

ANIMAL PRODUCTION



JOURNAL OF THE BRITISH SOCIETY OF ANIMAL PRODUCTION

MAY 1967

VOL. 9 PART 2

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papers on original research provided that they have not been and, with the exception of authors' summaries, will not be published elsewhere without the Editors' written permission.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 3th 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.

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



A MONTHLY REVIEW OF VETERINARY SCIENCE
 Editor: J. A. LAING Chairman of Editorial Board: SIR JOHN RITCHIE

The British Veterinary Journal

This, the oldest veterinary periodical in the British Commonwealth, has always maintained the broadest interest in animal welfare including regular articles on breeding and nutrition

Annual Subscription 120s.
 U.S.A. & Canada \$17.50

Contents of a recent issue:

Fisher and McEwan: Death in Neonatal Calf Diarrhoea. Part II. The Role of Oxygen and Potassium. *Beveridge and Rose:* Influenza in Horses: Persistence of Antibody Measured by Three Methods. *Cullen and Herbert:* Some Ecological Observations on Micro-organisms Inhabiting Bovine Skin, Teat Canals and Milk. *Lawson, Nixon, Noble and Weipers:* Development and Eruption of the Canine Dentition. *Pearson and Ogg:* Studies in John's Disease in Northern Ireland. Part VI. The Application of Control Measures. *Swarbrick:* Ulcers of Unknown Aetiology on the Skin of a Dairy Cow.

Book Reviews

Current Topics

Baillière, Tindall & Cassell

7 and 8 Henrietta Street, London WC2

THE JOURNAL OF THE AUSTRALIAN INSTITUTE OF AGRICULTURAL SCIENCE

CONTENTS—VOL. 33, No. 1. MARCH 1967 INCLUDE

Articles

Townsville Lucerne: History and Prospect, by L. R. HUMPHREYS
 Companion Grasses for Townsville Lucerne at Katherine, N.T., by M. J. T. NORMAN
 Storage and Mobilization of Nitrogen in Fruit Trees: A Review, by B. K. TAYLOR
 Coprophagous Beetles in Pasture Ecosystems, by P. GILLARD

Letters

Accretion Studies of Soil Organic Matter, by E. F. HENZELL, I. F. FERGUS and A. E. MARTIN; J. K. M. SKENE

Theses

Protein Synthesis in Developing Wheat Endosperm, by JOHN K. RAISON
 Investigations into the Effects of Testosterone Propionate in the Male Castrate Sheep, by W. B. OSBORNE
 A Rapid Procedure for the Estimation of Nitrogen Availability in Soils, by S. A. WARING
 Pasture Growth in Relation to Defoliation, by L. R. HUMPHREYS
 A Study of Wheat-crop Physiology in Relation to Time of Sowing, Rate of Sowing and Fertilizer Application, by R. A. FISCHER
 The Relationship between Soil Moisture Content and the Rate of Evapotranspiration, by A. Y.-K. WU
 Heat Stress in Dairy Cattle: Physiological Responses and Variations in Milk Composition and Equilibrium, by H. V. REES
 The Evaluation of Phosphorus Availability in a Queensland Kraznozom, by P. G. E. SEARLE

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**

BRITISH POULTRY SCIENCE

CONTENTS OF VOLUME 8, PART 1, JANUARY 1967

- BUVANENDRAN, V. A search for an association between maternal egg white protein polymorphisms and embryonic mortality in the domestic fowl.
- BUVANENDRAN, V. Linkage relationships of egg albumen loci in the domestic fowl.
- PAYNE, C. G., LAMMING, G. E. and LEWIS, D. Synthetic oestrogens in the production of roasting fowl. 2. Dietary nutrient concentration and time of implantation.
- GREY, T. C. and SHRIMPTON, D. H. Volatile components of raw chicken breast muscle.
- GREY, T. C. and SHRIMPTON, D. H. Volatile components in the breast muscles of chickens of different ages.
- JACKSON, N., SQUANCE, E. and SHANNON, D. W. F. Studies on the effect of lysine and methionine supplementation of a high-protein maize-soyabean diet and of a low-protein barley-white fishmeal diet on the performance of caged layers.
- SELL, J. L., HAJJ, R., COX, A. and GUENTER, W. Effects of magnesium deficiency in the hen on egg production and hatchability of eggs.
- CROPPER, W. J. and SCOTT, M. L. Studies on folic acid nutrition in chicks and poults.
- KIRKWOOD, A. C. Control of poultry mites.
- BOOK REVIEW.

This Journal is published quarterly in January, April, July and October. The annual subscription is 80s. (U.S.A. \$14.00), single parts 22s. 6d. (U.S.A. \$3.75). 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

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>
21	Crossbreeding in the evolution of new breeds of cattle with special reference to the tropics	1949-65	43	12s.
22	Fertility in cattle: natural service v. A.I.	1942-65	18	6s.
23	A.I. in the tropics; recent references on semen quality	1960-65	26	6s.
24	Pregnancy diagnosis from vaginal mucus	1955-64	33	9s
25	'Belting' in coat colour of livestock	1918-59	8	6s
26	Miniature pigs	1954-66	13	6s.
27	Collection of bull and ram semen by electro-ejaculation	1936-64	65	18s.
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.

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

EXPERIMENTAL AGRICULTURE is concerned with the application of experimental work to the whole range of agricultural problems in tropical countries.

Contents of Vol. 3, No. 2, April 1967

- H. C. PEREIRA, P. H. HOSEGOOD and M. DAGG. Effects of tied ridges, terraces and grass leys on a lateritic soil in Kenya.
- E. A. WEISS. Effects of Nitrogen, Phosphate and time of cutting on green material and oil yields from Geranium (Pelargonium Hybrid) in West Kenya.
- J. J. HARDON and P. D. TURNER. Observations on Natural pollination in Commercial plantings of Oil Palm (*Elaeis Guineensis*) in Malaya
- G. C. TANEJA and B. M. FULADI. The Response of Sheep to a Thermal Burden Induced by Exercise.
- B. A. C. ENYI. Effects of Age on Establishment and Yield of Cocoyam Setts (*Xanthosoma Sagittifolium* Schott).
- P. D. TURNER. Evaluation of Fungicides for Use against *Marasmius Palmivorus* on Oil Palms
- ABDALLA A. ABDULLA. Effect of Temperature and Photoperiod on Bulbing of the Common onion (*Allium Cepa L.*) Under arid Tropical Conditions of the Sudan.
- J. H. PONS. The Effects of Fertilizers on Subtropical Hyparrhenia Veld in Swaziland.
- C. THAKUR and S. K. CHOWDHURY. Summer Cropping Groundnuts in North Bihar.
- J. B. WILLIAMS. A Device for Calculating Available-Water.
- P. J. SALTER. Methods of Determining the Moisture Characteristics of Soils.
- BOOK REVIEWS.

**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

THE JOURNAL OF AGRICULTURAL SCIENCE

VOL. 68, PART 2, APRIL 1967

- L'ESTRANGE, J. L. OWEN, J. B. and WILMAN, D. The relationship between the serum magnesium concentration of grazing ewes and their dry matter intake and milk yield.
- L'ESTRANGE, J. L. OWEN, J. B. and WILMAN, D. Effects of a high level of nitrogenous fertilizer and date of cutting on the availability of the magnesium and calcium of herbage to sheep.
- BOND, D. A. Combining ability of winter bean (*Vicia faba* L.) inbreds.
- RUSSEL, A. J. F. and BARTON, R. A. Bone-muscle relationships in lamb and mutton carcasses.
- FORBES, J. M. Factors affecting the gestation length in sheep.
- CARE, A. D., VOWLES, L. E., MANN, S. O. and ROSS, D. B. Factors affecting magnesium absorption in relation to the aetiology of acute hypomagnesaemia.
- TINKER, P. B. H. The effects of magnesium sulphate on sugar-beet yield and its interactions with other fertilizers.
- ARNOLD, G. W. and DUDZINSKI, M. L. Comparison of faecal nitrogen regressions and *in vitro* estimates of diet digestibility for estimating the consumption of herbage by grazing animals.
- SHORLAND, F. B., CZOCHANSKA, Z., BARTON, R. A. and RAE, A. L. A comparison between the effects of ryegrass and white clover on the iodine values and melting points of some depot fats of sheep.
- KUBOTA, T. and WILLIAMS, R. J. B. The effects of changes in soil compaction and porosity on germination, establishment and yield of barley and globe beet.
- ENGLAND, F. Non-sward densities for the assessment of yield in Italian ryegrass. I. Comparison between sward and non-sward densities.
- BOND D. A. and HAWKINS, R. P. Behaviour of bees visiting male-sterile field beans (*Vicia faba*).
- REID, D. Studies on the cutting management of grass-clover swards. V. The effect of changes in the closeness of cutting at different times in the season on the yield and quality of herbage from a perennial ryegrass-white clover sward.
- BURHAN, H. O. and MANSI, M. G. Rotation responses of cotton in the Sudan Gezira. I. The effect of crop rotation on cotton yields.
- MANSTON, R. The influence of dietary calcium and phosphorus concentration on their absorption in the cow.
- LAWRENCE, T. L. J. High level cereal diets for the growing/finishing pig. I. The effect of cereal preparation and water level on the performance of pigs fed diets containing high levels of wheat.
- HANBURY, L. F. and MAUGHAN, G. L. An investigation into the spacing of monogerm sugar beet seed in the development of the spring mechanization of the crop.
- GARWOOD, E. A. and WILLIAMS, T. E. Soil water use and growth of a grass sward.
- WIDDOWSON, F. V., PENNY, A. and WILLIAMS, R. J. B. Results of an experiment at Woburn testing farmyard manure and N, P and K fertilizers on five arable crops and on a long ley. II. N, P and K removed by the crops.
- TUMA, H. J., DINKEL, C. A., MINYARD, J. A. and BREIDENSTEIN, B. C. Methods of predicting kilograms of retail cuts in the beef carcass.

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. 2. June 1967

- Obituary notice (Mr. A. L. Bacharach).
- Nitrogen balance studies with the milk-fed lamb. 4.
- Nitrogen intakes of urban dwellers in Lagos, Nigeria.
- Protein value of diet and neurological manifestations produced in rats by β, β -iminodipropionitrile.
- Nitrogen balance studies with the milk-fed lamb. 5.
- Nitrogen balance studies with the milk-fed lamb. 6.
- Vitamin B₁₂ deficiency and excretion of ether-soluble acids in the rat.
- Transference of flavonol antioxidants from the diet to the tissue lipids of rats.
- Determination of lignin.
- Vitamin C synthesis in rats and iron content of diet.
- Goitre in Ceylon.
- Metabolism of urea in sheep.
- Reproduction and vision in rats, and 3-dehydroretinol.
- Nutritional effects of autoxidized fats in animal diets. 4.
- Effects on sheep of low-sodium hay diet.
- Digestion of heat-damaged protein.
- Interrelations of calcium, fluorine and vitamin D in bone metabolism.
- Concentration of copper in liver of African children with marasmus.
- Dietary fat and milk fat secretion in the cow.
- Changes in skinfolds during pregnancy.
- Carotene and vitamin A in tissue of Ghanaians.
- Effect of a low-protein diet and a cold environment on calorie intake and body composition in the rat.
- Effect of fermentation on nutritive value of foods prepared from rice and grams.
- Lipid peroxides in vitamin E-deficient animals.
- Vitamin E and stress. 4.

*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. 2, JUNE 1967

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

- Caeruloplasmin in bovine milk. L. Å. HANSON, E.-G. SAMUELSSON and JAN HOLHGREN.
- Acetaldehyde and diacetyl in lactic cultures. VITTORIO BOTTAZZI and FRANCO DELLAGLIO.
- Gas chromatography-mass spectrometry of fatty acids. RAGNAR RYHAGE.
- n-Pent-1-en-3-ol and n-pent-1-en-3-one in butter. W. STARK, J. F. SMITH and D. A. FORSS.
- Volatile compounds in butter oil. D. A. FORSS, W. STARK and GERDA URBACH.
- Deposits from milk on heated surfaces. H. BURTON.
- Milking throughout pregnancy and milk secretion. A. SMITH, J. V. WHEELOCK and F. H. DODD.
- Suspension of milking and milk secretion. J. V. WHEELOCK, A. SMITH and F. H. DODD.
- Twice-daily milking of ewes. M. MORAG and S. FOX.
- Review. Water-soluble vitamins in milk and milk products. MARGARET E. GREGORY.
- Cambridge University Press, Bentley House, 200 Euston Road, London, N.W.1

THE MINERAL NUTRITION OF LIVESTOCK

BY

E. J. UNDERWOOD, C.B.E.

The author is the Director of the Institute of Agriculture of the University of Western Australia at Nedlands and is well known for his previous contributions to the subject. The work is intended to meet the needs of students, extension officers and progressive farmers as well as of teachers and research workers in many parts of the world. The 14 chapters deal with both major and trace elements and provide a well balanced and critical account of present knowledge of an important aspect of animal nutrition.

Demy 8vo, cloth boards, 256+12 pages of half-tone plates

Price 40s. (\$6.00)

Published by arrangement with the

FOOD AND AGRICULTURE ORGANIZATION OF
THE UNITED NATIONS

by

COMMONWEALTH AGRICULTURAL BUREAUX

Obtainable from

COMMONWEALTH AGRICULTURAL BUREAUX
CENTRAL SALES, FARNHAM ROYAL, BUCKS, ENGLAND

JOURNAL OF DAIRY SCIENCE

OFFICIAL PUBLICATION OF THE AMERICAN DAIRY SCIENCE
ASSOCIATION SINCE 1917

RAYMOND ALBRECTION, 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.

Escherichia Coli in Animals

By W. J. SOJKA

*Review Series No. 7 of the
Commonwealth Bureau of Animal Health*

This book has been written for veterinary surgeons, both those engaged in research and in the field, comparative pathologists, post-graduate students and laboratory technicians.

Part I deals with the general characteristics of the organism, its biochemical and serological behaviour and other properties; Part II with the disease conditions associated with the organism in cattle, sheep, pigs, poultry, other animals, and, in less detail, in man; and Part III with details of laboratory procedures concerned with media, reagents, biochemical tests, etc.

Price 50s.

quarto

pp. viii + 232

Available from:

**Commonwealth Agricultural Bureaux
Central Sales Branch
Farnham Royal
Bucks. England**