels of antibiotic and sources of protein in diets for pigs weaned at 9 lb. live weight.
- CALDER, A. F. C., LODGE, G. A. and BLAIR, R. The early weaning of pigs. V. The inclusion of digestive enzymes and antibiotics in diets for pigs weaned at 6-7 lb. live weight.
- Lucas, I. A. M., Calder, A. F. C. and Smith, H. The early weaning of pigs. VI. The effects of early weaning and of various growth curves before 50 lb. live weight upon subsequent performance and carcass quality.

Articles are illustrated with plates and figures

The Journal of Agricultural Science is issued bi-monthly. Subscription (60s. per volume of three parts, two volumes yearly) may be sent to any Bookseller, or to the Cambridge University Press, Bentley House, 200 Euston Road, London, N.W.1.

THE BRITISH JOURNAL OF NUTRITION

PUBLISHED FOR THE NUTRITION SOCIETY

Vol. 13, No. 4 Shortened Versions of Titles 1959 35s. net

Amino-acid content of raw and heat-sterilised cow's milk. By Sheila Payne-Botha and E. J. Bigwood.

Blood coagulation in normal and scorbutic guinea-pigs. By P. BARKHAN and A. N. HOWARD.

In vitro conversion of β -carotene into vitamin A in tissues from the rat, guinea-pig and sheep. By N. A. Worker.

Availability of bound nicotinic acid to the rat.

1. By E. KODICEK and P. W. WILSON.

The efficient use of time in the calorimetric measurement of heat output. By A. B. CAIRNIE and J. D. PULLAR.

Experimental production of vitamin B₁₂ deficiency in rats and mice on a maize-groundnutmeal diet By Prema Fatterpaker, W. V. Lavate, A. G. Mulgaonkar, J. M. Noronha, D. V. Rege, H. P. Tipnis and A. Sreenivasan.

Effect of oestrogens by mouth on some aspects of the physiology of the newborn calf. By GILLIAN M. HAWKINS, J. H. B. ROY, K. W. G. SHILLAM, J. C. GREATEROX and P. L. INGRAM.

Effect of giving stilboestrol and chlortetracycline to colostrum-fed calves. By JILL M. LANG, J. H. B. ROY, K. W. G. SHILLAM and P. L. INGRAM.

Metabolic inter-relationships of dietary riboflavin and vitamin B_{12} in the rat. By W. V. LAVATE and A. SREENIVASAN.

Mode of action of dietary carbohydrate on protein metabolism. By H. N. Munro, J. G. Black and W. S. T. THOMSON.

Composition of tissue lost through reduction of diet in obese patients. By H. LJUNGGREN, D. IKKOS and R. LUFT.

Electrophoretic pattern of plasma proteins in kwashiorkor and under nutrition among Celonese children. By N. G. Baptist, C. C. DE Silva and M. A. Sideek.

A ballistic bomb calorimeter. By D. S. MILLER and P. R. PAYNE.

Diet in Pregnancy. 3. By A. M. THOMSON.

Combined Subscription for The British Journal of Nutrition (4 issues) and The Proceedings of the Nutrition Society (2 issues) is £7 per annum.

Cambridge University Press, Bentley House, 200 Euston Road, London, N.W.1

nutrition abstracts and reviews

This journal is produced by the Commonwealth Bureau of Animal Nutrition. The Bureau is part of the Commonwealth Agricultural Bureaux organisation financed by Commonwealth governments and the journal is issued under the direction of the Commonwealth Agricultural Bureaux Council, the Medical Research Council and the Reid Library of the Rowett Research Institute. In its four quarterly parts there are informative abstracts on all aspects of nutrition both animal and human and each part contains a critical review article on some special aspect of the subject.

The current volume is Volume 29 for which subscription rate is £6. 6s.

Full information is available from:

The Secretary,
"Nutrition Abstracts and Reviews,"
Rowett Research Institute,
Bucksburn, Aberdeen, Scotland

the author is mainly concerned with the approach to homozygosis during the formation of inbred lines.

10s 6d

essentially practical
in approach, this
standard work
deals with the handling
and management of
horses, cattle, sheep,
pigs, goats, poultry,
dogs, cats, rabbits,
and fur-bearing animals.

31s 6d

"packed with information concerning farm animals, well illustrated and has an extensive list of references to which the reader can go for further details." Nature

the chief aim of this book is to make both the reasoning and conclusion of quantitative genetics intelligible to non-mathematical biologists.

35s

TWEEDDALE COURT EDINBURGH 1

The Theory of Inbreeding

Practical Animal Husbandry

Seventh Edition

WILLIAM C. MILLER E. D. S. ROBERTSON

Livestock Improvement in Relation to Heredity and Environment

Fourth Edition

J. E. NICHOLS

Introduction to Quantitative Genetics

in preparation

D. S. FALCONER

Oliver and Boyd