

ANIMAL PRODUCTION

JOURNAL OF THE BRITISH SOCIETY OF ANIMAL PRODUCTION



OLIVER & BOYD LTD.
EDINBURGH AND LONDON

MARCH 1960

VOL. 2 PART 1

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

JOURNAL OF DAIRY SCIENCE

Official publication of the
American Dairy Science Association

Research Papers in Volume 43, No. 1, January 1960

- V. R. WENNER. Rapid Determination of Minerals and Ions in Milk.
- O. W. KAUFMANN, T. I. HEDRICK, I. J. PFLUG, C. G. PHEIL and R. W. KEPPELER. Relative Cleanability of Various Stainless Steel Finishes after Soiling with Inoculated Milk Solids.
- B. L. LARSON. Significance of Strontium 90 in Milk.
- J. T. LAZAR, JR., and R. W. HENNINGSON. Influence of Vacuum Pasteurization upon the Freezing Point Value, Total Solids and Concentration of Fluid Milk.
- W. K. STONE, P. M. LARGE and G. C. GRAF. Determination of Curd Making Quality of Non-fat Dry Milk.
- C. W. YOUNG, J. E. LEGATES and J. G. LECCE. Genetic and Phenotypic Relationships between Clinical Mastitis, Laboratory Criteria and Udder Height.
- L. W. SPECHT and L. D. MCGILLIARD. Rates of Improvement by Progeny Testing in Dairy Herds of Various Sizes.
- R. S. EMERY, C. K. SMITH, R. M. GRIMES, C. F. HUFFMAN and C. W. DUNCAN. Physical and Chemical Changes in Bovine Saliva and Rumen Liquid with Different Hay-Grain Rations.
- D. C. CHURCH and R. G. PETERSEN. Effect of Several Variables on *In Vitro* Rumen Fermentation.

This Journal is published monthly. The annual subscription is \$15.00 per year in the United States and Canada and \$15.50 in all other countries, net, and post paid. Subscriptions should be sent to The Garrard Press, 510 North Hickory Street, Champaign, Illinois.

Membership dues to the association are \$10.00 per year, including the *Journal of Dairy Science*. Dues should be sent to Professor H. F. Judkins, Secretary-Treasurer, 32 Ridgeway Circle, White Plains, New York.

JUST PUBLISHED

POULTRY-KEEPING IN INDIA, by P. M. N. Naidu

It offers reliable, helpful and up-to-date information on the numerous problems involved in Poultry-Keeping. Recent advances in poultry breeding, housing, nutrition, disease control, marketing, etc., are exhaustively dealt with. Written in a popular style and profusely illustrated, it will serve as day-to-day guide to poultry-keepers and a reference work to students in agriculture and veterinary colleges, extension workers and others connected with poultry-keeping.

Pp. 293, 21 coloured plates, 192 black and white illustrations. \$9.00/65 sh.

OTHER RECENT PUBLICATIONS

AGRICULTURE AND ANIMAL HUSBANDRY IN INDIA, by Dr M. S. Randhawa

A standard and reference volume on all important components of Indian Agriculture providing a comprehensive account of India's geological past, physical features, soils, climate, vegetation, irrigation works, agricultural holdings, crops, farm animals and fisheries.

Pp. 364, 117 illustrations, 11½" × 8½". (1958.) \$6.00/42 sh.

STATISTICAL METHODS FOR AGRICULTURAL WORKERS

by V. G. Panse and P. V. Sukhatme

An important text-book on statistical methods and designs of experiments in relation to agriculture.

Pp. 361. 9½" × 6½". (1958.) \$6.00/40 sh.

THE MANGO, by S. R. Gangoli et al.

The first authoritative monograph on India's most important fruit. Pp. 530, 213 coloured plates, 65 black and white illustrations. 7½" × 10". (1957.) \$13.00/90 sh.

AGRICULTURAL RESEARCH IN INDIA—INSTITUTES AND ORGANISATIONS

by Dr M. S. Randhawa

Provides a connected account of all agricultural research institutions and organisations in India.

Pp. 450, 79 plates. 10" × 8½". (1958.) \$7.00/48 sh.

MECHANICAL CULTIVATION IN INDIA, by D. A. Gadkary

A monograph discussing the scope for the use of mechanical aids in crop production and provides information on farm machinery and implements and their maintenance, etc.

Pp. 148, 10 plates, 10" × 7" (1958.) \$2.50/13 sh.

Available from:

The Business Manager

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
NEW DELHI 2

*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

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. Botryomycosis 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 S.: 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. 108

CONTENTS

October, 1959

- F. YATES, S. LIPTON, P. SINHA and K. P. DAS GUPTA: An Exploratory Analysis of a Large Set of $3 \times 3 \times 3$ Fertilizer Trials in India
- D. L. BROWN: The Nguni Breed of Cattle. I. A Descriptive Review
- G. EVANS: See Rates of Grasses for Seed Production. I. Pasture Varieties of Ryegrass, Cocksfoot and Timothy
- J. W. S. REITH: Fertilizer Placement for Swedes and Turnips
- H. A. KARAM: Birth, Weaning and Yearling Weights of Rahmani Sheep. I. Effects of some Environmental Factors. II. Heritability Estimates and Correlations
- D. STEPHENS: Field Experiments with Trace Elements on Annual Food Crops in Ghana
- J. S. GLADSTONES: The Potential of Lupins as Crop and Forage Plants in Western Australia. With Plate
- J. H. STAPLEY and P. S. HAMMOND: Large-Scale Trials with Insecticides against Capsids on Cacao in Ghana. With Plate

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. 27, No. 1. *Shortened Titles*. FEBRUARY 1960 25s.

Original Articles:

- The use of bacteriophage and α -bromopropionic acid in counting bacteria in cheese. P. S. ROBERTSON.
 The colloidal phosphate of milk. II. Influence of citrate. G. T. FYNE and T. C. A. MCGANN.
 Evaluation of some factors affecting the S.N.F. of milk. W. H. ALEXANDER and F. B. LEECH.
 Chromatographic identification of lactobacilli in cheese. G. C. CHEESEMAN.
 Production of acetone and acetaldehyde by lactic streptococci. R. J. HARVEY.
 Strontium-90 from fallout in the diet and milk of a dairy herd. G. W. COX, A. MORGAN and R. S. TAYLER.
 Chemical changes in dried skim-milk during storage. E. L. RICHARDS and M. R. CHANDRASEKHARA.
 Turbimetric methods for testing homogenised milk. J. D. S. GOULDEN.
 Availability of calcium of ultra-high-temperature sterilized milk. KATHLEEN M. HENRY and JOYCE TOOTHILL.
 Effect of cream-holding temperature in the manufacture of sweet cream starter butter. F. H. MCDOWALL, J. A. SINGLETON and B. S. LE HERON.
 Effect of proportion of starter in the manufacture of sweet cream starter butter. F. H. MCDOWALL, J. A. SINGLETON and B. S. LE HERON.
 RESTRICTED and *ad lib.* feeding of formolized skim-milk to pigs. R. BRAUDE and K. G. KITCHELL.
 The effect of udder infections on the lactation yield of milk and milk solids. J. O'DONOVAN, F. H. DODD and F. K. NEAVE.

Reviews of the progress of dairy science:

- Section C. Dairy Chemistry. The chemistry of butter and butterfat. E. G. PONT.

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, 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. LIII, PART 2, OCTOBER 1959. 25s. net

- LANGER, R. H. M. and RYLE, G. J. A. The effect of time of sowing on flowering and fertile tiller production in S. 48 timothy.
 JONES, D. J. C. Studies of the chemical composition of kales and rapes. III. The minor elements.
 KING, J. W. B., WATSON, J. H. and YOUNG, G. B. Genotype-environment interactions in the wintering of lambs.
 LODGE, G. A. Nitrogen metabolism in the lactating sow.
 LODGE, G. A. The energy requirements of lactating sows and the influence of level of food intake upon milk production and reproductive performance.
 WALKER, D. M. The *in vitro* digestion of roughage dry matter.
 EVANS, G. C. The design of equipment for producing accurate control of artificial aerial environments at low cost.
 SLEE, JOHN. Fleece shedding, staple length and fleece weight in experimental Wiltshire Horn-Scottish Blackface sheep crosses.
 RAVEN, A. M. and THOMPSON, A. The availability of iron in certain grass, clover and herb species. II. Alsike, broad red clover, Kent wild white clover, trefoil and lucerne.
 EVANS, R. E. The minimum amount of white-fish meal required to supplement the proteins in some vegetable-protein concentrates.
 HUGHES, A. P. Plant growth in controlled environments as an adjunct to field studies. Experimental application and results.
 ZALESKI, A. Lucerne investigations. IV. Effect of germination and seed rates on establishment, mortality and yield of dry matter and protein per acre.
 DAVIES, R. O., JONES, D. I. H. and MILTON, W. E. J. Factors influencing the composition and nutritive value of herbage from fescue and *Molinia* areas.
 MANTON, V. J. A. The relationship between fertility in the bovine and impedance change frequency.

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. 14, No. 1 Shortened Versions of Titles 1960 35s. net

- | | |
|--|---|
| <p>Dietary fats and blood cholesterol in rats. By J. P. FUNCH, E. NIELSON and H. DAM.</p> <p>Inorganic constituents in the plasma of healthy Ayrshire cattle. By E. W. FISHER.</p> <p>Availability of bound nicotinic acid to the rat. 2. By E. KODICEK.</p> <p>Availability of bound nicotinic acid to the rat. 3. By K. J. CARPENTER, E. KODICEK and P. W. WILSON.</p> <p>Availability of bound nicotinic acid to the rat. 4. By D. K. CHAUDHURI and E. KODICEK.</p> <p>Vitamin B₁₂ content of piglets and of milk from sows on different rations. By R. S. BARBER, R. BRAUDE, J. E. FORD, MARGARET E. GREGORY, K. G. MITCHELL and J. W. G. PORTER.</p> | <p>Mineral composition of individual bones of the domestic fowl. By T. G. TAYLOR, J. H. MOORE and F. HERTELENDY.</p> <p>Severe undernutrition in growing and adult animals. 1. By R. A. MCCANCE.</p> <p>Severe undernutrition in growing and adult animals. 2. By C. W. M. PRATT and R. A. MCCANCE.</p> <p>Commercial breads as sources of vitamin E for rats. By I. M. SHARMAN and PAMELA J. RICHARDS.</p> <p>Chemical and nutritional changes in stored herring meal. 2. By C. H. LEA, L. J. PARR and K. J. CARPENTER.</p> <p>Cutaneous loss of nitrogen compounds in African adults. By SYLVIA J. DARKE.</p> |
|--|---|

*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 30 for which subscription rate is £6. 6s.

Full information is available from:

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

BRITISH POULTRY SCIENCE

Journal of the Poultry Education Association

Contents of Volume 1 No. 1, April 1960

- G. A. CLAYTON and A. ROBERTSON. Light induction of out-of-season reproduction in the turkey.
- T. R. MORRIS and S. FOX. The use of lights to delay sexual maturity in pullets.
- R. S. GOWE, A. S. JOHNSON, R. D. CRAWFORD, J. H. DONNS, A. T. HILL, W. F. MOUNTAIN, T. R. PELLETIER and J. H. STRAIN. Restricted versus full-feeding during the growing period for egg production stock.
- T. E. GODSELL. Linear programming and poultry feeding.
- G. McBRIDE. Poultry husbandry and the peck order.
- D. G. A. GUTTRIDGE. Dried grass meals in practical broiler diets.
- C. M. A. BAKER. The genetic basis of egg quality : a review of the literature.

This new journal will appear initially twice a year in April and October. The annual subscription is 30s. (U.S.A. and Canada \$5.00), single parts 17s. 6d. (U.S.A. and Canada \$2.75). Orders and subscriptions may be sent to any bookseller or direct to:—

OLIVER AND BOYD, LTD

Tweeddale Court, 14 High Street, Edinburgh, 1

THE JOURNAL OF THE AUSTRALIAN INSTITUTE OF AGRICULTURAL SCIENCE

Volume 25, No. 4 December, 1959

CONTENTS

ARTICLES

- Programming for Farm Management Extension, by M. L. PARKER.
Useful Correlations between Results of Fertiliser Trials and other Field Data, by C. B. WELLS.

TECHNICAL ARTICLES

- Mistletoe Control on a Large Scale, by A. C. BROWN.
The Influence of Sod-Seeded Legumes on the Nitrogen Economy of Grassland Soils at Lismore, N.S.W., by J. W. MCGARITY.

TECHNICAL NOTES

- Wool Fibre Thickness Frequency Distribution in the Staple: the Proximal Sample Compared with the Whole Staple, by W. R. LANG and B. R. WARDLE.
Residual Response to Urea Fertilisation, by E. G. CUTHBERTSON.
Bacterial Blight of Cotton in North Western Australia, by N. J. THOMPSON and J. J. BASINSKI.
The Magnesium Supplying Power of Glazed Porcelain Pots, by F. J. ROBERTS.
The Effect of Supplementation with Urea and Molasses on the Liveweight, Appetite and Wool Growth of Sheep, by J. B. COOMBE.
Slide Rule for Judging and Grading Beef Carcasses, by N. Y. M. YEATES.
Inhibition of Rooting by Maleic Hydrazide, by P. MAY.
The effect of an Autumn Application of Nitrogenous Fertiliser to Irrigated Pastures on the Production of Grazing Dairy Cows, by M. FREER and D. E. TRIBE.
Weather Damage to Exposed Hay Bales, by W. SHEPHERD.
The Effect of Nitrogen on Non-Irrigated Maize Sown in Pasture Slits, by J. STRANG and P. BROUE.
Growth Rates of Lucerne (Hunter River) and *Glycine javanica* in a Tropical Highland Environment, by G. W. KYNEUR.
Changes in the Soluble Sugar Contents of Short Rotation Ryegrass during Growth, by JEAN S. COUCHMAN.

Published quarterly. Annual subscription rates, including postage, within Australia £1, 10s.: British Commonwealth countries, £1, 13s.; Other countries, £1, 15s.

Orders and subscriptions should be sent to:

The Business Manager,
Australian Institute of Agricultural Science,
226 Clarendon Street,
East Melbourne, C.2
Victoria, Australia.