
Resume and Supporting Information

Roger Meischke

BVSc, MVSc, PhD, MRCVS, MACVSc, MASM.



Personal details	2
Employment	3
Tertiary teaching positions	6
Membership of statutory authorities and committees	7
Representation on committees	8
Governmental committees	8
Professional, scientific and other committees	9
Submissions and evidence to parliamentary committees	11
Papers to governmental committees and inquiries	11
Scientific papers	14
Papers in science policy, philosophy and politics	14
Papers in pharmacology, pathology, microbiology and immunology	15
Papers in animal welfare, production and husbandry	17
Legal opinions and court cases (examples)	21
Mentorship of graduate students	22

Personal details

Roger Meischke

BVSc, MVSc, PhD, MRCVS, MACVSc, MASM.

Employment

Director

Dr Roger Meischke Pty Ltd

[REDACTED]	
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

Home and farm

[REDACTED]	
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

Citizenship

Australian

Qualifications

Bachelor of Veterinary Science, University of Sydney, 1970 (BVSc)

Master of Veterinary Science, University of Sydney, 1975 (MVSc)

Doctor of Philosophy, University of Glasgow, 1978 (PhD)

Memberships

Royal College of Veterinary Surgeons, 1977

Australian Society for Microbiology, 1979

Australian Institute of Biology, 1986

Australian College of Veterinary Scientists in Pharmacology, 2006

Employment

Consulting veterinary scientist

2010-present

I provide consultancy services in medicines evaluation, compliance investigations and scientific assessments for Government and industry as well as expert review of animal welfare and animal husbandry issues for the university and primary industry sectors as well as animal welfare organisations.

Veterinary Medicines Registration Manager

2009 - 2010

Senior Veterinary Product Evaluator

2003 - 2009

Australian Pesticides and Veterinary Medicines Authority (APVMA)

I was appointed to the position of Veterinary Product Evaluator in the Veterinary Medicines Program in July 2003 and promoted to Senior Product Evaluator in February 2004. I have been Team Leader of the Veterinary Ethical and Complementary Medicines Team and, following the restructure of the APVMA in September 2007, I have been Team Manager of the Veterinary Medicines Registration Team on a number of occasions and for significant periods of time of up to six months for a total period of eighteen months. I was permanently appointed to the position in 2009.

During this time there have been major changes in process with respect to labelling, data protection, commercial-in-confidence matters, organisational restructure and ISO consolidations in response to specific failures. These changes have made the complex processes more difficult to administer than at other times. In these roles I act as Product Manager and Delegate responsible for the screening of applications, product and permit evaluations, bringing together of agency advices and final assessments including delegated regulatory decisions where appropriate. Quality control, risk assessment and risk management are central to the tasks performed. I have completed a number of world-first product registrations requiring new policy and regulatory changes.

I was seconded from the APVMA to Food Standards Australia New Zealand between January and July 2008 as Senior Veterinary Microbiologist in the Risk Assessment Microbiology Team to initiate work on the primary production and processing food standards based on whole-of-chain risk assessments. I returned to APVMA on 7 July 2008 to continue as Senior Product Evaluator in the Veterinary Medicines Program.

Registered veterinary practitioner and consultant

1986-2003

I established [REDACTED] Veterinary Hospital and the associated [REDACTED] Veterinary Surgery and [REDACTED] Veterinary Surgery. The main hospital was a purpose-built complex of three buildings of 500 square meters with associated large- and small-animal holding facilities. My practices were incorporated and had around 2000 clients, including companies and individuals ranging from extensive farming interests to individual animal owners. My consultancy component was based on thirty corporate clients, government departments, universities and semi-government organisations. I provided expert opinions for court cases on numerous occasions. I was an approved veterinarian for establishing and maintaining accreditation of primary producer clients in disease control programs such as ovine brucellosis, footrot and Johne's diseases. I was approved for the official identification and blood typing of horses and cattle. I was an approved veterinarian able to certify live animals for insurance purposes and export.

All animal species were treated at my practices: farm and domestic pets, native animals and wildlife, laboratory animals and the more unusual 'new' farm animals such as emus, ostriches, alpacas, goats and deer. The purpose-built laboratory supported an active research program and provided routine testing in haematology, biochemistry, microbiology, immunology and parasitology. Mentoring of students was a high priority and over twenty students from widely diverse backgrounds were hosted by the practice. These included senior veterinary science students, veterinary nursing students and animal technician trainees as well as several doctoral, masters and honours students. I attended accredited training courses on exotic diseases, Johne's disease in sheep and cattle, sheep footrot, ovine brucellosis, artificial breeding, cancer diagnosis and treatment, clinical parasitology and ultrasonography.

During this period I was elected Councillor and then Mayor of [REDACTED] Council. This meant running a statutory authority with a staff of 60 and an annual budget of over \$4 million. I was a member of the Local Government and Shires Associations, the Regional Leaders Forum, deputy Chairperson of the [REDACTED] Catchment Coordinating Committee and deputy Chairperson of the Companion Animals Advisory Board to the NSW Minister for Local Government. I was also a member of the ACT Ministerial Advisory Committee on Animal Welfare and participated in drafting many of the codes of practice. I am currently a member of the Australian National University Animal Experimentation Ethics Committee.

While in local government I was a member of the Southern Tablelands Regional Library Committee and numerous management committees covering emergency services, environmental planning and assessment, roads and traffic, and health and community services. I attended accredited training courses on Conflict of Interest in Local Government; Consultative Committee in award restructuring, structural efficiency, interaction and communication with stakeholders; Strategic Management – organisational performance, review and program evaluation; voluntary structural reform in local government; and performance management workshops.

Veterinary Officer 1968–1986
Commonwealth Department of Primary Industry

Senior Principal Veterinary Officer (Class 5) Research & Laboratories 1985–86
Australian Agricultural Health and Quarantine Service, Canberra
Responsible for the Department's research effort into livestock exports, the Australian Animal Health Laboratory, The National Animal Serum Laboratory, animal welfare, recombinant DNA technology and a wide range of special projects.

Principal Veterinary Officer (Class 4) Special Projects & Animal Welfare 1982–85
Australian Bureau of Animal Health, Canberra
Responsible for a wide range of special projects, submissions to parliamentary inquiries, aspects of the Royal Commission into the Meat Industry, consultancies, international liaison and the transfer of quarantine, together with a substantial workload of Ministerial and Prime Ministerial correspondence.

Senior Veterinary Officer (Class 3) Animal Welfare 1980–82
Australian Bureau of Animal Health, Canberra
This was the first appointment in animal welfare in Australia. Responsible for drafting national codes of practice, livestock exports, abattoirs including ritual slaughter, interstate transport, veterinary officer projects, and scientific seminars.

Veterinary Officer (Class 2) Epidemiology

1978–1980

Australian Bureau of Animal Health, Canberra

Responsible for epidemiological studies into endemic and exotic animal diseases, hydatid control, arbovirus survey in Indonesia design, and development of the national animal serum bank and associated laboratory.

Overseas Studentship

1975–78

Department of Veterinary Pathology, University of Glasgow, UK

Awarded an Australian Meat Research Committee overseas studentship and a Public Service Board Scholarship to study for a doctorate in tumour virology, immunology and pathology under Professor WFH Jarrett FRS. Licensed by the UK Home Office to experiment on living animals (ED3443 ELA 22/5205/1 of 15.2.77).

Veterinary Officer (Class 2)

1974

Veterinary Public Health Branch, Canberra

This promotion occurred while on secondment to the Australian Meat Board, Sydney.

Technical Adviser

1972–75

Australian Meat Board, Sydney, on secondment from the Veterinary Public Health Branch (Veterinary Officer Class 1/2)

Responsible for advising the Board on technical issues including trade complaints, heart disease, exotic diseases, animal production, meat science, conduct research on livestock bruising, carcase classification, salmonella contamination and pesticides. Represent the Australian Meat Board on national committees such as the Animal Production Committee and other inquiries. I completed an external Master of Veterinary Science degree with the Department of Veterinary Pathology and Microbiology at the University of Sydney.

Veterinary Officer (Class 1) Veterinary Public Health

1970–72

various locations

I was officer in charge of inspection and certification on export abattoirs, latterly at Guyra, which slaughtered all classes of livestock and had assorted boning and other processing facilities. I was responsible for a staff of 18 state and federal meat inspectors.

Cadet Veterinary Officer

1968–70

University of Sydney Faculty of Veterinary Science

I was awarded a Commonwealth Department of Primary Industry Cadetship to study Veterinary Science. I was awarded Credits in Physics, Biology, Pathology, Animal Husbandry, Bacteriology and Protozoology, and Meat Inspection, and a Distinction in Clinical Veterinary Pathology.

Tertiary teaching positions

Lecturer in health inspection and meat inspection 1971–72

Armidale Technical College

Tutor and Demonstrator in Microbiology 1986–87

Department of Biochemistry, Faculty of Science, The Australian National University

Lecturer 1986–90

ACT Institute of Technical and Further Education, Bruce Campus

Lecturer in animal health, welfare and legislation; disinfection and sterilisation; animal housing, handling and care for animal technicians and veterinary nurses.

Lecturer 1986–89

ACT Institute of Technical and Further Education, Reid Campus

Lecturer in food science; food hygiene; occupational health and safety for students in hospitality management and apprentice chef training courses.

Consultant 1986 to present

Research School of Biological Sciences, Institute of Advanced Studies, The Australian National University

See papers such as Marotte, Rice & Waite, *Journal of Anatomy* (1992) 180, 401–17; Marotte, Fleet & Mark, *Journal of Comparative Neurology* (1989) 282, 535–54.

Examiner in Pharmacology 2009 to 2012

Australian College of Veterinary Scientists, Pharmacology Chapter.

Presentation Judge 2013

Canberra Health Annual Research Meeting, Canberra Hospital 23.9.2013

Membership of statutory authorities and committees

Member 2010 - present

Veterinary Surgeons Board (ACT)

Australasian Veterinary Boards Council (expert panel in veterinary science)

Member 1981 - present

Australian National University Animal Experimentation Ethics Committee

Member nominated by the Australian Bureau of Animal Health (1982–86) and the Australian and New Zealand Federation of Animal Societies (1989–present).

Member, Deputy Chairperson 1998–2000

NSW Companion Animals Advisory Committee

Member and Deputy Chairperson nominated by the Local Government and Shires Associations of NSW.

Member, Deputy Chairperson 1996–2000

Upper Murrumbidgee Catchment Coordinating Committee

Member and Deputy Chairperson nominated by Gunning Shire Council; also member of the steering committee for the Murrumbidgee catchment action plan for integrated natural resources management: upper Murrumbidgee (1998).

Councillor, Mayor 1995–1999

Gunning Shire Council

Elected Councillor and Mayor; chairperson and member of management committees.

Member 1993–1996

ACT Ministerial Animal Welfare Advisory Committee

Member nominated by the Australian and New Zealand Federation of Animal Societies; chairperson or member of committees.

Member 1986–1994

University of Canberra Animal Experimentation Ethics Committee

Member appointed by the University.

Representation on committees

Governmental committees

1995–99 Southern Tablelands Regional Library Management Committee. Member representing Gunning Shire Council.

1995–98 Regional Leaders Forum. Member representing Gunning Shire Council.

1993 NSW Animal Welfare Advisory Committee: Layer Hen Search Conference, Sydney University, 10 – 12 December 1993. Member representing the Australian and New Zealand Federation of Animal Societies.

1989–90 National Advisory Committee on Kangaroos, Australian National Parks and Wildlife Service. Member representing the Australian and New Zealand Federation of Animal Societies.

1985–86 Policy Advisory Committee to the CSIRO Australian Animal Health Laboratory. Member representing the Department of Primary Industry.

1980–86 Animal Health Committee of the Standing Committee on Agriculture: several subcommittees including the Sub-committee on Animal Welfare. Member representing the Department of Primary Industry.

1983–86 Intergovernmental Committee on Research and Development in the Sea Transport of Sheep. Member representing the Australian Bureau of Animal Health.

1973–86 Animal Production Committee of the Standing Committee on Agriculture and several Expert Panels such as that on the importation of new beef cattle genotypes. Member representing the Australian Meat Board and later the Australian Bureau of Animal Health.

1984–86 Standing Committee on Agriculture's Working Party on the Legal Export of Psittacine and Other Australian Native Birds. Member and Convenor representing the Department of Primary Industry. See SCA 133, Townsville, 25 – 27 July 1984; AHC 33, Agenda 8.5 of 3.4.84.

1984 Bilateral Discussions between the USA and Australia, Canberra, 3 – 4 December 1984. Representing the Australian Bureau of Animal Health, Department of Primary Industry.

1983–84 Department of Transport Livestock Export Industry Advisory Committee: Technical Sub-committee. Member and Convenor representing the Australian Bureau of Animal Health.

1982–85 Recombinant DNA Monitoring Committee and Purposeful Release Working Group. Alternate and member representing the Department of Primary Industry.

1979–85 Southeast NSW and ACT Hydatid Control Program. Member and Technical Director representing the Australian Bureau of Animal Health.

1974 Standing Committee on Agriculture Animal Production Committee's workshop on the genetic improvement of beef cattle in southern Australia. Member representing the Australian Meat Board.

1973–75 Salmonella Technical Sub-committee of the Meat Industry Advisory Committee. Member and Co-ordinator representing the Australian Meat Research Committee.

1972–75 Australian Meat Research Committee National Workshops on Livestock Bruising. Member and Convenor representing the Australian Meat Board.

2010–present Chairman of Australian Kosher Slaughter Advisory Committee comprising animal welfare, Government, industry leaders and scientific experts. Member of drafting committee for Best Practice Guidelines for Animal Welfare in Kosher Slaughter of Cattle, Sheep, Goats and Poultry.

Professional, scientific and other committees

2009–2012 Examiner in Pharmacology for the Australian College of Veterinary Scientists

2006–08 Scientific Reviewer, Australian Veterinary Journal.

2005–07 Professional Auditor, NSW Veterinary Practitioner's Board.

1992–2000 ANZFAS Animals Today magazine. Member of editorial special advisory board.

1986–94 Royal Society for the Prevention of Cruelty to Animals (Australia). Technical adviser.

1989–92 Official veterinarian at Canberra combined cat clubs shows. As part of a team of three veterinarians, conducted health examinations on every animal exhibited.

1988 Australian Society for Microbiology Annual General Meeting, Canberra. Chairman of organising committee, and Chairman of the veterinary microbiology session (Australian Microbiologist 9(2), 229).

1985 United Nations Food and Agriculture Organisation: Animal Production and Health Commission for Asia, the Far East and the South West Pacific (APHCA) Tenth Session, Melbourne. Chairman of organising committee.

1985 Australian Academy of Science and ANZAAS joint exotic diseases symposium. Secretary of the organising committee.

1984 Australian & New Zealand Association for the Advancement of Science 54th Congress, Canberra. Secretary of veterinary science organising committee and Chairman of session on ecology of exotic pathogens.

1984 Team of specialists on human atypical mycobacterial infection. resulted in publication of Pulmonary disease in a child caused by atypical mycobacteria. Medical Journal of Australia (1984), 141, 242–3.

1981–82 ACT Further Education Accreditation Committee expert panel on the Bruce TAFE study program for Animal Technicians. Member representing the Australian Veterinary Association.

1983 to present Australian Veterinary Journal. Scientific referee.

1982 Australian Veterinary Association Annual General Meeting: Session on Laboratory Animal Science. Chairman.

1981–82 Australian Society for Animal Production. Branch Committee member.

1980–82 Australian Veterinary Association, ACT Division. Member of Branch Committee and convener of the subcommittee on animal welfare.

1981 Australian Society for Microbiology Annual General Meeting, Session on Veterinary Microbiology and Virology. Chairman.

1979–82 Seminar Convener for the Australian Bureau of Animal Health public seminar series. Twenty public seminars were arranged together with press briefings on diverse scientific matters of public interest.

1980–81 Australian Society for Microbiology. Executive member and member of the annual general meeting organising committee.

1978–80 National Science Foundation, Washington, USA, Division of Physiology, Cellular and Molecular Biology. Reviewer.

1979 International Society for Veterinary Epidemiology and Economics. Member of the national organising committee.

1975 AMRC National Workshop on the Economics of Lot Feeding. Convener for the Australian Meat Board.

1973–75 AMRC National Bruising Workshops. Convener and member representing the Australian Meat Board.

1972–75 CSIRO Meat Industry Advisory Committee and Working Groups. Member representing the Australian Meat Research Committee.

1972–75 Livestock Transport Committee. Member representing the Australian Meat Board. Established by the National Materials Handling Bureau in the Federal Department of Productivity, it reported in Livestock Bruising Project: stockyard and transport stock-crate design July 1977, 42pp.

1972–75 Sheep-meats Grading and Classification Committee. Member representing the Australian Meat Board.

1973–75 Queensland United Graziers Association Cattle Industry Bruising Committee. Member representing the Australian Meat Research Committee.

1972–74 CSIRO Division of Food Research Industry Committee on Food and Heart Disease. Member representing the Australian Meat Board, led to the joint promotion of the health benefits of lean meat by the National Heart Foundation and the Board.

1969 Sydney University Veterinary Society. Secretary.

1968 Year Representative to Faculty of Veterinary Science, University of Sydney.

Submissions and evidence to parliamentary committees

1975 Senate Standing Committee on Finance and Government Operations

1975 Inquiry into the nature and extent of Australian Government assistance to industry. Australian Meat Board submission.

1982 Royal Commission into the Australian Meat Industry. The Hon Justice AE Woodward, Commissioner, report published September 1982, see Senate Hansard 23.9.82: 1253-1272 for debate.

1982 The effectiveness of the Commonwealth meat inspection service with particular reference to the veterinary contributions - a personal view. HRC Meischke exhibit 573, 1-6. This matter discussed in detail at Transcript of 10 June 1982: 8101-81.

1982 Evidence of improper shredding of documents and related matters. See transcript of proceedings at Melbourne 1 June 1982: 7536-82, 7633-40.

1984-92 Senate Select Committee on Animal Welfare.

1984 Inaugural public hearings including livestock exports and the intensive animal industries. RW Gee, JH Auty, HRC Meischke and BL Moore 11 May 1984 Hansard pp 4-39.

1985 Public hearings on live sheep exports, kangaroos and cetacea in captivity. RW Gee, JH Auty & HRC Meischke, Parliament House, Canberra, 10 April 1985.

1985 Report on the export of live sheep from Australia. Published by the Australian Government Publishing Service, numerous citations.

1988 Public hearings on sheep husbandry. HRC Meischke & B Dover, Melbourne, 20 September 1988, Hansard pages 8204-33 on behalf of the Australian and New Zealand Federation of Animal Societies.

1988 Public hearings on animal experimentation. HRC Meischke & C Wright, Parliament House, Canberra, 31 October 1988, Hansard pages 8422-46.

1990 Submission on culling of large feral animals in the Northern Territory. (1990) HRC Meischke, prepared on behalf of RSPCA (Australia) 29 September 1990: 1-16.

1990 Submission on the transport of livestock in Australia. (1990) HRC Meischke, prepared on behalf of RSPCA (Australia) 30.9.90: 1-19.

1988-89 Inter-state Commission: The efficiency of interstate transport arrangements.

1988 Third Report 'Volume loading of livestock for transport by road.' submission number 10, Canberra 8.2.88, C. Wright and HRC Meischke on behalf of RSPCA (Australia) transcript 751-83a.

2000-01 Senate Rural & Regional Affairs & Transport References Committee. Inquiry into the Incidence of Ovine Johne's Disease in the Australian Flock: Volume 2, Submission 32 pp 1-93.

2000 Veterinary Accreditation for Ovine Johne's Disease Dr Roger Meischke, Joint Submission to the NSW Ombudsman and Senate Inquiry 20 May 2000.

2000-01 Volume 3, Submission 55 & 55A pp 67-248, Inquiry into Ovine Johne's Disease – the Bollom Case. Mr Arthur Bollom & Dr Roger Meischke, joint submission to the NSW Ombudsman and Senate Inquiry 12 June 2000; also third submission dated 5 April 2001.

2000 Senate References Committee, Proof Hansard 19th September 2000, Goulburn pp 240-53, evidence from Dr Roger Meischke & Mr Arthur Bollom.

Papers to governmental committees and inquiries

1972 Survey of hydatid disease and sheep measles at the New England Abattoir. Report to the hydatid disease and sheep measles eradication committee of the Glen Innes Shire Council, 11 April 1972.

1973 Progress made in the national brucellosis eradication campaign on a state by state basis. Report to the Australian Meat Board, March meeting, St 65/73, 115-17. Also released to the Australian Meat Exporters Federal Council (AMEFC).

1973 Report on polyunsaturated meat. Australian Meat Board St 65/73, 51-71. Also submitted to Standing Committee on Agriculture Animal Production Committee 54th meeting, agenda item 7(J) 20pp.

1973 The governmental and paragovernmental bodies involved in the Australian livestock and meat industry. Information paper for the United Nations Food and Agriculture Organisation.

1974 Briefing for Australian Meat Board on Department of Primary Industry Inquiry on the export of underprocessed canned meat. The issue of underprocessed canned Australian ham discovered in Britain caused a review of meat inspection arrangements.

1974 Summary report on cooperative trials investigating cattle bruising between the CSIRO, Department of Primary Industries (Qld) and the Australian Meat Board. United Graziers Association Committee meeting, Brisbane, 12 February 1974, 5pp.

1974 Australian Meat Board submission to the Industries Assistance Commission Inquiry into the bovine brucellosis and tuberculosis slaughter compensation scheme. July 1974, 25pp.

1975 Arrangements for cattle compensation for tuberculosis and brucellosis in Australian states. Submission to the Australian Meat Board, 15 July 1975, 4pp.

1975 Tuberculosis – a question of testing. Submission to the Australian Meat Research Committee, 7 August 1975, 9pp.

1975 Bovine brucellosis and tuberculosis slaughter compensation scheme: supplementary submission from the Australian Meat Board. (1975) Industries Assistance Commission Inquiry 27.3.75.

1975 Submission to Industries Assistance Commission inquiry into financing rural promotion. Prepared with J Noble on behalf of the Australian Meat Board.

1975 Plan for proposed barter of Australian beef for deepening of Newcastle harbour. Submission to Australian Meat Board and NSW Department of Public Works 10.9.75.

1975 Progress report on proposed barter deal. 15.10.75 supplementary submission. Other papers dated 10.8.75, and 30.8.75 on international barter trades for beef.

1975 Bruising of beef cattle. Standing Committee on Agriculture Animal Production Committee's Technical subcommittee on beef cattle production, 14th meeting 2.7.75 Sydney, 7pp.

1979 The national animal serum bank - proposal for the storage of sera. Australian Bureau of Animal Health, Epidemiology Branch, Department of Primary Industry.

1979 The national animal serum bank: progress and arrangements. Standing Committee on Agriculture Animal Health Committee submissions to 22, 23, 24th meetings and the Subcommittee of Principal Laboratory Officers meetings 7, agenda item 11.4, 9pp, and meeting 8.

1979 Proposed survey of arboviruses in Indonesia. Paper for the Australian Bureau of Animal Health and CSIRO, 8pp.

1979 Possible methods of identifying abattoir slaughtered sheep which are of local origin. Standing Committee on Agriculture Animal Health Committee's Subcommittee on Hydatids 1, 8.2, 1-13.

1979 An overview survey of hydatids, *C. ovis* and *C. tenuicollis* in sheep and lambs slaughtered at abattoirs in selected areas of NSW and Victoria. Standing Committee on Agriculture Animal Health Committee's Subcommittee on Hydatids 1, 8.1, 1-8.

1981 Report on overseas visit to the Middle East and Singapore 12.11.81-11.12.81. Purpose of the visit was to establish contacts with individual country veterinary authorities and animal welfare organisations, 21pp.

1983 Investigation and research requirements for the livestock export industry. Department of Transport Livestock Export Industry Advisory Committee, series of papers 20.8.83 Adelaide, 1-17.

1983 The establishment of a Bureau of Agricultural Resources. Submission to Committee of Inquiry chaired by Dr Max Day reporting to the Department of Primary Industry, 8pp.

1984 Impact of kangaroos on agriculture. Review of the literature in preparation for position statement for the Department of Primary Industry, 5pp.

1984 Submission to Inquiry on Meat Inspection Charging. Department of Primary Industry Interim Inspection Policy Council, 9pp.

1984 Eradication and control of brucellosis and tuberculosis in Australian. (1984) National Farmers Federation, Cattle Council of Australia, confidential briefing 14.6.84, 10pp.

1985 Briefing for the tenth session of the Animal Production and Health Commission for Asia, the Far East and the South West Pacific (APHCA). United Nations Food and Agriculture Organisation, 7 to 13 October 1985, Melbourne.

1986 Rinderpest vaccination for Export Cattle. Standing Committee on Agriculture 136th meeting, February 1986, Hobart, Agenda 5.6, briefing. See also Protocol for inoculation of cattle against rinderpest virus - cooperative Saudi Arabian/Australian project. (1984) submission to Department of Primary Industry 12.9.84, 9pp.

1987 RSPCA (Australia) submission to NSW Animal Research Review Panel's draft code of practice. Detailed redrafting 9.10.87: 10pp.

1988 The use of 1080 poison for feral and pest animal control. Victorian Animal Welfare Advisory Committee inquiry, submission by RSPCA 15.11.88: 15 pp.

2003 *to present* Several papers during to APVMA's Industry Liaison Committee and Regulatory Liaison Committee on low regulatory standards, euthanasia agents and chemical shearing, national guidelines, veterinary medicines in aquaculture and other matters.

2003 *to present* NDPSC Briefings for APVMA representative on Ketamine, Buprenorphine, GHRH vaccines, aquarium antiseptics, pheromones, DNA constructs, antibiotics in HGP's.

2011 Better regulation of agricultural and veterinary chemicals: submission on Policy Paper by the Federal Minister for Agriculture; see <http://daff.gov.au/agriculture-food/ag-vet-chemicals/better-regulation-of-ag-vet-chemicals/responses-to-the-discussion-paper/dr-roger-meischke>

2010 *to present* Expert Reviews of new veterinary medicines seeking registration

2012 Submission on the 2012 Agvet Reform Bill; see http://daff.gov.au/data/assets/pdf_file/0009/2138148/Meischke_Roger_Dr.pdf

Scientific papers

Papers in science policy, philosophy and politics

Disease danger to livestock. AD Shannon and eight other scientists (1982). The Sydney Morning Herald Monday 12 April 1982, 6. Also advisory briefings to the Bureau of Animal Health from AD Shannon, HRC Meischke & MG Cooper on the introduction of exotic disease agents, 22 May and 5 June 1981.

The importation of live viruses into the Australian National Animal Health Laboratory – democracy in action? J Shelton & HRC Meischke, Australian Veterinary Journal (1982) 58 (9), News 4–5.

Submission to the Minister for Primary Industry on the conservation of degraded lands. (1983) GJ Burch, MG Cook, RA Fischer, HRC Meischke, HA Nix, CH Watson & OB Williams, 14 March 1983, Joint Soil Science Society & Australian Institute for Agricultural Science Working Party 4pp.

Pests and parasites as migrants – an Australian perspective. Edited by AJ Gibbs & HRC Meischke (1985). Australian Academy of Science & Cambridge University Press, 192 pp. See also *Sydney Morning Herald*, 29 June 1984 p. 18, 'Study causes rethink on control of odd diseases'.

Politics of the Saudi sheep trade: a question of disease. P Scott & HRC Meischke, The Australian Quarterly (1990) Spring Issue, 231–9. See also Animals Winter issue 1995: 10–11.

Meeting on kangaroos between the US Department of Fish and Wildlife Service and the Australian National Parks and Wildlife Service. HRC Meischke & JH Auty (1990) representing Greenpeace 9 March 1990, 4pp. See also Queensland Kangaroo Kill 1989. Report to Greenpeace 31 October 1989, 4pp.

The live sheep trade. HRC Meischke (1991). Invited paper to the Plenary Session of the Pan Pacific conference on veterinarians and the environment. Darling Harbour, Sydney 12–17.5.91. Published as Problems still haunt live sheep transport. AVA News September 1991, 10–11, also in Animal Liberation Magazine October–December 1991, 26–7.

The effect of secrecy on the live sheep trade. HRC Meischke (1991). Invited paper to the livestock division of the Australian and New Zealand Federation of Animal Societies Annual General Meeting, Canberra, 20 July 1991.

Report on kangaroo game meat taken for human consumption. HRC Meischke (1993) dealing with the Hopwood report to the NSW Minister for Health on behalf of the International Wildlife Coalition 11.8.93, 6pp. Also related reports on the Kangaroo Cull Code for the International Fund for Animal Welfare (1993), and the International Standards Organisation TC 191 Humane Animal (Mammal) Traps for Greenpeace (1994).

Feral cat control – are cats on rubbish dumps a management problem? PM Wilson, CR Tideman & HRC Meischke (1994) Commissioned report to the ACT Parks and Conservation Service, June, on behalf of the School of Resource & Environmental Management, The Australian National University.

Report on the veterinary activities at the opening of the duck season at Lake Cowal on 16th March 1991. HRC Meischke. Paper prepared for the NSW Duck Coalition and presented to the NSW Government (9pp). Similar papers prepared for seasons in 1992 (15pp), 1993 (20pp) and 1994 (8pp); the practice was prohibited in 1995. See also Wildwatch- ducking for cover. (1991) Animals June 1991, 10–11. Also see The duck report – bird rescue takes off. (1992) Fund for Animals Newsletter 8 (1) 6–9.

Limitations to the efficacy of the canine electric fence and collar. HRC Meischke (1995) paper to the ACT Ministerial Advisory Committee meeting on 13.9.95 8/95 3–4.

That animal experimentation is a modern expression of animal sacrifice – a journey of discovery and understanding. HRC Meischke (2003). Invited paper presented to the Second Canberra Weekend of Ideas at Manning Clark House on Science and Ethics 7–9 March, Canberra. See also *Canberra Times*, 5 March 2003 'Animals and our conscience'.

Better regulation of Agricultural and Veterinary Medicines- submission on Ministerial Policy Paper. HRC Meischke (2011) <http://www.daff.gov.au/agriculture-food/food/regulation-safety/ag-vet-chemicals/better-regulation-of-ag-vet-chemicals/responses-to-the-discussion-paper>

Sustainable animal health prescribing for major and minor farm animals in Australia. Dr Roger Meischke (2012) Paper presented to the Australian Veterinary Association Annual Conference, Canberra, 10.30-11.20am Thursday 24th May 2012, combined session of Cattle/ Sheep/ Public Health/ Industry groups; see http://daff.gov.au/_data/assets/pdf_file/0003/2138835/Meischke_Roger_Attachment.pdf

Papers in pharmacology, pathology, microbiology and immunology

Hyperoestrogenic syndromes in cattle associated with the ingestion of phyto-oestrogens. HRC Meischke (1970) Final year essay (mini-Masters), Faculty of Veterinary Science, University of Sydney, 27pp.

The causes and pathology of haemorrhage in cattle. HRC Meischke (1973). Qualifying essay for admission to Master of Veterinary Science degree program at the University of Sydney, 8pp.

A survey of bovine teat papillomatosis. HRC Meischke, *The Veterinary Record* (1979) 104, 28–31.

In vivo and in vitro studies on bovine papilloma virus. HRC Meischke (1978), Doctor of Philosophy Thesis, University of Glasgow, 320pp.

In vitro transformation by bovine papilloma virus. HRC Meischke, *Journal of General Virology* (1979) 43, 473–87.

Experimental transmission of bovine papilloma virus (BPV) extracted from morphologically separable teat and cutaneous lesions and the effects of inoculation of BPV transformed foetal bovine cells. HRC Meischke, *The Veterinary Record* (1979), 104, 360–6.

The establishment of a national serum bank in Australia. RS Morris, HRC Meischke and AD Shannon (1979) in *Arbovirus research in Australia*. Proceedings 2nd symposium 17 – 19 July 1979, published by CSIRO and the Queensland Institute of Medical Research, edited by TD St George & EL French, 96–100.

Isolation of bovine leucosis virus from cattle. HRC Meischke (1980). *Australian Veterinary Journal*, 56, 6.

Do viruses cause cancer? Bovine papilloma virus. HRC Meischke (1981). Proceedings of the Annual General Meeting of the Australian Society for Microbiology, May, S16, 25.

Adult T-cell leukaemia virus. HRC Meischke (1983). *Australian Veterinary Journal*, 60 (10), 315–16.

Abattoir disease recording and reporting. HRC Meischke, *Australian Veterinary Journal Newsletter* 6th July 1984, 16.

Spina bifida with meningocele in a lamb. HRC Meischke & W Hein (1985). Veterinary pathology report to ABAH and John Curtin School of Medical Research, The Australian National University.

The tumourigenicity in athymic nude mice of bovine papilloma virus transformed foetal bovine skin cells. HRC Meischke (1985). Veterinary pathology report to ABAH.

Exotic animal diseases. HRC Meischke & WA Geering (1985), in *Pests & Parasites as Migrants*, edited by Gibbs & Meischke, published by Australian Academy of Science & Cambridge University Press, Chapter 3, 28-40.

Tan bark induced dermatitis in dogs. HRC Meischke (1987). *The Stafford*, 4 (4), 18.

Suspected lysosomal storage disease in kangaroos. JT Rothwell, PAW Harper, WJ Hartley & HRC Meischke (1990). *Journal of Wildlife Diseases*, 26 (2), 275-8.

Sheep diseases – why bother? HRC Meischke (1990). Australian Suffolk Breeders Association Field Day, 2nd June, Freeway Farm, Mittagong.

The widespread occurrence of papillomatosis in the animal kingdom – comparative pathology. HRC Meischke (1991). In: *Proceedings of the national meeting on Human Papilloma Virus and the Gynecologist*, organised by the Obstetrics & Gynecology Society 15 November, Terrigal, p. 4.

Filiform squamous papillomas in sheep (OSP) - clinical features, histology, immunochemistry, transmission experiments and analysis of papillomavirus DNA. MLR Hayward, HRC Meischke, PJ Baird & L Gissman (1992) the Eleventh International Papilloma Workshop, 5 – 11 September 1992, Edinburgh, Scotland, page 77.

Filiform viral papillomas on sheep. MLR Hayward, PJ Baird & HRC Meischke (1993), *The Veterinary Record*, 132, 86-88.

DNA sequence of ovine papilloma virus. PJ Baird, HRC Meischke, H Delius & L Gissman (1993) 12th International Papillomavirus Workshop.

A study of the natural and experimental transmission of ovine papillomavirus (OPV) induced squamous papillomas on sheep. HRC Meischke & PJ Baird (1994). Poster presentation, 13th International Papillomavirus Conference, Amsterdam, 8 – 13 October 1994.

Diseases and parasites of cats on rubbish dumps. PM Wilson, HRC Meischke & CR Tideman (1995). *Australian Veterinary Journal*.

Ovine papillomavirus infection of ovine mammary skin xenografts in SCID mice. GD Higgins, J Karlis, L Kuiper, HRC Meischke, PJ Baird & CJ Burrell (1995) 14th International Papillomavirus Conference, Baltimore.

Cloning and sequencing of two ovine papillomaviruses. J Karlis, H Delius, PJ Baird, HRC Meischke, CJ Burrell & GD Higgins (1996) 15th International Papillomavirus Conference, Brisbane.

Heritage pharmacy in a low regulatory environment: a case study in the development of a standard for ornamental aquarium antiseptic products. Roger Meischke (2004). Australian Society for Microbiology 2004 Conference Sydney SuperDome 27th September page 42 Veterinary Microbiology PP09.

Bioequivalence: the nexus between pattern of use, formulation type and the need for bioequivalence studies. Roger Meischke (2005). Joint Meeting Australian College of Veterinary Scientists and Australian Veterinarians in Industry within the Australian Veterinary Association Conference (preprint 16th May 2005).

Rapid Response Regulatory Options for Zoonotic Diseases. Roger Meischke & Phil Reeves (2005). Communicable Diseases Control Conference, Sydney Convention Centre 3rd May 2005.

Registering Mordant Products with Consequential Claims. Roger Meischke (2005) Australian Society for Microbiology 2005 Conference Canberra, 28th September 2005 pages 104-5
Veterinary Microbiology PP13.3.

Target Animal Efficacy and Safety Data Requirements for Applications for Product Registrations and Minor Use/Off Label Permits. Roger Meischke (2006), Australian Veterinary Association Annual Scientific Meeting (Industry Group), Hobart, 9.00am Thursday 25th May 2006 in Joint Session APVMA Considerations of Target Animal Safety and Efficacy.

Veterinary Prescribing of Unregistered Products. Roger Meischke (2006), Australian Veterinary Association Conference, Hobart, 2.30pm 25th May 2006.

Prescribing for Aquaculture Forum: a regulatory perspective. Roger Meischke (2006). Australian Veterinary Association Conference, Hobart, 3.45 pm 25 May 2006.

Good Clinical Practice Guidelines from an Australian Perspective. Roger Meischke (2007) Australian Veterinarians in Industry GCP Course, Sydney, 21-22 July 2007.

The regulation of veterinary medicines in Australia. Roger Meischke (2007). Australian College of Veterinary Scientists, Pharmacology Chapter Candidates Workshop, Canberra, 3-5 August 2007.

Veterinary Permits in Context. Roger Meischke (2008) at the Australian Pesticides and Veterinary Medicines Authority's Back to Basics Seminar, National Convention Centre, Canberra, 12-13 June 2008.

The use of veterinary medicines in aquaculture: a regulator's perspective. Roger Meischke (2008). 'Innovation in a Global Market' Skretting Australian Aquaculture 2008 Brisbane International Conference and Trade Show, 3-6 August 2008.

Project Management of Registration Applications for Veterinary Medicines. Roger Meischke & Judith Platt (2008). APVMA Field Trip Seminar, Yarrandoo (Novartis) Research Station, 17 October 2008.

Requirements and Guidelines for Veterinary Herbal Remedies. Roger Meischke (2009) VMDA Industry Meeting, North Ryde, 15 April 2009.

Veterinary prescribing ethics and rights: using formulators to compound veterinary medicines. Roger Meischke (2011) Aust College of Vet Scientists Science Week, Gold Coast July. P43 Proceedings.

http://pharmacology.anzcvsc.org.au/pharmacology_assets/Pharmacology%20Block%20Course%202011%20Proceedings%20v2.pdf

Sustainable animal health prescribing for major and minor farm animals in Australia. Roger Meischke (2012) Paper presented to the Australian Veterinary Association Annual Conference, Canberra, 10.30-11.20am Thursday 24th May 2012, Combined session of Cattle/ Sheep/ Public Health/ Industry groups.

Ovine Johne's Disease Market Assurance Program limitations for future marketing and disease control. Roger Meischke (2012) Australian Wool Innovation Forum Sydney 15th November 2012. See report in the Land 22.11.12 pages 1 and 5.

Papers in animal welfare, production and husbandry

The Australian chilled beef export industry. HRC Meischke and DW Paxton, Australian Journal of Food Technology (1973), 25 (12), 592-609.

The effect of horns on bruising in cattle. HRC Meischke, WR Ramsay and FD Shaw, Australian Veterinary Journal (1974) 50, 432-434. See also Horns are not wanted. (1975) CSIRO Rural Research 89, 19-21.

Composition of the Australian herd 1973. HRC Meischke & MAS Jones, Australian Meat Research Committee Review (1975) 21, 23-30. Also published in the Standing Committee on Agriculture Technical Report (1979) Introduction of new beef cattle genotypes into Australia. 3, 42-51.

Bruising of beef cattle: measurement and some causes. HRC Meischke (1975) paper given to beef cattle field day at Claremont, Larras Lee, 17.4.75, Australian Meat Board paper 153/75. Also published in The Pastoral Review, June 1975, 371.

The economic loss due to bruising in beef cattle. HRC Meischke (1974). Paper given to Agricultural Bureau of NSW, Goulburn 30.5.74, reported in Meat Producer & Exporter July 1974, 7. Australian Meat Board Agenda Paper 213/74 13pp.

Bruising of beef cattle. HRC Meischke, Australian Meat Research Committee Review (1974), 19, 1.

Cattle bruising - a report to the Graziers Association of NSW. (1974) Paper given 23.9.74, see also Muster October 1974 issue, 4-5.

Bruising in cattle. HRC Meischke (1975) Master of Veterinary Science Thesis in the Department of Veterinary Pathology and Microbiology, University of Sydney, 172pp.

The effect of tipping of horns and interruption of journey on bruising in cattle. WR Ramsay, HRC Meischke and B Anderson, Australian Veterinary Journal (1976), 52, 285-286.

A knocking box effect on bruising in cattle. HRC Meischke and JC Horder, Australian Journal of Food Technology (1976), 28 (10), 369-371. See also AMRC Review (1978) 34, 21.

A bruising problem. HRC Meischke (1976) Queensland Country Life, 26th August

Beef Cattle Bruising. HRC Meischke and JC Horder, Australian Poll Hereford Annual (1976) 103-105.

Horns of a dilemma. HRC Meischke (1976) Queensland Country Life, 4th November.

Balance in animal welfare. HRC Meischke, International Journal for the Study of Animal Problems (1980) 1 (5), 274.

Legislative and other controls affecting the welfare of animals in production. HRC Meischke and LL Steiger (1980) Proceedings of a joint symposium of the Australian Institute of Agricultural Science, Australian Society for Animal Production and Australian Veterinary Association Melbourne 25.11.80, 1-5.

The transport of livestock. HRC Meischke, NSW Veterinary Proceedings (1981) 40-41. Based on paper given to the annual general meeting of the Australian Veterinary Association (NSW) at Sydney University 4-5.4.81.

The veterinarian and animal welfare. RW Gee and HRC Meischke (1981) 51st ANZAAS Congress, Brisbane 11.5.81. Also published in The Veterinary Record (1982) 110 (4), 86.

Philosophical and moral aspects to the use of animals in experimentation. HRC Meischke and RA Begbie, Australian Advances in Veterinary Science (1981) 232-237.

The coordination of technical roles in the care of experimental animals. HRC Meischke (1981) Fourth Biennial Conference of the Australian Animal Technicians Association, 13-15 May. Published in Improved care through information exchange. Proceedings of the Conference 14-15.

The welfare of Australian sheep and lambs exported by sea to the Middle East. HRC Meischke (1981) Australian Bureau of Animal Health Report published by the Australian Government Publishing Service as The sea transport of sheep and tabled in both Houses of the Australian Parliament in 1981, 40pp.

Laboratory animal welfare - ethical and practical considerations. HRC Meischke (1981) Annual Scientific Meeting of the Australian Society for Zoo and Laboratory Animal Science, 21.8.81 University of Sydney. Published in the ASZLAS Newsletter April 1982, 3-4.

Handling and transport of meat animals in relation to efficiency, meat quality and welfare: the handling and transport of livestock in relation to meat quality. JR Wythes, RJ Arthur and HRC Meischke (1982) Proceedings of the Australian Society for Animal Production 14, 116-119, published by Pergamon Press.

The design and construction of facilities from the animal's point of view. HRC Meischke and BL Moore (1982) Agricultural Engineering Conference Resources - efficient use and conservation. Institution of Engineers, 22-24.8.82, University of Armidale, National Conference Publication 82 (8), 27-35.

Animal welfare during transportation. HRC Meischke (1982) 52nd Australian and New Zealand Association for the Advancement of Science (ANZAAS) Congress, Macquarie University, Sydney.

Sheep exports from Australia - cumulative husbandry. RW Gee, JH Auty and HRC Meischke (1982) ANITRANS'82 International Conference on the Transport of Animals by Sea, 21 - 22 October 1982, London. Published in Livestock Production Science, pp 11.

A taste for new wine. HRC Meischke (1983) address to the Annual General Meeting of the Royal Society for the Prevention of Cruelty to Animals (Australia) 3rd March, Canberra.

Regulatory aspects of animal welfare in the Australian pig industry. BL Moore and HRC Meischke, Second Australian Pig Production and Marketing Review Conference, 16-20.5.83, University of Tasmania (1983) 7, 5-8.

The animal welfare debate - a role for the veterinary profession. BL Moore and HRC Meischke (1983) NSW Veterinary Officers Conference 31.8-1.9.83, CB Alexander Agricultural College, Paterson.

Suppression of inappropriate behaviour in farm animals. BL Moore and HRC Meischke (1983) Roundtable, Proceedings 18th International Ethological Conference, 29.8-6.9.83, University of Queensland, 205.

Animal Welfare - a force for change. HRC Meischke and BL Moore, Proceedings of the Australian Society for Animal Production (1984), 15, 80-83.

Pig industry responses to the animal welfare challenge. HRC Meischke (1984) Sattelite Australian Society for Animal Production 15th Biennial Conference, Gunnedah 11.2.84.

Humane handling practices in Australian abattoirs. BL Moore and HRC Meischke, Annual General Meeting of the Australian Veterinary Association and the Association of Veterinarians in Public Health, Sydney 13-18 May 1984 Sydney, published in Australian Advances in Veterinary Science (1984), 17.

Animal Welfare - bushfire aftermath: Livestock handling, transport and slaughter. BL Moore and HRC Meischke, Australian Advances in Veterinary Science (1984), 17.

The welfare issue: a turning point in pig husbandry? HRC Meischke and JH Auty (1984) Symposium at the Annual General Meeting of the Intensive Pig Producers of Australia, August 1984.

Sacrifices old and new. RA Begbie and HRC Meischke (1984) for International Conference on Religious Perspectives on the Use of Animals in Science 25-27.7.84 London, 7pp.

Animal experimentation and its control in Australia. JH Auty, BL Moore, V Anderson and HRC Meischke (1985) Proceedings of the International Council for Laboratory Animal Science meeting: Laboratory animals and the advancement of science. 5-9.5.85, Shores, Israel, pp 146-151, abstract p 22.

Grazing animal transport and handling - cumulative husbandry in the export of livestock. HRC Meischke and RG Brennan in Grazing Animal Welfare. published by the Australian Veterinary Association (Qld) (1985) 137-144.

Mulesing. HRC Meischke (1987) The Shield March, 7, also in Animal Liberation the Magazine Jan-March, 21.

Review of legislation in Australia with respect to the welfare of sheep and goats. RG Brennan and HRC Meischke (1987) Australian Veterinary Association Annual Conference, Launceston, Tasmania.

Sheep flystrike and mulesing. JH Auty, HRC Meischke and C Townend (1988) Parasitology Today 4 (9), 253-4.

Good handling can be learned. HRC Meischke (1988) Prime Beef Producer 2 (1), 28-31.

The live sheep export trade - the veterinary role. HRC Meischke (1989), Presented to the NSW Australian Veterinary Association Meeting Yass 25.11.89 and published in the AVA News 24.4.90 153-5.

A balance between animal experimentation and animal welfare. HRC Meischke (1990) Paper given to the public workshop of the same name at the University of Canberra 6.12.90.

Veterinary practice and the farmer. HRC Meischke (1993) Paper given to the Canberra Institute of Technology, Bruce Campus, 27 October 1993.

Animal welfare has become an administrative loose end. HRC Meischke (1994) Australian Veterinary Association Annual Conference, 7 - 8 March 1994, Canberra.

Commercial Duck Welfare in Australia. Roger Meischke (2011) Report for Animal Liberation NSW. Published in http://www.aussieducks.com.au/documents/Duck_Report.pdf

Legal opinions and court cases (examples)

1985 Appeared as an expert witness in the appeal by World Cup Rodeo against RSPCA (Vic) in the County Court. Melbourne, case involved a conviction for aggravated cruelty for roping calves, the appeal was lost and the conviction stood with the resulting legal precedent effectively banning calf roping in Victoria.

1987 Appeared as an expert witness in 'the Man from Snowy River II' case brought by the RSPCA (Vic) for equine cruelty and aggravated cruelty. Mansfield Magistrates Court, Victoria, involving the axe death of a pregnant mare used in the film, widely reported.

1988 Appeared as an expert witness in RSPCA (NSW) v. Jones for aggravated cruelty in sheep. Bombala Magistrates Court involving the neglect of a large number of sheep which had never been shorn nor treated for parasites.

1990-91 Provided expert opinions in defamation case of Terrill and Watchorn v. Australian Capital Television Pty Ltd, Supreme Court of the ACT 1594-1595 of 1987. Namadgi National Park culling of feral horses by rangers who believed they were defamed by CTC.

1991 Appeared as expert witness in the trial of RSPCA (NSW) v. Ronneberg for cruelty and aggravated cruelty to sheep and goats. Dubbo Magistrates Court, extensive trial of approximately six weeks duration involving the starvation of large numbers of sheep and goats. Transcript R.1675 I 1 sg 18.2.91, 1-67; R.1675 K/2 pf 19.2.91, 1-32. Magistrate Sloan's judgment 620/92 R222 EAF-C2 of 4.3.92, pages 2- 72.

1991 Conducted inspections, provided expert testimony in RSPCA (NSW) v. O'Heir for aggravated cruelty to cattle. Braidwood Court, extensive case involving six properties covering 2854.3 hectares and examining 810 cattle leading to numerous offences 8.9.91.

1991 Provide expert opinion in case of RSPCA (NSW) v. Harris for cruelty to horses. Berridale, extensive starvation and failure to provide veterinary treatment case involving some of 26 horses 28.8.91.

1993 Provided expert opinions and represented RSPCA (NSW) in conference to resolve the Boyd 'Desert Corner' case. Condoblin 16.7.93, aggravated cruelty involving starvation and failure to provide veterinary treatment, large numbers of sheep on 5000 acre property.

1994 Provided clinical and expert testimony in RSPCA (NSW) v. Trimbole. Queanbeyan local court matter involving 100 pigs and 50 dogs preying on each other, aggravated cruelty failure to provide veterinary treatment.

1995 Provided expert opinions on hens involved in the ACT Government v. Parkwood Eggs. 20.10.95, 9 pp. Case heard in the ACT magistrates court No cc 22254-57 of 1996 leading to decision by Magistrate Ward on 18.2.97. Involved an action against an egg producer with around 250,000 hens but resolved into the issue of trespass to relieve animal cruelty.

1996 Provided expert opinion on kangaroo cruelty for International Fund for Animal Welfare. Outback Queensland video made by Canadian team of investigators lasting 7 hours eventually leading to prosecution 5.7.96.

1999 Expert and material witness in RSPCA (NSW) v. Booth (Ostrich ACT). Goulburn Court matter involving failure to treat and aggravated cruelty to ostrich 26.6.98. Expert witness in related matter of a civil claim between Valentin v. HIH Casualty & General Insurance Ltd Number 771 of 1998 was heard at the Downing St Local Court Sydney on 23.2.99.

2005-2006 Professional Veterinary Prescribing Audits under Court Order for the NSW & Victorian Veterinary Surgeon's Boards.

2006 Expert Opinion on RSPCA(NSW) v. Gilbert for the plaintiff: cruelty to cattle case Orange April 2006. Case withdrawn with costs against RSPCA.

Mentorship of graduate students

Meat Hygiene and Veterinary Public Health. (1980) Ian Stephens, Master of Veterinary Studies Thesis, Faculty of Veterinary Science, University of Queensland.

Animal Welfare and the New South Wales Egg Industry. (1982) Robert Drake, Honours Thesis, Department of Geography, Faculty of Arts, The Australian National University.

The politics of technological decision-making: the establishment of ANAHL. (1983) Pam Scott, Master of Arts Thesis, University of Wollongong.

Technology, welfare and intensive animal farming: case studies of the poultry and pig industries. (1985) JR Bowling, Doctor of Philosophy Thesis, Department of Human Sciences, Faculty of Arts, The Australian National University.

Model Codes of Practice for the Welfare of Animals: a survey of the extent of dissemination, degree of acceptance and methods of review. (1986) G George, Project Report for New Zealand Ministry of Agriculture seconded veterinarian.

The politics of science: the establishment of the Australian Animal Health Laboratory. (1986) Pam Scott, Doctor of Philosophy Thesis, Department of Science and Technology Studies, University of Wollongong.

Losses due to bruising in the Australian poultry industry. (1988) G Griffiths, Doctor of Philosophy Thesis, Faculty of Veterinary Science, Murdoch University.

Dynamic cardiomyoplasty and related techniques: a discussion of their use in human and veterinary therapy. (1992) Paul Beltz, Final Year Essay (mini-masters), Faculty of Veterinary Science, University of Sydney.

A case of primary pulmonary infection with *Mycobacterium avium-intacellulare-scrofulaceum* complex in a previously healthy boy. (1994) MR Meischke. Microbiology Casebook, Faculty of Medicine, University of New South Wales.

Odour preferences and feeding behaviour in three Australian *Pteropus* species (Chiroptera: Pteropodidae). (1994) AC Oldfield, Doctor of Philosophy Thesis, Department of Forestry, School of Resource and Environmental Management, The Australian National University.

Are cats on rubbish dumps a problem? (1994) PM Wilson, Honours Thesis, Department of Forestry, School of Resource and Environmental Management, The Australian National University.

Which comes first: the chicken or the egg? An analysis of the Animal Welfare Act 1992 (ACT) and the Code of Practice for domestic poultry. (1996) Anneke Myers, Honours Thesis, Faculty of Law, The Australian National University.

Veterinary Officer Projects 1979–1982: Eight veterinarians from all over Australia were mentored in special scientific projects at their workplace, most were successful and the veterinarians went on to complete higher degrees.

Secondment and exchanges of veterinary scientists: Arrangement of secondment or exchanges of veterinary scientists from Canada, New Zealand, Bahrain and several Australian State Departments of Agriculture. Arrangement of study tours of experts such as Dr Temple Grandin and Dr Lesley Syme, resulting in the publication of detailed reports on particular livestock industry practices.

Examiner in Pharmacology for the Australian College of Veterinary Scientists, Pharmacology Chapter 2009 – 2012.

Presentation Judge: Canberra Health Annual Research Meeting 23.8.2013



Politics of the Saudi Sheep Trade: A Question of Disease

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Politics of the Saudi sheep trade: a question of disease

On 24 July 1989, the first of a series of blows was delivered to the Australian live sheep export trade when 72,000 sheep were rejected by the Saudi Arabian officials at Jeddah. The reason given was that the sheep had tested positive for bluetongue disease. Five days later, a second shipment was rejected because of bluetongue at Dammam. However, a further three shipments were unloaded without incident, and it appeared that trade had returned to normal. Then, on August 10th, the consignment of 33,500 sheep on board the *El Cordero* was rejected by the authorities, again at Dammam, but this time on the basis of positive testing for sheep pox. On 15 August, the Australian Meat and Livestock Council (AMLC) called for a halt to trade with the Middle East. The next day it was announced by the Australian Government that a high level delegation led by an executive director of the Department of Primary Industry and Energy, Dr. Gardner Murray, would visit Saudi Arabia in an attempt to settle these trade problems. However, just as the delegation was due to arrive, a fourth shipment of around 66,000 sheep was rejected at Dammam, again because of sheep pox infection. Following what it claimed was the delegation's 'failure to get answers', the AMLC officially suspended the live sheep trade with the Middle East. But this did not stop the rejection of two more shipments which had set sail before the suspension was announced.

The significance of these six rejections in terms of immediate economic losses, future trading uncertainty and international reputation meant that a prompt response was essential to contain the damage. The past success of Australia's meat and livestock export trade can be largely attributed to its freedom from many serious animal diseases, especially foot-and-mouth disease, bluetongue and sheep pox. But the unexpectedness of the Saudi actions caught Australian government officials and industry representatives off-guard and in just a few weeks, Australia's live sheep trade with Saudi Arabia was in tatters and its disease-free reputation was being questioned.

What followed was a series of claims, counter claims, defences and accusations, often contradictory, but always challenging the Saudi claims of

the presence of disease. This paper will trace the controversy over the disease claims as it was carried out in the media.

The question of disease

In 1989, Australia exported more than 7 million live sheep to the Middle East, worth around \$230m. This trade involved about 130 ship voyages each year of which about half depart from Fremantle in Western Australia and the rest from Portland and Adelaide. The ships are mostly converted oil tankers whose capacities range from 12,000 to 125,000 head. The voyage can take from 11 to 30 days, but usually is in the range 13 to 18 days.¹

There are four main shipping companies involved in the trade - the Saudi-owned Saudi Livestock Transport and Trading Company, the Australian Saudi Arabian Livestock Company and Almukairish Australia, Kuwait Livestock Transport and Trading Company, and Fares Rural Meat and Livestock Company. Elders IXL supplies more than half the sheep.²

Saudi Arabia is the largest single destination for Australia's live sheep. The other important markets in the Middle East are Kuwait, the United Arab Emirates (UAE), Qatar and sometimes Libya. Australian sheep fit at the low-cost end of the market. Live sheep are preferred over frozen meat for reasons of custom, religion and price. Trade and prices increase at times of religious significance such as Ramadan and the Hajj.³

Throughout the whole affair, it was assumed, (and claimed), by most of the Australians involved that there was no disease present in any of the shipments. This belief was based on the general acceptance that Australia is free from these exotic animal diseases. Yet the Saudi claim that the sheep received were diseased, and Australia's claim that these diseases are not present in Australia are not incompatible. The Saudi officials never questioned Australia's disease status, only the product that landed in their ports.

In other words, the claim that the sheep could not be diseased because these diseases are not found in Australia is no defence at all. It has been known and documented that animals may contract these diseases from contaminated ships or from ports along the way.⁴ According to Meischke, 'This applies especially to diseases which are transmitted or caused by insects and to ships with cargoes which discharge at a number of ports, taking up to two weeks to unload'.⁵ He goes on to point out that there have been many reports of exported Australian livestock catching diseases exotic to Australia, and cites the 1985 Rinderpest outbreak in Bahrain, and the introduction of screw-worm fly into Bahrain via Australian sheep, presumably after being infected at the port of Muscat in Oman. A study of the occurrence of screw-worm fly on livestock vessels concluded that 'there are numerous places where screw-worm can successfully pupariate and prove difficult to dislodge when the ship is disinfected'.⁶ Furthermore, in his report to the Ministerial Committee on the Australian Animal Health Laboratory, Professor Frank Fenner stated that 'sheep exported from Australia to countries in the Middle East are very susceptible [to sheep pox] and may suffer heavy losses'.⁷

These possibilities were never seriously addressed in Australia during this series of incidents. Instead, there was 'plenty of speculation about the real reason'. Farmers claimed the disease reports were 'ridiculous' and 'baffling'. The AMLC reported that the industry was 'bewildered' by the rejections. The Federal Government was reported to be 'mystified by the motives'.⁸ Certainly no one seemed to seriously consider the possibility that there was a disease problem with the sheep.

Looking for reasons

Speculation about the 'real' reasons took three forms: speculation about Saudi political motives, about their economic motives, and about their competence, integrity and rationality. It was reported that a number of farmers privately held views that the Saudis were 'simply unbusinesslike' and 'unpredictably petulant'.⁹ The opposition spokesman on primary industry, Bruce Lloyd, was reported as saying that the 'Saudis were acting illogically'.¹⁰ The acting senior assistant director of the Australian Quarantine and Inspection Service (AQIS) and member of the delegation sent to Saudi Arabia, Bob Biddle, was quoted as saying that AQIS 'had no idea what the Saudis were doing with the allegedly affected sheep. It may well be that they are not doing tests; we don't know.' This report also referred to the 'sheep supposedly taken away for examination by Saudi Arabian veterinarian and technical staff' ¹¹ [emphasis added]. Others dispensed with innuendo, declaring openly that 'in Australia there was certainty that the Saudis have simply lied about the disease threat'.¹² Speculating on the alleged refusal to allow an Australian veterinarian to inspect the sheep, the *Canberra Times* concluded that it was 'presumably because the Saudis did not want a contrary expert opinion'. And, not to put too fine a point on it, Dr. Bruce Standen of the AMLC claimed that 'comments in the Gulf media were deliberately intended to escalate the problem and were based on unscientific, medically unsound, ill-researched speculation'.¹³

The economic explanations put forward in the Australian press claimed that it was a move calculated to disrupt trade and hence lower Australian sheep prices, or else to protect the small developing domestic industry.¹⁴ A spokesman for Primary Industries and Energy Minister, John Kerin, was reported as saying that 'Saudi Arabia's Minister for Agriculture has a "protectionist" view towards live imports and developing the country's own sheep industry'.¹⁵ Industry sources, named and unnamed, repeated similar assertions in the media.¹⁶ And headlines announced 'Saudis' health concerns about Australian sheep are all economic: bluetongue or hip pocket pox?'¹⁷

A number of political explanations were also put forward. Michael Prendergast, executive director of the Sheepmeat Council of Australia, said he could 'only guess at what the political motivation might have been', and then went on to guess that 'there was a political element in Saudi Arabia keen to reduce imports of live sheep and they were trying to flex their muscle'.¹⁸ Other theories claimed the rejections were the result of a political feud

between the Departments of Agriculture and Commerce in Saudi Arabia, the result of a royal edict from King Fahd, a political struggle within the royal family, a domestic feud involving exporters since only one exporter was affected, and Saudi displeasure with Prime Minister Hawke over his sympathy for Israel.¹⁹

Claims and counter-claims

It was not until the end of August, nearly six weeks after the first rejection, that the matter of the age of the sheep was raised in the media. As one analyst reported: 'To put it bluntly, the Australian farming community is being misled over the Middle East live sheep export crisis'.²⁰ And reports in the Saudi press that 'Australia had been off-loading diseased and sub-standard sheep' were now being echoed in Australia.²¹ An executive officer of the RSPCA claimed that the 'sheep sent to Saudi Arabia could not be got rid of elsewhere' and that the Saudis would no longer accept what was known as 'black, ugly meat from Australia'.²²

Considerable evidence emerged to support the claim that the Saudis were unhappy with the quality of the sheep they were receiving, and that they had made many unsuccessful attempts over the years to be supplied with sheep less than three years old. This dissatisfaction was well known in the industry, and in fact, it was in 1981 that Saudi Arabia first decreed that sheep no older than two years should be imported. In 1987, the Saudis tried to enforce this age restriction by Royal decree, and in 1988 they sought an 'age profile' for each sheep and certificate of approval before unloading. As one farm consultant said: 'They have tried and tried to get the message through [that they were unhappy about the quality of the sheep being sent from Australia] and we haven't taken any notice'.²³ Yet, in the face of this, some elements of the industry continued to maintain that 'there was no evidence that age of Australian wethers was a problem'.²⁴

Despite all the speculation, the Saudis remained firm in their allegations of disease. A press release issued by the Saudi Arabian Embassy in Canberra listed the symptoms observed and stated that standard veterinarian tests and autopsies had confirmed the presence of disease.²⁵ It also revealed that the veterinarian employed by the Saudi Livestock Company was present when the sheep from the third rejected shipment were examined and found to have sheep pox. Interestingly, this press release was not widely reported, and then only in passing and more than a week after its release.

The first three shipments to be rejected by the Saudis were later accepted by Kuwait, Oman and Bahrain. These discrepancies in diagnosis were used to great effect in Australia, fueling speculation that the disease claims were politically inspired. However, the fourth rejected consignment, which was then sent to the United Arab emirate of Abu Dhabi, was rejected as unfit for human consumption. After a week in Abu Dhabi, the consignment was reloaded onto the *El Cordero* and went searching for a market. It was reported that Jordan and Egypt refused the cargo even as a gift. Moreover,

Egypt was reluctant to allow the ship through the Suez canal, concerned that the sheep would be dumped overboard.²⁶ The Egyptian authorities wanted Egyptian veterinarians on board to supervise, and they wanted guarantees that a destination had been found. This episode, along with the concern of Qatar about a positive *brucella melitensis* (Malta fever) diagnosis in a consignment, led to an agreement between all seven emirates in the UAE to reject future shipments if found diseased by any other Gulf Cooperation Council state.

When the delegation sent to Saudi Arabia failed to get access to the results of the tests performed by the Saudis, independent verification was called for by Australian officials. Reports in the Australian press on the results of testing differ. For example, some reports claimed that an Australian veterinarian in Saudi Arabia, David Scharp (sometimes spelled Sharp), had inspected sheep from the first two rejected consignments and maintained there was no disease present. Other reports claimed he was refused access. Some later reports maintained that all six shipments were tested by independent scientists and deemed free of disease.²⁷

The Saudis responded by charging Australia with 'trying to conceal, with different methods, the characteristic symptoms of sheep diseases to convince the health services in other Gulf states that the sheep are healthy'. In particular, it was claimed that the Australians had disposed of the diseased sheep on the way to Kuwait after they had been rejected by Saudi Arabia, arriving with 21,000 less sheep in the consignment.²⁸

Not everyone in Australia rejected the Saudi allegations. In contrast to some sections of the Australian rural press with their reports of 'shonky Saudi allegations', 'spurious claims from the Saudis' and 'dubious veterinary reports'²⁹ the *Canberra Times* editorial found 'no evidence to suggest that Saudi vets are any less competent than their Australian counterparts'.³⁰ A former principal veterinarian with the Commonwealth Department of Primary Industry, made the front page of the *Canberra Times* with his claims that in the past sheep have caught exotic diseases going overseas, and that Saudi veterinary standards are high. This view was supported by John Auty, former assistant director of the Bureau of Animal Health. Auty admitted that diseased sheep could get on board, and maintained that 'the Saudi veterinary service is of good quality and should be trusted'.³¹ Subsequently, an anonymous commentator was reported as saying: 'Once you establish a trust with them [the Saudis] they are very good business partners. This is why the Saudi action in turning away our live sheep is so worrying, because it indicates there are real problems to overcome'.³² Only after the resumption of trade did the rural press report that Dick Austen, Chairman of the AMLC, 'had unearthed genuine concern about the disease' when he was in Saudi Arabia negotiating new trading conditions.³³ And when pushed, even the Minister, John Kerin, admitted that he 'couldn't say unequivocally that the sheep were not diseased' and he 'didn't reject the claims totally'. What he wanted was to see proof of disease.³⁴

Diplomacy: Australian-style and Saudi-style

The situation was probably best summed up by a Saudi livestock importer, Hmoud Al-Khalaf, who 'blamed Australia's intransigence about disease for sparking the dispute and a failure of diplomacy by government officials for not ending the row sooner.'³⁵ In the process of trying to rescue Australia's international reputation, those involved managed to offend the Saudis by questioning their integrity and honesty, their scientific expertise and competence, and their motives.

The Australian press was full of claims about Saudi 'plots' and 'ploys', 'totally fallacious' claims, and being 'pilloried by spurious claims from the Saudis.'³⁶ Everyone, from the Prime Minister down, denied the disease claims.³⁷ In their weaker form, these denials maintained that there was no evidence to support the disease claim. Of course, this does not necessarily mean that none existed, only that the Saudis did not provide it. The stronger form of denial rejected the claim of disease outright.³⁸ And to add insult to injury, the Australian authorities requested independent laboratory testing. No doubt the final straw was what the press referred to as a 'strongly worded letter' from the Minister for Trade Relations, Michael Duffy, to the Saudi Government, 'accusing them of breaching an international quarantine agreement and not supplying Australia with proof of disease which it was entitled to have under International Code.'³⁹

As the *Canberra Times* stated, it was 'treading on dangerous ground to suggest that Saudi vets have made some sort of terrible mistake, and that if Australian vets, or vets nominated by Australia, had been present, the test results would have been different'. This was echoed by the *Sydney Morning Herald's* Middle East correspondent: 'Neither the Saudis nor the Abu Dhabians are likely to take kindly to suggestions that their testing procedures are not up to the highest international standards. Australian complaints about these procedures are probably counter-productive.'⁴⁰

At no stage did the Saudis waive in their allegations. They merely refused to discuss the matter. The Minister for Agriculture and Water, Dr. Abul Al-Shaikh, went on an extended post-Hajj holiday. Saudi officials then told Australian officials that they 'did not feel empowered to resolve the dispute while their minister was out of the country'. Weeks later Australian officials were still 'mystified' about when the Saudi minister would return. 'Guesses ranged from the middle of next week till the end of the month.'⁴¹

Finally, at the end of October 1989, the Minister returned and sent a letter to Kerin, but in Arabic. The press reported that 'translators were working feverishly to determine what the letter contains and how it will affect Australia's next move.' Unfortunately for Australia, the letter offered 'no hope of an early resolution to the dispute.'⁴² Trade did not resume until late January, and then only after the AMLC and others in the livestock industry⁴³ had produced a new set of stringent industry guidelines covering the age and condition of sheep, as well as shipping conditions. 'The Saudi Minister for Agriculture and Water indicated he was pleased with the new arrange-

ments.⁴⁴ The Australian press reported that the AMLC saw Al-Shaikh's reply as 'one of the most significant developments' in what it called 'the live sheep imbroglio . . . simply because Saudi has taken the trouble to reply.'⁴⁵

A Minister disappearing for six weeks during a crisis, refusing to communicate, and then communicating only in Arabic, is farcical enough. But some further incidents had a distinct Monty Pythonesque flavour about them. Headlines in Australia read: 'VFF trio grabbed by Arabs' and 'Arabs hold four for photographing sheep.'⁴⁶ It seems that whilst on a fact-finding tour, three industry representatives from the Victorian Farmers' Federation (the executive director, Kevin Shiell, and two sheep owners, Sandy Troup and Bill Whitehead) along with a journalist from the rural newspaper *Stock and Land*, were detained by police in the United Arab Emirates for seven hours for photographing a sheep container. In another incident, a major UAE newspaper warned its readers to boycott Australian mutton, suggesting that 'Australian sheep posed serious health threats, particularly to pregnant women and camels.'⁴⁷ Finally, there were the 5,000 missing sheep. Saudi authorities claimed they had died of brucella melitensis and their carcasses burnt. The *Stock and Land* reported that 'sources . . . agreed that they were sold, mainly through the Dubai live market.' John Kerin was quoted as saying: 'we think . . . they've been eaten!'⁴⁸

Just when it was thought to be safe . . .

Following the cautious resumption of trade in January 1990, half a million sheep were exported before the next blow was struck. On April 8th 1990, the *Arwa*, carrying 18,000 sheep, was rejected by Saudi Arabia. Four days later the *Uniceb*, carrying 30,000 sheep, was also rejected. The next two shipments were accepted without incident, but then the *Tabuk*, carrying 68,000 sheep was rejected. In each case 'scabby mouth' was given as the reason for rejection. Scabby mouth is regarded as a nuisance or minor complaint and is endemic around the world. Even Australia admits to having the problem. However, Saudi officials were apparently concerned about it and had rejected sheep from other countries for the same reason. The rejections surprised the Australians, even though the AMLC described it as just a 'slight blip in the system.'⁴⁹ However, the final blow came in early May when 56,000 sheep on board the *Corridale Express* were rejected because they were said to be too old.

It was widely acknowledged that the 1989 crisis had been poorly handled and that some media reports had been 'regarded as insulting to the Saudis.' When the second series of rejections occurred, the AMLC 'sought to muzzle debate in the media' in order to minimise the damage to trade.⁵⁰ Reports and comments which did appear in the media reflected a new understanding of the situation. Gone were the claims of Saudi lies and political intrigue. In their place was a recognition that 'the days of easy access for Australian live sheep to Saudi Arabia are over' and that Australia must 'communicate better and lift [its] game in terms of quality and disease control.'⁵¹

Commentators who had earlier strongly denied any likelihood of disease, now admitted that 'the disease factor is more real than imagined in Australia.'⁵² John Kerin acknowledged that 'the bottom line was that these countries did not want sheep with diseases.' The *Land*, which had been most vehement in its attack on the Saudis, now called for a Royal Commission into the 'farce in the hope some valuable lessons will be learned.'⁵³

If Australia is to retain and expand its overseas markets it cannot afford to take old trading arrangements for granted, nor can it afford serious failures in communication. This is especially the case where disease is a factor. Healthy information and lines of communication are just as important as healthy sheep. The rejections by Saudi Arabia cost Australia dearly. An independent and public inquiry into Australia's handling of the dispute may find a better way through the next rejection crisis.

* * * * *

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* * * * *

Pam Scott's earlier research has included an analysis of the establishment of the Australian Animal Health Laboratory at Geelong and the controversy over the importation of live exotic animal disease viruses into Australia.

Roger Meischke's early investigations into the live sheep trade were reported in *The Sea Transport of Sheep*, which was tabled in both Houses of the National Parliament in 1981.

Endnotes

1. R.T.Norris, R.B.Richards, 'Deaths in sheep exported by sea from Western Australia - analysis of ship Masters' reports', *Australian Veterinary Journal*, vol 66, no.4, April 1989; R.T.Norris, A.P.Kelly, 'The export of live sheep from Australia to the Middle East', Post Grad. Foundation Vet. Science, University of Sydney, Proceedings, Course 110, 1988; R.B.Richards, R.T.Norris, R.H.Dunlop, N.C McQuade, 'Causes of death in sheep exported live by sea', *Australian Veterinary Journal*, vol.66, no.2, February 1989.
2. *Animal Liberation Magazine*, October-December 1989, p.21.
3. R.T.Norris, A.P.Kelly, *op.cit.*, p.38. The Hajj is the Moslem religious period for making pilgrimages to Mecca. It finishes in September.
4. Mr Richard Norris from the Animal Health Division of the Western Australian Department of Agriculture was reported as saying that it was certainly not possible for live sheep exported from Australia to catch bluetongue or sheep pox en route. (*Cross Country Report*, no. 9, 27 August 1989, p.1.) However, in his many papers on the live sheep trade, he points to 'the risk of contracting diseases endemic to the Middle East such as sheep pox' facing Australian sheep. The risks referred to include the slow rate of discharge in some ports and not isolating stock from local sheep and goats. (R.T.Norris, R.B.Richards, R.H.Dunlop, 'An epidemiological study of sheep deaths before and during export by sea from Western Australia', *Australian Veterinary Journal*, vol.66, no.9, September 1989, p.276. R.T.Norris, A.P.Kelly, *op. cit.*)
5. R. Meischke, 'The Live Sheep Export Trade: the Veterinary Role', *AVA News*, 24 April 1990, pp.153-155. Paper presented to Australian Veterinary Association (NSW) Divisional Meeting, Yass, 25 November 1989.

6. N.Rajapaksa, J.P. Spradbery, 'Occurrence of the Old World screw-worm fly *Chrysomya bezziana* on livestock vessels and commercial aircraft', *Australian Veterinary Journal*, vol. 66, no. 3, March 1989, pp.94-95.
7. *The Future Operation of ANAHL: Report to the Ministerial Committee on ANAHL*, AGPS, 1984, p.60.
8. ABC TV, *Countrywide*, 25 August 1989; *AMLC News*, vol.1, no.7; *Canberra Times*, 15 August 1989, p.5; *Courier Mail*, 16 August 1989, p.57.
9. ABC TV, *Countrywide*, 25 August 1989.
10. *Canberra Times*, 22 August 1989, p.2.
11. *Advertiser*, 14 August 1989, p.15.
12. ABC TV, *op.cit.*
13. *Canberra Times*, 15 August 1989, p. 5; *AMLC News*, vol.1, no.7, p.4.
14. ABC TV, *op.cit.*; Dr Bruce Standen, AMLC, *Cross Country Report*, no.9. 27 August 1989, p.1; *Australian Financial Review*, 15 August 1989, p.3; *Land*, 11 January 1990, p.6.
15. *National Farmer*, 11 August 1989, p.1.
16. e.g. *Australian*, 17 August 1989, p.5.
17. *Sydney Morning Herald*, 26 August 1989, p.13.
18. *National Farmer*, 11 August 1989, p.1.
19. *Australian*, 17 August 1989; *Canberra Times*, 15 August 1989, p.5; *Australian Financial Review*, 15 August 1989, p.3; *Weekly Times*, 30 August 1989.
20. *Ibid.*
21. *Land*, 31 August 1989, p.3.
22. *Weekly Times*, 30 August 1989.
23. *Land*, 16 November 1989.
24. SCA President Mr Bill Bonthron quoted in *Australian Rural Times*, 23 November 1989, p.3.
25. 'The Rejection of Live Sheep Shipments', *Press Release*, Royal Embassy of Saudi Arabia, Canberra, 22 August 1989.
26. *Land*, 5 October 1989, p.3; *Age*, 11 October 1989; *Land*, 12 October 1989.
27. *Weekly Times*, 15 November 1989, p.4.
28. *Canberra Times*, 31 August 1989.
29. Editorial, *Land*, 7 September 1989, p.8 and 14 September 1989, p.8.
30. *Canberra Times*, 27 August 1989, p.6.
31. *Canberra Times*, 25 August 1989, p.1; *Sydney Morning Herald*, 26 August 1989.
32. *Weekly Times*, 13 September 1989.
33. *Land*, 25 January 1990, p.3.
34. ABC TV, *op. cit.*
35. *Weekly Times*, 20 December 1989, p.4.
36. Editorial, *Land*, 14 September 1989, p.8, and 7 September 1989, p.8.
37. The Prime Minister was reported as saying that there 'was no evidence given to Australia to suggest that the Saudi actions were justified', *Canberra Times*, 1 September 1989.
38. Michael Prendergast, Executive Director, Sheepmeat Council of Australia, said 'I'm totally sure that the sheep are healthy', *Canberra Times*, 22 August 1989, p.2.
39. *Daily Telegraph*, 24 August 1989, p.4.
40. *Canberra Times*, 27 August 1989, p.6; *Sydney Morning Herald*, 12 September 1989, p.11.
41. *Canberra Times*, 31 August 1989; *Weekly Times*, 20 September 1989.
42. *Weekly Times*, 1 November 1989, p.1; *Land*, 2 November 1989, p.7.
43. Representatives from the Sheepmeat Council of Australia, the Australian Livestock Exporters Association and the Federal government.
44. *Land*, 1 January 1990, p.3.
45. *Weekly Times*, 1 January 1990.
46. *Weekly Times*, 20 September 1989; *Australian*, 19 September 1989, p.4.
47. *Weekly Times*, 13 September 1989, p.1.
48. *Stock and Land*, 21 September 1989, p.3; *Australian Magazine*, October 1989, p.66.
49. *Weekly Times*, 25 April 1990, p.3.
50. *Australian Rural Times*, May 17-23 1990, p.6.
51. *Weekly Times*, 6 June 1990, p.3; *Australian Rural Times*, May 17-23 1990, p.6.
52. *Weekly Times*, 20 June 1990, p.127.
53. *Weekly Times*, 6 June 1990, p.3; Editorial, *Land*, 21 June 1990, p.8.



THE WELFARE OF AUSTRALIAN SHEEP AND LAMBS EXPORTED BY SEA TO THE MIDDLE EAST

by

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CONTENTS

1. INTRODUCTION
2. DESCRIPTION OF JOURNEY
3. PRIOR TO EMBARKATION
4. ON-BOARD THE SHIP
 - 4.1 Animal Transport Conditions
 - 4.1.1 Environmental conditions
 - 4.1.2 Food-water-air-light
 - 4.1.3 Waste control
 - 4.1.4 Facilities
 - 4.1.5 Animal handling
 - 4.2 Animal Responses
 - 4.2.1 Cardinal signs
 - 4.2.2 Woolbreak
 - 4.2.3 Mortality and morbidity
 - 4.2.4 Post-mortem findings
 - 4.2.5 Other observations
5. DISCUSSION
6. CONCLUSIONS
7. ACKNOWLEDGEMENTS
8. REFERENCES

1. INTRODUCTION

The export of live sheep and lambs from Australia began in 1945-6 when more than 24,000 were transported from Western Australia to Singapore. The trade expanded steadily until late 1960 when exports to the Arabian Gulf began. In the succeeding eight years almost half a million sheep were transported to Kuwait, Bahrain and other Gulf ports (1). The change in major destination led to a major change in the type of animals transported, their origin and also mortalities en route. For the Singapore trade the smaller, light Merino wether from the tropical and sub-tropical areas was replaced by the 50 kg heavy crossbred Merino wether from the more temperate areas destined for the Middle East.

The trade has grown rapidly from 900,000 sheep in 1973 to 5,244,300 in 1979 of which 2,751,000 were from Western Australia and 2,115,800 from South Australia. Mortalities on board ships have been reported as being reduced from over 4 percent in 1975 to around 2 percent per average journey in 1979 (2). These figures are less than accurate since they are based entirely on unconfirmed statements by shipping companies. They do not include the 20% (approximately) of journeys for which no figures have been supplied.

The Australian community has shown increasing interest in the welfare of animals for export especially since the sinking of the "Farid Fares" with the death by fire or drowning of all the sheep on board. More recently the "Al Yasrah" was reported as having a fire on board leading to the restricted feeding and subsequent death of over one thousand sheep. Apart from the countless letters of protest from individuals to their

community leaders and the popular press, there has been the rapid formation of well educated, effective lobby groups such as the Animal Liberation Movement and the Campaign Against Live Animal Exports (CALAE). Since the export of live animals is a Federal matter, so too have the animal welfare organisations formed federal bodies such as the Australian Federation of Animal Societies and RSPCA Australia. The declared policy of these bodies is the banning of the export of live animals for slaughter. There is ample international precedent for a ban involving selected animal species (India) or more generally (Great Britain, Ireland and Thailand). Australia herself has a ban on the export of native fauna except for very restricted purposes.

It was decided that the mounting concern over the export trade could be best answered by direct observations and hard facts. A previous report (3) on the export of horses to Japan was well received in the community. This report covers the export of sheep to the Middle East and presents observations and facts as well as recommendations based thereon. Appropriate sections will be published in the scientific literature in due course.

2. DESCRIPTION OF JOURNEY

This report will describe the loading of sheep and lambs in Australia and their transport by sea to the Middle East.

Table 1 lists the midday positions of the vessel as well as the environmental parameters routinely recorded by the officers on the bridge. In Section 4.1.1 these parameters will be contrasted with those recorded in the sheep holding areas.

Table 1: Midday position and environmental conditions as recorded on the bridge.

DATE	LATITUDE LONGITUDE	TEMPERATURE RELATIVE HUMIDITY	WIND FORCE SEA FORCE	BAROMETRIC PRESSURE WEATHER
21-9-80	33°55'S 122°37'E	22°C 77%	3 3	1023 mbHg Cloudy
22-9-80	35°14'S 116°37'E	21°C 70%	7 6	1008 mbHg Overcast
23-9-80	30°26'S 110°19'E	20°C 57%	6 6	1015 mbHg Showery
24-9-80	26°06'S 105°55'E	23°C 45%	3 3	1027 mbHg Cloudy
25-9-80	21°26'S 99°37'E	27°C 53%	4 4	1026 mbHg Cloudy
26-9-80	16°35'S 92°51'E	30°C 59%	3 4	1020 mbHg Part Cloudy
27-9-80	12°00'S 86°37'E	31°C 53%	3 3	1017 mbHg Part Cloudy
28-9-80	7°37'S 80°38'E	33°C 57%	4 4	1016 mbHg Part Cloudy
29-9-80	3°07'S 74°33'E	33°C 51%	2 2	1015 mbHg Part Cloudy
30-9-80	1°24'N 68°33'E	27°C 76%	4 4	1015 mbHg Showery
1-10-80	7°22'N 64°21'E	30°C 70%	4 4	1013 mbHg Overcast
2-10-80	14°34'N 61°51'E	31°C 58%	3 3	1011 mbHg Part Cloudy
3-10-80	21°55'N 60°11'E	33°C 54%	2 2	1012 mbHg Part Cloudy

The sheep were mainly purchased by paddock sale in the South West of WA and held a short distance from Esperance prior to the commencement of loading. They were then transported by mainly triple deck semi-trailers to the shipside. Following inspection by a stock inspector, the sheep were loaded at the port of Esperance on Friday and Saturday 19 and 20 September. The vessel set sail at 7.15 pm on Sunday 21 September.

The journey was made during the better part of the year where the weather at both ends was agreeable. The winds and seas were slight to calm.

The ship carried 10,800 sound-mouthed sheep (four to five years old) and 28,000 sheep and lambs with six permanent incisors or less (up to three years of age). A significant proportion of the latter group were cross-bred lambs. The number loaded was determined by the agents in accordance with that recommended by the Department of Transport. A 10% sample of the latter group weighed an average of 43.56 kg. The recommendations allow the vessel to carry 37,139 sheep at 50 kg per head and 38,733 sheep at 45 kg. Pro-rata, the load of 38,800 sheep and lambs was within the guidelines of the Department of Transport and represented a stocking density of 3.31 sheep per square metre.

Two incidents caused a stoppage in the mechanical ventilation of the sheep pens. On day four, at 5.10 am, a main switchboard failure prevented any power generation for 40 minutes. At 11.00 am on the same day the ventilation was stopped again for 15 minutes to restart the main engine. On day 8 at 1.10 am the main engine stopped due to a temporary shortage of fuel. The sheep were without ventilation for approximately 15 minutes. Further discussion on these incidents will appear later in the report.

The vessel carries approximately 60 men. The stock were tended by 26 stockmen including their "foreman" the stockman-tindal. Overall responsibility for the stock was taken by the chief officer. Each stockman thus looked after 1500 sheep and lambs. The author was unable to examine the supply of veterinary medicines and was unable to locate any pen allocated for use as a hospital pen.

The vessel contained six main decks which were from top to bottom:- II, I, A, B, C and D decks. Each of these was horizontally divided into two tiers so that there were effectively twelve tiers of sheep. At the rear of the ship, two small decks were called 6A and 6B. Although 6B had two tiers, 6A did not and it had been used on other journeys for the holding of cattle. Table 2 lists the approximate number of sheep of 50 kg average weight allowed on each deck.

Table 2: Recommended sheep numbers of average 50 kg weight on decks of vessel, type of ventilation and location of sample sites.

DECK	SHEEP NUMBER	VENTILATION	SAMPLE SITE
II	5970	0+	1
I	6232	0+	
A	6124	0+	2
B	5841	+	
C	5177	+	
D	4265	+	3
6A	942	*	5
6B	2246	+	4

0 = deck open to outside air, not dependent on mechanical ventilation.

+ = deck with mechanical ventilation.

* = deck which had variable atmospheres due to opening and closing of hatchways to outside. One sample site placed on this deck due to high temperatures generated by the engine heat.

The vessel was divided into two broad areas - those with access to the outside air and those without such access and so dependent on mechanical ventilation. The chief officer was asked to designate the area on the ship with the highest temperatures, he chose a site near the central core amidships which was on deck 6A. The five sample sites were allocated as indicated in Table 2. Further details of the sample sites appear in Table 3.

Table 3: The stocking rate and main features of sample sites chosen for environmental and physiological measurements.

SAMPLE SITE	SHEEP PER SQUARE METRE	MAIN FEATURES
1	3.57	Amidships. Likely to experience worst of ships' movements.
2	3.60	Portside. Most exposed to prevailing weather.
3	3.30	Amidships. One of worst atmospheres.
4	3.59	Amidships. Poor atmosphere. Most noisy with screw below.
5	3.37	Amidships. Likely to have highest temperatures.

In addition to environmental and physiological measurements, the author performed over two hundred post-mortem examinations. During the first two days it became clear that some carcasses which were due for examination were thrown overboard by the stockmen. Persistent complaints led to the cessation of this practice - but not without considerable effort in checking that it did not continue. The dead were collected first thing in the morning and their deck location was noted. They were then moved to an open deck site so that their remains could be thrown overboard with ease.

Towards the end of the journey, the destination became known as Bandar Abbas in Iran. Because of difficulties associated with war in the area, the author left the ship near the Strait of Hormuz. Discharge at Bandar Abbas commenced the following day and took five days. The difference between mortalities recorded up to the 14th day and the mortalities reported by the captain for the whole journey suggest that significant problems were encountered at discharge. This has been confirmed by reports of subsequent vessels taking portable yards and watering equipment aboard in Australia when bound for Bandar Abbas.

3. PRIOR TO EMBARKATION

The sheep and lambs were bought mainly in the South West of WA during the ten days prior to embarkation. They were delivered during the last four days to the holding yards a short distance from Esperance where they were fed on green grass and hay.

The animals were not vaccinated or drenched and carried quite variable amounts of wool. Approximately one third had staple lengths over 25 mm (one inch), one third were 25 mm and one third had less than 25 mm. One mob was noticed which was fresh off-shears - they had been shorn two days before. Excess wool is not used in the Middle East and is positively detrimental to environmental conditions in transit. This particular load also represented a direct loss to the owner of approximately 130 bales of fleece wool worth around \$40,000. The sheep were, however, lightly sprayed with "Diaza-dip" prior to transport to shipside. Some mobs were identified as coming from properties 24, 48 and 74 km from Esperance. Some came on resale from other enterprises.

The weather was very cold during the fourth and fifth day pre-embarkation, and coincided with the arrival of the sheep into the holding yards.

At the holding yards, the sheep were "shandied" - a colloquial term describing the mixing of different mobs of sheep. Thus, the animals loaded on board were mixed in age, breed and origin. The agents' representative stated that this practice was common and regarded favourably in the industry, since it tended to "settle them down". This may be true when different mobs of the same weight, breed and age are mixed but is unlikely to be the case when a load, such as the one described here, is so treated.

The short distance haulage of the stock from the holding yards to shipside was done mainly in triple deck semi-trailers. Although the journey was short, the conditions during transit and unloading were poor. Little care was taken to ensure adequate distribution of the load, the trucks were consistently overloaded with frequent evidence of legs sticking out through the sides. The trucks were not cleaned between loads and several had protruding objects and poor flooring indicating a longer-term neglect of proper maintenance.

The animals were unloaded through a ramp at dockside which any self-respecting farmer would have repaired immediately. The floor of the ramp was covered with a steel mesh presumably to prevent slipping. However, the floor under the mesh had worn away presenting a large hole nearly one metre in diameter. The animals frequently tripped as their legs went through the mesh into the hole. It is possible that several of the broken legs seen on the sheep later were due to this hazard.

The shipside yards comprised several large pens fenced with 5 bar horizontal galvanised pipe. There was no provision for waste control or roofing. The sheep stood in accumulated excreta and had no protection from the sun or the rain. Due to prior wet weather the bitumen floor of the yards was covered with wet excreta which covered the wool coats of the sheep. There was no provision for feeding or watering. Uncontrolled dogs of all shapes and sizes (including a large Alsatian) "played" with the sheep in full view of their owners without being placed under control. Many animals were held overnight in the yards under constant fear from these dogs. The "stockmen" all carried goads, commonly lengths of 50 mm polythene pipe which were used with monotonous regularity. The only real evidence of good stockmanship was shown by the WA Department of Agriculture stock inspectors who completed their task efficiently and effectively.

4. ON-BOARD THE SHIP

A large number of observations were made on the conditions under which the animals were transported and their responses. Observations commenced on the day the ship set sail, designated day one, through to the day the author left the ship, day fourteen. Observations were recorded largely between the hours of 6.00 am and 8.30 pm, although frequently the work continued beyond these hours.

4.1 Animal Transport Conditions

The conditions under which animals are transported represent the inputs which result in the response of the animals reported in Section 4.2. This direct cause and effect relationship is only confounded by the nature of the animals themselves and their treatment prior to embarkation.

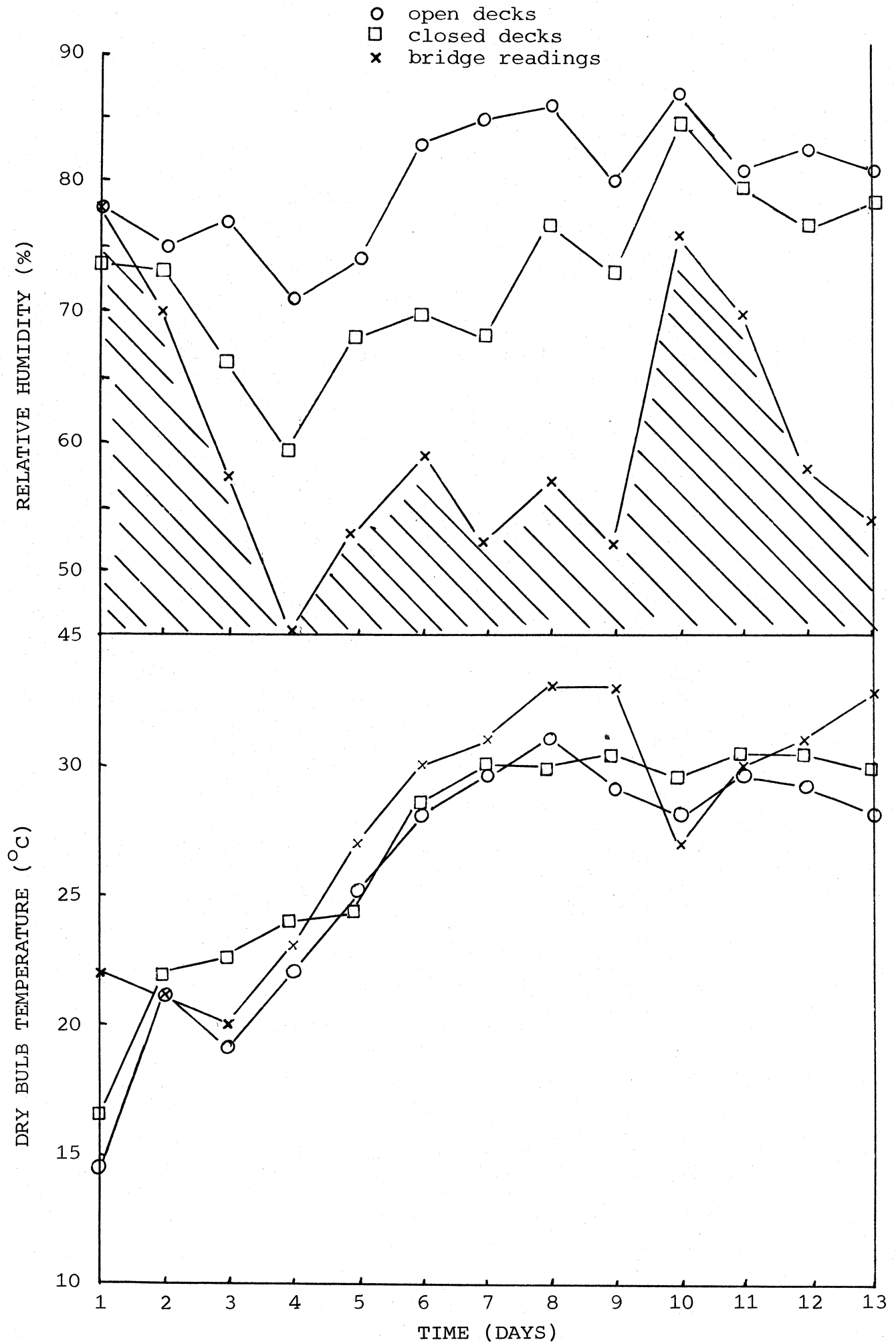
4.1.1 Environmental conditions.

Five sites were selected for the sampling of environmental conditions. These are described in Section 3. Sites 1 and 2 were on "open" decks exposed to the outside environment while sites 3 and 4 were entirely dependent on the mechanical ventilation system on "closed" decks. Site 5 was predicted to be the area with the highest temperatures but because the main doorways were frequently opened on hot days, and the unusual single storey pen structure on that deck, the results were meaningless and have been excluded. Figure 1 illustrates the temperature and relative humidity as recorded on the open and closed decks, and on the bridge. The former were recorded between 10.30 am and 12.30 pm while the latter were recorded at midday and appear in the ship's log. The open deck figures are the average of readings taken at sites 1 and 2 while the closed deck figures are the average of sites 3 and 4.

The relative humidity and temperatures on the bridge varied more than those in the decks. Generally the temperature was more extreme - colder on cold days and hotter on hot days. The relative humidity was consistently lower on the bridge than in the decks. The open decks displayed lower temperatures but a higher relative humidity than the closed decks.

The wind speed was recorded at all sites using a hand held device. To compare the effect of the relative humidity, temperature and wind speed on the animals they must be combined in some fashion. The best available method adapted to Australian conditions is that published by the Bureau of Meteorology (4). The combination of temperature, relative humidity and wind speed produce a ratio called the Relative Strain Index (RSI) (5). Using human data, it has been established that the limits of comfort, transition and discomfort are RSIs of 0.2, 0.3, and 0.5 respectively, and an RSI of over 0.5 is described as a distress zone.

Figure 1: Changes in temperature and relative humidity in three areas of the vessel during the journey.



Comparable figures for sheep are hard to come by, however it has been reported that the maximum tolerable humidity for sheep in transit is 300 mm Hg vapor pressure (6) or 71% at 35°C which is equivalent to an RSI of 0.5. It is possible that the human and sheep figures will be in broad agreement. Figure 2 illustrates RSIs observed in open and closed decks, and on the bridge.

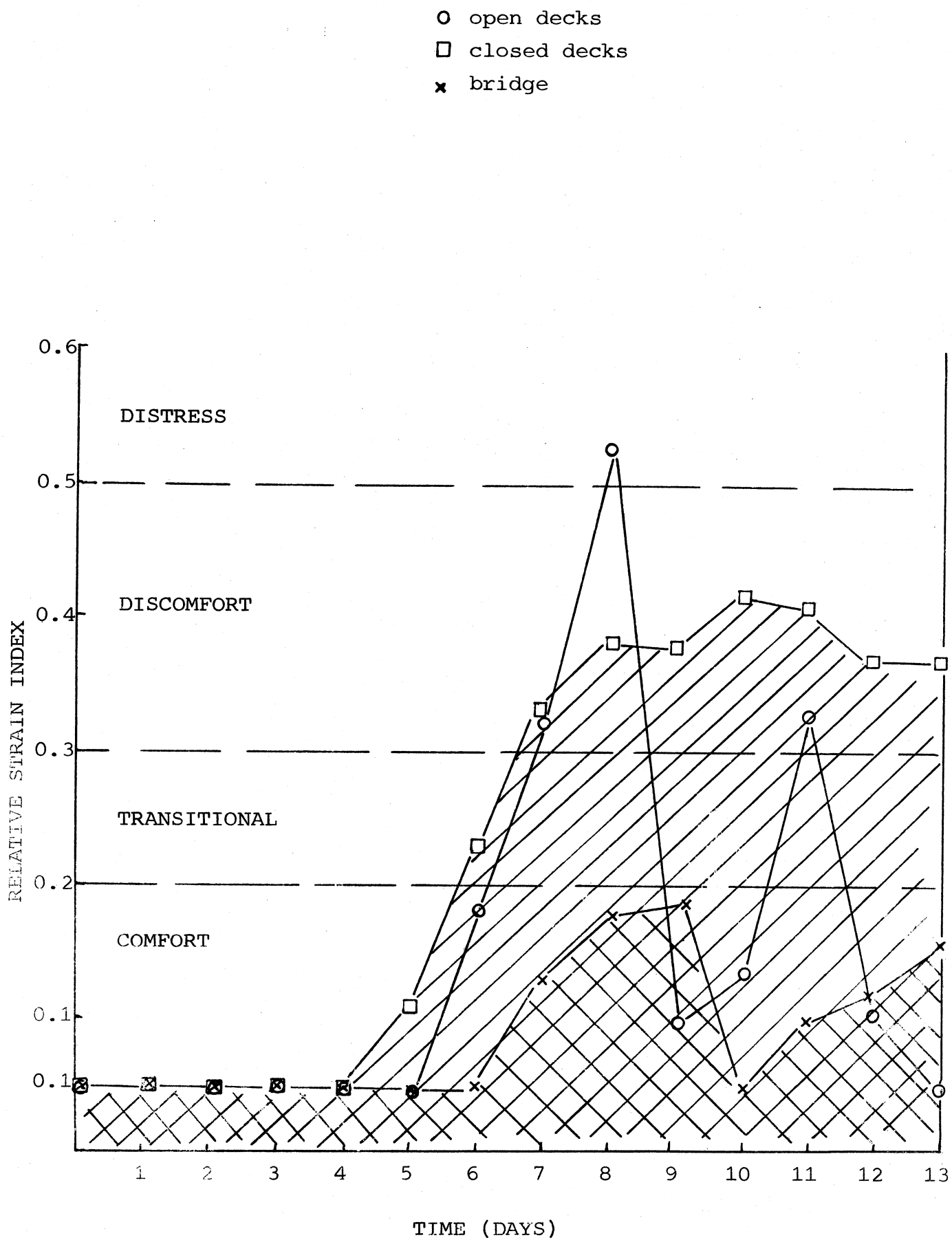
The RSI on the bridge did not leave the comfort zone for the whole of the journey. The open decks had an RSI which left the comfort zone on three days only. By contrast, the RSI on the closed decks climbed steadily as the vessel approached the Equator and remained in the discomfort zone for the latter half of the journey. These observations will be discussed further in Section 4.2.

4.1.1 Food - Water - Air - Light.

Although the requirements of food, water, air and light are a basic but relatively inexpensive part of any system of animal husbandry on land, their provision is a finite expense at sea.

The sheep were fed sheep pellets, which were manufactured in Adelaide and Freemantle. Samples have been sent to the University of Sydney for analysis and the results will be reported in due course. In years past, the pellets contained molasses both as an appetite stimulant, as a source of energy and as a binding material in the pellet structure. Its use has been discontinued (although the use of dates and their equivalent in pellets continues in the Middle East). One major effect has been the decrease in firmness of the pellets. This means that by the time the food is in the troughs for the sheep to eat, around 80% of it is in the form of mash and dust - only 20% in the form of pellets. It was observed that the sheep always ate the pellets first, leaving the dust last. The high prevalence of conjunctivitis and nasal discharge may well have been due to the dust - certainly the author was so affected.

Figure 2: The Relative Strain Index at three locations on board the vessel.



The vessel left Esperance with 450 tonnes of pellets on board. The stock were first fed on the morning of 21 September (day 1). This meant that some had been without food for at least 24 and perhaps 36 hours following embarkation. Feeding or watering while loading is very difficult since the passageway space is occupied with the troughs. Throughout the journey the sheep were fed twice a day - between 6 and 10 am and 1 and 4 pm. The pellets and dust were blown along 100 mm diameter tubes and deposited into portable troughs. The location of the troughs was inadequate in certain areas towards the bow of the ship where sea spray and rain could make feeding impossible. The crew made every attempt to maintain cleanliness. However, the two tier system of housing the sheep meant that the feed and water troughs of the lower tier were frequently contaminated with faeces and urine from the upper tier. The problems of inadequate waste control are outlined in Section 4.1.3. It was noticed that the larger and older sheep frequently fed first leaving the smaller, younger ones to eat the remaining dust later.

Fresh water is a valuable commodity at sea. It is either transported from the port of origin or produced from sea water on board. Desalination is a by-product of normal engine cooling and this source supplied approximately 70 tonnes per day while the ship was sailing. The vessel carried 1955 tonnes of water when it left Esperance. The daily consumption rate was around 100 tonnes per day which included 23 tonnes for domestic use. When fresh water from these two sources is unavailable, the ship carries a special desalination plant which can desalinate 100 tonnes of water for a cost of 5-6 tonnes of diesel fuel. It was thus in the interest of the carrier to restrict the use of fresh water. The sheep were watered between 8.30 am and 12 noon and then 3.30 to 5.30 pm. Outside these hours, fresh water was not available because the pumps supplying the hoses were turned off. The crew maintained the best possible standards of cleanliness and rinsed out each trough before filling.

Nevertheless, many troughs became contaminated with faeces, urine and pellet dust as soon as they were filled. Frequently, the older and larger animals drank first leaving the smaller, younger animals to drink the contaminated water. The water supplied to the sheep was not chlorinated and was un-medicated. The hoses used did not have any device to prevent back siphoning.

Air was supplied through an elaborate system of suction fans and blowers. It was designed by a well respected Danish ventilation company to provide around fifty changes of air per hour. A significant proportion of the air intake (clean air) vents were in close proximity to and on the same level as the exhaust (dirty air) vents. Under the relatively calm conditions which prevailed it is likely that a proportion of the dirty air was recirculated. The closed decks were entirely dependent on this ventilation system - it was clear that various obstructions, including the sheep themselves, created a great number of "dead spots" where the air did not circulate adequately. Since each lower tier had only 1.2 metres ceiling height, the opportunity for any air circulation with sheep in the pen was minimal. This was exacerbated by the fact that the inlet vents were frequently at deck ceiling height (2 to 3 metres). The result was the frequent crowding in areas of pens with reasonable ventilation - again the larger stronger sheep were nearest the air vents.

Light was supplied by daylight and by fluorescent lights in other areas. Generally, the normal diurnal rhythm was maintained although on several occasions it was noticed that the closed decks were at "half light" with alternate tubes switched off. The sheep responded by resting for those periods. Even with the full lighting complement switched on, it was impossible to see some areas of the lower tier pens in the closed decks. The chief officer used a torch to view these areas adequately when looking for sick and dead animals.

4.1.3 Waste Control

Mention has already been made of the absence of waste control on shore at Esperance. On board, the sheep were expected to stand in their own excreta for the whole journey. The impervious pressed aluminium alloy or concrete floors drained through single 10 mm holes in each corner, which were always blocked, through grates in the alley ways, which were frequently blocked. The result was that their wool was covered in urine diluted faeces. The impact of this feature on atmospheric ammonia levels and humidity was great. Frequently the waste spilled over from the upper tiers into the food and water troughs of the lower pens. The alley ways were kept swept and free of debris to the best of the crew's ability. Water spillage, feed spillage and, in certain areas, sea spray and rain, exacerbated the problems.

4.1.4 Facilities

Mention has already been made of the apparent lack of veterinary hospital facilities. There were no slings to lift sick sheep. The overall impression was one of a capable group of officers and men trying to cope with inadequate equipment and still getting the job done. Around 1% of the troughs were defective. The watering hoses were adequate but cumbersome with no end pieces.

Frequently the design of the upper tier floor meant that the horizontal bars of the lower tier did not run parallel leaving a wedge shaped gap where animals caught their feet.

The lighting and ventilation facilities were inadequate in design but were well maintained. There were frequent breakdowns in the feed delivery system. During loading of the ship, all kinds of makeshift partitions tied into place with twine were used to direct the sheep. The ceiling of the upper deck (II) was not waterproof, leading to serious leakages when it rained. The canvas covers designed to protect the exposed decks from sea spray were cumbersome to use and largely ineffective.

The most serious deficiency in facilities was the absence of a fail-safe power generating system to keep up the ventilation in the event of a main switchboard breakdown or a fuel supply failure.

The complete absence of any method of separating the live animals from their accumulated excreta remains a most serious deficiency.

4.1.5 Animal Handling.

Section 3 deals with the ability of wharf laborers as animal handlers. On board, the captain, the chief officer and the stockman-tindal showed considerable expertise and concern in animal handling. They were most capable and compassionate, given the difficult conditions under which they worked. When these three were absent, the handling methods became a little more varied. Some stockmen displayed extraordinary concern and gently coaxed their animals along, others were unbelievably rough. There was no evidence of willful cruelty, although ignorance did cause cruel acts to occur. For example, dead and sick sheep were hoisted from the lower closed decks to the open ones for examination and disposal. The method was usually a piece of twine around their neck.

There was no established order over the handling of sick sheep, therefore most were left to die without treatment except when the author put some out of their misery.

The poor atmospheric conditions forced the stockmen to leave the sheep as soon as possible and they were frequently located out of view of the bridge in the open air. The poor lighting meant that many sick sheep, especially in the lower tiers, went unnoticed. The number of carcasses which were decomposed on examination indicates they were not seen until some time after their death.

Although each deck was labelled with the maximum recommended number it could carry, the individual pens were not. This led to the overstocking and understocking of pens during loading and the need in subsequent days to shift a large number of sheep.

The mixing of different breeds, ages, sizes and mobs led to problems in feeding, watering and ventilation which should have been avoided.

Excluding the poor handling aspects due to deficiencies in equipment and facilities, the overall quality of animal handling on board was equal to that seen at port side - both groups could markedly improve their methods.

4.2 Animal Responses.

Section 4.1 outlines the major features of the shipboard carriage of sheep and lambs. These features resulted in certain responses by the animals which will be outlined in this section.

During the voyage, pens were selected near the sample sites described in Section 2. In each sample pen, seven animals were tagged with different coloured ear tags and spray-marked to help identify them. It was planned to examine the animals daily but this proved impossible, and so the sites were divided into two groups and examined every second day.

4.2.1 Cardinal Signs

An essential feature of the clinical examination of any animal (including man) is the measurement of the cardinal signs. The cardinal signs measured were respiratory rate, heart rate, rectal temperature and the appearance of the mucous membranes. Any abnormal features were also noted.

Figure 3 shows the change in average cardinal signs during the journey for both the open and closed deck sample sites. Readings during the first half of the journey failed to show any differences between deck sites. However, when the RSI entered the discomfort level in the closed deck (figure 2), the average rectal temperatures and respiratory rates exceeded those of the open decks. There was no discernable trend in heart rates.

The mean readings for sample pen 4 excluded those relating to the blue tagged animal whose broken leg (happened on day five due to wedge-shaped gap between floor and horizontal bars of upper tier) caused it to show quite abnormal cardinal signs due to a defined cause. All other animals were regarded as clinically normal even though they, like the author, were showing signs of stress as evidenced by a change in their cardinal signs.

4.2.2 Woolbreak

It is well known by farmers that woolbreak occurs in sheep after severe stress associated with fly-strike, poor nutrition or parasitism (7). Woolbreak has been investigated extensively in the search for a chemical method of defleecing sheep (8). Commonly, woolbreak is tested by using a manual scoring system (9). However the depilation force measuring technique of Dr Gordon may record a change in the force shortly after the stress occurs (8). The technique has been fully described elsewhere and involved the taking of two measurements. A small staple is selected on the middle of the back and held by clamps attached to a tubular 2 kg spring balance. A steady even pull plucks out the staple and records the force required. The size of the staple was determined using a set of calipers which had been calibrated so that the resultant reading could be mathematically converted into kilo Tex. The depilation force divided by the staple size squared produced the wool break readings. Figure 4 illustrates the change in average woolbreak force of the seven animals in each of four sample pens during the journey, except the sheep with the broken leg in pen 4.

Figure 3: The average respiratory rate, heart rate and rectal temperature of seven sheep in each of four sample pens during the voyage.

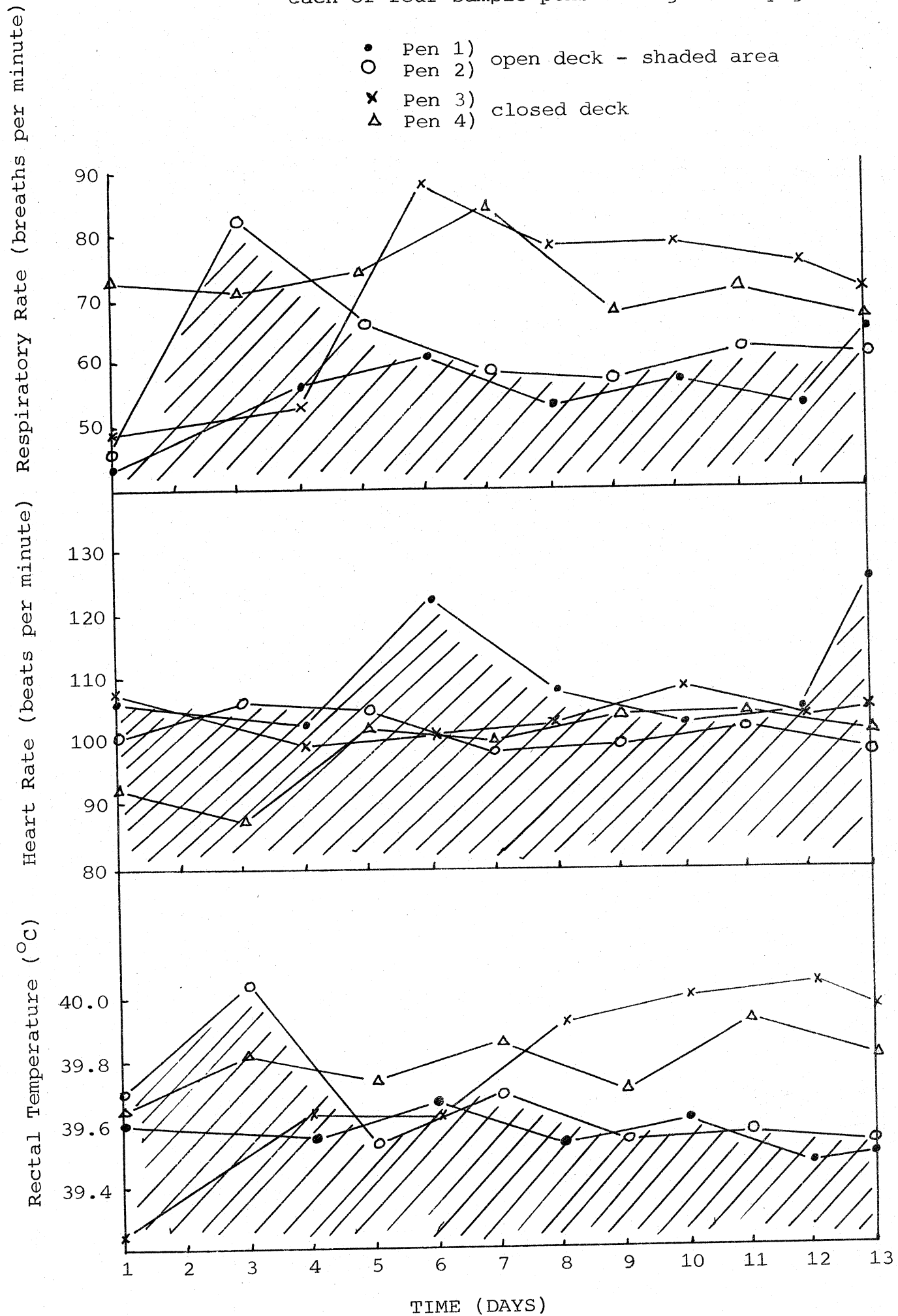


Figure 4: The change in average woolbreak force of seven animals in each of four sample pens during the voyage.

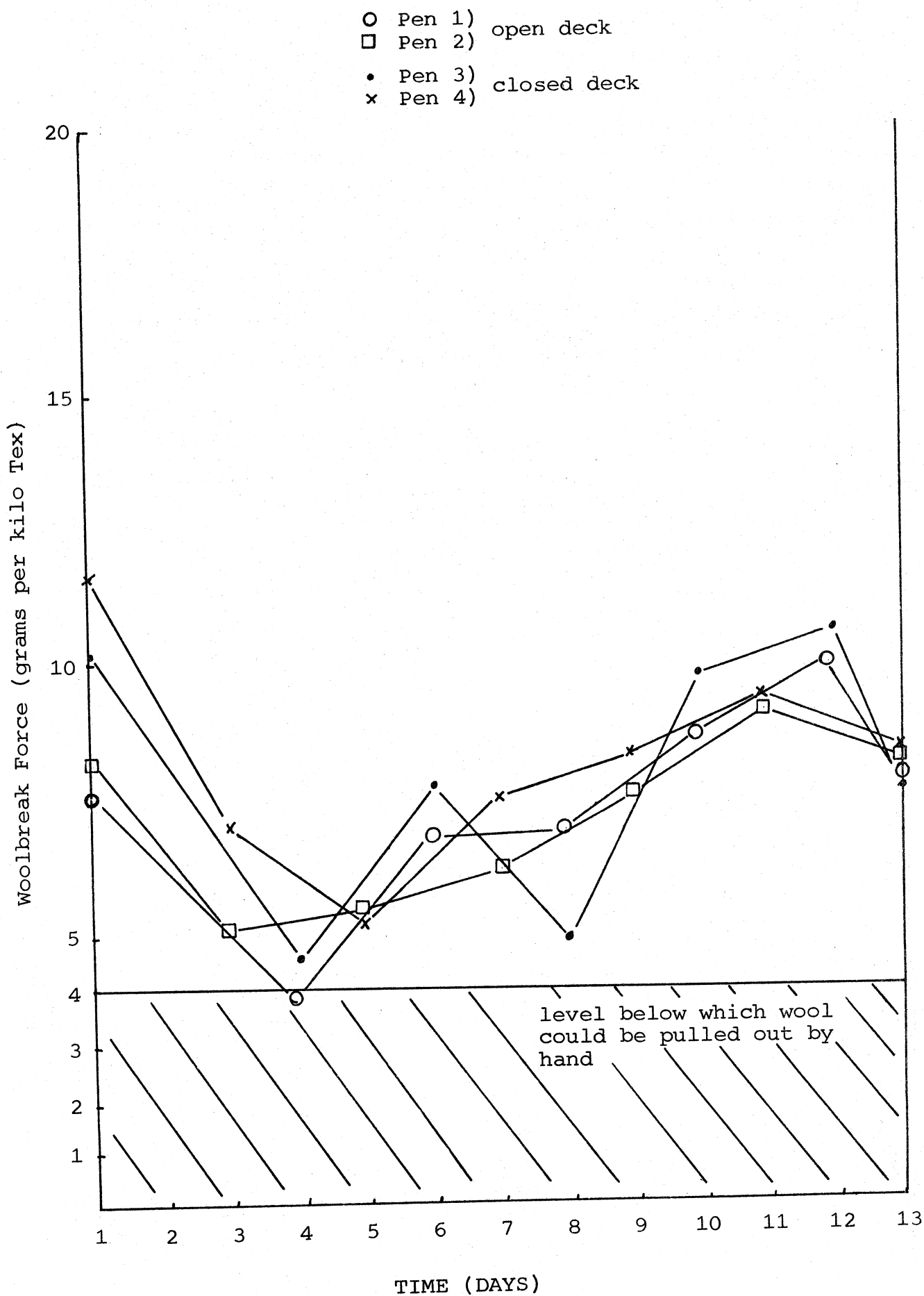


TABLE 4: Age-specific mortalities compared with age of sheep and lambs on board.

Age Group	8 Tooth	6 Tooth or Less
Percent of animals loaded	27.8	72.2
Percent of mortalities	22.9	77.1
Number of animals	10,800	28,000
Number of mortalities	67	225

Figure 5 further describes the mortality age structure. During the first week proportionately more lambs and two toothed died than during the second week when proportionately more full mouth sheep died. One possible explanation for this observation lies in the shift in post-mortem findings over this period (Section 4.2.4).

Figure 6 shows the daily mortality of open and closed decks as a percentage of the total mortality. It is clear that from day three the mortality in the closed decks was much higher than that in the open ones. This difference remained consistent over the rest of the journey. The arrow on Figure 6 shows the switchboard fault which led to the failure of ventilation in the early morning of day four. The closed deck mortalities reflect this incident by a rise on day four and five, but the open deck figures do not. This provides further evidence that the differences in mortality between open and closed decks is probably in large measure due to inadequate ventilation.

Figure 5: The age structure of mortalities during the first and second weeks of the voyage.

O Total
● 1st week
x 2nd week

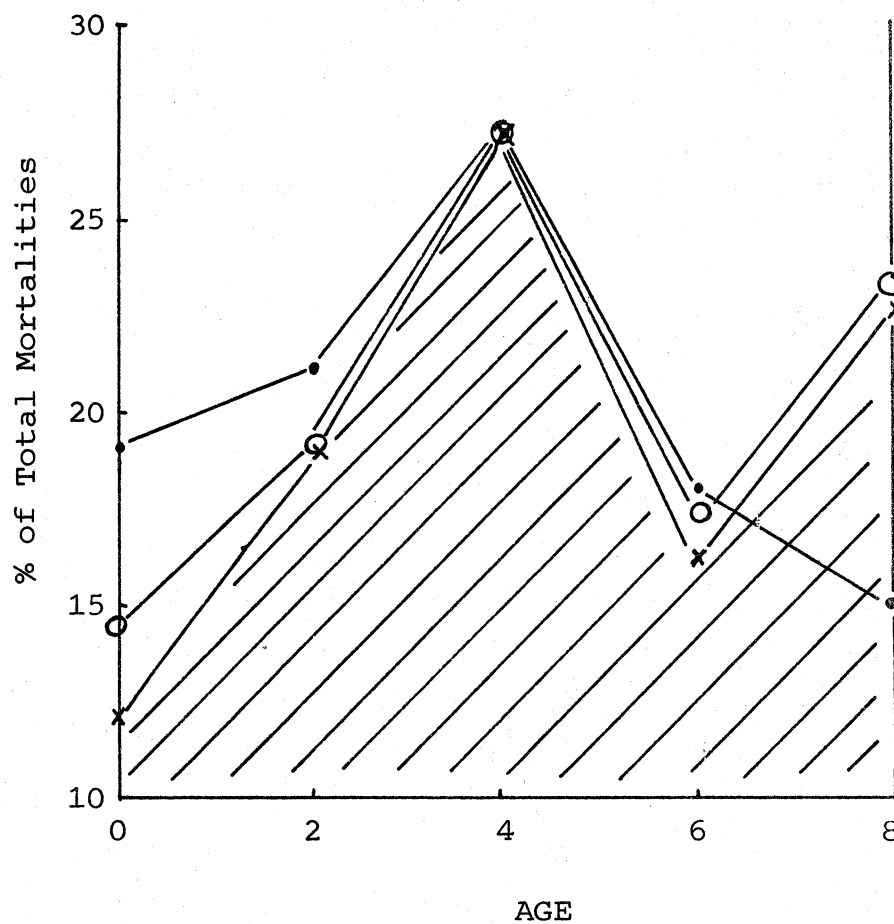
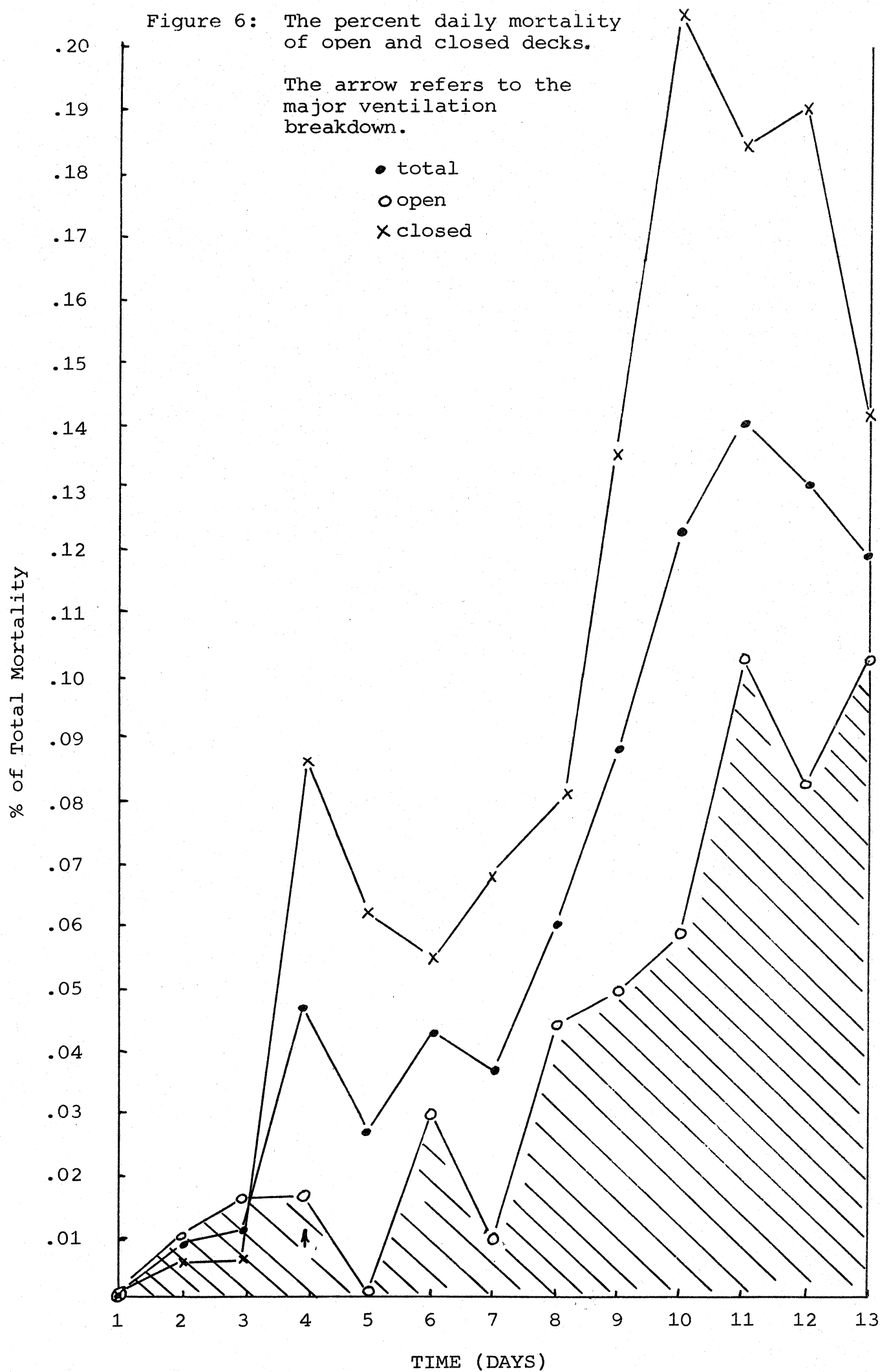


Figure 6: The percent daily mortality of open and closed decks.



The difference in mortality between sheep in the open and closed decks (Figure 6) could be predicted from the difference in the relative strain indexes of their environments (Figure 2).

The overall mortality rose steadily as the vessel entered the tropics and appeared to stabilise during the final three days.

Morbidity information was more difficult to obtain because of lighting and stocking density problems. Nevertheless, although the stock had firm faeces when they arrived on board, by day three many sheep showed a yellow diarrhoea. This increased so that by day five it was very difficult to find any animals with firm faeces. Diarrhoea then became less prevalent so that by day twelve most sheep and lambs had semi-solid faeces.

Profuse lacrimation, frequently accompanied by a clear mucous nasal discharge, became obvious in approximately one percent of the animals by day three, affected five percent by day five, and decreased to less than one percent by day twelve. Affected animals sneezed and coughed frequently. The condition appeared to be more prevalent in the closed decks during feeding times and may have been due to the pellet dust.

There was some evidence of foot soreness as the journey progressed with animals lifting and placing their feet repeatedly, occasional ones becoming lame and reluctant to rise. Due to the excessive moisture, the horn on the feet became very soft and easily damaged. There was no evidence of foot-rot in these sheep.

Several animals examined were close to the point of death. One phenomenon described by the captain and chief officer was the "eat, drink, die" syndrome where animals eat and drink then fall into a panting state with their heads arched back and unable to stand - within the hour they are usually dead. Often there was evidence of paddling with muscle tremors and frothing at the mouth. Occasionally hypersensitivity to light and sound was elicited. Such animals rapidly succumb and in their latter stages showed a normal rectal temperature and a normal or low respiratory rate and heart rate. The final onset of death was delayed in a few cases for one or two days. In the early stages rectal temperatures as high as 43°C, respiratory rates more than 150 breaths per minute and heart rates of greater than 160 beats per minute were recorded.

4.2.4 Post-mortem Findings

Table 5 shows the major external and internal findings in order of prevalence from the post-mortem examination of nearly three hundred animals. There were relatively few (2%) cases of trauma and a high number of animals showing hyperacute or acute lung lesions. These were regularly accompanied by external signs such as cyanotic mucous membranes and blood from the nostrils or the mouth.

TABLE 5: Major Post-Mortem Findings

	Percent Examined*
1. EXTERNAL SIGNS	
a. Cyanotic mucous membranes	53
b. Blood from nostrils or mouth	37
c. Gross post-mortem decomposition and distension	10
d. Extensive Wool Break	3
e. Vomitus	2
f. Trauma	2

* 294 carcasses were examined for
external signs

	Percent Examined*
2. INTERNAL SIGNS	
a. Acute lung	69
b. Enteritis	23
c. Hyperacute lung	17
d. Pale liver	11
e. Fevered	11
f. Inhaled ingesta	2
g. Other	12

* 190 carcasses were examined
for internal signs

Note:- The 104 animals examined for external but not internal
signs at post-mortem included:

30 which were too decomposed
6 with obvious traumatic injury
68 showing cyanosis and/or blood coming out of
nostrils and mouth similar to those showing
acute or hyperacute lung lesions.

The lung appearance was categorised as follows:

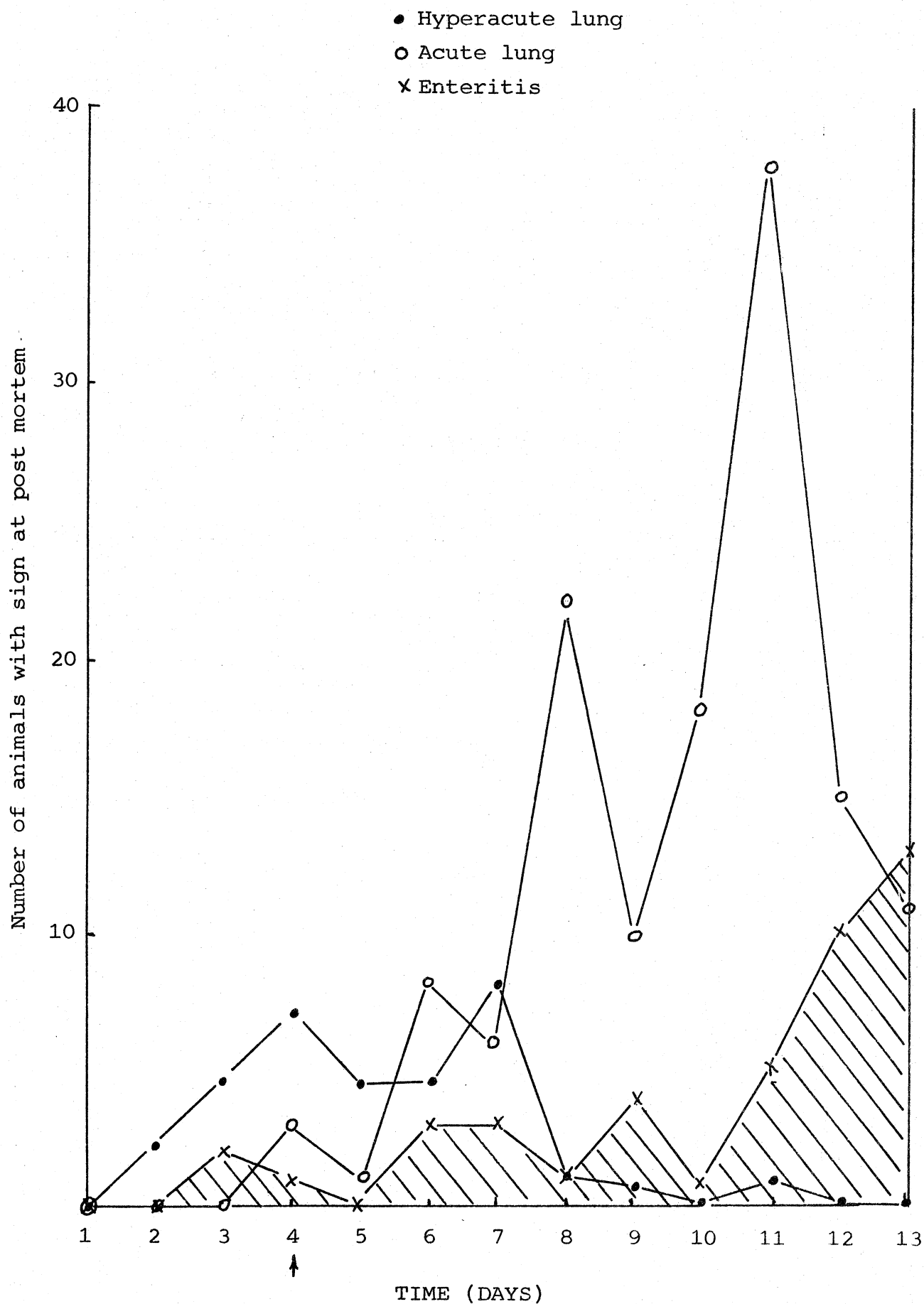
Hyperacute lungs were swollen, oedematous with a bright red to dark red colour. The cut surface oozed serosanguinous fluid and frequently clotting was delayed. In most cases the whole lung was affected although when animals were sacrificed there were areas of peripheral consolidation in the apical and cardiac lobes. Occasionally areas of lung appeared to have collapsed for one centimetre or more from the pleural surface. Acute lungs were less oedematous or swollen with more defined areas of consolidation. Frequently, the lungs gave a marbled appearance with areas of mottled pink, dark red and bright red. The cut surface did not ooze fluid and clotting appeared normal. All or part of the lung could be affected. Marbled lungs were always completely affected.

Enteritis was seen in twenty-three percent of those examined and involved specific areas of the large or small intestines. Occasionally the entire intestinal tract was inflamed and in one animal there was a rumenitis.

The three main post-mortem findings appear in graph form in Figure 7 where it can be seen that the hyperacute lungs preceded the acute ones, the latter appearing mainly during the second half of the journey. Note that both forms contributed to the mortality at day four which was ascribed to the ventilation breakdown in the previous section.

Figure 7: The distribution of major post mortem findings during the journey.

The arrow refers to the day ventilation broke down.



Enteritis was mainly a problem towards the end of the journey and certainly did not contribute to the mortality seen following the ventilation breakdown on day four. Samples were placed in 10% formol saline from two animals sacrificed in their terminal stages. They were processed in the pathology laboratory of the Woden Valley Hospital. On examination of stained sections, the hyperacute lung showed evidence of congestive heart failure consistent with a mechanical or physical cause of death. Asphyxiation and heat stroke could present a similar picture. The acute lung showed a bronchitis with one section containing a granuloma without foreign body.

Further detailed investigations will be needed before these observations can be related to a specific cause.

4.2.5 Other Observations

The concern and compassion for the animals shown by the captain and chief officer was remarkable. Without it, the mortalities could have been two or three times as high. Of the many examples, perhaps the best is the reaction of these men when the main switchboard failure prevented any ventilation. Their first and only priority was to restore power and ventilation to the animals. Ventilation for the officers and crew was restored many hours later. Both welcomed the author on board and spent many hours discussing the sheep and lambs. On most occasions one of them was present during the post-mortem examinations. It was admitted by them that their knowledge of animal husbandry and management including post-mortem techniques was deficient and largely learned on the job. Both would welcome the opportunity to attend a short course designed to teach a basic understanding of these disciplines.

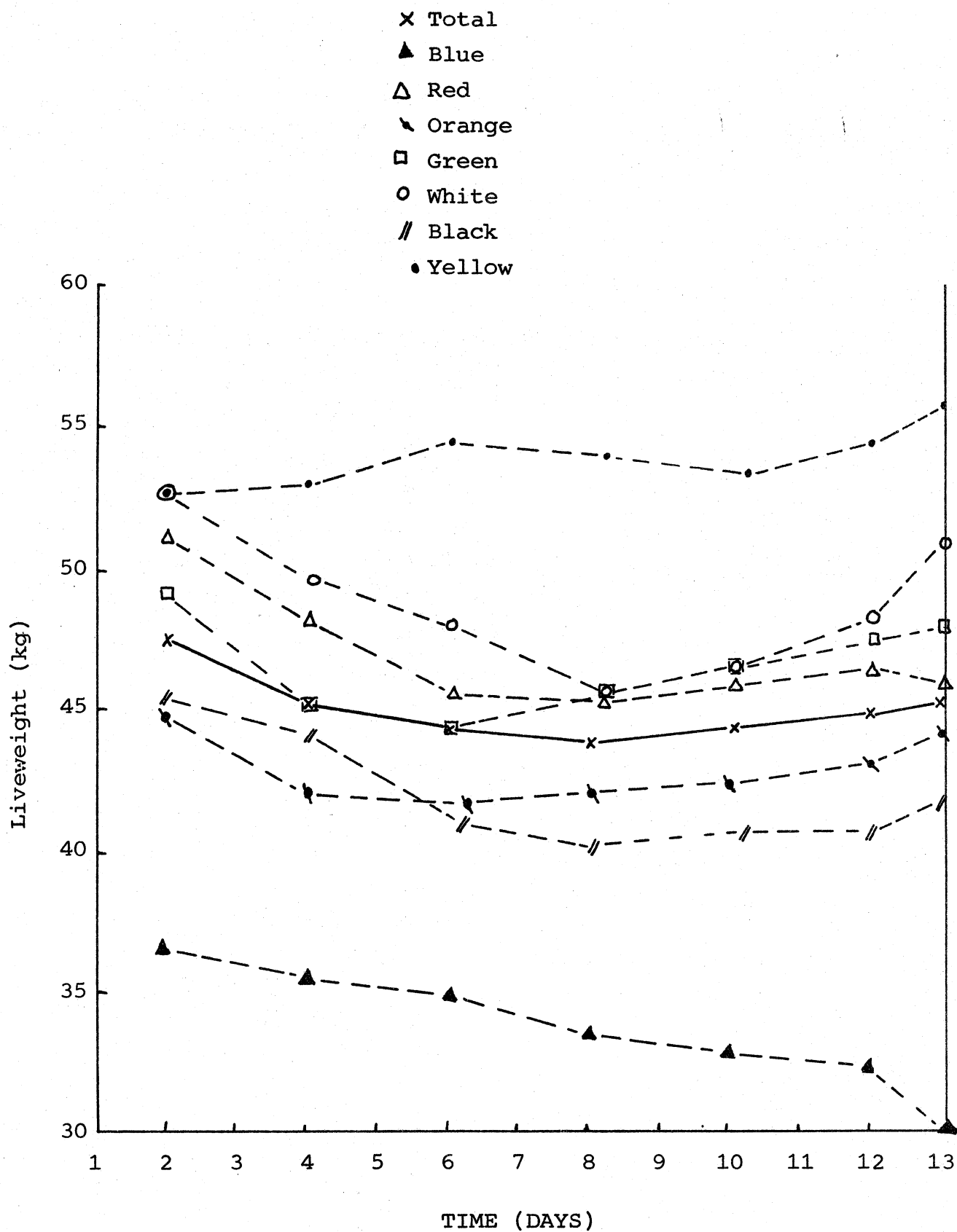
Mention has already been made of many behavioural features of the animals in response to the changed conditions on board. The effects of mixing different ages and sizes has been outlined. During the latter half of the journey many animals showed behaviour indicative of boredom and frustration such as the repeated pawing of the ground, mouthing of the edge of food and water troughs and other fittings. Their fear of man had largely disappeared by day four when they would readily move forward to smell an outstretched hand. When the lighting was turned to a low level as many as could lay down and the rest stood resting.

It had been planned to take a large number of liveweight readings but the airlines lost the machinery specially obtained from CSIRO for the purpose. Instead, a small clock face scale was borrowed from the Western Australian Department of Agriculture and the carcass weights of seven animals at sample site five were recorded.

Figure 8 shows these weights for the animals concerned and the overall average. One of the heaviest animals gained weight throughout the journey while the lightest steadily lost weight. Overall, the group lost weight during the first week and staged a recovery during the second but never regained their original weights. These observations support the criticisms made of mixing different mobs of sheep and lambs.

The bulk of the observations reported here are in the form of group or population averages - and much valuable information can be gained using these techniques. However, it is the individual animals which die or are sick or lose weight. Animal welfare is essentially a statement of the effects of the environment on an individual animal. It is, therefore, necessary to point out that the group averages frequently mask more acute problems in individuals.

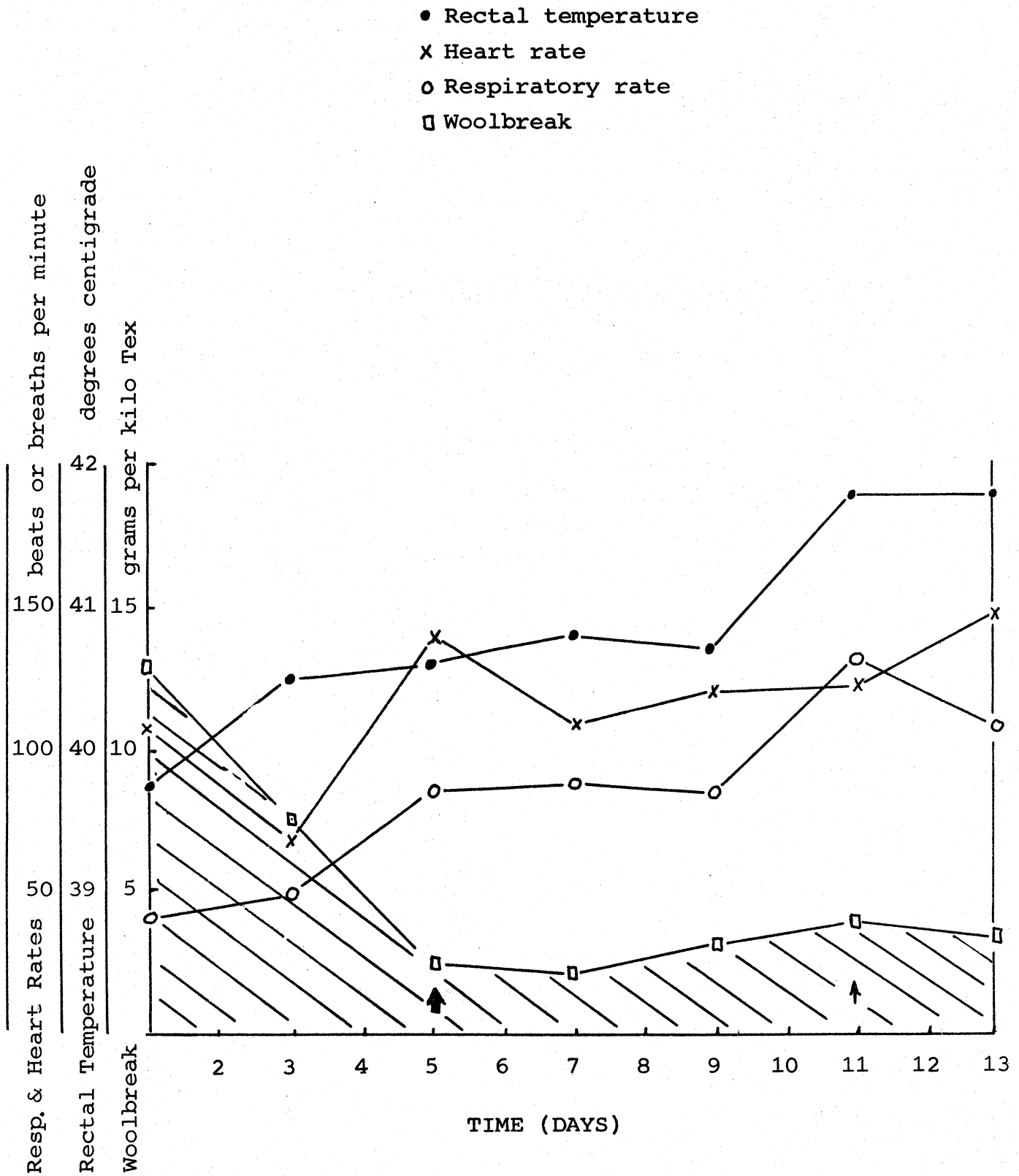
Figure 8: The liveweight of sheep en route to the Middle East.



For example in Section 4.2.1 it was noted that a sheep in pen four had broken its leg on day five due to a design fault in the pen structure. This animal had to be excluded from the calculations in Section 4.2 because it would have masked the effects of other less defined environmental influences on the group as a whole.

Figure 9 illustrates the observations on this animal for the various parameters reported earlier for groups of animals. Following the break in the leg, the heart and respiratory rates and the rectal temperature rose, to rise again as the fracture became infected on day eleven. The wool break readings fell and remained below the level where staples could be plucked by hand for the rest of the journey. The animal survived the journey at least to day fourteen and although only one of nearly forty thousand its story was repeated by many who survived the journey in a lesser state than when they started it.

Figure 9: Cardinal signs and woolbreak readings on one animal in sample pen 4. Thick arrow is day leg observed broken. Thin arrow is day the broken leg was seen to be infected.



5. DISCUSSION

The Australian port of Esperance, the vessel and the shipping company are widely recognised as being among the best in the industry. The company is proud of its reputation and the fact that the owners are indeed concerned about the welfare of the animals. Any criticisms therefore made in this report reflect the best in the industry and so should not be taken as a comment on other sections which are thought to be less capable.

The practices and procedures in Australia have wider implications for the trade than was originally thought. The mixing of breeds, ages and weights in Australia leads to unnecessary welfare problems on board. Similarly, the full brunt of poor practices in Australia are often only apparent later at sea. There is an urgent need for Australian facilities and practices to be upgraded.

There are several Commonwealth Departments and agents of those Departments who have officers at shipside. They are not obliged to wear uniforms and so may appear for duty in thongs and tee shirts or other casual clothes. The image of the Australian Government at shipside would be greatly improved if it became mandatory for officers or their agents to provide an identifiable presence by wearing suitable uniforms.

It was clear from comments by those ashore and on board that the presence of an official veterinarian created an atmosphere where stockmen and other animal handlers became more conscientious. The fact that someone was investigating the cause of death meant that handlers were quicker to correct minor faults which, left unattended, could have led to more deaths. The overall mortality on this journey was low and could be described as excellent when one regards the mishaps which occurred en route. Nevertheless, each percentage point of mortality on a ship of the 40,000 sheep class represents a loss of over \$10,000 to the owners in animal value alone.

Claims have frequently been made that a certain percentage mortality per journey is acceptable. Current Department of Transport practices enforce a lowering of stocking density when the mortality exceeds four percent on two consecutive journeys. A mortality of four percent over a fourteen day journey is equivalent to an on-farm mortality of 104% per annum - clearly unacceptable. But so is a mortality of one percent (equals 26% per annum). Mortality on some shipments has been considerably less than one percent. Any mortality is an individual tragedy but probably with humane stocking densities and compassionate trained handlers with good facilities, including adequate ventilation and waste control, a low mortality of 0.25% as reported for sheep travelled above deck to Singapore, should be possible (1, 10).

The conditions of transport presented in Section 4.1 are quite inadequate in most respects. Yet the ship satisfies the Department of Transport requirements. Clearly the requirements must therefore be inadequate. Most of the points raised in this report have been repeatedly mentioned in the literature, for example in 1959 (10), 1961 (6) and 1970 (1), but they still continue. Some practices have deteriorated, for it is known that some waste control was practised on ships carrying sheep to Singapore in 1961 (1). The Commonwealth requires export abattoirs to separate sheep from their excreta by using slatted floors in holding yards where they are rarely held for longer than three days, yet finds it acceptable for sheep to stand in their own waste on board ships for two or three weeks. A stocking density of 3.31 sheep per square metre is unacceptable under any circumstances except short-distance transportation of sheep. In practical terms, it means that only around half of the sheep can lie down at any one time and that once an animal has gone down through illness it will have real difficulty getting up again. The graduation of allowable densities according to live weight ignores basic scientific knowledge on the production of heat and the effects of stress on heavier sheep compared with lighter ones (11). There is an urgent need to revise the accepted practices.

There is a degree of ignorance of good veterinary and animal husbandry practices even amongst experienced staff on board ships. At least one person on board each vessel ought to have undergone a training course specifically to enable him to supervise a cargo of live sheep. Similar courses are mandatory for officers on board other cargo ships and oil tankers. The training ought to include basic post mortem techniques and recognition of gross pathology so that a meaningful report can be submitted at the end of each journey. The Commonwealth should have the means of checking mortalities and other data submitted by companies.

The two major post-mortem findings of lung pathology and enteritis require further investigation. There are many possible causes of the lung pathology such as uncomplicated pasteurellosis (12, 13) or one involving a viral infection similar to that reported in cattle (14). Ammonia poisoning, asphyxiation, congestive heart failure and heat stroke could be involved. There is a need for a specialist team with a mobile laboratory to investigate shipboard mortalities.

The physiological measurement of clinically normal sheep provided valuable information on stress induced by the environmental conditions on closed decks which raised the respiratory rate and rectal temperatures above that seen on open decks. There is an urgent need to improve the Gordon method of measuring woolbreak force so that it is more accurate and less cumbersome. Its results are in broad agreement with the changes in liveweight during the journey.

Following disembarkation, Australian sheep are so different to other sheep in the Middle East that they are instantly recognised. They are, in effect, an Australian advertisement. Where consistently poor quality Australian sheep are presented, not only will a market for live sheep disappear, but a slur is cast on other Australian products of animal origin. Therefore, it is in Australia's interest to discourage practices which allow the trade to fall into disrepute through trans-shipment or any other excessive handling practice which reduces quality.

6. CONCLUSIONS

A. The welfare of sheep and lambs prior to embarkation in Australia is inadequate. Poor stockmanship, makeshift facilities and a neglect of accepted husbandry practices have become entrenched.

B. The current requirements of the Department of Transport are not based on up to date scientific knowledge or accepted practices and are inadequate in many respects - for example the stocking rates, the ventilation systems, the absence of waste control and the threshold mortality before action is taken.

C. There is a lack of knowledge among responsible men on export ships of the basic procedures in animal nursing, treatment of sick animals and post-mortem techniques. This leaves them unable to respond to veterinary emergencies when they occur. The conditions during transit of this voyage were such that a number of animals which died could have lived had proper treatment facilities and knowledge been available.

D. This report identifies lung and gastrointestinal lesions as major post-mortem findings. These should be further investigated as should any major cause of mortality on ships.

E. In conclusion, there are serious but readily rectifiable deficiencies in the welfare of Australian sheep and lambs exported to the Middle East. These deficiencies occur before embarkation and during sea transportation. The trade is one of considerable economic importance, and should continue subject to an improvement in the welfare of export animals. A record of genuine and concerned attention given to the humane export of live animals will do much to ensure the continuation of this valuable trade.

7. ACKNOWLEDGEMENTS

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8. REFERENCES

1. Gardiner, M.R. and Craig, J. (1970) "Factors affecting survival in the transportation of sheep by sea in the tropics and sub-tropics" Aust. vet. J. 46, 65-69.
2. Anon. (1980) "Report to the Australian Veterinary Association Ltd. Standing Committee on Animal Welfare from the Working Party on Transport of Livestock for Export".
3. Tuckey, K.W. (1980) "The export of slaughter horses to Japan on the M.V. Canberra Maru, May-June 1980" Bureau of Animal Health, Canberra.
4. Gaffney, D.O. (1973) "Atlas of Australian resources - second series - Climate" Bureau of Meteorology, Dept. of Science, Canberra.
5. Lee, D.H.K. and Henschel, A. (1963) "Evaluation of Environment in Shelters" (U.S. Department of Health, Education and Welfare Cincinnati).
6. Hamilton, F.J., Manus, P., Bennett, J.W., and Hutchinson, J.C.D. (1961) "Observations on the transport of sheep by sea through the tropics" Aust. vet. J., 37, 297-302.

7. Belschner, H.G. (1959) 'Sheep management and diseases'. Angus and Robertson, Sydney, pages 349 and elsewhere.
8. Gordon, A.J. (1980) "The measurement of, and factors affecting, the strength of attachment of wool to the skin of sheep". Aust. J. exp. agric. anim. Husb. 20, 40-49.
9. Reynolds, P.J., Dolnick, E.H., Sidwell, G.M., and Terrill, C.E. (1972) "The effects of cyclophosphamide dosage on the rate of wool loosening". J. anim. Sci. 34 (2), 246-249.
10. Lavers, D.W. (1959) "Veterinary aspects of the export of stock". Aust. vet. J., 35, 148-153.
11. Graham, N. McC. (1969) "The influence of body weight (fatness) on the energetic efficiency of adult sheep". Aust. J. agric. Res., 20, 375-85.
12. Blood, D.C. and Henderson, J.A. (1974) "Veterinary Medicine" fourth edition, Bailliere Tindall, London, page 369.
13. Gilmour, N.J.L., Angus, K.W., and Sharp, J.M. (1980) "Experimental pulmonary infections of sheep caused by Pasteurella haemolytica biotype T". Vet. Record, 106, 507-508.
14. Thomas, L.H., Stott, E.J., Jones, P.W., Jebbett, N.J. and Collins, A. (1980) "The possible role of respiratory syncytial virus and Pasteurella spp. in calf respiratory disease". Vet. Record, 107, 304-307.