

George Owen Mackie

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Curriculum Vitae

Early years and training.

1929 Born at Louth, Lincolnshire, England, Oct 20.

1940 Evacuated to Canada. School in Vernon B.C. Repatriated 1944 to school in UK.

1948 Military service, commissioned 2nd Lieut. Royal Artillery. Served in Gibraltar, 54th Anti-Aircraft Regiment, 1949/50.

1950 Oxford University. Elected to Casberd Scholarship, St John's College.

1953 Graduated with Hons B.A. degree.

1954- 57 D.Phil programme at Oxford. Awarded Oxford Naples Scholarship and ranked *proxime accessit* in Christopher Welch Scholarship.

M.A. and D.Phil. awarded in 1957.

1956 Emigrated to Canada. Canadian citizenship 1965.

Marital status

Married to Gillian Vallance Mackie née Faulkner (deceased Sept 2021) with five children

Jobs and research appointments in Canada.

Alberta

1956 Lecturer, University of Alberta, Edmonton

1957 Assistant Professor

1961 Associate Professor

1963-4. N.R.C. Postdoctoral Overseas Fellow, studied at Wood Hole, Mass., USA (Marine Biological Laboratory), St Andrews, Scotland (Gatty Marine Lab) and Villefranche-sur-Mer, France (Station Zoologique, Université de Paris)

1966 Professor

1966 Visiting Research Associate, University of Wisconsin, Madison.

1968 President, Association of the Academic Staff, University of Alberta.

Victoria

1968-1994 Professor, University of Victoria

1971-73 Chairman, Biology Dept.

1974-5 NRC Travel Fellow and NRC/CNRS Scientific Exchange Visitor for sabbatical year. Research at Plymouth, England (Marine Biological Association), Kotor, Montenegro (International Brain Research Institute) and Villefranche-sur-Mer, France (Station Zoologique, Université de Paris).

1977. NRC/CNRS Scientific Exchange Visitor in France (work at Villefranche-sur-Mer)

1978 Visiting Professor, University of California, Los Angeles, California.

1980-88. Editor, Canadian Journal of Zoology

1982 NSERC International Collaborative Research Visitor, Hopkins Marine Station, Stanford University, Pacific Grove California.

1985/6. Exchange visitor under Canada-Switzerland Scientific Exchange Programme (Basel).

1986-88. Killam Research Fellow.

1995 Professor emeritus, University of Victoria

Honours

1982. Fellow, Royal Society of Canada

1989. Fry Medalist, Canadian Society of Zoologists

1991. Fellow, Royal Society of London

1999. Honorary Member, Canadian Society of Zoologists

Publications

1. Totton, A.K. and G.O. Mackie. 1956. Dimorphism in the Portuguese Man-of-War. *Nature* 177: 290.

2. Mackie, G.O. 1959. The evolution of the Chondrophora. *Trans. Roy. Soc. Canada. LIII Ser. III. Sect. 5: 7-20.*

3. Mackie, G.O. 1960a. The structure of the nervous system in *Velella*. *Quart. J. Micro. Sci.* 101: 119-131.

4. Mackie, G.O. 1960b. In: Totton, A.K. & G.O. Mackie. *Studies on Physalia physalis (L.) Part II, Behaviour and Histology.* "Discovery" Reports 30: 301-408. Cambridge University Press.

5. Mackie, G.O. 1960c. Echiuroids from the Canary Islands. *Ann. Mag. Nat. Hist. Ser. 13, Vol. iii:* 247-251.
6. Mackie, G.O. 1961. In: "Is there a nervous system in *Hydra*?" (Floor Discussion) pp. 69-72 in the *Biology of Hydra* (ed. Lenhoff and Loomis), Univ. of Miami Press.
7. Mackie, G.O. 1962. Factors affecting the distribution of *Velella* (Chondrophora). *Internat. Rev. Ges. Hydrobiol.* 47: 26-32.
8. Mackie, G.O. 1962. Pigment effector cells in a cnidarian. *Science* 137 (3531): 689-690.
9. Mackie, G.O. 1963. Siphonophores, bud-colonies and superorganisms. In: *The Lower Metazoa; Comparative Biology and Phylogeny*, (ed. E. Dougherty), Univ. of California Press, pp. 329-337.
10. Mackie, G.O. & D.A. Boag. 1963. Fishing, feeding and digestion in siphonophores. *Publ. Staz. Zool. Napoli* 33: 178-196.
11. Adshear, P.C., G.O. Mackie & P. Paetkau. 1963. On the hydras of Alberta and the Northwest Territories. *Nat. Mus. Can., Bull* 199: 1-13.
12. Mackie, G.O. & G.V. Mackie. 1963. Systematic and biological notes on living hydromedusae from Puget Sound. *Nat. Mus. Can., Bull.* 199: 63-84.
13. Mackie, G.O. 1964. Analysis of locomotion in a siphonophore colony. *Proc. Roy. Soc. B.* 159: 366-391.
14. Mackie, G.O., D.B. Fillion, B. Hammond, & A. Hancock. 1964. Massive accumulations of protein in the nuclei of *Cordylophora*. *Can. J. Zool.* 42: 1011-1016.
15. Mackie, G.O. 1965. Conduction in the nerve-free epithelia of siphonophores. *Amer. Zool.* 5: 439-453.
16. Josephson, R.K. & G.O. Mackie. 1965. Multiple pacemakers and the behaviour of the hydroid *Tubularia*. *J. Exp. Biol.* 43: 292-332.
17. Mackie, G.O. 1966. Growth of the hydroid *Tubularia* in culture. In: "The Cnidaria and their Evolution" (ed. W.J. Rees), Academic Press, New York.
18. Mackie, G.O. 1966. Treatise on the Siphonophora (Book Review), *Science* 152: 944-945.
19. Mackie, G.O., L.M. Passano & M. Pavans de Ceccatty. 1967. Physiologie du comportement de l'Hydroméduse *Sarsia tubulosa* Sars. Les systèmes à conduction aneurale. *Comptes rendus de l'Acad. Sci. Paris* 264: 466-469.

20. Passano, L.M., G.O. Mackie, & M. Pavans de Ceccatty. 1967. Physiologie du comportement de l'Hydroméduse *Sarsia tubulosa* Sars. Les systèmes des activités spontanées. Comptes rendus de l'Acad. Sci. Paris 264: 614-617.
21. Mackie, G.O. & G.V. Mackie. 1967. Mesogloal ultrastructure and reversible opacity in a transparent siphonophore. Vie et Milieu, Sér. A: Biologie marine 28: 47-71.
22. Jha, R.K. & G.O. Mackie. 1967. The recognition, distribution and ultrastructure of Hydrozoan nerve elements. J. Morph. 123: 43-61.
23. Mackie, G.O. & L.M. Passano. 1968. Epithelial conduction in hydromedusae. J. Gen. Physiol. 52: 600-621.
24. Mackie, G.O. 1968. Electrical activity in the hydroid *Cordylophora*. J. Exp. Biol 49: 387-400.
25. Mackie, G.O., A.N. Spencer, & R. Strathmann. 1969. Electrical activity associated with ciliary reversal in an echinoderm larva. Nature 223: 1384-1385.
26. Mackie, G.O. 1970. Neuroid conduction and the evolution of conducting tissues. Quart. Rev. Biol. 45(4): 319-332.
27. Mace, T.F. & G.O. Mackie. 1970. A study of an estuarine lagoon, with particular reference to *Cordylophora lacustris* Allman. Can. J. Zool. 48: 1454-1456.
28. Mackie, G.O. 1971. Neurological complexity in medusae: a report of central nervous organization in *Sarsia*. Actas del 1° Simposio Internacional de Zoofitogenia, Salamanca, pp. 269-280.
29. Galt, C.P. & G.O. Mackie. 1971. Electrical correlates of ciliary reversal in *Oikopleura*. J. Exp. Biol. 55: 205-212.
30. Fields, W.G. & G.O. Mackie. 1971. Evolution of the Chondrophora: Evidence from behavioural studies on *Velella*. J. Fish. Res. Bd. Canada 28: 1595-1602.
31. Mackie, G.O. 1972. The anatomy of the nervous system of *Octopus vulgaris*, by J.Z. Young. Book Review in Science 177: 1183.
32. Mackie, G.O. 1973. Coelenterata. p. 95-97 In: Encyclopedia of Microscopy and Microtechnique (ed. Peter Gray). Van Nostrand Reinhold Co., New York.
33. Mackie, G.O. 1973. Co-ordinated Behaviour in Hydrozoan Colonies. In: Development and Function of Animal Colonies (ed. R.S. Boardman, A.H. Cheetham and W.A. Oliver). Dowden, Hutchinson and Ross, New York.
34. Mackie, G.O. Report on giant nerve fibres in *Nanomia*. 1973. In: Recent Trends in Research in Coelenterate Biology (ed. T. Tokioka). Publ. Seto Mar. Biol. Lab. 20: 745-756.

35. Mackie, G.O. and D.H. Paul. 1973. (abstract) Electrical recordings from tunicate ciliated cells. *Amer. Zool.* 4: 229.
36. Mackie, G.O. 1974. Behaviour of a compound ascidian. *Can. J. Zool.* 52: 23-27.
37. Mackie, G.O. Locomotion, flotation and dispersal. 1974. In: *Coelenterate Biology: Reviews and New Perspectives.* (ed. L. Muscatine and H.M. Lenhoff). Academic Press, New York. p. 313-357.
38. Mackie, G.O., D.H. Paul, C.L. Singla, M.A. Sleight and D.E. Williams. 1974. Branchial innervation and ciliary control in the ascidian *Corella*. *Proc. R. Soc. Lond.* 187: 1-35.
39. Mackie, G.O. and C.L. Singla. 1975. Neurobiology of *Stomatoca*. I. Action systems. *J. Neurobiol.* 6: 339-356.
40. Mackie, G.O. 1975. Neurobiology of *Stomatoca*. II. Pacemakers and conduction pathways. *J. Neurobiol.* 6: 357-378.
41. Bone, Q. and G.O. Mackie. 1975. Skin impulses and locomotion in *Oikopleura* (Tunicata: Larvacea). *Biol. Bull.* 149: 267-286.
42. Mackie, G.O. 1975. (abstract) Spike propagation through coupled gland cells and secretion release. *J. Cell Biol.* 67: 254a.
43. Mackie, G.O., C.L. Singla and C. Thiriou-Quévieux. 1976. Nervous control of ciliary activity in gastropod larvae. *Biol. Bull.* 151: 182-199.
44. Mackie, G.O. and Q. Bone. 1976. Skin impulses and locomotion in an ascidian tadpole. *J. Mar. Biol. Ass. U.K.* 56: 751-768.
45. Mackie, G.O. 1976. Propagated spikes and secretion in a coelenterate glandular epithelium. *J. Gen. Physiol.* 68: 313-325.
46. Mackie, G.O. (editor) 1976. *Coelenterate Ecology and Behavior.* Plenum Publishing Corp. New York, 725 pp.
47. Mackie, G.O. 1976. The control of fast and slow muscle contractions in the siphonophore stem. In: *Coelenterate Ecology and Behavior* (ed. G.O. Mackie) Plenum Publishing Corp. New York, 647-569.
48. Anderson, P.A.V. and G.O. Mackie. 1977. Electrically coupled, photosensitive neurons controlling swimming in a jellyfish. *Science* 197: 186-188.
49. Mackie, G.O. and Q. Bone. 1977. Locomotion and propagated skin impulses in salps. *Biol. Bull.* 153: 180-197.

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51. Bone, Q., R. Fenaux and G.O. Mackie. 1977. On the external surface in Apendicularia. *Ann. Inst. Océanogr. Paris* 53: 237-244.
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53. Mackie, G.O. 1978. Coordination in physonectid Siphonophores. *Mar. Behav. Physiol.* 5: 325-346.
54. Mackie, G.O. and Q. Bone. 1978. Luminescence and ciliary control in Pyrosoma. *Proc. Roy. Soc. B.* 202: 483-495.
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56. Anderson, P.A.V., Q. Bone, G.O. Mackie and C.L. Singla. 1979. Epithelial conduction in salps II. The role of nervous and non-nervous conduction system interactions in the control of locomotion. *J. Exp. Biol.* 80: 241-250.
57. Mackie, G.O. 1979. Is there a conduction system in sponges? pp 145-151 in C. Levi and N. Boury-Esnault (eds.) *Biologie des Spongiaires*. CNRS Paris.
58. Mackie, G.O. 1980. Epithelium. pp 177-178. In: *Yearbook of Science and Technology*. McGraw Hill, New York.
59. Donaldson, S., G.O. Mackie and A. Roberts. 1980. Preliminary observations on escape swimming and giant neurons in Aglantha digitale (Hydromedusae: Trachylina). *Can. J. Zool.* 58: 549-552.
60. Hernandez-Nicaise, M.L., G.O. Mackie and R.W. Meech. 1980. Giant smooth muscle cells of Beroe: ultrastructure, innervation and electrical properties. *J. Gen. Physiol.* 75: 79-105.
61. Prosser, C.L. and G.O. Mackie. 1980. Contractions of holothurian muscles. *J. Comp. Physiol.* 136: 103-112.
62. Roberts, A. and G.O. Mackie. 1980. Escape swimming and "giant" neurons in a small jellyfish. *J. Exp. Biol.* 84: 303-318.
63. Mackie, G.O. 1980. Jellyfish neurobiology since Romanes. *Trends in Neuroscience.* 13-16.
64. Mackie, G.O. 1980. Slow swimming and cyclical "fishing" behavior in Aglantha digitale (Hydromedusae: Trachylina). *Can. J. Fish. Aquat. Sci.* 37: 1550-1556.

65. Mackie, G.O., R.J. Larson, K.S. Larson and L.M. Passano. 1981. Swimming and vertical migration of *Aurelia aurita* (L) in a deep tank. Mar. Behav. Physiol. 7: 321-329.
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67. Mackie, G.O. 1981. Plugged syncytial interconnections in hexactinellid sponges. J. Cell Biol. 91: 103a.
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69. Bone, Q. and Mackie, G.O. 1982. Urochordata. In: Electrical Conduction and Behaviour in 'Simple' Invertebrates (ed. G.A.B. Shelton). Clarendon Press, Oxford, pp. 473-536.
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73. Mackie, G.O., Lawn, I.D. and Pavans de Ceccatty, M. 1983. Studies on hexactinellid sponges II. Excitability, conduction and coordination of responses in *Rhabdocalyptus dawsoni* (Lambe, 1873). Phil. Trans. Roy. Soc. London. B301: 401-418.
74. Reiswig, H.M. and Mackie, G.O. 1983. Studies on hexactinellid sponges III. The taxonomic status of Hexactinellida within the Porifera. Phil. Trans. Roy. Soc. London. B301: 419-428.
75. Mackie, G.O. and Singla, C.L. 1983. Coordination of compound ascidians by epithelial conduction in the colonial blood vessels. Biol. Bull. 165: 209-220.
76. Mackie, G.O. 1984. Fast pathways and escape behavior in Cnidaria. Ch. 2, pp. 15-42 in: R.C. Eaton (ed.) Neural Basis of Startle Behavior. Plenum. New York.
77. Mackie, G.O. 1984. Introduction to the Diploblastic Level. Ch. 4, pp. 43-46 in: Biology of the Integument, Vol. 1: Invertebrates (eds. J. Bereiter-Hahn, A.G. Matoltsy and K.S. Richards), Springer-Verlag, Heidelberg. Ch. 4: pp 43-46.
78. Mackie, G.O., Anderson, P.A.V. and Singla, C.L. 1984. Apparent absence of gap junctions in two classes of cnidaria. Biol. Bull. 167: 120-123.

79. Mackie, G.O. and Stell, W.K. 1984. FMRFamide-like immunoreactivity in the neurons of medusae. *Am. Zool.* 24: 201.
80. Mackie, G.O. 1984. Submersible observations of plankton distribution in Saanich Inlet. p. 81 in Juniper, S.K. and R.O. Brinkhurst (eds.). Proceedings of a multidisciplinary symposium on Saanich Inlet, 2nd February 1983. *Can. Tech. Rep. Hydrogr. Ocean Sci.* 38: 104 pp (abstract).
81. Mackie, G.O. and Meech, R.W. 1985. Separate sodium and calcium spikes in the same axon. *Nature* 313: 791-793.
82. Kerfoot, P.A.H., Mackie, G.O., Meech, R.W., Roberts, A. and Singla, C.L., 1985. Neuromuscular transmission in the jellyfish *Aglantha digitale*. *J. Exp. Biol.* 116: 1-25.
83. Mackie, G.O. 1985. Zoology/Invertebrates In: New Canadian Encyclopedia. New Canadian Encyclopedia Publishing Ltd., Edmonton.
84. Mills, C.E., Mackie, G.O. and Singla, C.L. 1985. Giant nerve axons and escape swimming in *Amphogona apicata* with notes on other hydromedusae. *Can. J. Zool.* 63: 2221-2224.
85. Mackie, G.O. 1985. Midwater plankton of British Columbia studied by submersible PISCES IV. *J. Plankton Res.* 7: 753-777.
86. Mackie, G.O., Singla, C.L. and Stell, W.K. 1985. Distribution of nerve elements showing FMRFamide-like immunoreactivity in hydromedusae. *Acta Zoologica.* 166: 199-210.
87. Mackie, G.O. 1986. "Portuguese man-of-war" (vol. 15, p. 700) and "Sea fan" (vol. 17, p. 261) in: The World Book Encyclopedia, World Books, Inc. Chicago.
88. Mackie, G.O. 1986. From aggregates to integrates: physiological aspects of modularity in colonial animals. *Phil. Trans. Roy. Soc B.* 313: 175-196.
89. Mackie, G.O. 1986. Conduction and contraction in the tunic of a compound ascidian. *Amer. Zool.* 26: 130A.
90. Mackie, G.O. 1986. Donald Murray Ross, 1914-1986 (obituary), *Trans. Roy. Soc. Canada Ser V*, Vol. 1, 340-342.
91. Mackie, G.O. 1987. Nerve nets in G. Adelman (ed.) *Encyclopedia of Neuroscience*. Vol. II: 747-748. Reprinted 1988 in L.N. Irwin (ed.). *Comparative Neuroscience and Neurobiology*. Birkhäuser. Boston. 84-86.
92. Mackie, G.O., Pugh, P.R. and Purcell, J.E. 1987. Siphonophore Biology. *Advances in Marine Biology* 24: 97-262. Figs. 1-49.
93. Mackie, G.O. and Singla, C.L. 1987. Impulse propagation and contraction in the tunic of a compound ascidian. *Biol. Bull.* 173: 188-204.

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97. Mackie, G.O. and Marx, R.M. 1988. Phosphatic spicules in the nematocyst batteries of *Nanomia cara* (Siphonophora: Physonectae). Zoomorphology 108: 85-91.
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99. Mackie, G.O. 1989. Louis Agassiz and the discovery of the coelenterate nervous system. Hist. Philos. Life Sciences 11: 71-81.
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101. Mackie, G.O., Nielsen, C. and Singla C. 1989. The tentacle cilia of *Aglantha digitale* (Hydrozoa-Trachylina) and their control. Acta Zoologica 70: 133-141.
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