

Intensive Livestock Farming

Edited by

W. P. BLOUNT

T.D., PH.D., F.R.C.V.S., F.P.H., F.R.S.E.



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To
THE LORD COLE
Chairman, Unilever, Ltd.

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PREFACE

The farming of livestock in Britain and in many other developed countries is growing more intensive each year, and as this is a field about which few texts have been written it is not surprising that the publishers decided that this would provide them with pastures new. What is surprising is the fact that they gave me the opportunity to act as editor, since my association with agriculture today relates almost solely to that of the poultry industry. Perhaps this in itself is some justification, as 'concrete farming' has been applied more to poultry than to any other species. In this respect it has received both brickbats and bouquets, and it is to the former that I hope parts of this book will make an effective reply. I have endeavoured to answer Ruth Harrison whose outspoken criticism of intensive farming created such great interest 3 years ago, and who has just been appointed a member of the Standing Advisory Committee (recommended in the Brambell Committee Report), whose chairman is Professor H. R. Hewer. And here I must thank the publishers Vincent Stuart Ltd. for permission to quote various passages from her book *Animal Machines*.

However, in addition to poultry matters I have had the privilege for many years of working alongside many agricultural specialists, and I consider myself particularly fortunate to have obtained their most helpful co-operation. They are experts in a variety of fields—animal physiology, nutrition and feeding systems, stock management, agricultural economics and marketing, fish farming, the role of computers and last but by no means least research. In all, eighteen colleagues have collaborated with me in producing this book, which it is hoped will appeal both to members of the veterinary profession and agriculturalists, particularly as eight of the contributors are themselves veterinary surgeons actively engaged in disease control or research.

Intensive livestock farming obviously covers a very wide range of subjects, but feeding and disease control form two of the most important, that is why they have been covered in greater detail than some other aspects of the problem. Doubtless some readers will feel that the text as a whole is somewhat disjointed, but to have dealt with all its important facets would have at least doubled its size. In spite of this obvious defect, one hopes that the average purchaser of the book will consider that his money has been well spent.

Acknowledgments and Thanks

As far as possible I have tried to give an adequate list of references and therefore apologise for any inadvertently missed.

On a number of occasions I have drawn freely upon the Agricultural Notes published in the *Financial Times*, *Daily Telegraph* and *The Times*. I have much pleasure in acknowledging these and in doing so would thank not only the editors concerned but also their special scientific and commodities staffs for the way in which they keep their readers in daily touch with events of agricultural importance.

I wish to thank the Ministry of Agriculture, Fisheries and Food for permission to use the photographs illustrating B. S. Hanson's article on the 'Diagnosis and Treatment of Poultry Diseases'. Also Messrs. Butterworth, Inc., Washington, D.C. for permission to reproduce illustrations from *Physiology of Digestion in the Ruminant* as follows:

'% of total stomach tissue contributed by each compartment for calves and lambs at several ages', from 'Anatomical development of the ruminant stomach', by Warner, R. G. and Flatt, W. P. and 'Factors which influence the balance of bacterial species in the rumen', from 'Possible factors influencing the balance of different species of cellulolytic bacteria in the rumen', by Kistner, A.

In addition the editor-in-chief (Ernest O. Herreld) *Journal of Dairy Science* and Dr. L. A. Mabbitt of the National Institute for Research in Dairying, Shinfield, Reading, for permission to use the Figure 'Amounts of digesta found in the reticulo-rumen of Shorthorn cows receiving various diets' from 'Weight Changes in Dairy Cows', C. C. Balch and C. Line, *J. Dairy Res.* (1957), **24**, 11-19.

I am also indebted to the editor of *Medical and Biological Illustration* and to Dr. P. F. Newell for permission to use Figure 9, and quote freely from *The Nocturnal Behaviour of Slugs*.

My best thanks go to all the contributors, who are listed separately, for the excellence of their several contributions. In addition I want to thank Jim Morton for kindly collating the work of my three colleagues Pat Bichan, Paddy Walsh and Peter Wilson whose combined contributions cover Calves and Cattle; also Bill Marshall who heads the Company's Farm Buildings Advisory Service, and who has supplied a variety of plans and drawings. It will be obvious to most readers that no single person could write effectively on such a wide subject as Intensive Livestock Farming, hence my gratitude to all the other contributors.

The permission to involve twelve of my scientific colleagues in the preparation of this book was readily given by Mr. C. A. C. de Boenville, Chairman of both the Unilever U.K. Milling Group Administration and of The British Oil and Cake Mills Ltd. That for my associates at the Unilever Research Laboratories, Colworth House, Sharnbrook, Beds., was given by Mr. J. K. D. Dow, B.Sc., M.R.C.V.S., Head of the Nutrition Dept., and to them both I am immensely grateful.

Finally I am particularly grateful to Miss H. R. Fraser for typing the text with speed and care, and to further secretarial assistance from Miss W. M. Buckley, who has dealt with the not inconsiderable

correspondence. My assistant Miss M. M. Martin, M.A., F.P.H., has very kindly prepared the index, read the proofs, and given other invaluable help.

January 1968

W. P. B.

FOREWORD

Sir John Ritchie, C.B.

LL.D. (h.c.) (Ed.), D.V.Sc. (h.c.) (Lv.), LL.D. (h.c.) (Tor.), B.Sc., F.R.C.V.S.,
D.V.S.M., F.R.S.E. Principal and Dean, The Royal Veterinary College (University
of London), Royal College Street, London, N.W. 1.

I am glad to have an opportunity to write a foreword to this book on intensive livestock farming edited by W. P. Blount.

The subject is still a controversial one and it is useful to have information on so many of its aspects collected into one book. Indeed, the range which is covered is extremely wide, covering all the food animals and including a very useful chapter on fish farming, an enterprise which has been so little exploited here but has been very successful in several European countries.

Nutrition is given a prominent place throughout and this is obviously of great importance with animals which require all their food to be provided for them.

Whatever system is used in the management of animals disease will occur but the disease patterns and the disease potential will vary. If the possibility of disease is great under intensive conditions, this is balanced by the opportunities for the successful application of preventive medicine.

Intensive management is not new but more animals of several species are now maintained in this way than ever before. Under conditions of reduced acreage and economic stress clearly intensivism has come to stay.

Some 40 years ago I was employed in the City of Edinburgh and my main task was to inspect the cows in over 100 dairy herds within the City boundaries. Freshly calved cows were bought into the dairies from markets in the north of England, they were not bred again and never left the cowshed until their milk production had dropped to an uneconomical level and they were ready for slaughter as fat cows. On occasion their lactations lasted for over two years yet these animals appeared to be in good health and to maintain a good level of milk production.

The fact that animals maintained under intensive conditions do remain apparently contented, healthy and productive may not be sufficient scientific evidence for concluding that no element of cruelty exists in this practice but in the absence of evidence to the contrary it is surely a good enough starting point upon which to base our judgment of their welfare and to build further and more precise evidence. Many aspects, particularly of animal behaviour, still require study. It is essential to ensure as far as possible that animals kept for the production of milk, meat or eggs enjoy freedom from pain and stress, and this book will help us to make a rational approach to the problems associated with such animals kept intensively.

3 January 1968

J. N. RITCHIE

AUTHOR BIOGRAPHIES

A. W. Ashby, B.Sc., M.Sc., graduated at the University College of Wales, Aberystwyth, specialising in agricultural economics, and working on farms in Wales during vacations. Subsequently he did post-graduate work at Cambridge and at Cornell University, U.S.A. before becoming a Lecturer in Agricultural Economics at Nottingham in 1950. Three years later he moved to the Institute of Agrarian Affairs, Oxford, where he carried out research, also editing work in the field of agricultural economics. From 1955 he has been in the Economics and Statistics Department of Unilever Limited.

Subject

THE IMPACT OF BRITAIN'S ENTRY INTO THE COMMON
MARKET ON INTENSIVE LIVESTOCK PRODUCTION

A. O. Betts, M.A., Ph.D., M.R.C.V.S., received his professional education at The Royal Veterinary College, at the University of Cambridge and at Cornell University. After a brief period in general practice he joined the staff at the Cambridge Veterinary School where, apart from 2 years in the U.S.A., as a Commonwealth Fellow, he remained until 1964 when he was appointed to his present post of Professor of Veterinary Microbiology and Parasitology, The Royal Veterinary College, University of London. His research has been concerned largely with enzootic pneumonia of pigs, viruses affecting the respiratory and digestive tract of pigs and cattle, and the production and use of S.P.F. pigs and calves. In 1961 he was adviser in Yugoslavia on pig health control under the Anglo-Yugoslav Technical Assistance Scheme, and he has also advised and lectured on the control of diseases by S.P.F. techniques in the Netherlands, Switzerland and Germany.

Subject

S. P. F. ANIMALS

P. I. Bichan, B.Sc., who was born and brought up on a small mixed farm in the Orkney Islands, graduated at Aberdeen University, following which he spent 2 years with the Animal Breeding Research Organisation before joining B.O.C.M. Barlby Farm in 1953.

Barlby Farm has been concerned with Dairy Bull Progeny Testing, Sire Performance Testing, producing beef from dairy bull progeny and calf rearing. Work has been undertaken to investigate various

systems of housing and managing purchased calves; intensifying grazing of both milk and dairy stock and comparative trials in various pure and crossbred animals for beef and milk.

Subject

TRENDS IN CALF PRODUCTION

W. P. Blount, T.D., Ph.D., F.R.C.V.S., F.P.H., F.R.S.E. Qualifying in Edinburgh in 1928, he held the James Tindall research scholarship and Centenary Fellowship whilst working as an assistant in the Dept. of Anatomy, Royal (Dick) Veterinary College, later concentrating on haematology. After a short spell in practice in Folkestone the editor decided to concentrate on poultry at the suggestion of the late Sir Frederick Hobday. One year was spent at Weybridge under T. M. Doyle and N. Hole, before moving to Hamilton's Poultry Pathological Research Laboratory, Goring, Oxon. The following year he set up the Poultry Health Laboratories at St. Leonards-on-Sea in conjunction with a veterinary practice. Four years later he was appointed Chief Veterinary Officer to the East Sussex County Council, joining the T.A. in 1937 and transferring to the R.A.V.C. in 1941. Until the end of the war he worked mainly at the Chemical Defence Experimental Station, Porton. Since 1945 he has been Poultry Adviser to the British Oil & Cake Mills Ltd., being appointed a Director of the Company in 1957. He is Honorary Veterinary Consultant in the Faculty of Medical Sciences, University College, London, and a Vice-President of the World's Poultry Science Association.

Subjects

Housing Systems and Controlled Environments for Poultry; Poultry Nutrition, Foods and Feeding; Poultry Diseases and other Problems of Doubtful Aetiology which have been linked with Nutrition; Rabbit Production; Health and Disease Problems; Factory Farming and World Food Problems.

E. T. Cattle began his career by studying human pathology, specialising in morbid anatomy. He left his studies to join a large commercial poultry company to gain knowledge of applied genetics. Although planned as a 'sandwich course' his interest in animal production was so aroused that it proved to be the start of his working career. In the 1950s he joined a partnership in poultry husbandry and breeding, acting as consultant to many of the well-known poultry breeders. During this time he became interested in the interaction of genetics/environment, and disease-inhibiting factors and in 1960 was given a chance to apply these theories in practice. After 1 year he was appointed to the staff of the company (now the Cobb Breeding Company) as Research and

Development Director. He has a keen interest in futuristic ways of producing protein.

Subject

A DEVELOPMENT IN MODERN SHEEP PRODUCTION

R. Coles, B.A., Ph.D., M.Sc., D.Sc., D.V.Sc. Graduated at King's College, London, following which he took his higher degrees at the Institute of Education, University of London, and the London School of Economics, University of London. In 1934 he joined the Ministry of Agriculture, first with the Markets (Eggs and Poultry), then the Fertilizer Divisions. In 1945 he was appointed Superintending Officer, Poultry Advisory Service, and in 1946 became Chief Poultry Adviser N.A.A.S., the post he still holds. He is a Past President of the W.P.S.A., the W.P.S.A. European Federation, the W.P.S.A. U.K. Branch and the Poultry Education Association. He was awarded the Jelf Medal (University of London), the Queen's Medal, the P.A.G.B. Medal and the B.O.C.M. Poultry Award. He has had publications in *Poultry Science*, *British Poultry Science*, *Journal of Agricultural Science*, *The Empire Journal of Experimental Agriculture*, *Nature*, and the *Journal of Science in Food and Agriculture*.

Subject

THE STRUCTURE OF THE POULTRY INDUSTRY OF ENGLAND AND WALES

D. G. Filmer, M.A., Dip.Agric. (Cantab), B.Sc. (Agric.), N.D.A. Coming from a well-known farming family in Kent he attended one of the first 3-year Agricultural Technical Courses in the country commencing 1944, later obtaining a first-class certificate after a further year at the Kent Farm Institute. He then graduated B.Sc. at Wye College. With a Ministry of Agriculture award he went to Cambridge University to study Animal Nutrition and Husbandry, Statistics and Field Experimentation. In 1956, after National Service, he returned to Cambridge where he was appointed to the staff of the School of Agriculture. In 1961 he was appointed Animal Nutritionist to R. Silcock & Sons Ltd., and is concerned with the formulation of their range of poultry, pig and ruminant diets, and research leading to the development of improved and new animal foods.

Subject

NUTRITION OF THE INTENSIVELY MANAGED PIG

M. J. Gaisford, B.Sc. (Agric.), hails from Wiltshire where his father farmed for many years. He graduated at Reading University, then joined F. & G. Sykes Ltd. where he was mainly concerned in poultry housing, husbandry and breeding in the Genetics Department. In

1963 he joined B.O.C.M. as Assistant Farm Manager of their Demonstration Farm, Stoke Mandeville, being appointed Farm Manager in 1966. He is particularly interested in the housing and husbandry of poultry under controlled environment conditions and in the measurement of egg shell quality.

Subject

BATTERY CAGE EGG PRODUCTION

C. M. Gould, M.A., B.Sc., M.R.C.V.S., graduated as a Veterinary Surgeon at Edinburgh in 1954, and is mainly concerned with farm practice, with particular interest in grassland and other management problems of cattle, sheep and pigs. In the B.V.A. he is one of the Committee concerned with the initiation and the organisation of Information Services for Veterinary Surgeons.

Subject

THE FUTURE RELATIONSHIP BETWEEN THE VETERINARY SURGEON AND THE LIVESTOCK FARMER

B. S. Hanson, M.R.C.V.S. After graduating at The Royal (Dick) Veterinary College in 1942, he returned as an assistant to the agricultural practice in Devon where he had previously seen practice. The following year he joined the R.A.V.C. and served in the Middle East, Italy and Germany over a period of four years. On demobilisation he spent 1½ years in a London horse and small animals practice and a similar period as Veterinary Adviser to P.A.G.B. He joined the field staff of Animal Health Division, M.A.F.F. in 1951, took charge of the diagnostic section in 1962 and was transferred to the Veterinary Investigation Service in January 1967. His work has been associated with the diagnosis and investigation of poultry diseases, and also lecturing. Outside his normal duties he is serving on the TS.65 Working Party, the Chicken House Panel, R.A.S.E., and is an examiner for the N.D.P. Board. In 1964 he was awarded the B.T.F. Goodchild Trophy.

Subject

DIAGNOSIS AND TREATMENT OF POULTRY DISEASES

J. F. Harbourne, M.V.Sc., M.R.C.V.S. After qualifying at Liverpool in 1950 he went into private practice as an assistant in Cheshire and then in the West Riding of Yorkshire. In 1952 he joined the Ministry and spent all his time at the Leeds Veterinary Investigation Centre as A.V.I.O. until he took up his new appointment as V.I.O. at the Thirsk Centre in October 1965. A good deal of his earlier effort was devoted to the study of the epidemiology and control of fowl typhoid, and some of this work formed part of his University of Liverpool's M.V.Sc.

degree thesis. His later work has been devoted mainly to respiratory diseases in cattle.

Subject

DISEASES OF INTENSIVELY HOUSED CATTLE, PIGS AND SHEEP

A. B. Harker, B.Sc. A graduate in Agriculture from the University of Aberdeen, he has had practical experience on farms, (including a short period of farming on his own account) in Devonshire, Shropshire, Norfolk and Denmark. He joined B.O.C.M. in 1956 and, following appointments in the south-east of England, became Agricultural Adviser for B.O.C.M. in Scotland in 1962.

Subject

SHEEP HUSBANDRY

K. J. Hill, D.V.Sc., M.R.C.V.S. An Animal Health Trust Scholar at Liverpool University he qualified M.R.C.V.S., B.V.Sc., in 1948. After 3 years as an Assistant Lecturer in Physiology at Liverpool (during which he was awarded M.V.Sc., for his thesis on gastric function in ruminants) he joined the Agricultural Research Council's Institute of Animal Physiology at Babraham, Cambridge, where he continued research on ruminant digestive physiology. In 1955 he was a Kellogg Foundation Fellow at New York State Veterinary College, Cornell University, where he worked on the problem of bloat in ruminants. Awarded D.V.Sc., for published work in 1961 and in 1962, he joined Unilever Research Laboratory, Sharnbrook to set up a section of Animal Physiology. The work of this section relates to the requirements of the Animal Feedstuff Industry for detailed information on the digestive physiology and biochemistry of all farm animals, particularly in relation to intensive livestock production.

Subject

THE PHYSIOLOGY OF RUMINANT DIGESTION

W. M. Justice. A Grammar School boy he joined J. Sainsbury Ltd. in 1930, and has progressed through various appointments, including Fresh Meat Buyer, merchandiser, to his present position as Director responsible for Fresh Meat, Eggs and Poultry. He has *inter alia* been connected with the Broiler Industry in Britain almost from its inception. His responsibilities with one of the leading distributors of perishable foodstuffs has brought him into the closest contact with agricultural interests.

Subject

THE IMPACT OF INTENSIVE LIVESTOCK PRODUCTION ON
FOOD CHAIN ORGANISATIONS

R. Kenworthy, B.V.Sc., M.R.C.V.S. He qualified in Liverpool, 1951, and went into large animal practice as an assistant. The ensuing 7 years were spent in three agricultural practices in Buckinghamshire, Pembrokeshire and Salop, dealing mainly with dairy and beef cattle, sheep and pigs: being extensively involved in the tuberculosis eradication programme of M.A.F.F. as an L.V.I. In 1958 he went to the Central Veterinary Laboratory, M.A.F.F., Weybridge, as an Assistant Veterinary Investigation Officer, 2 years later taking up a research appointment at the Unilever Research Laboratory, Colworth. He has spent the past 6 years studying the influence of bacteria in general and *E. coli* in particular, on the intestinal tract of the young pig.

Subject

INFLUENCE OF BACTERIA ON ABSORPTION FROM THE SMALL
INTESTINE

P. Matthews. Prior to joining the Queens Royal Regiment (afterwards transferring to the Royal Army Veterinary Corps) he spent 4 years as a technician in the laboratories at Weybridge in the T.B. and poultry diagnosis departments. He continued as a laboratory technician during the war, first at Aldershot then later at the Chemical Defence Experimental Station, Porton, Wilts. Afterwards he spent 2 years in the Middle East as a meat inspector. His return to Weybridge after the war was short lived as he joined B.O.C.M. at Stoke Mandeville in 1947. There he managed the company's demonstration farm for 19 years, before being appointed Poultry Farms Management Consultant.

Subject

A SELECTED SERIES OF POULTRY PRODUCTION PROBLEMS
INVOLVING MANAGEMENT FACTORS

J. L. Miles. After 1 year gaining general farming experience and National Service, he entered Bristol University Veterinary School in 1958, leaving 3 years later. In 1962 he joined B.O.C.M. and after 3 years practical poultry experience at Stoke Mandeville he worked on Poultry Costings until 1966 when he was transferred to the field staff.

Subject

POULTRY COSTINGS

I. T. Miller. After receiving training at the Moulton Farm Institute he took charge of the litter testing and other pig demonstrations at Stoke Mandeville where he remained for 5 years. Next he became a pig specialist in the B.O.C.M. south-western area, and in 1962 was transferred to Glasgow as the Company's Scottish Pig Food Sales

Manager. Much of his time is now spent in the field tackling problems of management and organisation.

Subject

THE HUSBANDRY OF PIGS HOUSED INTENSIVELY

J. Morton, B.Sc. He graduated at Glasgow University, and obtained practical farming experience in Scotland and England. The posts held by him included Livestock Husbandry Officer, N.A.A.S.; Assistant Livestock Editor *Farmer and Stock-breeder*; and Chief Livestock Officer Milk Marketing Board where he was responsible for a stud of some 800 bulls. His present position is Public Relations and Marketing Development Officer with B.O.C.M. Ltd.

Subject

PART AUTHOR AND CO-ORDINATOR OF THE SECTION ON CATTLE

W. H. Naish. A member of the W.P.S.A. and Poultry Education Association, he is now National Poultry Foods Marketing Manager for B.O.C.M. Prior to taking up this appointment in 1964 he was for 15 years Poultry Food Sales Manager of the company's Bristol branch. Recently his work has taken him to France and South Africa.

Subject

INTEGRATION AND AGRIBUSINESS

W. E. Pearson, B.Sc. (S.A.), B.V.Sc. (Pret.), M.R.C.V.S., M.I. Biol., F.Z.S. Associated with agriculture in one form or other since 1946 (in South Africa, Nigeria, Italy and the U.K.) he has covered most species but, in particular poultry and fish. He received his veterinary training at Onderstepoort, previously having taught for 6 years. In South Africa he spent 3 years as Veterinary Research Officer in the Cape Province, and then left to teach Pathology and Bacteriology at the Veterinary School in Nigeria. After a short spell in Italy as Veterinary Consultant to a large farming operation, he joined Unilever Limited where he has been engaged in research for the past 11 years.

Subject

MODERN INTENSIVE FISH FARMING

S. A. Richards, B.Sc., Ph.D. After taking his B.Sc. in Zoology he worked for a period in Australia with the Department of Agriculture and Stock, being concerned with the ecology of fruit flies in Queensland citrus orchards. On returning to this country he obtained a Ph.D. in Agriculture at Wye College (London University) in avian physiology.

Many of his experiments were concerned with the assessment of pain in chickens in relation to modern procedures of electrical stunning and slaughter. This work has been published in the *Veterinary Record* and *Research in Veterinary Science*.

Subject

PAIN PERCEPTION IN ANIMALS, WITH PARTICULAR REFERENCE TO POULTRY

P. Roberts, B.Sc., A.R.C.S., D.I.C. After graduating in mathematics at Imperial College, London, he specialised in statistics, taking the college diploma in that subject. In 1950 he joined I.C.I. as a statistician at their Agricultural Research Station, Jealotts Hill, where he worked mainly on statistical problems connected with fertiliser and pesticide investigations. Appropriate methods of statistical analysis of long-term field experiments were also investigated as well as others involving grazing animals. Later he was seconded to the Sudan Government as Statistician to the Agricultural Research Division, spending 2 years in the Sudan Gezira where he analysed some long-term agronomic experiments on cotton. Another subject to which he made some fundamental contributions was that of entomological field experiments. He joined Silcocks in 1961 where, in addition to the mathematical problems of a modern business such as linear programming, he has worked on the design and analysis of experiments in intensive animal husbandry. A large part of this work is with poultry and pigs, but there has also been the opportunity for a revision of experimental methods with dairy cows.

Subject

THE ROLE OF THE COMPUTER

W. P. Roberts, B.Sc. Educated at Hereford Cathedral School he graduated at Reading University, staying on there to lecture and carry out research into the economic problems of the small farmer. Prior to graduation he had gained considerable practical experience in many capacities from farm pupil, head cowman to farm manager. He is now Chief Agricultural Economist to the B.O.C.M. and his work ranges from an appraisal of national economic trends and their effect on agriculture, to the organisation of the Company's Farm Management advisory work and costings schemes.

Subject

THE ECONOMICS OF INTENSIVE LIVESTOCK PRODUCTION

D. H. Shrimpton, M.A., Ph.D. The son of a country miller (Pro-vender Millers Ltd., later Wharf Mills Ltd., Winchester), he graduated in biochemistry (Nat. Sci. Tripos with Chemistry, Botany and Zoology),

and had post-graduate training in chemical microbiology, both at Cambridge. From 1951–55 he was at the Rowett Research Institute, working primarily on vitamin nutrition in poultry; but also with rats, pigs and sheep in respect of vitamin B₁₂. He has also undertaken a study of animal feedstuffs in respect of protein quality and the provision of B vitamins. From 1955–65 he was at the Low Temperature Research Station, Cambridge, a joint University and Agricultural Research Council Laboratory for the study of food science. During this period he was also a demonstrator in the University School of Agriculture (1956 and 1957). Since 1965 he has been a member of staff of the Animal Research Division of Unilever Research Laboratory, Colworth House.

Subject

RESEARCH IN RELATION TO INTENSIVE LIVESTOCK FARMING

I. R. Stalberg. After service with the Royal Artillery in the Middle East he returned to farming, taking up an appointment in 1949 with the Air Ministry as land adviser. He was successively farm manager with Northumbria Farms Ltd. (1957) and the Plymouth Co-operative Society (1960), joining the British Beef Company in 1963. There he was responsible for establishing and managing the company's beef units at Stowmarket. In 1966 he emigrated to South Africa.

Subject

A 2-YEAR STUDY IN OPERATING A LARGESCALE INTENSIVE BEEF FATTENING UNIT

J. P. Walsh, N.D.A. Following 4 years farming experience he took the Diploma Course in Agriculture at the University of Leeds 1932–36, joining Unilever as an Agricultural Adviser in Yorkshire in 1938. From 1942–46 he served with the Royal Navy. In 1948 he became an Adviser to the O.C.O. Feed Company and in 1952 Area Agricultural Adviser for B.O.C.M. Southern Branches. In 1960 he was appointed Chief Cattle Adviser to the U.K. Milling Group of Unilever Ltd.

His duties entail supervising the advisory work of approximately 100 University Graduates or holders of the N.D.A./N.D.D. who are employed by B.O.C.M. to give advice to farmers on livestock husbandry, nutrition, budgeting, breeding, etc. In this work as close liaison as possible is maintained with the N.A.A.S.

He is responsible for the cattle policy on the three Company farms in Essex, Yorkshire and Scotland where they conduct Danish Bull Progeny Tests, Beef Sire Performance Tests, commercial intensive beef production, multiple rearing of store calves, early weaning work with dairy and beef calves and commercial milk production.

Subject

INTENSIVE SYSTEMS OF MILK PRODUCTION

R. W. Widdowson, N.D.A. After leaving the Royal Agricultural College, Cirencester, where he was awarded the Ducie Gold Medal, he joined B.O.C.M.'s Bristol Branch. From 1955 to the present day he has been Assistant Pig Adviser to B.O.C.M. and has become more and more involved in the improvement of British pigs by applied genetics. He presented the first British paper on the use of ultrasonics in pig breeding and performance testing, and has also published a paper on progeny testing using split-litter techniques. He is currently in charge of the Company's Pig Breeding Scheme, and responsible for giving recording and genetic advice to a number of weaner groups which have taken shape in the last few years.

Subject

SCIENTIFIC AND PRACTICAL ASPECTS OF IMPROVED PIG BREEDING METHODS

H. Ll. Williams, B.Sc. (Agric.), M.Sc., Ph.D., N.D.D. He was born on a dairy farm in Carmarthenshire (where his father was a master breeder of British Friesians, establishing the GROVE herd in 1912) and educated at the University College of Wales, Aberystwyth, where he took a degree in Agriculture (Animal Husbandry), a College Diploma in Dairying and the National Diploma in Dairy Husbandry. In 1951 he joined A.B.R.O. to supervise the initial stages of the cyclical crossbreeding experiment (dairy cattle) at their Staffordshire Field Station. In 1956 he was appointed Lecturer in Animal Husbandry at the Royal Veterinary College, London, where in addition to lecture courses for undergraduates he gives post-graduate courses on Agriculture and Livestock Production. He is also concerned with the re-organisation of the 300 acre R.V.C. Farm, to demonstrate modern methods of livestock production. In 1960 he obtained his M.Sc. (London) with a thesis on 'Taste Acuity of Calves', and in 1966 graduated Ph.D. (London) with a thesis on 'The Intensification of Sheep Production'.

Subject

THE ONSET AND THE MODIFICATION OF THE BREEDING SEASON OF SHEEP

J. Wilson, B.Sc. was educated at King's College, University of Durham and graduated in 1951 with B.Sc. Honours in Animal Husbandry. His practical training was on mixed arable and stock farms in Northumberland. For the past 15 years he has been engaged in formulation/development/advisory work in the compound feeding-stuffs industry, and his present position is Chief Nutritional Adviser with Lever's Feeds Ltd. He is responsible for the quality of raw materials used in manufacture, their formulation and the finished products;

also for the progression of new research information, through development experiments and field trials, into new or modified company products, or management systems. He maintains close contact with the Animal Research Division of Unilever Ltd. and uses his Company's farm as a vital development link between research work and the final field-testing stage.

Subject

SOME RELEVANT STATISTICS ON THE U.K. POPULATION AND TRENDS; BEEF PRODUCTION

INTRODUCTION

Whilst agriculture has a fine record, like every other segment of industry, increases in output must clearly be sufficient to meet rising costs, otherwise net incomes will fall. Whilst the range of incomes is necessarily wide and for all types and sizes of farms, there is little question that those who have introduced intensive methods of husbandry are certain to be in a better position to weather the economic storm through which we are passing. Production is now valued at £1800 million, with upwards of £200 million being invested annually.

Between 50,000 and 60,000 acres of farmland have been lost during the past 10 years, indeed at the British Association meeting last year Professor W. Ellison predicted that nearly 4 million acres would have been taken away from farming for non-agricultural purposes by the end of the century.

In Britain between 1954 and 1960 the annual growth in labour productivity in agriculture was about 4 per cent, rising to 6 per cent by 1964, yet industry is absorbing thousands of agricultural workers annually. This remarkable achievement has resulted from an absence of restrictive practices amongst farm workers whose skill and adaptability, linked with mechanisation, calls for sincere congratulations.

Since 1945 nearly 300,000 workers have left British agriculture, but the U.S.A. is losing farmers at the rate of 35,539 a year. Statisticians have in fact calculated that the last farmer will disappear at 24 minutes past 2 on June 9th, 2101! (Zumbro 1966). Similarly it has been estimated that only one organisation would remain for the production of eating eggs somewhere between the years 2050 and 2075, at about which time only one hatchery would exist for the 316 million hatching eggs needed!

There is more than an element of truth in these U.S. assertions, as can be seen from the reduction in the number of flocks in the R.O.P. programme. These fell from a peak of 480 in 1947 to sixty-four 10 years later, and none should have remained theoretically by 1963, whereas there were nineteen!

Increased mechanisation and automation in agriculture automatically entails the use of more capital which is not necessarily easy to obtain, unless one is fully credit worthy, in the banking sense. At the present time banks are lending agriculture over £500 million, and merchant credit which amounts to about £150 million has risen by £70 million during the past 4 years. Long-term credit for the purchase of agricultural land (as a contrast to short-term credit) is something which the banks do not usually undertake, but farmers can use the Agricultural Mortgage Corporation for this purpose. The Government's

plan to cure the U.K.'s chronic imbalance of payments, looks for a growth rate of the economy as a whole of +3 per cent (1964-74). This would appear to involve only a 1 per cent extra output of animal feeds, but a 3.6 per cent annual increase in agricultural output.

Looking at the whole subject of intensive livestock farming objectively farmers can be said to go intensive either to hold their own or to make a greater profit. They do not normally house their stock in this relatively expensive manner for any other reason. Farmers are not usually thinking that the extra milk, eggs or meat they produce should be made available for export, to benefit some under-developed country where some of the population may be on the verge of starvation. Nor are they laying out capital with the object of providing their stock with a more comfortable environment, unless by so doing their animals become more productive, assuming that stress factors are not an obvious feature.

Like every other efficient business the owner of any livestock establishment must know his outgoings and income intimately which explains the current interest in farm costings. In practice one finds that many farmers fail to realise the necessity for checking very carefully all the data that is eventually going through the computer. In addition, unless appropriate action is taken at the farm afterwards many costings are wasted. It is here that the knowledgeable adviser can often proffer sound suggestions for helping to improve the profitability of the enterprise.

The role of the veterinary surgeon today is changing rapidly, and the treatment of single animals becoming of secondary importance. Flock and herd studies, in terms of veterinary preventive medicine, are now occupying practitioners far more than in the past, and this trend will undoubtedly continue, particularly if a suitable system of payment can be agreed upon between client and practitioner.