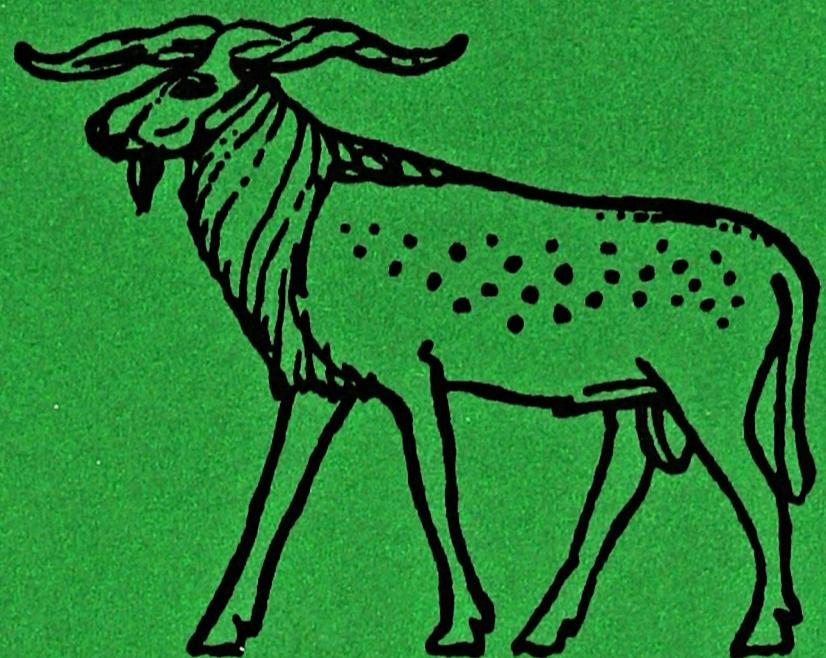


**COMPUTERS  
IN  
ANIMAL PRODUCTION**



**AN OCCASIONAL PUBLICATION  
OF THE  
BRITISH SOCIETY OF ANIMAL PRODUCTION**

**1981**

**No.5**

The British Society of Animal Production's *Occasional Publication* Series contains the full papers presented at certain symposia organized by the Society. A full list of titles is given at the back of this Publication. Copies may be obtained from the British Society of Animal Production, c/o Milk Marketing Board, Thames Ditton, Surrey, KT7 0EL, England.

**Front cover centrepiece: Ancient Egyptian corkscrew-horned hair sheep. Beni Hassan ca 2000 BC  
(after Griffith, 1896).**

# **COMPUTERS IN ANIMAL PRODUCTION**

**Proceedings of a symposium organized by  
THE BRITISH SOCIETY OF ANIMAL PRODUCTION  
and held at Harrogate in November 1980**

**BSAP OCCASIONAL PUBLICATION  
Number 5**

**edited by G. M. HILLYER, C. T. WHITTEMORE and R. G. GUNN**

**BSAP  
THAMES DITTON  
1981**

*Occ. Publ. Br. Soc. Anim. Prod. No. 5*

© 1981 THE BRITISH SOCIETY OF ANIMAL PRODUCTION  
Printed in Great Britain by D. & J. Croal Ltd., Haddington.

## **ACKNOWLEDGEMENTS**

**The Society is indebted to the following sponsors for their financial assistance towards the cost of the symposium:—**

- J. K Bacon, Managing Director, Ellesmere Electronics Ltd, Cambrian House, Station Approach, Ellesmere, Shropshire, SY12 0DD.
- Dr P. A. Geisler, Zilog U.K. Ltd, Babbage House, King St., Maidenhead, Berks, SL6 1 DU.
- Dr B. W. Kingston, Manager, Education and Scientific Programmes, IBM United Kingdom Ltd, 101 Wigmore St., London, W1H 0AB.
- D. Phillips, Marketing Manager, Dalgety Crosfields Ltd, Dalgety House, The Promenade, Clifton, Bristol, BS8 3NJ.
- Miss Elisabeth Wynne, Sales Manager, Farmfax Ltd, Houghton Down, Stockbridge, Hants.
- P. W. Bradbury, Financial Director, JSR Farms, Southburn, Driffield, North Humberside, YO25 9ED.
- Dr P. Jackson, DatAgro Ltd, 15 Ray Mead Court, Maidenhead, Berks, SL6 8TN.
- E. J. Jones, Marketing Director, Format Computer Systems Ltd, Chobham Rd., Sunningdale, Berks, SL5 0DX.
- Dr R. A. Lowe, Technical Manager, Colborn Nutrition Ltd, Heanor Gate, Heanor, Derbyshire, DE7 7SG.
- H. I. Smith, Planning and Development Manager, J. Bibby & Sons Ltd, St. Alban's House, Portland St., Royal Leamington Spa, Warwickshire, CV32 5EZ.
- D. A. Wilkins, Farm Systems, 6 Almond Grove, Bar Hill, Cambridge, CB3 8DU.

Thanks are also due to the Organizing Committee, in particular C. T. Whittemore, G. M. Hillyer, C. F. R. Slade and Mrs J. M. Newton.

## LIST OF DELEGATES

Dr L. K. O'CONNOR, HON. PRESIDENT BSAP,  
Milk Marketing Board, Thames Ditton, Surrey.

- ABLETT, M. Format Computer Systems Ltd, Chobham Road, Sunningdale, Berks.
- AKAM, D. N. MIRD, Shinfield, Nr. Reading, Berks. RG2 9AT.
- ALDERMAN, G. Agricultural Science Service, ADAS, MAFF, Room 324, Great Westminster House, Horseferry Road, London, SW1A 2AE.
- ASHTON, A. P. "Garth House", 17 Market Place, Bridlington, N. Humberside, YO16 4QJ.
- AVIS, P. R. D. MLC, Queensway House, Bletchley, Milton Keynes, MK2 2EF.
- BACON, J. K. Ellesmere Electronics Ltd, Cambrian House, Station Approach, Ellesmere, Shropshire.
- BAILLIE, J. H. ICI Pharmaceuticals Division Ltd, Animal Health Department, Alderley House, Alderley Park, Macclesfield, Cheshire.
- BAKER, Dr H. K. MLC, PO Box 44, Queensway House, Bletchley, Milton Keynes, MK2 2EF.
- BALL, J. A. Colborn Nutrition Ltd, Heanor Gate Ind. Estate, Heanor, Derbyshire, DE7 7 SG.
- BALL, Dr P. University of Nottingham, School of Agriculture, Sutton Bonington, Loughborough, Leics.
- BANCROFT, Miss A. Pilwood Feeds, East Wellow, Romsey, Hants.
- BARBER, Dr G. D. West of Scotland Agricultural College, Auchincruive, Ayr, KA6 5HW.
- BAVER, A. Scottish Milk Marketing Board, Underwood Road, Paisley.
- BEEVER, Dr D. E. Grassland Research Institute, Hurley, Maidenhead, Berks.
- BENNETT, D. J. J. Bibby (Agriculture) Ltd, Adderbury, Nr. Banbury, Oxon. OX17 3 HL.
- BIRCH, Miss B. V. North Eastern Farmers Ltd, Bannermill, Aberdeen, AB2 2QT.
- BLAIR, I. 126 Arnold Street, North Carlton, Melbourne, Victoria 3146, Australia.
- BLOWERS, S. Welsh Agricultural College, Llanbadarn Fawr, Aberystwyth, Dyfed.
- BOND, D. G. MLC, PO Box 44, Queensway House, Bletchley, Milton Keynes, MK2 2EF.
- BOND, K. I. J. Bibby & Sons Ltd, Stonebow House, York, YO1 2NP.
- BOOT, H. M. Pig Business Services, Bleak House Farm, Aston, Nantwich, Cheshire, CW5 8DS.
- BOYD, Dr J. Unilever Research, Colworth House, Sharnbrook, Bedford.
- BRISTOW, Miss S. M. J. Bibby (Agriculture) Ltd, Adderbury, Nr. Banbury, Oxon. OX17 3HL.
- BROADBENT, Dr P. J. North of Scotland College of Agriculture, 581 King Street, Aberdeen, AB9 1UD.
- BRUCE, Dr J. M. Scottish Farm Buildings Investigation Unit, Craibstone, Bucksburn, Aberdeen, AB2 9TR.
- BURGESS, Dr A. D. National Institute of Agricultural Engineering, Wrest Park, Silsoe, Beds.
- BURGESS, D. Cotswold Pig Development Co., Cotswold Farm, Pelham Road, Claxby, Market Rasen, Lincoln, LN8 3YR.
- BUTTERWORTH, K. MAFF/ADAS, Block A, Government Buildings, Kenton Bar, Newcastle upon Tyne, NE12 YA.
- CAR, Prof. Dr M. Faculty of Agricultural Sciences, Gjorgiceva 6, 41000 Zagreb, Yugoslavia.
- CHARLES, D. R. MAFF, Block 2, Chalfont Drive, Nottingham, NG8 3RH.
- CHARNOCK, C. W. J. Oldacre Ltd, Cleeve Hall, Bishops Cleeve, Cheltenham, Glos.
- CHESWORTH, Dr J. M. School of Agriculture, 581 King Street, Aberdeen, AB2 1UD.
- CHUBB, Dr L. G. Dalgety Spillers, 39 Station Road, Harston, Cambridge.

- CLARK, J. J. Scottish Farm Buildings Investigation Unit, Craibstone, Bucksburn, Aberdeen, AB2 9TR.
- CLARKE, D. K. W. F. Tuck & Sons (Wholesale) Ltd, Burston, Diss, Norfolk.
- CLOTHIER, R. J. Dalgety Spillers Agriculture Ltd., Dalgety House, The Promenade, Clifton, Bristol, BS8 3NJ.
- COOKE, Dr B. C. Dalgety Spillers Agriculture Ltd., Dalgety House, The Promenade, Clifton, Bristol, BS8 3NJ.
- COOPER, Dr P. H. Colborn-Dawes Ltd, Barton Mills, Canterbury, Kent, CT1 1BY.
- COWDY, P. E. M. BOCM-Silcock Ltd, Basing View, Basingstoke, Hants. RG21 2E.
- CRABTREE, G. Computer Applications Ltd, 14 Ashfield Road, Chorley, Lancs.
- CRABTREE, Dr J. R. School of Agriculture, 581 King Street, Aberdeen.
- CRAVEN, Dr J. A. Milk Marketing Board, Grove Road, Wrexham, Clwyd.
- CROW, R. J. Cyanamid of GB Ltd, Fareham Road, Gosport, Hants. PO13 0AS.
- CULJAK, M. Factory of Agricultural Machinery, Tos "Belje", Knezevo, Beli Manastir, Yugoslavia.
- CUNNINGHAM, Prof. J. M. M. West of Scotland Agricultural College, Auchincruive, Ayr.
- CUTTS, I. R. National Institute for Research in Dairying, Shinfield, Reading, Berks. RG2 9AT.
- DAELMANS, Dr National Institute for Agricultural Engineering, Van Gansberghelaan 115, B9220 Merelbeke, Belgium.
- DARROCH, R. A. Agricultural Training Board, Bourne House, 32-34 Beckenham Road, Beckenham, Kent, BR3 4PB.
- DAVIES, O. D. ADAS/MAFF, Trawsgoed EHF, Trawgoed, Aberystwyth, Dyfed.
- DEAN, R. D. South Reston Pigs Ltd, Estate Office, Rothwell, Lincoln. LN7 6BJ.
- DE ASSIS, A. G. Biomathematics Division, Grassland Research Institute, Hurley, Maidenhead, Berks.
- DE LILLE, P. Bogaardestraat 768, 9990 Maldegem, Belgium.
- DEVINE, D. R. RHM Animal Feed Services Ltd, NAC Dairy Unit, NAC, Kenilworth, Warks.
- DINNIS, I. R. 24 High Street, Twyford, Reading, Berks.
- DOREY, Dr A. P. Electronics Department, Southampton University, Southampton, SO9 5NH.
- DURRANT, R. J. Nitrovit Ltd, Nitrovit House, Dalton, Thirsk, N. Yorks. YO7 3JE.
- EADIE, J. Hill Farming Research Organization, Bush Estate, Penicuik, Midlothian, EH26 0PY.
- EMMANS, G. C. The Edinburgh School of Agriculture, APAD, Bush Estate, Penicuik, Midlothian.
- ESSLEMONT, Dr R. J. Department of Agriculture, University of Reading, Earley Gate, Reading, Berks.
- FILMER, D. G. BOCM-Silcock Ltd, Basing View, Basingstoke, Hants. RG21 2E.
- FISHER, Dr C. ARC Poultry Research Centre, Roslin, Midlothian, EH25 9PS.
- FORBES, Dr J. M. Department of Animal Physiology and Nutrition, University of Leeds, Leeds, LS2 9JT.
- FORSTER, N. C. BOCM-Silcock Ltd, Basing View, Basingstoke, Hants. RG21 2E.
- FOX, H. J. Croft House, Hallthwaites, Millem, Cumbria, LA18 5HP.
- FRANCE, Dr J. Grassland Research Institute, Hurley, Maidenhead, Berks.
- FRANCIS, G. H. ADAS, Block C, Government Buildings, Brooklands Avenue, Cambridge, CB2 2DR.
- FRAPE, Dr D. L. The Priory, Church Yard, Mildenhall, Suffolk, IP28 7EE.
- GIBSON, A. The Edinburgh School of Agriculture, Animal Production Advisory and Development Dept, Bush Estate, Penicuik, Midlothian EH26 0QE.
- GILL, Dr R. D. Unilever Research, Colworth House, Sharnbrook, Beds.

- GIVENS, D. I. MAFF/ADAS, Nutrition Chemistry Department, Staplak Mount, Star-cross, Exeter, Devon.
- GLOVER, E. H. Wye College, University of London, Wye, Ashford, Kent, TN25 5AJ.
- GODFREY, J. Welsh Office Agricultural Department, Trawsgoed, Aberystwyth, Dyfed, SY23 4HT.
- GOODALL, E. Biometrics, Queen's University of Belfast, Newforge Lane, Malone Road, Belfast, BT9 5PX.
- GOVIER, R. J. Farmfax Ltd, Houghton Down, Stockbridge, Hants.
- GRANT, A. J. ADAS/MAFF, Room 207, Great Westminster House, Horseferry Road, London, SW1P 2AE.
- GREGSON, Dr K. University of Nottingham, School of Agriculture, Sutton Bonington, Loughborough, Leics.
- HALL, C. F. Hall & Sons (Dairy Farmers) Ltd, Pinner Park Farm, Pinner, Middlesex, HA5 4SU.
- HALLAM, S. Pauls & Whites Foods Ltd, P O Box 39, Key Street, Ipswich, Suffolk.
- HALLEY, R. J. Seale-Hayne Agricultural College, Newton Abbot, Devon, TQ12 6NQ.
- HAMNETT, R. G. Shuttleworth College, Old Warden Park, Biggleswade, Beds. SG18 9DX.
- HARDY, Dr B. Dalgety Spillers Agriculture Ltd, Dalgety House, The Promenade, Clifton, Bristol, BS8 3NJ.
- HARKER, A. B. BOCM-Silcock Ltd, Renfrew, 19 Campbell Drive, Bearsden, Glasgow.
- HARKINS, J. Edinburgh School of Agriculture, West Mains Road, Edinburgh.
- HARRIS, C. I. MAFF/ADAS, Government Buildings, Coley Park, Reading, Berks. RG1 6DT.
- HEARD, T. W. Grove House, Corston, Malmesbury, Wilts.
- HENDERSON, Ms R. Edinburgh School of Agriculture, APAD, Bush Estate, Penicuik, Midlothian.
- HENNESSY, W. An Foras Taluntais, Moorepark, Fermoy, Co. Cork, Ireland.
- HEYES, D. M. J. Bibby (Agriculture) Ltd, Adderbury, Nr. Banbury, Oxon. OX17 3HL.
- HILLYER, G. M. The Edinburgh School of Agriculture, APAD, Bush Estate, Penicuik, Midlothian.
- HOLDEN, Miss B. Milk Marketing Board, Farm Computer Unit, Thames Ditton, Surrey, KT7 0EL.
- HOLMES, J. J. E. B. Bradshaw & Sons Ltd, Bell Mills, Driffield, Yorks. YO25 7XL.
- HOOLE, W. J. Bibby (Agriculture) Ltd, Adderbury, Nr. Banbury, Oxon. OX17 3HL.
- HOYLAND, E. I. Somerset College of Agriculture and Horticulture, Cannington, Bridgewater, Somerset.
- HUDSON, K. A. Beecham Animal Heath, Broadmead Lane, Keynsham, Bristol, Avon, BS18 1ST.
- HUGHES, G. Farmfax Ltd, Houghton Down, Stockbridge, Hants.
- HUGHES, Dr J. G. Welsh Office Agricultural Dept, 66 Ty Glas Road, Llanishen, Cardiff.
- HUNTER, E. A. ARC Unit of Statistics, JCMB, Kings Buildings, University of Edinburgh, Edinburgh, EH9 3JZ.
- ILLIUS, Dr A. W. Edinburgh School of Agriculture, West Mains Road, Edinburgh.
- INCE, R. G. W. F. Tuck & Sons Ltd, The Mills, Burston, Diss, Norfolk.
- JACKSON, Dr P. DatAgro Ltd, 15 Ray Mead Court, Maidenhead, Berks.
- JENNINGS, N. A. RHM Animal Feed Services Ltd, NAC Dairy Unit, NAC, Stoneleigh, Kenilworth, Warks.
- JOHNSON, C. L. Department of Animal Physiology and Nutrition, University of Leeds, Leeds, LS2 9JT.
- JONMUNDSSON, Dr J. V. The Agricultural Society of Iceland, Baendahollin, P O Box 7080, Reykjavik, Iceland.
- JONSSON, Dr M. B. Institute of Animal Genetics, West Mains Road, Edinburgh, EH9 3JH.

- JØRGENSEN, E. National Institute of Animal Science, Research in Pigs and Horses, 25 Rolighedsvej, DK — 1958 Copenhagen, Denmark.
- JORY, Mrs M. M. ADAS, Government Buildings, Burghill Road, Westbury on Trym, Bristol, BS10 6NJ.
- KEARNEY, P. A. Agricultural Institute, Moorepark, Fermoy, Co. Cork, Ireland.
- KENYON, P. J. BOCM-Silcock Ltd, Basing View, Basingstoke, Hants. RG21 2E.
- KESTIN, S. Meat Research Institute, Langford, Nr. Bristol, Avon. BS19 7DY.
- KILKENNY, J. B. Meat and Livestock Commission, Queensway House, Bletchley, Milton Keynes.
- KIRK, J. A. Seale-Hayne College, Newton Abbot, Devon, TQ12 6NQ.
- KOFOED-HANSEN, N. A/S N Foss Electric, 69 Slangerupgade, DK 3400 Hillerød, Denmark.
- LAIRD, R. West of Scotland Agricultural College, Animal Husbandry Dept, Auchincruive, Ayr, KA6 5HW.
- LAKE, G. R. Milk Marketing Board, Thames Ditton, Surrey, KT7 0EL.
- LEWIS, T. Beecham Animal Health, Broadmead Lane, Keynsham, Bristol, Avon, BS18 1ST.
- LISHMAN, Dr W. B. Somerset College of Agriculture and Horticulture, Cannington, Bridgewater, Somerset.
- MAINLAND, Dr D. D. West of Scotland Agricultural College, Economics Division, Auchincruive, Ayr, KA6 5HW.
- MAN, S. Farmfax Ltd, Houghton Down, Stockbridge, Hants.
- MANSBRIDGE, Miss J. R. ADAS, Block C, Government Buildings, Brooklands Avenue, Cambridge.
- MAXWELL, Dr T. J. Hill Farming Research Organization, Bush Estate, Penicuik, Midlothian, EH26 0PY.
- MILNE, Dr J. A. Hill Farming Research Organization, Bush Estate, Penicuik, Midlothian, EH26 0PY.
- MOIOLA, A. 5 Chem de l'Eponontaz, 1213 Geneva, Switzerland.
- MORGAN, Dr C. A. The Edinburgh School of Agriculture, West Mains Road, Edinburgh, EH9 3JG.
- MULHOLLAND, J. R. ADAS, Great Westminster House, Horseferry Road, London, SW1.
- McCULLOGH, I. I. Department of Agriculture for Northern Ireland, Experimental Husbandry Department, Greenmount College, Antrim, N. Ireland, BT41 4PU.
- McDONALD, I. Rowett Research Institute, Bucksburn, Aberdeen, AB2 9SB.
- NEILSON, D. R. The Edinburgh School of Agriculture, APAD, Bush Estate, Penicuik, Midlothian.
- NEWTON, Mrs J. M. Milk Marketing Board, Breeding Research Unit, Thames Ditton, Surrey.
- NORMAN, J. A. ICI Pharmaceuticals Division, Alderley House, Alderley Park, Macclesfield, Cheshire.
- OFFER, A. L. ADAS/MAFF, Martlett House, St. Johns Street, Chichester, West Sussex.
- OFFER, Dr N. W. West of Scotland Agricultural College, Auchincruive, Ayr, KA6 5HW.
- OLDHAM, Dr J. D. National Institute for Research in Dairying, Shinfield, Reading, RG2 9AT.
- OSBOURN, Dr D. F. Grassland Research Institute, Hurley, Maidenhead, Berks. SL6 5CR.
- PARKINSON, H. Edinburgh School of Agriculture, Boghall Farm, Biggar Road, Edinburgh, EH10 6DX.
- PEARSON, J. T. Peter Hand (GB) Ltd, 15-19 Church Road, Stanmore, Middlesex.
- PEPPER, T. A. Glasgow University, Department of Animal Husbandry, Veterinary Hospital, Bearsden, Glasgow.
- PHILLIPS, R. J. BP Nutrition (UK) Ltd, Minsal Works, Wincham, Northwich, Cheshire, CW9 6DF.

- PICKFORD, J. R. BP Nutrition (UK) Ltd, Bocking Hall, Bocking Church Street, Braintree, Essex, CM7 5JY.
- PIMBLETT, I. J. Pfizer Central Research, Animal Nutrition Research, Sandwich, Kent.
- POLLOTT, G. E. Meat and Livestock Commission, P O Box 44, Queensway, Bletchley, Milton Keynes.
- POWLEY, Dr G. ADAS, Bridgets EHF, Martyr Worthy, Winchester, Hants.
- PRESCOTT, Prof. J. H. D. The Edinburgh School of Agriculture, West Mains Road, Edinburgh, EH9 3JG.
- PYE, R. E. W. & J. Pye Ltd, Fleet Square, Lancaster, LA1 1HA.
- RAINE, Miss H. RHM Animal Feed Services Ltd, Deans Grove House, Deans Grove, Colehill, Wimbourne, Dorset.
- RAMSAY, D. A. The Edinburgh School of Agriculture, APAD, Bush Estate, Penicuik, Midlothian.
- RECORD, S. J. Fishers Nutrition Ltd, Cranswick, Driffield, N. Humberside, YO25 9DG.
- REES, P. University of Newcastle upon Tyne, Department of Agriculture, Newcastle upon Tyne.
- REES, P. C. Welsh Agricultural College, Llanbadarn Fawr, Aberystwyth, Dyfed.
- RENTON, A. R. Northamptonshire College of Agriculture, Moulton, Northampton.
- RICHARDSON, R. H. Milk Marketing Board, Breeding and Production Research Unit, Thames Ditton, Surrey, KT7 0EL.
- ROOK, Prof. J. A. F. The Hannah Research Institute, Ayr, KA6 5HL.
- ROUND, J. S. K. Nitrovit Ltd, Nitrovit House, Dalton, Thirsk, N. Yorks, YO7 3JE.
- ROWAN, T. G. University of Liverpool, Department of Animal Husbandry, Vet. Field Station, Neston, Wirral, Cheshire.
- ROWLAND, C. The Edinburgh School of Agriculture, West Mains Road, Edinburgh, EH9 3JG.
- ROWLANDS, G. J. Agricultural Research Council, Institute for Research on Animal Diseases, Compton, Nr. Newbury, Berks.
- RUBY, V. National Institute of Animal Science, Research in Pigs and Horses, 25 Rolighedsvej, DK-1958 Copenhagen, Denmark.
- RUSSELL, Dr A. M. Agricultural Research Council, Institute for Research on Animal Diseases, Compton, Nr. Newbury, Berks.
- SCOTT, L. J. Colborn-Dawes Ltd, Barton Mills, Canterbury, Kent.
- SHEARD, M. J. Sainsbury Ltd, Springfield, The Street, Horringer, Bury St. Edmunds.
- SHIPSTON, A. H. RHM Animal Feed Services Ltd, Deans Grove House, Colehill, Wimbourne, Dorset.
- SIBBALD, A. R. Hill Farming Research Organization, Bush Estate, Penicuik, Midlothian, EH26 0PY.
- SIMPSON, A. D. F. RHM (Research Ltd), Lord Rank Research Centre, Lincoln Road, High Wycombe, Bucks.
- SLADE, C. F. R. Bridgets EHF, Martyr Worthy, Winchester, Hants.
- SLADER, R. W. Meat Research Institute, Langford, Nr. Bristol, Avon. BS19 7DY.
- SMITH, Dr H. Cyanamid of GB Ltd, 154 Fareham Road, Gosport, Hants.
- SMITH, Dr N. E. Feeding and Metabolism Department, NIRD, Shinfield, Reading, Berks. RG2 9AT.
- SMITH, T. L. BP Nutrition (UK) Ltd, Minsal Works, Wincham, Northwich, Cheshire, CW9 6DF.
- SORENSEN, K. Foss Electric (UK) Ltd, The Chantry, Bishopthorpe, York, YO2 1QF.
- SPECHTER, Dr H. H. Rothamsted Experimental Station, 78 Coleswood Road, Harpenden, Herts.
- SPEEDING, A. W. Meat and Livestock Commission, P O Box 44, Queensway House, Bletchley, Milton Keynes, MK2 2EF.

- SPEDDING, Prof. C. R. W. Reading University, Department of Agriculture and Horticulture, Earley Gate, Reading, RG6 2AT.
- SPEIGHT, B. R. Scottish Milk Marketing Board, Underwood Road, Paisley, PA3 1TJ.
- SPEIGHT, D. Nitrovit Ltd, Nitrovit House, Dalton, Thirsk, N. Yorks. YO7 3JE.
- SPENCER, P. G. Bernard Matthew Ltd, Gt Witchingham Hall, Norwich, Norfolk.
- STIPIC, Dr N. Faculty of Agricultural Sciences, Simunska cesta 25, 41000 Zagreb, Yugoslavia.
- STIRK, K. H. Burgess Feeds Ltd, Thornton Dale, Nr. Pickering, Yorks.
- STOEHR, P. J. Newcastle upon Tyne University, Department of Agriculture, Newcastle upon Tyne.
- STRICKLAND, M. J. ADAS/MAFF, Boxworth EHF, Boxworth, Cambridge, CB3 8NN.
- SWAN, Dr H. George Morrell & Sons Ltd, Norman House, 46-50 East Parade, Harrogate, N. Yorks.
- SYLVESTER, Miss L. W. J. Oldacre Ltd, Cleeve Hall, Bishops's Cleeve, Nr. Cheltenham, Glos.
- SYRETT, R. F. MAFF, Government Buildings, Epsom Road, Guildford, Surrey.
- TALLIS, A. R. G. Agricultural Training Board, Bourne House, 32/34 Beckenham Road, Beckenham, Kent, BR3 4PB.
- TAYLOR, Mrs J. The Edinburgh School of Agriculture, Farm Business Management Unit, 6 South Oswald Road, Edinburgh.
- TAYLOR, Dr St. C. S. Animal Breeding Research Organization, The King's Buildings, West Mains Road, Edinburgh.
- THORNLEY, Dr J. M. H. Grassland Research Institute, Hurley, Maidenhead, Berks. SL6 5LR.
- THYSEN, I. National Institute of Animal Science, Department of Research in Cattle and Sheep, Rolighedsvej 25, DK-1953 København V, Denmark.
- TOLLEY, P. C. BP Nutrition (UK) Ltd, Stepfield, Witham, Essex, CM8 3AB.
- TOPHAM, M. Room 206A, Department of Agricultural Economics, Newcastle University, Newcastle upon Tyne.
- TOPLIS, P. RHM Animal Feed Services Ltd, Deans Grove House, Colehill, Wimbourne, Dorset, BH21 7AE.
- TRAPNELL, Dr M. G. Dalgety Crosfields Ltd, Dalgety House, The Promenade, Clifton, Bristol.
- TUER, G. R. Brockholme Farm, Danby Wiske, Northallerton, Yorks.
- TURNER, M. J. B. National Institute of Agricultural Engineering, Wrest Park, Silsoe, Beds.
- VALLANCE, J. R. North of Scotland College of Agriculture, 141 High Street, Elgin, Moray.
- WARREN, M. E. Milk Marketing Board, Thames Ditton, Surrey.
- WATHES, Dr C. M. MAFF, Shardlow Hall, Shardlow, Derbyshire.
- WATLING, J. Sheldon Jones Ltd, Priory Mills, West Street, Wells, Somerset.
- WESTON, S. P. National Institute for Research in Dairying, Shinfield, Reading, RG2 9AT.
- WHITHORN, A. The Edinburgh School of Agriculture, West Mains Road, Edinburgh, EH9 3JG.
- WHITTEMORE, Dr C. T. Edinburgh School of Agriculture, APAD, Bush Estate, Penicuik, Midlothian, EH26 0QE.
- WILBY, D. T. W. F Tuck & Sons Ltd, The Mills, Burston, Diss, Norfolk.
- WILKINS, D. A. Farm Systems (Cambridge) Ltd, 6 Almond Grove, Bar Hill, Cambridge, CB3 8DU.

**WILKINSON, Dr J. M.** MAFF, Great Westminster House, Horseferry Road, London,  
SW1P 2AE.

**WILSON, Dr R. M.** Welsh Agricultural College, Llanbadarn Fawr, Aberystwyth, Dyfed.

**WOJCIKIEWICZ, W.** Pauls & Whites Foods Ltd, PO Box 39, Key Street, Ipswich, Suffolk.

**WOOD, Dr P. D. P.** Milk Marketing Board, Thames Ditton, Surrey.

**WRAY, J. P.** ADAS, Bridgets EHF, Martyr Worthy, Winchester, Hants.

**YEO, M. L.** MAFF/ADAS, Woodthorne, Wolverhampton.

## CONTENTS

|  |     |
|--|-----|
| <b>1. COMPUTERS AND THEIR POTENTIAL</b>  |     |
| 1.1 SPEDDING, C. R. W. Computers and their potential: application to animal production .....                         | 1   |
| 1.2 GEISLER, PAMELA, A. and FRANCE, J. Computers and their potential: software .....                                 | 5   |
| 1.3 DOREY, A. P. Computer hardware: principles and potential .....   | 9   |
| <b>2. ANIMAL ENTERPRISE MANAGEMENT</b>   |     |
| 2.1 BURGESS, A. D. Data recording .....  | 17  |
| 2.2 ESSLEMONT, R. J., STEPHENS, A. J. and ELLIS, P. R. Dairy herd management .....                                   | 21  |
| 2.3 WARREN, M. E. Farm management information services .....   | 33  |
| 2.4 TURNER, M. J. B. Performance monitoring of animals using on-line computers .....                                 | 41  |
| 2.5 WHITMORE, C. T. Animal production response prediction .....  | 47  |
| 2.6 FILMER, D. G. Packages for intensive farm enterprises .....  | 65  |
| 2.7 EADIE, J. and MAXWELL, T. J. Hill resource management .....  | 81  |
| <b>3. MODEL BUILDING</b>   |     |
| 3.1 BEEVER, D. E. Simulation model of rumen fermentation .....   | 89  |
| 3.2 SIBBALD, A. R. Modelling sheep systems .....   | 99  |
| 3.3 EMMANS, G. C. A model of the growth and feed intake of <i>ad libitum</i> fed animals, particularly poultry ..... | 103 |
| 3.4 WOOD, P. D. P. Lactation curves .....  | 111 |
| 3.5 McDONALD, I. Statistical approaches to model building .....  | 115 |
| <b>4. POLICIES FOR FUTURE USE OF COMPUTERS IN ANIMAL PRODUCTION</b>  |     |
| 4.1 BUTTERWORTH, K. Computers in the farm office .....   | 121 |
| 4.2 FORBES, J. M. Flow of information from research .....  | 127 |
| 4.3 KILKENNY, J. B. Integration with management .....  | 131 |
| 4.4 WHITMORE, C. T. A policy for encouraging the effective use of computers in animal production development .....   | 137 |
| Summary of concluding discussion .....   | 141 |
| Poster paper abstracts .....   | 143 |