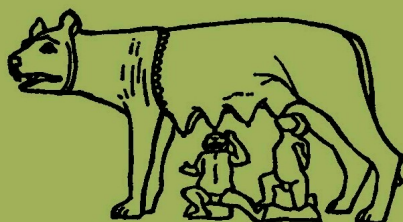


ANIMAL PRODUCTION



JOURNAL OF THE BRITISH SOCIETY OF ANIMAL PRODUCTION

NOVEMBER 1967

VOL. 9 PART 4

OLIVER & BOYD LTD
EDINBURGH AND LONDON

INFORMATION FOR CONTRIBUTORS TO *ANIMAL PRODUCTION*

Animal Production publishes papers on original research provided that they have not been and, with the exception of authors' summaries, will not be published elsewhere without the Editors' written permission. Authors' summaries can be reproduced if full acknowledgement of the source is made.

Contributions may be in the field of animal production, or in any related scientific field. Reports on techniques will be published only as appendices to scientific papers. Results of research which do not warrant a comprehensive presentation may be submitted for consideration as *Notes*. *Notes* are not intended for the publication of interim results. They should not exceed 2000 words or the equivalent inclusive of tables and illustrations.

Manuscripts should be typewritten in double spacing with wide margins. Each page and the lines on each page should be numbered. *Two* copies of the typescript (one of illustrations) should be sent to

Dr. Gerald Wiener,
Animal Production,
A.R.C. Animal Breeding Research Organisation,
West Mains Road, Edinburgh 9.

Manuscripts are not returned with proofs; authors should therefore retain copies.

For guidance to the general style which should be adopted in the writing and presentation of papers authors are referred to *General Notes on the Presentation of Scientific Papers* (2nd revised ed., 1965) published by the Royal Society, London (price 5s.). Points of detail applying particularly to *Animal Production* are given below.

Illustrations. The same material should not normally be presented in tables and figures. 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.
- (b) Photographs intended for half-tone reproduction should be on glossy paper. They will be accepted only if found necessary by the Editors.
- (c) Colour plates are unlikely to be accepted unless authors bear the cost.

[Continued on inside back cover

Single number, 25s. or \$4.00 net.

Annual subscription, 90s. or \$14.00

Front cover centrepiece: Romulus and Remus nursed by a she-wolf (after the statue in Rome). Artistically anomalous (the Etruscan wolf is early 5th century B.C., the infants are Renaissance additions) and scientifically suspect, yet it symbolises an appealing myth for those, like the contributors to this journal, who owe their living to animals.

ERRATA

ANIMAL PRODUCTION, 1966, Vol 8, Part 1

Robertson: A mathematical model of the culling process in dairy cattle

p. 96 two lines from the bottom should read:

“... The proportion selected increases by ...”

p. 97 line 13 to commence:

$$\sigma_i(V_t + \tau^2)^{\frac{1}{2}}$$

line 18 to read:

$$\left(\frac{dq}{dy}\right)_{y=\bar{y}} = \frac{Kz}{\tau}$$

p. 98 six lines from the bottom should be:

$$\frac{1}{\bar{q}} \left(\frac{dq}{dS}\right)_{S=\bar{y}} = \frac{b_g}{b_p} \frac{i}{V_w + \tau^2}$$

BRITISH SOCIETY OF ANIMAL PRODUCTION

★ ★ ★

Previous numbers of 'ANIMAL PRODUCTION' are available:—

1959	Volume 1 in 2 parts	30s. or \$5.00
1960	Volume 2 in 2 parts	30s. or \$5.00
1961	Volume 3 in 3 parts	45s. or \$7.50
1962	Volume 4 in 3 parts	45s. or \$7.50
1963	Volume 5 in 3 parts	45s. or \$7.50
1964	Volume 6 in 3 parts	45s. or \$7.50
1965	Volume 7 in 3 parts	65s. or \$11.00
1966	Volume 8 in 3 parts	65s. or \$11.00
	(Single parts	25s. or \$4.00)

★ ★ ★

Earlier publications of the Society, from 1944-58, are also available.
Orders and enquiries should be addressed to:

Oliver & Boyd Ltd.
Tweeddale Court
14 High Street
Edinburgh, 1

★ ★ ★

Information about the activities of the British Society of
Animal Production and details of membership may be obtained
from:

The Honorary Secretary
British Society of Animal Production
West of Scotland Agricultural College
Auchincruive
Ayr

The British Veterinary Journal

A monthly review of veterinary science

Editor: J. A. Laing

The October issue includes:

L. P. Pugh: The Evolution of the Veterinary Profession in Great Britain.

Robin Tassell: The Effects of Diet on Reproduction in Pigs, Sheep and Cattle.
Part V: Plane of Nutrition in Cattle.

Lloyd S. Wiggan and J. B. K. Clark: Observations on the Fertility of Diluted and Stored Ram Semen used in Artificial Insemination.

J. O. L. King: The Continuous Feeding of Two Antibiotics to Growing Rabbits.

J. H. Aafjes and J. K. Nijhof: A Simple Artificial Rumen giving Good Production of Volatile Fatty Acids.

Annual Subscription 120s

Available from

Baillière, Tindall & Cassell 7 & 8 Henrietta Street, London W.C.2

THE JOURNAL OF THE AUSTRALIAN INSTITUTE OF AGRICULTURAL SCIENCE

CONTENTS—VOL. 33, No. 2, JUNE 1967 INCLUDE

Articles

Disease Resistance Breeding, by R. D. BROCK

The Effect of Time of Planting on the Performance of Irrigated Winter Crops in the Ord River Valley,
by D. F. BEECH and M. J. T. NORMAN

Presidential Address

Integration of Northern and Southern Development as an Essential in Australia's Future Prosperity,
by E. M. HUTTON

Letters

Wheat Cultivation Trails, by G. D. KOHN and R. R. STORRIER; D. R. ROONEY, H. J. SIMS and C. L. TUOHEY

Australian Cotton Production, by J. J. BASINSKI
Townsville Lucerne and Soil Erosion, by J. S. MUSPRATT

Theses

The Formation and Swelling of Complexes between Montmorillonite and Some Organic Compounds,
by BENNY KIAN THENG

Chloride Exclusion by Clay Mineral Surfaces, by D. G. EDWARDS

Changes in Some Physical and Chemical Properties of the Surface of an Impoverished Red-brown Earth Soil under Pasture, by A. L. CLARKE

A Study of the Drainage of Irrigated Sand Dune Using an Electrical Resistance Analogue, by R. G. MEIN

Comparison of the Effects of Arsenic and Amitrole in the Control of *Eriocereus martinii* (Lab.) Ricc. by G. DIATLOFF

The Influence of Iron Oxides on the Physical Properties of Soils, by T. L. DESHPANDE

Some Aspects of the Relation between Labile Soil Phosphorus and Plant Responses, by I. F. FERGUS

The Adsorption of Amino Acids and Peptides by Montmorillonite and Illite, by R. H. LABY

The Utilization of Low-quality Roughage, by Janet Z. FOOT

Physiological Responses in Sheep During Eating, and the Energy Cost of Eating, by B. A. YOUNG

Book Reviews

Technical Notes

Talks

News Items

Institute Affairs

Enquiries should be addressed to the

Business Manager, 226 Clarendon Street, East Melbourne, C.2, Victoria, Australia

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: 110s. to subscribers in the Commonwealth and the Republic of Ireland whose governments contribute to the Commonwealth Agricultural Bureaux.

210s. to subscribers in non-contributing countries.

Order it through your bookseller or direct from

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

JOURNAL OF DAIRY SCIENCE

OFFICIAL PUBLICATION OF THE AMERICAN DAIRY SCIENCE
ASSOCIATION SINCE 1917

RAYMOND ALBRECTSON, President, Cornell University, Ithaca, N.Y.
E. O. HERREID, Editor-in-Chief, University of Illinois, Urbana
C. J. CRUSE, Executive Secretary, 903 Fairview Ave., Urbana, Illinois 61801

/

Shortened titles of papers published in the January 1967 issue:

W. L. DUNKLEY. Evaluating Oxidized Flavor in Milk.

W. V. PRICE. Quality of Brick Cheese.

D. G. CROSBY. DDT Contamination in Milk.

C. D. FUNK. Mastitis Screening Tests.

This Journal is published monthly. The annual subscription rate is \$20.00 in the United States and Canada and is \$20.50 in all other countries, post paid.

Subscriptions should be sent to C. J. Cruse.

Membership dues to the Association are \$12.50 per year, including the *Journal of Dairy Science*. Dues should be sent to C. J. Cruse.

ANIMAL BREEDING ABSTRACTS

is such an invaluable guide to the latest literature on livestock breeding and production that we can hardly believe you have not heard of it (110s. annually, or 210s. if you live outside the British Commonwealth or the Republic of Ireland) **BUT** do you know about our

ANNOTATED BIBLIOGRAPHIES

<i>Number</i>	<i>Subject</i>	<i>Period covered</i>	<i>Number of References</i>	<i>Price</i>
29	Influence of environmental temperature on reproductive performance in poultry	1955-66	71	20s.
32	Beef production in the tropics	1964-66	62	18s.
34	Size of farm animals related to their productivity	1952-66	94	27s.
35	Albinism in farm animals	1957-64	8	6s.
36	The Charolais and its use in crossbreeding	1963-66	26	6s.
37	The productivity of indigenous wildlife v. domestic livestock	1959-66	35	9s.
39	Performance of Santa Gertrudis in the tropics	1949-66	27	6s.
40	Effect of stocking density on egg production	1945-66	14	6s.
42	Theoretical aspects of heterozygosity	1955-64	26	6s.
45	Growth and development of zebu cattle	1957-66	46	12s.
46	Effect of early weaning on reproductive performance and litter growth in pigs	1958-66	28	6s.
47	Damascus cattle and goats	1939-64	10	6s.
48	Fertility in dairy cattle: selected references 1964-66	1964-66	95	27s.
49	Twinning in cattle (replaces No. 11)	1955-66	46	12s.
50	Inheritance of black coat colour in sheep	1956-65	8	6s.
51	Pregnancy diagnosis in the pig	1953-65	22	6s.
52	Heritability of udder conformation	1952-66	51	12s.
53	Performance of castrates v. boars	1954-67	25	6s.
54	A. I. in the horse and donkey	1958-66	39	9s.

These are duplicates of bibliographies prepared on request at the Commonwealth Bureau of Animal Breeding and Genetics, Edinburgh. In addition to the full title reference, the abstract published in *Animal Breeding Abstracts* is reproduced. They can be obtained on application to the Director of the Bureau, The King's Buildings, West Mains Road, Edinburgh, 9. The prices quoted include postage by ordinary mail, and the remittance should be sent with the order *unless you want it posted by air mail*. If the material is to be sent by air mail, do not send money with your request. You will receive an invoice which includes air mail postage.

EXPERIMENTAL AGRICULTURE

Contents of Vol. 3, No. 3, July 1967

- J. E. JACKSON. The study of Variation in Crop Fields from Year to Year.
M. A. HOLLIES. Effects of Shade on the Structure and Chlorophyll Content of Arabica Coffee Leaves.
D. STEPHENS. Experiments with Nitrogen and Magnesium Fertilizers on Coffee in Uganda.
D. V. LIYANAGE. Identification of Genotypes of Coconut Palms Suitable for Breeding.
D. A. PERRY. Premature death of Groundnut Plants in Northern Nigeria.
R. F. ALLBROOK. Use of Soil, Water and Leaf Analyses in Growing Oranges in Jordan.
G. D. THOMPSON, J. M. GOSNELL and P. J. M. DE ROBILLARD. Responses of Sugarcane to Supplementary Irrigation on Two Soils in Natal.
S. K. DE DATTA, R. S. AYYANGAR and J. T. MAGBANUA. Effects of Lindane and Carbaryl on Insects, Soil and Plant Nitrogen, and Grain fields of Rice.
H. P. SIKDER. DORMANCY of Paddy Seeds in Relation to Different Seed Treatments.
BOOK REVIEWS:
The Transformation of Rural Communities; L. E. VIRONE, C. PELLIZZI, M. UPTON and L. MARCANO
A Buyers' Market—The Importance of Title and Summary, G. V. JACKS.
Weeds of the World—Biology and Control: LAWRENCE J. KING.

Annual Subscription per volume of 4 parts 75s. Single parts 25s. net

Copies may be ordered from your bookseller or from

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

BRITISH POULTRY SCIENCE

CONTENTS OF VOLUME 8, PART 3, JULY 1967

- EDWARDS, D. G. and MORRIS, T. R. The effect of maize and maize oil on egg weight.
NIR, I. and ASCARELLI, I. The effect of thyroid status and restriction of dietary protein on survival of vitamin A deprived chicks.
KULENKAMP, A. W., COLEMAN, T. H. and ERNST, R. A. Artificial insemination of Bobwhite quail.
DAGHIR, N. J. and PELLETT, P. L. Influence of breed, age and body weight on organ weight in the chicken.
WELLS, R. G. Egg shell strength. 2. The relationship between egg specific gravity and egg shell deformation and their reliability as indicators of shell strength.
FOSTER, W. H. The relative importance of traits reported in the first three Gosford Random Sample Tests.
AKESTER, A. R., ANDERSON, R. S., HILL, K. J. and OSBALDISTON, G. W. A radiographic study of urine flow in the domestic fowl.
BORNSTEIN, S. and BARTOV, I. Comparisons of sorghum grain (milo) and maize as the principal cereal grain source in poultry rations. 1. Their relative value for broilers.
BORNSTEIN, S. and BARTOV, I. Comparisons of sorghum grain (milo) and maize as the principal cereal grain source in poultry rations. 2. Their relative feeding for layers.

This Journal is published quarterly in January, April, July and October. The annual subscription commencing 1968 is £5 (U.S.A. \$17.00), single parts 27s. 6d. (U.S.A. \$4.50). Orders and subscriptions may be sent to any bookseller or direct to the publishers:

OLIVER AND BOYD LTD
Tweeddale Court, 14 High Street, Edinburgh 1

THE JOURNAL OF AGRICULTURAL SCIENCE

VOL. 69 PART 1 AUGUST 1967

- JOHNSON, K. G. and WEBSTER, M. E. D. Extremity skin temperature in British and Zebu cross cattle. (With Two Text-figures)
- PRIESTLEY, G. C. Seasonal changes in the inner root sheath of the primary follicles in Herdwick sheep. (With One Plate)
- BIRCH, J. A., DEVINE, J. R., HOLMES, M. R. J. and WHITEAR, J. D. Field experiments on the fertilizer requirements of maincrop potatoes. (With Four Text-figures)
- AKKADA, A. R. ABOU and OSMAN, H. EL SAYED. The use of ruminal ammonia and blood urea as an index of the nutritive value of protein in some food stuffs.
- GRIMES, R. C. The growth of lambs grazing tall fescue receiving high and low levels of nitrogen fertilizer. (With Three Text-figures)
- SMITH, I. D. The effect of constant long daily photoperiod upon the onset of puberty in ewes
- SPEDDING, C. R. W., BETTS, J. E., LARGE, R. V., WILSON, I. A. N. and PENNING P. D. Productivity and intensive sheep stocking over a five-year period. (With Eighteen Text-figures)
- MURRAY, D. M. and YEATES, N. T. M. Walking trials with cattle. II. A comparison of bulls, steers and heifers. (With Six Text-figures)
- OWEN, E. and DAVIES, G. M. Effect of breed, sex, type of cereal and supplementary hay upon the performance of beef cattle given high-concentrate diets
- STERN, W. R. Soil water balance and evapotranspiration of irrigated cotton. (With Three Text-figures)
- JONES, I. T. and HAYES, J. D. The effect of seed rate and growing season on four oat cultivars. I. Grain yield and its components. (With One Text-figure)
- LUPTON, F. G. H., ALI, MOHAMED A. M. and SUBRAMANIAM, S. Varietal differences in growth parameters of wheat and their importance in determining yield. (With Three Text-figures)
- GARWOOD, E. A. and WILLIAMS, T. E. Growth, water use and nutrient uptake from the subsoil by grass swards
- MORRISON, S. R., HINTZ, H. F. and GIVENS, R. L. Back of response by growing-finishing pigs to germicidal ultraviolet radiation
- CLEMENT, C. R. and WILLIAMS, T. E. Leys and soil organic matter. II. The accumulation of nitrogen in soils under different leys. (With Three Text-figures)
- GASSER, J. K. R. and PENNY, A. The value of urea nitrate and urea phosphate as nitrogen fertilizers for grass and barley. (With Two Text-figures)

Articles are illustrated with plates and figures

The Journal of Agricultural Science is issued bi-monthly. Subscription (75s. 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

Shortened Versions of Titles from Vol. 21, No. 4. December 1967

- Severe undernutrition in growing and adult animals. 17. By D. LISTER and R. A. McCANCE.
- Milk in schools: an experiment in nutrition education. By J. C. MCKENZIE, JULIET MATTINSON and JOHN YUDKIN.
- Studies on magnesium in ruminant nutrition. 8. By N. F. SUTTLE and A. C. FIELD.
- Nitrogen losses in sweat and protein requirements in tropical countries. By ANN ASHWORTH and A. D. B. HARROWER.
- Vitamin E and stress, 7. By J. GREEN, I. R. MUTHY, A. T. DIPLOCK, J. BUNYAN, M. A. CAWTHORNE and ELSPETH A. MURRELL.
- Incubation inside the bovine rumen. By J. W. CZERKAWSKI.
- Protein requirements of the mature breeding ewe. 2. By J. J. ROBINSON and T. J. FORBES.
- Effect of groundnut meal containing aflatoxin on *Cynomolgus* monkeys. By W. F. J. CUTHBERTSON, A. C. LAURSEN and D. A. H. PRATT.
- Some effects of overfeeding for four days in man. By J. A. STRONG, D. SHIRLING and R. PASSMORE.
- Uncooked and roll-dried wheat starch, with and without sucrose, and dental caries in the rat. By R. M. GREEN and R. L. HARTLES.

Combined Subscription for The British Journal of Nutrition (4 issues) and The Proceedings of the Nutrition Society (2 issues) is £9 per annum.

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

The Journal of Dairy Research

LIST OF SHORTENED TITLES, VOL. 34, NO. 3, OCTOBER 1967

Subscription price per Volume of 3 parts 80s. Single parts 30s.

- B-complex vitamins in heated milk. H. BURTON, J. E. FORD, J. G. FRANKLIN and J. W. G. PORTER.
- Salts of VFA's and milk production. C. C. BALCH, W. H. BROSTER, V. W. JOHNSON, C. LINE, J. A. F. ROOK, J. D. SUTTON and VALERIE J. TUCK.
- Design of milk solids testing schemes. M. G. O'KEEFFE.
- A suggested correction to the British Standards hydrometric method for the estimation of total solids in milk. M. G. O'KEEFFE.
- A milking parlour for experimental work with lactating ewes. M. MORAG, J. A. C. GIBB and S. FOX.
- Thermorésistance de butyriques. O. CERF, J. L. BERGERE et J. HERMIER.
- Iodine values of oxidized milk lipids. E. G. PONT and GWENDA L. HOLLOWAY
- Stability of vitamins in milk. J. E. FORD.
- Mastitis bacteria and antibiotics. A. JONES, T. M. HIGGS, F. I. NEAVE and A. SMITH.
- Microbial flora, flavour and FFA in Cheddar cheese. B. REITER, T. F. FRYER, A. PICKERING, HELEN R. CHAPMAN, R. C. LAWRENCE and M. ELISABETH SHARPE.
- Review. The secretion of water and water-soluble constituents in milk. J. A. F. ROOK and J. V. WHELOCK.

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

COMMONWEALTH BUREAU OF ANIMAL NUTRITION

The chief task of the Bureau is the production of *Nutrition Abstracts and Reviews*. In this quarterly journal, which covers the fields of human and animal nutrition, are published about 10,000 bibliographical references a year, over half of them accompanied by informative abstracts. The information contained in the volumes of *Nutrition Abstracts and Reviews* published since 1951, amounting at present to about 100,000 references, is now coded on punched cards for mechanical retrieval. The Bureau is prepared to answer enquiries and provide bibliographies on specific nutritional topics. In addition, sets of cards to be used in conjunction with the abstracts in the journal may be ordered.

Further information may be obtained from

**The Director,
Commonwealth Bureau of Animal Nutrition,
Bucksburn, Aberdeen, AB2 9SB, Scotland**

ANIMAL BEHAVIOUR

Volume 15 Part 4

Editors: P. P. G. Bateson and L. R. Aronson

this issue includes:

Saccharin Reverses the Effect of Food Deprivation upon Fluid Intake in Mice.

Leaping and Other Movements in some Cardiid Bivalves.

Coastal Distribution, Display and Sound Production by Florida Fiddler Crabs.

Oestrogen Stimulation of Nest Material Preparation in the Peach-face Lovebird.

Communication among Honey Bees with Field Experience.

An Assessment of the Reversal Index.

The Formation of Attachments by Domestic Chicks to Two Textures.

Coital behaviour in dogs. I. Preferential mating in the bitch.

Relationship between Sensory Stimulation and Gross Motor Behaviour During the Postnatal Development in the Rat.

Changes in the Behaviour of *Lebistes reticulatus* upon a Repeated Shadow Stimulus.

Animal Behaviour is published three times yearly.

Annual Subscription 100s: U.S.A: and Canada \$17.50

Bailliere, Tindall & Cassell

7 & 8 Henrietta Street London WC2

Index Veterinarius

A COMPLETE BIBLIOGRAPHY OF VETERINARY LITERATURE

This subject and author index of current literature on veterinary and related sciences is produced by the Commonwealth Bureau of Animal Health and was first published in 1933. It is issued quarterly and each year about 15,000 references are listed.

For compilation of the *Index* 700 periodicals in 22 languages are searched and coverage embraces the whole world.

Annual subscription is 300s. (\$45) (reduced rate to residents in British Commonwealth or Republic of Ireland—140s.). Orders may be sent to the Central Sales Branch, Commonwealth Agricultural Bureaux, Farnham Royal, Slough, Bucks.