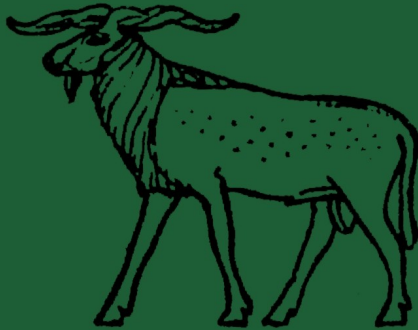


# THE MECHANIZATION AND AUTOMATION OF CATTLE PRODUCTION



AN OCCASIONAL PUBLICATION  
OF THE  
BRITISH SOCIETY OF ANIMAL PRODUCTION

1980

No. 2

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 inside the back cover. Copies may be obtained from the Secretary of the Society, c/o Harvest House, 62 London Rd., Reading, Berkshire, RG1 5AS, England.

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

# THE MECHANIZATION AND AUTOMATION OF CATTLE PRODUCTION

Proceedings of a symposium organized by  
THE BRITISH SOCIETY OF ANIMAL PRODUCTION  
and held at Harrogate in December 1977

BSAP OCCASIONAL PUBLICATION  
Number 2

BSAP  
READING  
1980

© 1980 THE BRITISH SOCIETY OF ANIMAL PRODUCTION

## ACKNOWLEDGEMENTS

For the success of the meeting and the production of the proceedings we are indebted to many people. Special thanks are due to John Southgate for excellent support, particularly his organization at Harrogate.

We wish to thank Jackie Hicks for composing the typescript, Jill Read for subediting and also Colin Line and Patrick Mulvany for much help in revising manuscripts.

The part played by Peter Hollis in encouraging the manufacturers of equipment to take part in the meeting and to exhibit their products was also important.

In this respect we are indebted to the following who supported the meeting financially and by demonstrating their equipment.

Alfa-Laval Co. Ltd, Oakfield Road, Cwmbran, Gwent, UK.

Calan Electronics Ltd, Crossroads, by Ormiston, East Lothian, UK.

Fifarm Nursette, Cupar, Fife, UK.

Fullwood & Bland Ltd, Grange Road, Ellesmere, Salop, UK.

Gascoigne Gush & Dent (Agricultural) Ltd, Berkeley Avenue, Reading, RG1 6JW, UK.

Hosier Equipment (Collingbourne) Ltd, Collingbourne Ducis, Marlborough, Wilts.

National Institute for Agricultural Engineering, Silsoe, Bedford, UK.

Poiesz BV, Pollaan 50, Postbus 39, Holland.

Ritchey Tagg Ltd, High Burton, Masham, Nr. Ripon, Yorks.

Saltney Engineering Co. Ltd, Deva Works, Saltney, Chester, UK.

Simplex of Cambridge Ltd, Sawston, Cambridge, CB2 4LJ, UK.

Vaccar Ltd, Southern Avenue, Leominster, Hereford.

Volac Ltd, Crayden Old Farm, Wendy, Royston, Herts.

Westfalia Separator Ltd, Habig House, Old Wolverton, Milton Keynes.

Finally we wish to express our thanks to the late James Stansfield, the joint organizer in the initial important stage, who encouraged the full collaboration of the agricultural engineering interests and ensured the meeting's eventual success.

F. H. Dodd      Chairman and Editor

D. N. Akam

P. J. Broadbent

P. A. Clough

P. Hollis

J. E. Moffit

A. J. Quick

M. J. B. Turner

## PREFACE

At the start of the nineteenth century nearly half of the working population in the United Kingdom worked directly in farming. Through mechanization the proportion has declined to less than five per cent. Nevertheless progress has been uneven and most of the important machines have been for crop production, for tilling the soil, sowing, harvesting and more recently for pest and weed control. The mechanization of livestock farming started much later and with the exception of poultry farming and machine milking it is very recent. The main stimulus for mechanization in cattle production has been the increasing size of herds and the decline in labour, but in the future, the development of electronic measurement and the use of small computers should also make it possible to improve *technical* efficiency through increased mechanization.

This occasional publication records the proceeding of a BSAP symposium held to consider the progress that has been made in the mechanization and automation of cattle production. It is an appropriate time for such a review since advanced electronic equipment is now being sold to farmers for the automatic identification of cattle, the measurement of milk yield and cattle liveweight and also the collection and analysis of data. This mechanization brings into farming a technology unfamiliar to farmers. The aim of the meeting was not to consider the details of the electronics and computer programmes but to examine the progress and potential of equipment currently being developed. From the papers presented at the meeting it became clear that rapid progress is being made in measuring performance, control of operations and data analysis. It is now technically possible for many of the important aspects of cattle management to be mechanized and recorded and for electronic equipment to record and analyse the data collected to indicate the changes that should be made to increase the efficiency of production. Only farmers with the largest herds will adopt the complete systems, at least in the short term, but part of these systems will have immediate application for many farmers and they will bring about marked changes in livestock farming in due course. The key to adoption is economic. For widespread use the systems must enable those who use them to make more profit than those who do not.

The symposium covered a wide range of topics starting with the measurement of animal performance, then considering progress in mechanizing milking and feeding before examining farm records, collection and analysis and the implication of the most recent electronic technology. In a final session overseas progress was described.

The symposium was a success. Almost 200 delegates came, mostly from the UK, but also from several other European countries.

Dr F. H. Dodd

## INTRODUCTION

Of the varied stimuli for change in agriculture probably the most important are economic factors and people with ideas. The latter may be research workers from state and commercial organisations, advisers, and by no means least, farmers. Frequently a farmer has played the key role and this has been so with the mechanization of livestock production.

Mr Peter Price, a Hampshire farmer, was dissatisfied with the rate of progress and through persuasion, encouragement and drive has collected together and used advanced equipment long before it was generally available. Mr Price opened the meeting with an interesting and amusing account of his successes and failures.

## LIST OF PARTICIPANTS

Prof. P. N. Wilson—President BSAP

- AKAM, D. N., NIRD, Shinfield, Reading.  
ALEXANDER, W. G. G., Home Farm, Eynsford, Dartford, Kent.  
ALLEN, Dr D. M., MLC, Queensway House, Bletchley, Milton Keynes.  
AMPCLISS, J., E. B. Equipment, Ltd.  
ANDERSEN, T., Ole Sørensen & Co. A/S, Denmark.  
BACON, J. K., The Home Farm, Goodwood, Chichester, Sussex.  
BAGGOTT, P. S., Manus (G.B.) Limited, London Road, Moreton-in-Marsh, Glos.  
BASFORD, W. D., ADAS, Block 7, Chalfont Drive, Nottingham.  
BATES, E., E.B. Equipment, Ltd.  
BAUER, A., Scottish Milk Marketing Board, Underwood Road, Paisley.  
BEAR, J. S., MAFF, Woodthorne, Tettenhall Road, Wolverhampton.  
BEARD, Mrs S. M., ADAS Unit, National Agricultural Centre, Stoneleigh, Warwicks.  
BEBB, D. L., Writtle Agricultural College, Chelmsford, Essex.  
BELL, Prof. R. L., NIAE, Wrest Park, Silsoe, Beds.  
BEVAN, R. A., Midland Bank Limited, 24 Norton Street, Liverpool.  
BIDE, Miss J., MAFF/ADAS, Staplake Mount, Starcross, Exeter, Devon.  
BILLON, P., ITEB, Service Traite Mecanique, 149 rue de Bercy, Paris 75579.  
BISSET, G. A., Gascoigne Gush & Dent (Agricultural) Limited, Berkeley Avenue, Reading.  
BRADLEY, R. F., Harper Adams Agricultural College, Newport, Salop.  
BRIGSTOCKE, T. D. A., BOCM Silcock Limited, Basing View, Basingstoke, Hants.  
BROADBENT, Dr P. J., North of Scotland College of Agriculture, 581 King Street, Aberdeen.  
BROOKE, D. W. I., University of Reading, Department of Agriculture, Earley Gate, Reading.  
BROWN, C. M. A., National Milk Records, MMB, Thames Ditton, Surrey.  
BRUCE, D., NIAE, Wrest Park, Silsoe, Beds.  
BULLOCK, S., Agricultural Press Farms Limited, 1 Throwley Way, Sutton.  
BUREMA, H. J., IMAG, Wageningen, The Netherlands.  
BURGESS, Dr A. D., NIAE, Wrest Park, Silsoe, Beds.  
CADE, F. J., BOCM Silcock Limited, Weymouth, Dorset.  
CANT, E. J., NIRD, Shinfield, Reading.  
CATT, W. R., MAFF/ADAS, Government Buildings, Coley Park, Reading.  
CHALMERS, D., MAFF/ADAS, 122A Thorpe Road, Norwich.  
CHAPMAN, A. R., Wade & Mitchell Northern Limited, 3 West Moor Lane, Raskelf, Easingwold, York.  
CLAESSON, Prof. O., Swedish University of Agricultural Sciences, 750 07 Uppsala 7, Sweden.  
CLARK, D. K., Vaccar Limited, Moorside Road, Winnal, Winchester, Hants.



**CLARK, N.**, Victoria House, 137 Cold Bath Road, Harrogate, N. Yorks.  
**CLARK, R. D.**, Peter Hand (G.B.) Limited, 59 High Street, Rickmansworth.  
**CLOUGH, P. A.**, NIRD, Shinfield, Reading.  
**COOK, K. N.**, MMB, Thames Ditton, Surrey.  
**COOKE, Dr I. J.**, Gascoigne Gush & Dent (Agricultural) Limited, New Farm Road, Alresford, Hants.  
**CORBY, M. P.**, Diversey Technical Centre, Mill Lane, Riddings, Derbys.  
**COX, A. L.**, National College of Agricultural Engineering, Silsoe, Beds.  
**CRISFORD, P.**, Farmers Weekly, 1 Throwley Way, Sutton, Surrey.  
**CROFTS, G. W.**, R.J. Fullwood & Bland Limited, Ellesmere, Salop.  
**CURRAN, D.**, North Barn Farm, Long Bredy, Nr. Dorchester, Dorset.  
**CUTTS, I. R.**, NIRD, Shinfield, Reading.  
**DAVIES, W. G.**, Ellesmere Electronics Limited, Cambrian House, Station Approach, Ellesmere, Salop.  
**DEVINE, D. F.** RHM Limited, NAC Dairy Unit, National Agricultural Centre, Stoneleigh, Kenilworth, Warwicks.  
**DINNIS, I. R.**, Beecham Animal Health, Beecham Limited, Great West Road, Brentford, Middx.  
**DODD, Dr F. H.** NIRD, Shinfield, Reading.  
**DODE, P. F.**, Gascoigne Gush & Dent (Agricultural) Limited, Berkeley Avenue, Reading.  
**DAWSON, J. R.**, NIAE, Wrest Park, Silsoe, Beds.  
**EDWARDS, D.**, Fifarm Nursette Ltd., Cupar, Fife.  
**ELCOCK, N. V.**, Institute for Research on Animal Diseases, Compton, Newbury.  
**ELLIS, R.**, Westfalia Separator Limited, Habig House, Old Wolverton, Milton Keynes, MK12 5PY.  
**ERLEN, P. H.**, Westfalia Separator Limited, Old Wolverton, Milton Keynes.  
**ESSLEMONT, Dr R. J.**, Department of Agriculture, University of Reading.  
**EVANS, G. H.**, A.C. Bamlett Limited, Station Road, Thirsk, N. Yorks.  
**FAIR, J.**, Yewtree Farm, Poulton, Pulford, Chester.  
**FIELD, W. B.**, Hosier Equipment Limited, Collingbourne Ducis, Wilts.  
**FILBY, D. E.**, NIAE, Wrest Park, Silsoe, Beds.  
**FILMER, D. G.**, BOCM Silcock Limited, Basing View, Basingstoke, Hants.  
**FOOT, A. S.**, (ex NIRD), Bosket, Turks Lane, Mortimer, Reading.  
**FRASER, G.**, Quantock Veal Limited, Goods Farm, Merridge, Spaxton, Bridgwater.  
**FRASER, N. P.**, Mowbray Gardens, Kirkby Malzeard, Nr. Ripon, N. Yorks.  
**FRIEND, E.**, Friend Farms Limited, Winnington Grange, Market Drayton, Salop.  
**FRIEND, I. J. C.**, Friend Farms Limited, Market Drayton, Salop.  
**FRIEND, J.**, Friend Farms Limited, Market Drayton, Salop.  
**GARSTANG, J. R.**, Great House EHF, Helmshore, Rossendale, Lancs.  
**GOLDSMITH, E. J.**, Simplex of Cambridge Limited, Sawston, Cambridge.  
**GOLDSMITH, F. E.**, Alfa-Laval Co. Limited, Oakfield, Cwmbran, Gwent.  
**GOLIGHTLY, A. J.**, Jealott's Hill Farm, Warfield, Bracknell, Berks.

- GOODFELLOW, R. E., Welsh Agricultural College, Llanbadarn Fawr, Aberystwyth.
- GORDON, Dr F. J., Agricultural Research Institute, Hillsborough, Co. Down.
- GREAT, C. J., Alfa-Laval Limited, Oakfield, Cwmbran, Gwent.
- GREEN, C. B., Simplex of Cambridge Ltd, Sawston, Cambridge.
- GRIFFIN, A. K., NIRD, Shinfield, Reading.
- GULLIVER, D. T. C., Saltney Engineering Co. Limited, 14 Brookfield Road, Sawston, Cambridge.
- HALL, J., Rushton's Engineering Co. Limited, St. Germain Street, Huntingdon.
- HALLEY, R. J. Seale-Hayne Agricultural College, Newton Abbott, Devon.
- HAMBLIN, B., Westfalia Separator Limited, Habig House, Old Wolverton, Milton Keynes, MK12 5PY.
- HARRIS, J. C., ABRO, Blythbank Farm, West Linton, Tweeddale.
- HART, E., Livestock Farming, 2 The Green, Orlingbury, Kettering, Northants.
- HARVEY, D. L., Diversey Limited, Weston Favel, Northampton.
- HAWKINS, M. F., Gascoigne Gush & Dent (Agricultural) Limited, Berkeley Avenue, Reading.
- HEATH, R. P., Seale-Hayne Agricultural College, Newton Abbott, Devon.
- HENDERSON, D. M., Alfa-Laval Co. Limited, Oakfield, Cwmbran, Gwent.
- HINDMARCH, R. W., Ellesmere Electronics Limited, Cambrian House, Station Approach, Ellesmere, Salop.
- HOGG, R., Calan Electronics Ltd, Crossroads, by Ormiston, East Lothian.
- HOLLIS, P., R. J. Fullwood & Bland Limited, Ellesmere, Salop.
- HOLMES, J. J., E.B. Bradshaw & Sons Limited, Bell Mills, Driffield, N. Humber-side.
- HUTCHINSON, M., Diversey Ltd, Weston Favel, Northampton.
- JAMES, R. D., Ciba-Geigy Agrochemicals, Whittlesford, Cambridge.
- JAMIESON, M., MAFF/ADAS, Government Buildings, Kenton Bar, Newcastle.
- JENKINS, I. A., Saltney Engineering Co. Limited, 1 Herons Rye, Lower Dippers, Pulborough, W. Sussex.
- JOHANNSON, Dr E., Agricultural Society of Iceland, Box 7080, Reykjavik, Iceland.
- JONES, A. D., R. J. Fullwood & Bland Limited, Ellesmere, Salop.
- JONES, J. A., MLC, Queensway House, Bletchley, Milton Keynes.
- JONES, W. T., J. Bibby Agriculture Limited, Adderbury, Banbury, Oxon.
- JØRGENSEN, V., Ole Sørensen & Co. A/S, Denmark.
- KAVANAGH, M., Hosier Equipment Limited, Collingbourne Ducis, Wiltshire.
- KELLER, P., De Landbrugstekniske Undersøgelser, Ørritslevgaard, DK-5450, Otterup, Denmark.
- KERR, A. J., South West Scotland Grassland Society, Camsiscan, Craigie, Kilmarnock, Ayrshire.
- KILKENNY, J. B., MLC, Queensway House, Bletchley, Milton Keynes.
- KINGWILL, R. G., NIRD, Shinfield, Reading.
- KITCHEN, J. A., Howard Harvestore Ltd, Eye, Suffolk.
- KLUFT, C., NEDAP, Groenlo, Holland.

- KONGGAARD, S. P., Ole Sørensen & Co. A/S, Denmark.
- LANGHAMMER, Miss E., 23 Kiel, Universitat Kiel, Institut für Landwirtsch  
Verfahrenstechnik, Olshausen Str. 40-60, Germany.
- LATHAM, J. S., Latham Farms Limited, Averham, Newark, Notts.
- LAWRENCE, J. S., Hunday Electronics Limited, Samson Close, Killingworth,  
Newcastle upon Tyne.
- LEAVER, J. D., West of Scotland Agricultural College, Crichton Royal Farm,  
Dumfries.
- LESLIE, W. A., Gascoigne Gush & Dent (Agricultural) Limited, Berkeley Avenue,  
Reading.
- LEWIS, T., MLC, St. Andrews House, St. Andrews Street North, Bury St.  
Edmunds.
- LONSDALE, C. R., Kenneth Wilson (Holdings) Limited, Morwick Hall, York  
Road, Leeds.
- McCREA, M. R., School of Veterinary Science, Langford, Bristol.
- MacDONALD, A., Scottish Farmer, 39 York Street, Glasgow.
- McLAREN, A. S., Calan Electronics Ltd., Crossroads, by Ormiston, East Lothian.
- MacPHERSON, R., Block B, Govt. Buildings, Brooklands Avenue, Cambridge.
- MAATJE, K., Institute for Animal Husbandry, 'Schoonnoord', Dribergseweg  
10D, Zeist, Netherlands.
- MARSTON, D., MAFF, Block 2, Govt. Buildings, Lawnswood, Leeds.
- MARTIN, H., C.W.S. Limited, Farms & Horticultural Group, The White House,  
Stoughton, Leics.
- MERRY, C. B., Volac Limited, 23 Mallard Road, Scotton, Catterick, N. Yorks.
- MILNER, C. K., Colborn Group Limited, Barton Mills, Canterbury, Kent.
- MINISTER, Miss P., Dairy Farmer, Wharfedale Road, Ipswich.
- MOFFITT, J. E., Peepy Farm, Stocksfield, Northumberland.
- MUNDELL, M., Scottish Farmer, Norwood, Abercromby Road, Castle Douglas,  
Kirkcudbrightshire.
- MURFITT, R. F. A., National College of Agricultural Engineering, Silsoe, Beds.
- MURRAY, F., Simplex of Cambridge Limited, Sawston, Cambridge.
- NAYLOR, P. A., MAFF, Great Westminster House, Horseferry Road, London,  
SW1.
- NICHOLLS, G. J., National Milk Records, MMB, Thames Ditton, Surrey.
- NORRIS, J. J., Department of Agriculture, Floor 2E, Agriculture House, Dublin.
- NORDEGREN, S. A., Alfa-Laval Company, S-14700 Tumba, Sweden.
- O'GARVEY, C. P., University College, Ballycoolin Road, Dublin.
- OWEN, D., SCATS, Northgate House, Staple Gardens, Winchester, Hants.
- OWEN, J. D., Castle Lloyd Farm, Pendine, Dyfed.

- PIDDEN, W. A., Anderson Strathclyde Ltd, Saunderton, High Wycombe, Bucks.
- POIESZ, G. W., Poiesz B. V., Pollaan 50, Postbus 39, Zutphen, Holland.
- POLLARD, R. G., West of England Farmers Limited, 6 Bath Road, Melksham, Wilts.
- PORTER, D., Superglide Engineering Limited, Broadway Works, Chilton Polden, Nr. Bridgwater, Somerset.
- PRICE, J. T. R., Hosier Equipment Ltd, Collingbourne Ducis, Wiltshire.
- PRICE, P. H. M., Woodman Farms, Avington, Nr. Winchester.
- PUCKETT, Dr H. B., U.S. Department of Agriculture, 226 Agricultural Engineering Buildings, University of Illinois, Urbana, Illinois, USA.
- QUICK, A. J., MAFF, Coley Park, Reading, Berks.
- REDMAN, P. L., ADAS Liaison Unit, NIAE, Wrest Park, Silsoe, Beds.
- REED, Miss J. A., Loughry College of Agriculture & Food Technology, Cookstown, Co. Tyrone.
- REED, W., Hunday Electronics Limited, Samson Close, Killingworth, Newcastle upon Tyne.
- REID, G. W., Rowett Research Institute, Bucksburn, Aberdeen.
- REITSMA, Dr S. Y., NIRD, Shinfield, Reading.
- RIX, Ir. J., 23 Kiel, Institut fur Landwirtschaftliche Verfahrenstechnik, Universitat Kiel, Olshausenstr. 40-60, Germany.
- ROBERTS, L., R. J. Fullwood & Bland Limited, Ellesmere, Salop.
- ROBINSON, T. W., North of Scotland College of Agriculture, Farm Buildings Division, Craibstone, Bucksburn, Aberdeen.
- ROSE, M. J., Alfa-Laval Co. Limited, Oakfield, Cwmbran, Gwent.
- ROSSING, W., IMAG, Wageningen, Netherlands.
- SAMSON, I., Calan Electronics Ltd., Crossroads, by Ormiston, East Lothian.
- SCOTT, Prof. N. R., Agricultural Engineering Dept., Cornell University, USA.
- SHUTTLEWORTH, J. B., Vacar Limited, Moorside Road, Winnal, Winchester.
- SINCLAIR, G., ADAS, Edenbridge House, Lowther Street, Carlisle.
- SMITH, D. H., Vicon Limited, Lovetofts Drive, Ipswich.
- SMITHERS, B., Westfalia Separator Limited, Habig House, Old Wolverton, Milton Keynes, MK12 5PY.
- SOUTHGATE, J. R., MLC, Queensway House, Bletchley, Milton Keynes.
- SPEIGHT, B. R., Scottish Milk Marketing Board, Underwood Road, Paisley.
- STANDAGE, M. R. M., MAFF/ADAS, Block 7, Chalfont Drive, Nottingham.
- STEELE, M. J., Colman & Co. (Agricultural) Limited, Ballingdon Works, Sudbury, Suffolk.
- STICKLAND, R. G., Gascoigne Gush & Dent (Agricultural) Limited, Berkeley Avenue, Reading.
- STRATTON, Ms. I. M., NIRD, Shinfield, Reading.
- STREET, M. J., NIAE, Wrest Park, Silsoe, Beds.
- STRICKLAND, M. J., Boxworth EHF, Boxworth, Cambridge.

THOMAS, Miss T. P., ADAS/MAFF, Christchurch Road, Winchester, Hants.  
THOMPSON, W., ICI Limited, Agricultural Division, Jealott's Hill Research Station, Bracknell, Berks.  
THOMPSON-COON, M., Seawell Grounds, Nr. Towcester, Northants.  
THOMPSON-COON, W., Seawell Grounds, Nr. Towcester, Northants.  
TOLLEY, P. C., BP Nutrition (UK) Limited, Stepfield, Witham, Essex.  
TOWNEND, R. R., Hunday Electronics Limited, Samson Close, Killingworth, Newcastle upon Tyne.  
TRITTON, A. J., Whitelands, Hatfield Petheral, Chelmsford, Essex.  
TURNER, A., Alfa-Laval Co. Limited, Oakfield, Cwmbran, Gwent.  
TURNER, M. J. B., NIAE, Wrest Park, Silsoe, Beds.  
TYBLEWSKI, J., Northamptonshire College of Agriculture, Moulton, Northampton.  
UNITT, N., Alfa-Laval Co. Limited, Oakfield, Cwmbran, Gwent.  
WALKER-LOVE, J., West of Scotland Agricultural College, Auchincruive, Ayrshire.  
WALLACE, E. B., Calan Electronics Ltd., Crossroads, by Ormiston, East Lothian.  
WALLINGTON, R. S., West of Scotland College of Agriculture, Auchincruive, Ayr.  
WARREN, M. E., LCP Department, MMB, Thames Ditton, Surrey.  
WATLING, G. J. F., Sheldon Jones Limited, Priory Mills, Wells, Somerset.  
WENNBERG, H., Alfa-Laval, S-14700 Tumba, Sweden.  
WILSDON, G. C. H., Dengie Manor Farms, New Hall, Asheldham, Southminster, Essex.  
WILSON, C. D., MAFF, Central Veterinary Laboratory, New Haw, Weybridge.  
WILSON, Prof. P. N., BOCM Silcock Limited, Basing View, Basingstoke, Hants.  
WOOD, D., RASE, National Agricultural Centre, Stoneleigh, Kenilworth.  
WRAY, J. P., MAFF, Bridgets EHF, Martyr Worthy, Winchester, Hants.