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Publications on

**ASPECTS OF VETERINARY
PUBLIC HEALTH**

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PREFACE

This application, to be examined for the degree of Doctor of Science (Massey University), is based on work which could be broadly classified under the heading of veterinary public health. The 1956 W.H.O. definition of veterinary public health is "the utilisation of veterinary medical arts and sciences in the prevention of disease, protecting life, and promoting the wellbeing and efficiency of man." The scope of the subject is therefore wide and of a multidisciplinary nature. The applicant was formally appointed to promote the discipline of veterinary public health at Massey University in 1973. However, he has had a major interest in the topic since becoming involved in insecticide toxicity in the early 1960's. This interest led to the development of animal models for the study of human infectious disease, particularly cariogenic streptococci, and the use of gnotobiotic techniques.

Work at Massey University developed into two main areas; occupationally acquired zoonoses and meat hygiene, including the slaughter of stock. The studies on occupational zoonoses were initially confined to leptospirosis with an emphasis on the epidemiology of infection by *Leptospira interrogans* in animals and man, and risk factors associated with human infection. This work was later extended to other occupationally acquired infections and the epidemiology of infection by *Streptococcus suis* types 1 and 2, in pigs and man.

The investigations on the slaughter of stock were initially related to humane aspects of the procedure, but included studies related to the effects of slaughter on meat quality and more general aspects of meat hygiene.

By definition, veterinary public health is a multidisciplinary subject, and thus, the majority of papers presented in this submission are of joint authorship. However, none are presented in which the applicant did not have a major role in either initiation and planning of the project and/or a major part in the execution of the research.

A list of publications on other topics is included to indicate an additional breadth of interest and contributions to science.

ACKNOWLEDGEMENTS

I sincerely acknowledge all my co-authors in the publications submitted. I am particularly indebted to the late Professor R. Lovell and the late Dr P. Ingram who encouraged and advised me in my earlier scientific endeavours.

I wish to acknowledge the expert and enthusiastic technical assistance of Mr V. Jansen, now at the Auckland Medical School, for the work involving gnotobiotic animals.

I am particularly indebted to Professor B.W. Manktelow for his support and for the advice and help of other colleagues within the Faculty of Veterinary Science, Massey University.

Finally, I wish to thank my wife for her encouragement, and assistance in proof reading my contributions.

CONTENTS

Part I Insecticide poisoning of foxes

- 1.1 Taylor, J.C.; Blackmore, D.K. (1961): A short note on the heavy mortality in foxes during the winter 1959-1960. *Vet.Rec.* **73**: 232-233.
- 1.2 Blackmore, D.K. (1963): The toxicity of some chlorinated hydrocarbon insecticides to British Wild Foxes. *J.Comp.Path.* **73**: 391-409.
- 1.3 Blackmore, D.K. (1964): A survey of disease in British Wild Foxes (*Vulpes vulpes*). *Vet.Rec.* **76**: 527-533.

Part II Studies on cariogenic Streptococci and other topics in gnotobiotic and S.P.F. laboratory animals

- 2.1 Blackmore, D.K.; Green, R.M. (1971): The use of germfree and specific pathogen free rats in short-term experiments for the assessment of potentially cariogenic organisms. *Arch.Oral Biol.* **15**: 1149-1155.
- 2.2 Blackmore, D.K.; Drucker, D.B.; Green, R.M. (1971): Caries induction in germfree rats by streptococci isolated from dental abscesses in man. *Arch.Oral Biol.* **15**: 1377-1379.
- 2.3 Green, R.M.; Huxley, H.G.; Drucker, D.B.; Blackmore, D.K. (1972): Conflicting results from the oral inoculation of a cariogenic streptococcus on caries incidence in the hooded rat. *Arch.Oral Biol.* **17**: 903-906.
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- 2.5 Blackmore, D.K.; Drucker, D.B.; Green, R.M. (1973): Observations on the cariogenic assessment of streptococci in gnotobiotic rats with reference to the taxonomy of *Streptococcus mutans*. In *Germfree Research: Biological effect of Gnotobiotic Environments*. Academic Press, New York, pp 205-210.
- 2.6 Green, R.M.; Blackmore, D.K.; Drucker, D.B. (1973): The role of gnotobiotic animals in the study of dental caries. *Brit.Dent.J.* **134**: 537-540.
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- 2.9 Blackmore, D.K.; Francis, R.F. (1970): The apparent transmission of staphylococci of human origin to laboratory animals. *J.Comp.Path.* **80**: 645-651.

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- 3.2 Hathaway, S.C.; Blackmore, D.K.; Marshall, R.B. (1978): The serologic and cultural prevalence of *Leptospira interrogans* serovar *balcanica* in possums (*Trichosurus vulpecula*). *J. Wildlife Dis.* **14 (3)**: 345-350.
- 3.3 Blackmore, D.K.; Hathaway, S.C. (1980): The natural nidality of zoonoses. Proc. Second Int. Symp. on Veterinary Epidemiology and Economics, Canberra. Australian Government Publishing Service, pp 207-213.
- 3.4 Hellstrom, J.S.; Blackmore, D.K. (1980): A cohort analysis study of bovine leptospirosis within a dairy herd. Proc. Second Int. Symp. on Veterinary Epidemiology and Economics, Canberra. Australian Government Publishing Service, pp 214-219.
- 3.5 Mackintosh, C.G.; Blackmore, D.K.; Marshall, R.B. (1980): Isolation of *Leptospira interrogans* serovars *tarassovi* and *pomona* from dogs. *N.Z. vet. J.* **28**: 100.
- 3.6 Mackintosh, C.G.; Marshall, R.B.; Blackmore, D.K. (1980): *Leptospira interrogans* serovar *balcanica* in cattle. *N.Z. vet.J.* **28**: 268.
- 3.7 Blackmore, D.K.; Marshall, R.B.; Mackintosh, C.G. (1981): Alternative strategies for the control of leptospirosis in dairy herds. *N.Z.vet.J.* **29**: 19-20.
- 3.8 Schollum, L.M.; Blackmore, D.K. (1981): The serological and cultural prevalence of leptospirosis in a sample of feral goats. *N.Z.vet.J.* **29**: 104-106.
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- 3.14 Fairley, R.A.; Schollum, L.M.; Blackmore, D.K. (1984): Leptospirosis associated with serovars *hardjo* and *pomona* in red deer calves (*Cervus elaphus*). *N.Z.vet.J.* **32**: 76-78.
- 3.15 Ho, H.F.; Blackmore, D.K. (1979): Effects of chilling and freezing on survival of *Leptospira* serovar *pomona* in naturally infected pig kidneys. *N.Z.vet.J.* **27**: 121-123.
- 3.16 Blackmore, D.K.; Bell, L.; Schollum, L.M. (1979): Leptospirosis in meat inspectors: preliminary results of a serological survey. *N.Z.Med.J. No. 648* **90**: 415-418.
- 3.17 Blackmore, D.K.; Schollum, L.M. (1982): The occupational hazards of leptospirosis in the meat industry. *N.Z.Med.J.* **95**: 494-497.
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- 3.25 Robertson, I.D.; Blackmore, D.K. (1987): The detection of pigs carrying *Streptococcus suis* type 2. *N.Z.vet.J.* **35**: 1-4.
- 3.26 Robertson, I.D.; Blackmore, D.K. (1989): The prevalence of *Streptococcus suis* types 1 and 2 in domestic pigs in Australia and New Zealand. *Vet.Rec.* (In Press).
- 3.27 Robertson, I.D.; Blackmore, D.K. (1989): Occupational exposure to *Streptococcus suis* type 2. *J.Epidem.Infec.* (In Press).
- 3.28 Wilks, C.R.; Abraham, G.; Blackmore, D.K. (1989): Bovine pestivirus and human infection. *Lancet* (i) **No. 8629**: 107.

List of other publications on epidemiology and zoonoses

Part IV Slaughter of stock and meat hygiene

- 4.1 Blackmore, D.K.; Newhook, J.C. (1976): Effects of different slaughter methods on bleeding sheep. *Vet.Rec.* **99** (16): 312-316.
- 4.2 Newhook, J.C.; Blackmore, D.K. (1982): Electroencephalographic studies of stunning and slaughter of sheep and calves. Part I : The onset of permanent insensibility in sheep during slaughter. *Meat Sci.* **6**: 221-233.
- 4.3 Newhook, J.C.; Blackmore, D.K. (1982): Electroencephalographic studies of stunning and slaughter of sheep and calves. Part II : The onset of permanent insensibility in calves during slaughter. *Meat Sci.* **6**: 295-301.
- 4.4 Blackmore, D.K.; Newhook, J.C. (1982): Electroencephalographic studies of stunning and slaughter of sheep and calves. Part III : The duration of insensibility induced by electrical stunning in sheep and calves. *Meat Sci.* **7**: 19-28.
- 4.5 Blackmore, D.K.; Newhook, J.C.; Grandin, T. (1983): Time of onset of insensibility in four to six-week-old calves during slaughter. *Meat Sci.* **9**: 145-149.
- 4.6 Blackmore, D.K.; Newhook, J.C. (1981): Insensibility during slaughter of pigs in comparison to other domestic stock. *N.Z.vet.J.* **29**: 219-222.

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- 4.8 Blackmore, D.K. (1984): Differences in behaviour between sheep and cattle during slaughter. *Res.Vet.Sci.* **37**: 223-226.
- 4.9 Blackman, N.L.; Cheetham, K.; Blackmore, D.K. (1986): Differences in blood supply to the cerebral cortex between sheep and calves during slaughter. *Res.Vet.Sci.* **40**: 252-254.
- 4.10 Tidswell, S.J.; Blackmore, D.K.; Newhook, J.C. (1987): Slaughter methods: electroencephalographic (EEG) studies on spinal cord section, decapitation and gross trauma of the brain in lambs. *N.Z.Vet.J.* **35**: 46-49.
- 4.11 Blackmore, D.K. (1979): Non-penetrative percussion stunning of sheep and calves. *Vet Rec.* **105**: 372-375.
- 4.12 Blackmore, D.K. (1985): Energy requirements for the penetration of heads of domestic stock and the development of a multiple projectile for shooting animals. *Vet.Rec.* **116**: 36-40
- 4.13 Blackmore, D.K. (1983): Problems associated with non-penetrative percussion stunning of sheep. *In* *Stunning of Animals for Slaughter*. Ed. G. Eikelenboom, Martinus Nijhoff Publishers, The Hague, pp 146-153.
- 4.14 Blackmore, D.K. (1983): Practical problems associated with the slaughter of stock. *In* *Stunning of Animals for Slaughter*. Ed. G. Eikelenboom, Martinus Nijhoff Publishers, The Hague, pp 167-178.
- 4.15 Thornton, R.N.; Blackmore, D.K.; Jolly, R.D.; Harris, R.E.; Marsden, N.A. (1979): Petechial haemorrhages in carcass fat of slaughtered lambs. *N.Z.vet.J.* **27**: 181-184 and 189.
- 4.16 Blackmore, D.K.; Petersen, G.V. (1981): Stunning and slaughter of sheep and calves in New Zealand. *N.Z.vet.J.* **29**: 99-102.
- 4.17 Petersen, G.V.; Blackmore, D.K. (1982): The effect of different slaughter methods on the post mortem glycolysis of muscles in lambs. *N.Z.vet.J.* **30**: 195-198.
- 4.18 Blackmore, D.K.; Delany, M.W. (1987): Determination of impaired brain function in animals at the abattoir. Seminar "Preslaughter stunning of food animals". European Conference group on the Protection of Farm Animals, Horsham, pp 17-32.

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- 4.20 Blackmore, D.K.; Delany, M.W. (1988): Slaughter of Stock: A practical review and guide. Publication No. 118, Foundation for Continuing Education of the N.Z.V.A., Massey University, Palmerston North.
- 4.21 Blackmore, D.K. (1989): The use of electrocardiograms as an aid in assessing the effects of stunning on cattle and pigs. *N.Z.vet.J.* (In Press).
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- 4.23 Blackmore, D.K. (1983): A new approach to Meat Inspection. *Nordisk Vet.* **35**: 184-189.
- 4.24 Blackmore, D.K. (1989): Ensuring the safety and wholesomeness of meat. In *The Production and Processing of Meat*. Eds R. Purchas, B. Butler Hogg and A.S. Davies. Occasional Publication No. 11, N.Z. Soc. Animal Production (In Press).

Part V

List of publications on other topics

Part V

PUBLICATIONS ON OTHER TOPICS

The following list only includes publications in journals and omits conference proceedings and similar publications not referred to a referee. Those marked with an asterisk relate to work submitted in a PhD thesis in 1967 to London University.

It is hoped that they demonstrate an additional breadth of scientific interest and competence by the author. Seven of these publications (marked⁺) covering totally different topics are included.

⁺ Blackmore, D.K. (1960): Some observations on dystokia in the ewe. *Vet. Rec.* **72**: 631-637.

* Blackmore, D.K. (1963): Some observations on *Cnemidocoptes pilae*, together with its effect on the budgerigar. *Vet.Rec.* **75**: 592-595.

* Blackmore, D.K. (1963): The incidence and aetiology of thyroid dysplasia in budgerigars. *Vet.Rec.* **75**: 1068-1072.

Blackmore, D.K. (1964): Problems encountered in attempting to anaesthetize and sedate British Wild Foxes. In *Small Animal Anaesthesia*, Pergamon Press, Oxford, pp 191-194.

* Blackmore, D.K.; Gallagher, G.L. (1964): An outbreak of erysipelas in captive wild birds and mammals. *Vet.Rec.* **76**: 1161-1164.

Keymer, I.F.; Blackmore, D.K. (1964): Diseases of the skin and soft parts of wild birds. *Brit.Birds* **57**: 175-179.

Blackmore, D.K. (1965): The budgerigar and the Veterinary profession. *J.Small Anim.Pract.* **6**: 1-5.

* Blackmore, D.K.; Lucas, J.F. (1965): A simple method for the accurate oral administration of drugs to budgerigars. *J.Small Anim.Pract.* **6**: 27-29.

* Blackmore, D.K. (1966): The pathology and incidence of Neoplasia in cage birds. *J.Small Anim.Pract.* **7**: 217-223.

Blackmore, D.K. (1966): The budgerigar as a laboratory animal. *J.Inst. Anim.Tech.* **17**: 151-154.

Blackmore, D.K. (1968): Some observations on Ornithosis. Part II: The disease in cage and aviary birds. *Diseases of Animals communicable to Man*, Pergamon Press, Oxford, pp 151-155.

+ Blackmore, D.K.; Owen, D.G. (1968): Ectoparasites: the significance in British wild rodents. *Symp.Zool.Soc. Lond.* **24**: 199-220.

Blackmore, D.K. (1968): Ornithosis. *Vet.Rec. (Clinical Suppl.)* **80**: VIII-IX.

Blackmore, D.K. (1969): Diseases of the reproductive system. Chapter 20, Diseases of Cage and Aviary Birds. Ed. M.L. Petrak, Lea and Febiger, Philadelphia, pp 321-329.

+ Blackmore, D.K. (1969): Diseases of the endocrine system. Chapter 22, Diseases of Cage and Aviary Birds, Ed. M.L. Petrak, Lea and Febiger, Philadelphia, pp 339-350.

+ Blackmore, D.K. (1969): Some problems of air filtration for germfree isolators. *Hygienisk Tidskrift* **25**: 45-55.

Blackmore, D.K. (1969): An introduction to the uses and maintenance of germfree animals. *Bull.Inst.Anim.Techn.* **5**: 8-9.

Hill, A.; Blackmore, D.K.; Francis, R.F. (1969): The isolation of Mycoplasmas from guinea pigs (*Cavia porcellus*). *Vet.Rec.* **81**: 291-292.

Blackmore, D.K.; Keymer, I.F. (1969): Cutaneous diseases of wild birds in Britain. *Brit.Birds* **62**: 316-331.

Blackmore, D.K.; Hill, A.; Jackson, O.F. (1971): The incidence of mycoplasma in pet and colony maintained cats. *J.Small Anim.Pract.* **12**: 207-216.

+ Festing, M.; Blackmore, D.K. (1971): Life span of specified pathogen-free (M.R.C. Category 4) mice and rats. *Laboratory Animals* **5**: 179-192.

Blackmore, D.K.; Hill, A. (1972): The isolation and identification of bacteria and mycoplasma pathogenic to laboratory animals "Safety in Microbiology", Academic Press, London, pp 103-120.

Blackmore, D.K. (1972): Hygiene. In U.F.A.W. Handbook on the Care and Management of Laboratory Animals, 4th edition, pp 94-104.

Blackmore, D.K. (1972): Cage Birds. In Jones' Animal Nursing, Pergamon Press, Oxford, pp 156-164.

Blackmore, D.K.; Keeley, A. (1972): Smaller Mammals. In Jones' Animal Nursing, Pergamon Press, Oxford, pp 165-168.

Casillo, S.; Blackmore, D.K. (1972): Uterine infections due to bacteria and mycoplasma in mice and rats. *J.Comp.Path.* **82**: 477-482.

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Blackmore, D.K.; Watson, A.R.A.; Brewer, D.N. (1977): The practical training of New Zealand veterinary undergraduates in meat hygiene. *Vet.Rec.* **100**: 23-25.

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Blackmore, D.K. (1986): Developments in Veterinary Public Health as they affect meat quality. *Kajian Veterinar, Malaysia* **18**: 229-234.

Blackmore, D.K.; Schultze, Wendy H.; Absolon, Gillian C. (1986): Light intensity and fur-chewing in Rabbits. *N.Z.V.J.* **34**: 158.